FIFTH FIVE-YEAR REVIEW REPORT FOR THE TAR CREEK SUPERFUND SITE OTTAWA COUNTY, OKLAHOMA

September 2015

Prepared By:
Oklahoma Department of Environmental Quality
Oklahoma City, Oklahoma
For U.S. Environmental Protection Agency

9679184

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FIFTH FIVE-YEAR REVIEW REPORT
Tar Creek Superfund Site
EPA ID No. OKD980629844
Ottawa County, Oklahoma

DETERMINATION

I have determined the following:

- The remedy at Operable Unit (OU) 1 is protective of human health and the environment with respect to groundwater. With respect to surface water, the remedy at OU1 does not meet applicable or relevant and appropriate requirements (ARAR), but those ARARs have been waived under 40 *Code of Federal Regulations* (CFR) § 300.430(1)(i)(C)(6).
- The remedy at OU2 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date at 2,940 residential yards and at areas frequented by children (high-access areas [HAA]) have adequately addressed in those yards and HAAs all exposure pathways that could result in unacceptable risks in these areas. There are approximately 19 residential yards that are currently scheduled to be sampled to determine if remediation will be required, and the U.S. Environmental Protection Agency (EPA) estimates that it will take one year to complete remediation if necessary for the 19 residential yards. The Oklahoma Department of Environmental Quality (ODEQ) will continue to evaluate additional residential properties and HAAs as they become known and assess the need for sampling and remediation under a Cooperative Agreement.
- The remedy at OU3 is protective of human health and the environment.
- The remedy at OU4 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks at: the smelter site; all rural residential yards; chat piles CP058, CP059, CP088, CP091, CP092, CP093, CP093-S1, CP093-S2, CP093-S3, CP093-S4, CP093-S5, CP094, CP094-S1, CP097, CP098, CP099, CP100, CP101, CP102, CP103, CP104, and CP105; at the following chat bases: CB011, CB044, CB046, CB048, CB049, CB053, CB143, CB146, CB147, CB156, CB157, CB216, CB219, CB221, CB222, CB223, CB230, CB231, CB232, CB233, CB234, CB235, CB236, CB237, CB238, CB239, CB240, CB241, CB241-S1, CB241-S2, CB242, and CB243; and the fine tailings deposit FT063. There are 83 chat piles, 213 chat

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bases, and 62 fine tailings deposits that still must be addressed; EPA estimates that it will take 30 years to complete this work.

- EPA has begun the remedial investigation and feasibility study process at OU5; it has not completed a baseline human health risk assessment or an ecological risk assessment at this date. Consequently, no protectiveness determination can be made for OU5.

Pam Phillips Acting

Carl E. Edlund, P.E.

Director, Superfund Division

U.S. Environmental Protection Agency, Region 6

9/29/15

Date

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CONCURRENCES

FIFTH FIVE-YEAR REVIEW
Tar Creek Superfund Site
EPA ID# OKD980629844

By: _____ Date: 9/23/15
Robert Sullivan, Remedial Project Manager
Superfund Remedial Branch

By: John Meyer For _____ Date: 9/23/15
Blake Atkins, Chief
LA/NM/OK Section, Superfund Remedial Branch

By: John Meyer _____ Date: 9/23/15
John Meyer, Associate Director
Superfund Remedial Branch

By: J E Costello _____ Date: 9/23/15
James E. Costello, Practice Group Leader
Superfund Branch, Office of Regional Counsel

By: _____ Date: 09/23/15
Mark Peycke, Chief
Superfund Branch, Office of Regional Counsel

By: Pam Phillips _____ Date: 9/29/15
Pam Phillips, Deputy Director
Superfund Division

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RECOMMENDATIONS TO ADDRESS CURRENT SITE ISSUES

Issue	Recommendations/Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-Up Actions: Affects Protectiveness (Y/N)	
					Current	Future
ODEQ research has found references to abandoned wells that need to be assessed to determine whether these wells should be plugged (this issue is carried over from the fourth five-year review). The OU1 record of decision (ROD) recognized that additional abandoned wells completed in the Roubidoux aquifer might be identified after completion of the OU1 remedial action (RA). The ROD stated that the need to plug additional wells would be evaluated as wells were identified. The existence of the wells, which were found by ODEQ's research in historical documents, has not been verified. Field work will be necessary to verify the existence of these wells and determine whether they are completed in the Roubidoux aquifer and in need of plugging.	ODEQ shall undertake actions to determine whether the wells that ODEQ found in the literature actually exist, and evaluate whether plugging these wells is necessary. Each well location found in the literature should be investigated, located, assessed, and, if necessary and technically feasible, plugged in accordance with the OU1 ROD. Since the last five-year review, ODEQ has plugged two wells.	ODEQ	EPA	9/30/2020	N	Y
While significant progress has been made, and 2,940 residential properties have been addressed, work remains before the OU2 RA is complete (this issue is carried over from the fourth five-year review). Residential yard remediation has been completed in the towns of Afton, Fairland, Narcissa, Peoria, Miami, Wyandotte, Picher, Quapaw, North Miami, Commerce and Cardin. The EPA continues to take calls from Ottawa County residents for residential yard remediation. The next five-year review should consider	ODEQ shall undertake remaining actions to complete the OU2 RA. Currently, EPA operates a telephone hotline for Ottawa County residents to request soil sampling. The next five-year review should consider whether OU2 can be deleted from the NPL. This deletion of OU2 from the NPL would be a partial deletion of the site.	ODEQ	EPA	9/30/2020	N	Y

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Issue	Recommendations/Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-Up Actions: Affects Protectiveness (Y/N)	
					Current	Future
whether OU2 can be deleted from the National Priorities List (NPL). This deletion of OU2 from the NPL would be a partial deletion of the site.						
An assessment of the surface water and sediment data for Tar Creek should be completed to verify if a human health or ecological threat exists (this issue is carried over from the fourth five-year review). The third and fourth five-year reviews recommended that the current surface water and sediment data for Tar Creek be evaluated to verify that no threat to human health exists in Tar Creek.	The EPA should complete the evaluation of current surface water and sediment data for Tar Creek and other site streams to verify that no unacceptable risks to human health and the environment exist in Tar Creek and the other streams. Numerous studies of the Tar Creek Superfund Site have been conducted over the past decade. These studies have collected surface water and sediment data in Tar Creek and other site streams. EPA should perform a data gap analysis to determine whether gathering additional surface water and sediment data is necessary. If EPA finds that additional surface water and sediment data are needed, then it should collect enough additional data to determine whether there are risks to human health and the environment associated with exposure to surface water and sediments in streams of the Tar Creek Superfund Site.	EPA	EPA	9/30/2020	N	Y
The soil cover at the Hockerville subsidence area is settling, has been vandalized, and is in need of repair. The Hockerville subsidence area was filled with construction and demolition debris in 2012. During the site inspection, which was part of this five-year review, the soil cover was found to have visible damage that was due to general settling of the cap, and also due to vandalism in the form of tire tracks made by all-terrain vehicles.	ODEQ should repair the cover at the Hockerville subsidence area. Additional soil should be added to repair the soil cover, and the cover grade should be re-established. EPA cooperative agreements with ODEQ and the Quapaw Tribe include repository operations and maintenance.	ODEQ	EPA	9/30/2017	N	N

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Issue	Recommendations/Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-Up Actions: Affects Protectiveness (Y/N)	
					Current	Future
The Central Mill Repository, which was constructed to handle OU4-related source material, requires general maintenance. Engineering options for preventing water from seeps at the Central Mill Repository from entering Tar Creek should be evaluated.	ODEQ and the Quapaw Tribe should conduct general maintenance at the Central Mill Repository. EPA cooperative agreements with ODEQ and the Quapaw Tribe include repository operations and maintenance. The Central Mill Repository has received source material from distal properties as part of the OU4 RA since 2010; it is at approximately 20% capacity.	ODEQ/Quapaw Tribe	EPA	9/30/2017	N	N
ODEQ should evaluate the need to continue the groundwater monitoring program under state funded OU1 operations and maintenance (O&M). EPA intends to work toward completing RA activities at OU1 after well plugging is complete.	ODEQ should complete an evaluation of the need to continue the groundwater monitoring program under state-funded OU1 O&M, and revise the O&M plan if necessary.	ODEQ	ODEQ	9/30/2020	N	N
EPA has begun the OU4 soil amendment pilot studies based on the recommendation of the September 2014 RAO report.	EPA will develop the short and long term performance standards and metrics to measure and determine protectiveness.	EPA	EPA	9/30/2020	N	N

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LIST OF ABBREVIATIONS

µg/dL	micrograms per deciliter
µg/L	micrograms per liter
AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
ATSDR	United States Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
BC	background concentration
BERA	baseline ecological risk assessment
BHHRA	baseline human health risk assessment
BIA	United States Bureau of Indian Affairs
BMP	best management practice
CAA	Clean Air Act
CDC	Centers for Disease Control
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	*Code of Federal Regulations*
CMFTP	Central Mill Fine Tailings Pond
CMR	Central Mill Repository
COC	contaminant of concern
COPC	contaminant of potential concern
CY	cubic yard
CWA	Clean Water Act
DOI	United States Department of the Interior
EPA	United States Environmental Protection Agency
ERCS	Emergency Response Cleanup Services
ESD	Explanation of Significant Differences
FS	feasibility study
FTPS	fine tailings pilot study
HAA	high-access area
HI	hazard index
IAG	Inter-Agency Agreement
IC	institutional control
ITEC	Inter-Tribal Environmental Council
KDHE	Kansas Department of Health and Environment
LEAD	Local Environmental Action Demanded
LICRAT	Lead Impacted Communities Relocation Assistance Trust
LTM	long-term monitoring
MCL	maximum contaminant level
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MK	Morrison Knudson Corporation
MRTPS	Mayer Ranch Passive Treatment System
MW	monitor well
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
OAC	Oklahoma Administrative Code
OCHD	Ottawa County Health Department

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O&M	operations and maintenance
OCLPP	Oklahoma Childhood Lead Poisoning Prevention Program
ODEQ	Oklahoma Department of Environmental Quality
OSDH	Oklahoma State Department of Health
OSRTI	Office of Superfund Remediation and Technology Innovation
OSWER	Office of Solid Waste and Emergency Response
OU	operable unit
OWQS	Oklahoma Water Quality Standard
OWRB	Oklahoma Water Resources Board
ppm	part per million
PPP	pollution prevention plan
PRP	potentially responsible parties
QAPP	quality assurance project plan
QTEO	Quapaw Tribe Environmental Office
QTO	Quapaw Tribe of Oklahoma
QSA	Quapaw Service Authority
RA	remedial action
RAO	remedial action objective
RAR	remedial action report
RD	remedial design
RfC	reference concentration
RI	remedial investigation
RSL	Regional Screening Level
ROD	record of decision
RSKERL	Robert S. Kerr Environmental Research Laboratory
RWD	Rural Water District
SARA	Superfund Amendments and Reauthorization Act
SCPTS	Southeast Commerce Passive Treatment System
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Officer
SI	site inspection
SLERA	Screening Level Ecological Risk Assessment
SMCL	secondary maximum contaminant level
START	Superfund Technical Assessment and Response Team
TBC	"To Be Considered" standards
TCAAM2	Tar Creek After Action Monitoring Part 2
TDS	total dissolved solids
TL	tolerance limit
TRA	Treece Relocation Assistance
TSMD	Tri-State Mining District
TZ	transition zone
UIC	underground injection control
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WIC	U.S. Department of Agriculture's Women, Infant, and Children Program

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EXECUTIVE SUMMARY

Under the statutory requirements of Section 121(c) of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 United States Code (U.S.C.) § 9621(c), as amended by the Superfund Amendments and Reauthorization Act (SARA), P. L. 99-499, and under the implementing regulatory provisions of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 *Code of Federal Regulations* (CFR) § 300.430(f)(4)(ii), five-year reviews are required for sites where hazardous substances remain on-site above levels that allow for unrestricted use and unrestricted exposure. In addition, United States Environmental Protection Agency (EPA) policy, as stated in the current five-year review guidance, provides that five-year reviews will be conducted at sites where a pre-SARA remedial action (RA) leaves hazardous substances on-site above concentration levels that allow for unrestricted use and unrestricted exposure. EPA policy also provides that five-year reviews will be conducted at pre- or post-SARA sites where the RA, once completed, will not leave hazardous substances on-site above concentration levels that allow for unrestricted use and unrestricted exposure but will require more than five years to complete. Previous five-year reviews of the site were performed as a matter of EPA policy, because the record of decision (ROD) for Operable Unit (OU) 1 was signed prior to the enactment of SARA, and the OU2 ROD stated that five-year reviews were not required. An Explanation of Significant Difference (ESD) to the OU2 ROD was signed in August 2007 requiring a five-year review of the OU2 remedy; subsequent five-year reviews of OU2 are, therefore, required by statute. The OU4 ROD was signed in February 2008. An ESD, explaining significant changes to the OU4 ROD, was signed in April 2010. The ESD explained that EPA was adding the residents of Treece, Kansas to the voluntary relocation of site residents described in the ROD. The first five-year review of the response actions for the site was completed in April 1994, the second five-year review was completed in April 2000, the third five-year review was completed in September 2005, and the fourth five-year review was completed in September 2010.

Pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9621(c), the fifth five-year review of the remedy in place at the Tar Creek Superfund Site ("site") located in Ottawa County, Oklahoma, and Treece, Kansas, was completed in September 2015. The results of the five-year review indicate that the response actions completed to date are currently protective of human health and the environment in the short term. Except as noted in previous five-year reviews regarding the ineffectiveness of the OU1 remedy designed to decrease mine water discharges to Tar Creek, the remedial response actions that have been performed appear to be functioning as designed, and the site has been maintained appropriately. No deficiencies were noted that impact the immediate protectiveness of the remedy, although several issues were identified that require further action to ensure the continued protectiveness of the remedy.

As a result of the complex nature of contamination associated with the site, remediation has been handled through various removal response actions and RAs. Five OUs have been designated at the site. The five OUs include: 1) OU1 (surface water/groundwater); 2) OU2 (residential properties and high-access areas [HAA]); 3) OU3 (Eagle-Picher Office Complex – abandoned mining chemicals); 4) OU4 (chat piles, other mine and mill waste, and smelter waste); and 5) OU5 (sediment and surface water).

During the fifth five-year review period, operation and maintenance (O&M) and groundwater monitoring activities continued at the site. Through the RA defined by the ROD for OU1, dikes

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and diversion channels were constructed at three abandoned mine openings (identified as Muncie, Big John, and Admiralty) to prevent the inflow of surface water into the abandoned mine workings. The Oklahoma Department of Environmental Quality (ODEQ) has developed an updated O&M plan for the Admiralty site. The O&M plan covers annual inspections of the dikes and diversion channels, abnormal occurrence response plans, performance standards, and annual cost estimates of O&M. The mining was conducted in the Boone aquifer, which is contaminated with hazardous substances including lead, cadmium, and zinc. To get to the drinking water in the Roubidoux aquifer, which underlies the Boone, wells must pass through the Boone. The lack of integrity in the casings of certain abandoned wells completed in the Roubidoux aquifer may enable contaminants from the overlying Boone aquifer to migrate into the Roubidoux; consequently, the OU1 ROD calls for these wells to be plugged. EPA and ODEQ are plugging these wells to stop the migration of contamination to the Roubidoux.

The ODEQ, in cooperation with the EPA, continued to evaluate the plugging of abandoned wells through the Roubidoux groundwater monitoring program for OU1. The Roubidoux groundwater monitoring program was implemented to: determine whether the well plugging actions were effective at preventing contamination of the Roubidoux aquifer, and evaluate trends in water quality of the Roubidoux aquifer. The Roubidoux aquifer has been monitored for 21 years, and neither the EPA nor ODEQ have identified any public drinking water wells at the site that fail to meet the maximum contaminant levels (MCL) established under the Safe Drinking Water Act. However, data show that secondary (aesthetically based) maximum contaminant levels (SMCL) for the indicator parameters (sulfate and iron) were exceeded in four wells completed in the Roubidoux, indicating that there may be potential mine water impacts to the Roubidoux aquifer from the contaminated portion of the overlying Boone aquifer at these four wells (ODEQ, 2014).The drinking water supplied from the Roubidoux aquifer continues to meet the health-based primary drinking water standards (MCLs), and it is still considered safe as a drinking water supply.

In addition, the Mayer Ranch passive treatment system (MRPTS) has been successful in treating mine water discharges to Tar Creek, located in southeast Commerce. The ODEQ is partnering with the University of Oklahoma under an EPA grant to construct an additional passive treatment system to treat mine water discharges to the Tar Creek up-gradient of the MRPTS. Treating mine water discharge via passive treatment appears to be economically feasible. The fourth five-year review stated that passive treatment would be evaluated to determine its effectiveness at reducing the risks posed by mine water discharge at the site; it also stated that the fund balancing applicable or relevant and appropriate requirements (ARAR) waiver included in the OU1 ROD may no longer be valid and should be reevaluated. EPA is working toward completion of the RA for OU1. It will be appropriate for O&M to begin once the requirements of the NCP at 40 CFR 300.435(f) are met. ODEQ is evaluating options for continuing the Roubidoux groundwater monitoring program established under the OU1 ROD.

OU2 addresses residential yard and HAA contamination. OU2 remediation has been completed in Afton, Cardin, Commerce, Fairland, Miami, Narcissa, North Miami, Peoria, Picher, Quapaw, and Wyandotte. OU2 was addressed through two removal response actions and a RA. Through the removal response actions and RA, contaminated soils at 2,940 residential properties and HAAs have been remediated to the goal of 500 parts per million (ppm) for lead. The excavated soil was disposed of at permanent on-site repositories. In addition, the Oklahoma Childhood Lead Poisoning Prevention Program (OCLPPP), which is carried out by the Ottawa County Health Department in conjunction with the Oklahoma State Department of Health, has provided

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childhood lead poisoning prevention education through community and tribal health fairs, Head Start and child care programs, and community organizations and events. The OU2 RA activities and the OCLPPP have worked together to create significant reductions in blood lead levels of children in Tar Creek and Ottawa County. In an April 2015 cooperative agreement, EPA and DEQ agreed that DEQ would undertake the OU2 RA, as described in the OU2 ROD, at the remaining OU2 properties. In September 2014, EPA held an OU2 milestone cleanup event, recognizing the reduction of blood lead levels in Ottawa County children.

OU3 involved a removal response action undertaken to clean up abandoned laboratory chemicals at the former Eagle-Picher Office Complex, located in Cardin, Oklahoma. This removal resulted in the disposal of 120 containers of laboratory chemicals. EPA determined that no further action was necessary to address OU3.

The OU4 ROD was signed in February 2008. OU4 addresses the generally undeveloped rural and urban areas of the site where mine and mill residues and smelter wastes have been placed, deposited, stored, disposed of, or otherwise come to be located as a result of mining, milling, smelting, or related operations. Under the OU4 ROD, the residents of the on-site towns of Picher, Cardin, and Hockerville were relocated because the areas have high concentrations of source materials (that is, the mill tailings known as chat and fines). As explained in a 2010 ESD, EPA expanded the relocation effort to include the residents of Treece, Kansas. EPA funded the Lead Impacted Communities Relocation Assistance Trust (LICRAT), through ODEQ. LICRAT purchased the Ottawa County properties at issue, and carried out the relocation effort with minimal EPA oversight. A similar trust, the Treece Relocation Assistance (TRA) was established in Kansas to address the Treece relocation. The LICRAT buyout began in 2009 and was completed in 2011. The Treece buyout was completed in 2012. A total of 628 residences, 74 businesses, and 125 renters were relocated from the impacted areas in Picher, Cardin, Hockerville, and Treece. The other OU4 RA activities began in 2009 and are ongoing. OU4 RA activities include the remediation of rural residential yards not included in OU2 RA, remediation of a former lead smelter, removal and disposal of chat piles and chat bases in distal areas, the construction of the Central Mill Repository from a former fine tailings pond, and a fine injection pilot study. Additionally, subsidence areas are being used as repositories for the permanent disposal of chat. Chat sales and reuse are also part of the OU4 selected remedy and are ongoing at the site. EPA has begun a pilot project whereby, in lieu of extensive excavation of contaminated soils, EPA is adding soil amendments high in phosphates to bind metals in soil, making them less bioavailable. This pilot project will inform EPA as to whether to continue excavation of contaminated transition zone (TZ) soil. It is hoped that more topsoil may be preserved by adding phosphate-containing soil amendments. In addition to preserving topsoil, an objective of the pilot study is to reduce metals bioavailability to acceptable levels while decreasing the volume of TZ soils being excavated and disposed at the Central Mill Repository (EPA, 2014d).

To date, as part of OU4, approximately 53 chat piles, chat bases, and fine tailings ponds (totaling approximately 1.6 million tons of chat, TZ soils, and fine tailings) have been remediated and 309,787 tons of chat have been sold (section 4.1, RA Performance). OU4 RA is ongoing.

A screening-level ecological risk assessment (SLERA) has been completed at the site. The SLERA documents that site contaminants in surface water, sediments, pore water, and soils within riparian and aquatic habitats pose a potential risk to ecological receptors at the site. The

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SLERA also suggests cleanup goals for lead, cadmium, and zinc in site sediments. EPA is presently conducting a remedial investigation (RI) for OU5. No OU5 remedy has been selected.

For the fifth five-year review, a data review, a site inspection, interviews, and technology assessment have been performed. Based on the findings from these activities, it appears the remedies are functioning in a manner that is consistent with the decision documents. To ensure continued protectiveness, seven issues are identified, as described in the following paragraphs. These are:

1. ODEQ research has found references to abandoned wells that need to be assessed to determine whether these wells should be plugged (this issue is carried over from the fourth five-year review). The OU1 ROD recognized that additional abandoned wells completed in the Roubidoux aquifer might be identified after completion of the OU1 RA. The ROD stated that the need to plug additional wells would be evaluated as wells were identified. The existence of the wells, which were found by ODEQ's research in historical documents, has not been verified. Field work will be necessary to verify the existence of these wells and determine whether they are completed in the Roubidoux aquifer and in need of plugging.
2. While significant progress has been made, and 2,940 residential properties have been addressed, work remains before the OU2 RA is complete (this issue is carried over from the fourth five-year review). Residential yard remediation has been completed in the towns of Afton, Fairland, Narcissa, Peoria, Miami, Wyandotte, Picher, Quapaw, North Miami, Commerce, and Cardin. The EPA continues to take calls from Ottawa County residents for residential yard remediation. The next five-year review should consider whether OU2 can be deleted from the National Priorities List (NPL). This deletion of OU2 from the NPL would be a partial deletion of the site.
3. An assessment of the surface water and sediment data for Tar Creek should be completed to verify if a human health or ecological threat exists (this issue is carried over from the fourth five-year review). The third and fourth five-year reviews recommended that the current surface water and sediment data for Tar Creek be evaluated to verify that no threat to human health exists in Tar Creek.
4. The soil cover at the Hockerville subsidence area is settling, has been vandalized, and is in need of repair. The Hockerville subsidence area was filled with construction and demolition debris in 2012. During the site inspection, which was part of this five-year review, the soil cover was found to have visible damage resulting from general settling of the cap, and also due to vandalism in the form of tire tracks made by all-terrain vehicles.
5. The Central Mill Repository, which was constructed to handle OU4-related source material, requires general maintenance. Engineering options for preventing water from seeps from entering Tar Creek should be evaluated.
6. ODEQ should evaluate the need to continue the groundwater monitoring program under state-funded OU1 O&M. EPA intends to work toward completing RA activities at OU1 after well plugging is complete.
7. EPA has begun the OU4 soil amendment pilot studies based on the recommendation of the September 2014 RAO report.

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To address the issues identified during the fifth five-year review, the following recommendations and follow-up actions have been identified for the site.

1. ODEQ shall undertake actions to determine whether the wells that ODEQ found in the literature actually exist, and evaluate whether plugging these wells is necessary. Each well location that ODEQ found in the literature should be investigated, located, assessed, and, if necessary and technically feasible, plugged in accordance with the OU1 ROD. Since the last five-year review, ODEQ has plugged two wells.
2. ODEQ shall undertake remaining actions to complete the OU2 RA. Currently, EPA operates a telephone hotline for Ottawa County residents to request soil sampling. The next five-year review should consider whether OU2 can be deleted from the NPL. This deletion of OU2 from the NPL would be a partial deletion of the site.
3. The EPA should complete the evaluation of current surface water and sediment data for Tar Creek and other site streams to verify that no unacceptable risks to human health and the environment exist in Tar Creek and the other streams. Numerous studies of the Tar Creek Superfund Site have been conducted over the past decade. These studies have collected surface water and sediment data in Tar Creek and other site streams. EPA should perform a data gap analysis to determine whether gathering additional surface water and sediment data is necessary. If EPA finds that additional surface water and sediment data are needed, then it should collect enough additional data to determine whether there are risks to human health and the environment associated with exposure to surface water and sediments in streams of the Tar Creek Superfund Site.
4. ODEQ should repair the cover at the Hockerville subsidence area. Additional soil should be added to repair the soil cover, and the cover grade should be re-established. EPA cooperative agreements with ODEQ and the Quapaw Tribe include repository O&M.
5. ODEQ and the Quapaw Tribe should conduct general maintenance at the Central Mill Repository. EPA cooperative agreements with ODEQ and the Quapaw Tribe include repository O&M. The Central Mill Repository has received source material from distal properties as part of the OU4 RA since 2010; it is at approximately 20 percent capacity.
6. ODEQ should complete an evaluation of the need to continue the groundwater monitoring program under state funded OU1 O&M and revise the O&M plan if necessary.
7. EPA will develop the short and long term performance standards and metrics to measure and determine protectiveness.

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Government Performance and Results Act Measures Review

As part of this five-year review, the Government Performance and Results Act Measures have also been reviewed. The measures and their status are as follows:

Environmental Indicators
Human Health: Long-term human health protection has not been achieved. Blood lead levels of Ottawa County children have been significantly reduced from approximately 35 percent to 3.7 percent above the new CDC blood lead reference level of 5 μg/dL.
Groundwater Migration: Groundwater migration is not under control. There is currently not sufficient data to make a determination.

Sitewide Ready for Anticipated Use
The site has not achieved Sitewide Ready for Anticipated Use status.

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FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Tar Creek Superfund Site		
EPA ID: OKD980629844		
Region: 6	**State:** OK	**City/County:** Ottawa County
SITE STATUS		
NPL Status: Final		
Remediation status: Under Construction; Operating		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes The OU1 dikes were completed in Dec. 1986	
Has site been put into reuse? Yes (partially)		
REVIEW STATUS		
Lead agency: State **If "Other Federal Agency" selected above, enter Agency name:** Click here to enter text.		
Author name: Oklahoma Department of Environmental Quality		
Review period: 9/2010 – 9/2015		
Date of site inspection: 1/14-16/2015		
Type of review: Statutory		
Review number: 5		
Triggering action: Other: Previous Five-Year Review Report		
Triggering action date (from WasteLAN): 9/29/2010 (date fourth five-year review report was signed)		
Due date *(five years after triggering action date)*: 9/29/2015		

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Issues/Recommendations

OU(s) without Issues/Recommendations Identified in the Five-Year Review:
OU3

Issues and Recommendations Identified in the Five-Year Review:

OU(s): OU1	Issue Category: Remedy Performance			
	Issue: ODEQ research has found references to abandoned wells that need to be assessed to determine whether these wells should be plugged (this issue is carried over from the fourth five-year review). The OU1 ROD recognized that additional abandoned wells completed in the Roubidoux aquifer might be identified after completion of the OU1 RA. The ROD stated that the need to plug additional wells would be evaluated as wells were identified. The existence of the wells, which were found by ODEQ's research in historical documents, has not been verified. Field work will be necessary to verify the existence of these wells and determine whether they are completed in the Roubidoux aquifer and are in need of plugging.			
	Recommendation: ODEQ shall undertake actions to determine whether the wells found in the literature actually exist, and evaluate whether plugging these wells is necessary. Each well location found in the literature should be investigated, located, assessed, and, if necessary and technically feasible, plugged in accordance with the OU1 ROD. Since the last five-year review, ODEQ has plugged two wells.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2020

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OU(s): OU2	Issue Category: Remedy Performance			
	Issue: While significant progress has been made, and 2,940 residential properties have been addressed, work remains before the OU2 RA is complete (this issue is carried over from the fourth five-year review). Residential yard remediation has been completed in the towns of Afton, Fairland, Narcissa, Peoria, Miami, Wyandotte, Picher, Quapaw, North Miami, Commerce, and Cardin. The EPA continues to take calls from Ottawa County residents for residential yard remediation. The next five-year review should consider whether OU2 can be deleted from the National Priorities List (NPL). This deletion of OU2 from the NPL would be a partial deletion of the site.			
	Recommendation: ODEQ shall undertake remaining actions to complete the OU2 RA. Currently, EPA operates a telephone hotline for Ottawa County residents to request soil sampling. The next five-year review should consider whether OU2 can be deleted from the NPL. This deletion of OU2 from the NPL would be a partial deletion of the site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2020

OU(s): OU1/OU5	Issue Category: Changed Site Conditions			
	Issue: An assessment of the surface water and sediment data for Tar Creek should be completed to verify if a human health or ecological threat exists (this issue is carried over from the fourth five-year review). The third and fourth five-year reviews recommended that the current surface water and sediment data for Tar Creek be evaluated to verify that no threat to human health exists in Tar Creek.			
	Recommendation: The EPA should complete the evaluation of current surface water and sediment data for Tar Creek and other site streams to verify that no unacceptable risks to human health and the environment exist in Tar Creek and the other streams. Numerous studies of the Tar Creek Superfund Site have been conducted over the past decade. These studies have collected surface water and sediment data in Tar Creek and other site streams. EPA should perform a data gap analysis to determine whether gathering additional surface water and sediment data is necessary. If EPA finds that additional surface water and sediment data are needed, then it should collect enough additional data to determine whether there are risks to human health and the environment associated with exposure to surface water and sediments in streams of the Tar Creek Superfund Site.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	9/30/2020

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OU(s): OU4	Issue Category: Operations and Maintenance			
	Issue: The soil cover at the Hockerville subsidence area is settling, has been vandalized, and is in need of repair. The Hockerville subsidence area was filled with construction and demolition debris in 2012. During the site inspection, which was part of this five-year review, the soil cover was found to have visible damage that was due to general settling of the cap, and also due to vandalism in the form of tire tracks made by all-terrain vehicles.			
	Recommendation: ODEQ should repair the cover at the Hockerville subsidence area. Additional soil should be added to repair the soil cover and the cover grade should be re-established. EPA cooperative agreements with ODEQ and the Quapaw Tribe include repository operations and maintenance.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	State	EPA	9/30/2017

OU(s): OU4	Issue Category: Operations and Maintenance			
	Issue: The Central Mill Repository, which was constructed to handle OU4 related source material, requires general maintenance. Engineering options for preventing water from seeps from entering Tar Creek should be evaluated.			
	Recommendation: ODEQ and the Quapaw Tribe should conduct general maintenance at the Central Mill Repository. EPA cooperative agreements with ODEQ and the Quapaw Tribe include repository O&M. The Central Mill Repository has received source material from distal properties as part of the OU4 RA since 2010; it is at approximately 20% capacity.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	Yes	State	EPA	9/30/2017

OU(s): OU1	Issue Category: Monitoring			
	Issue: ODEQ should evaluate the need to continue the groundwater monitoring program under state funded OU1 O&M. EPA intends to work toward completing RA activities at OU1 after well plugging is complete.			
	Recommendation: ODEQ should complete an evaluation of the need to continue the groundwater monitoring program under state-funded OU1 O&M and revise the O&M plan if necessary.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	State	State	9/30/2020

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OU(s): OU4	Issue Category: Remedy Performance			
	Issue: EPA has begun the OU4 soil amendment pilot studies based on the recommendation of the September 2014 RAO report.			
	Recommendation: EPA will develop short and long term performance standards and metrics to measure and determine protectiveness.			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Implementing Party**	**Oversight Party**	**Milestone Date**
No	No	EPA	EPA	9/30/2020

Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	*Addendum Due Date (if applicable):* *Not applicable*

Protectiveness Statement:

- The remedy at OU1 is protective of human health and the environment with respect to groundwater. With respect to surface water, the remedy at OU1 does not meet ARARs, but those ARARs have been waived under 40 CFR § 300.430(1)(i)(C)(6).
- The remedy at OU2 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date at residential yards and at areas frequented by children (HAAs) have adequately addressed all exposure pathways that could result in unacceptable risks in these areas. There are approximately 19 residential yards that are currently scheduled to be sampled to determine if remediation will be required; EPA estimates that it will take one year to complete remediation if necessary for the residential yards. ODEQ will continue to evaluate additional residential properties and HAAs as they become known, and will assess the need for sampling and remediation under a cooperative agreement.
- The remedy at OU3 is protective of human health and the environment.
- The remedy at OU4 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks at: the smelter site, all rural residential yards, chat piles CP058, CP059, CP088, CP091, CP092, CP093, CP093-S1, CP093-S2, CP093-S3, CP093-S4, CP093-S5, CP094, CP094-S1, CP097, CP098, CP099, CP100, CP101, CP102, CP103, CP104, and CP105; at the following chat bases: CB011, CB044, CB046, CB048, CB049, CB053, CB143, CB146, CB147, CB156, CB157, CB216, CB219, CB221, CB222, CB223, CB230, CB231, CB232, CB233, CB234, CB235, CB236, CB237, CB238, CB239, CB240, CB241, CB241-S1, CB241-S2, CB242, and CB243; and the fine tailings deposit FT063. There are 83 chat piles, 213 chat bases, and 62 fine tailings deposits that still must be addressed; EPA estimates that it will take 30 years to complete this work.
- EPA has begun the remedial investigation and feasibility study process at OU5 and has not completed a baseline human health risk assessment or an ecological risk assessment at this date; consequently, no protectiveness determination can be made.

Well plugging called for in the selected OU1 remedy addressed the primary route of potential human exposure by protecting the Roubidoux aquifer, and, in this way, preventing the possibility that

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hazardous substances would be ingested in drinking water drawn from the Roubidoux. EPA/ODEQ has plugged and abandoned 85 wells as part of the OU1 remedy. Sampling data indicate that the Roubidoux aquifer continues to meet all health-based primary drinking water standards. Exceedances of secondary drinking water standards for iron and sulfate at four wells have been identified. Secondary drinking water standards are aesthetically based values. The previous five-year review established that some of the exposure assumptions and the potential risks posed to human health and the environment for surface water and sediments at the site that were described in the OU1 ROD are no longer valid (EPA, 2010c). Fish tissue data collected by ODEQ demonstrate that risks to human health exist through consumption of fish caught from Tar Creek, the Spring and Neosho Rivers, and Grand Lake (DEQ, 2008b). Metals contained within site sediments are biologically available and pose risks to ecological receptors (MacDonald, 2009). In Tar Creek, Lytle Creek, and Elm Creek at the Tar Creek Site, EPA found that cadmium, lead, and zinc concentrations in surface water samples exceed the OWQS chronic toxicity standard; zinc concentrations also exceed the acute toxicity standard. With the exceptions noted above for OU1, the Roubidoux groundwater monitoring program, and O&M activities for the Tar Creek Superfund Site are all protective for the short and long term.

The remedy at OU2 is expected to be protective of human health and the environment in all areas where remediation has been completed. Over 2,940 properties have been remediated during the OU2 RA and during the removal actions that preceded the RA. Remaining properties in need of remediation are being evaluated. The RA for OU2 is ongoing and is scheduled to be completed by the next five-year review. Human health and the environment are being protected by the remedy for OU2.

The action implemented during the removal action for OU3 is protective of human health and the environment. The laboratory chemicals left at the former Eagle-Picher Office Complex were removed from the site and properly disposed.

The RA for OU4 is currently ongoing. The remedy at OU4 is expected to be protective of human health and the environment upon completion. In the interim, exposure pathways that could result in unacceptable risks are being controlled. The LICRAT voluntary relocation in Picher, Cardin, and Hockerville, Oklahoma, was completed in 2011. The voluntary relocation in Treece, Kansas, was completed in 2012, under a Kansas trust—the Treece Relocation Assistance (TRA). Chat sales continue at the site. Appendix H of the OWQS 785 OAC 45 was amended to limit the use of groundwater from the Boone aquifer. RAs on three rural residential properties, a smelter site, and multiple distal groups (which include chat piles and chat bases) have been completed. EPA has begun a pilot project whereby, in lieu of extensive excavation of contaminated soils, EPA is adding soil amendments that are high in phosphates to bind metals in soil, making them less bioavailable. This pilot project will inform EPA as to whether to continue excavation of contaminated TZ soil. It is hoped that more topsoil may be preserved by adding phosphate-containing soil amendments. In addition to preserving topsoil, an objective of the pilot study is to reduce metals bioavailability to acceptable levels while decreasing the volume of TZ soils being excavated and disposed at the Central Mill Repository (EPA, 2014d).

EPA is presently conducting a RI for OU5. No OU5 remedy has been selected.

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Fifth Five-Year Review Report
for
Tar Creek Superfund Site

The United States Environmental Protection Agency (EPA) has conducted the fifth five-year review of the remedial actions (RA) being implemented at the Tar Creek Superfund Site (site), for the period between September 2010 (when the fourth five-year review was completed) to September 2015. The purpose of a five-year review is to evaluate the implementation and performance of a remedy in order to determine if the remedy is or will be protective of human health and the environment. Protectiveness is generally defined in the National Contingency Plan (NCP) by the risk range and the hazard index (HI). Evaluation of the remedy and the determination of protectiveness should be based on and sufficiently supported by data and observations. This fifth five-year review report documents the results of the review for the site, conducted in accordance with the EPA guidance on five-year reviews. EPA guidance on conducting five-year reviews is provided by the Office of Solid Waste and Emergency Response (OSWER) Directive 9355.7-03B-P, *Comprehensive Five-Year Review Guidance* (EPA, 2001).

The site is primarily located in Ottawa County, Oklahoma, in the far northeastern corner of the state (*see* Figure 1). It consists of five Operable Units (OU): OU1 (surface water/groundwater); OU2 (residential properties and high-access areas [HAA]); OU3 (Eagle-Picher Office Complex – abandoned mining chemicals); OU4 (chat piles, other mine and mill waste, and smelter waste); and OU5 (sediment and surface water). As explained in an Explanation of Significant Differences (ESD) issued by EPA in April 2010, OU4 was expanded to include Treece, Kansas. The ESD explains that, consistent with the OU4 record of decision (ROD), EPA decided to complete a voluntary relocation of residents in Treece, Kansas as part of the OU4 RA (EPA, 2010a).

1.0 Introduction

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 United States Code (USC) § 9601 *et seq.* and the NCP, 40 *Code of Federal Regulations* (CFR) 300 *et seq.*, call for five-year reviews of certain CERCLA RAs. The statutory requirement to conduct a five-year review was added to CERCLA as part of the Superfund Amendments and Reauthorization Act of 1986 (SARA), P.L. 99-499. EPA may also conduct five-year reviews as a matter of policy for sites not addressed specifically by the statutory requirement. EPA classifies each five-year review as either "statutory" or "policy" depending on whether it is being required by statute or is being conducted as a matter of policy. The fifth five-year review for the site is a statutory review.

As specified by CERCLA and the NCP, statutory reviews are required for sites where, after RAs are complete, hazardous substances, pollutants, or contaminants will remain on site at levels that will not allow for unrestricted use or unrestricted exposure. Statutory reviews are required for such sites if the ROD was signed on or after the effective date of SARA. CERCLA § 121(c), as amended, 42 USC § 9621(c), states:

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> If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The implementing provisions of the NCP, as set forth in the CFR, state at 40 CFR § 300.430(f)(4)(ii):

> If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

Five-year reviews generally should be conducted as a matter of policy for the following types of actions:

- A pre- or post-SARA remedial action that, upon completion, will not leave hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure, but requires five years or more to complete;
- A pre-SARA remedial action that leaves hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure; or
- A removal-only site on the National Priorities List (NPL) where a removal action leaves hazardous substances, pollutants, or contaminants on site above levels that allow for unlimited use and unrestricted exposure and where no remedial action has or will take place (EPA, 2001).

This fifth five-year review for the site is required by statute. EPA signed an ESD for the OU2 ROD in August 2007 that requires a statutory five-year review of the OU2 remedy (EPA, 2007). The OU4 ROD, signed in February 2007, explicitly states that a statutory review will be conducted. Previous five-year reviews for the site were conducted as a matter of EPA policy because the ROD for OU1 was signed prior to the effective date of SARA, and the original OU2 ROD stipulated that a five-year review was not required. Although RODs for OU3 and OU5 have not been completed, actions associated with OU3 and OU5 are also described in this five-year review report as components of the site.

This is the fifth five-year review for the site. The first five-year review was completed in April 1994; the second five-year review was completed in April 2000; the third five-year review was completed in September 2005; and the fourth five-year review was completed in September 2010. The triggering action for this statutory review is the signed date of the fourth five-year review report, which was September 29, 2010.

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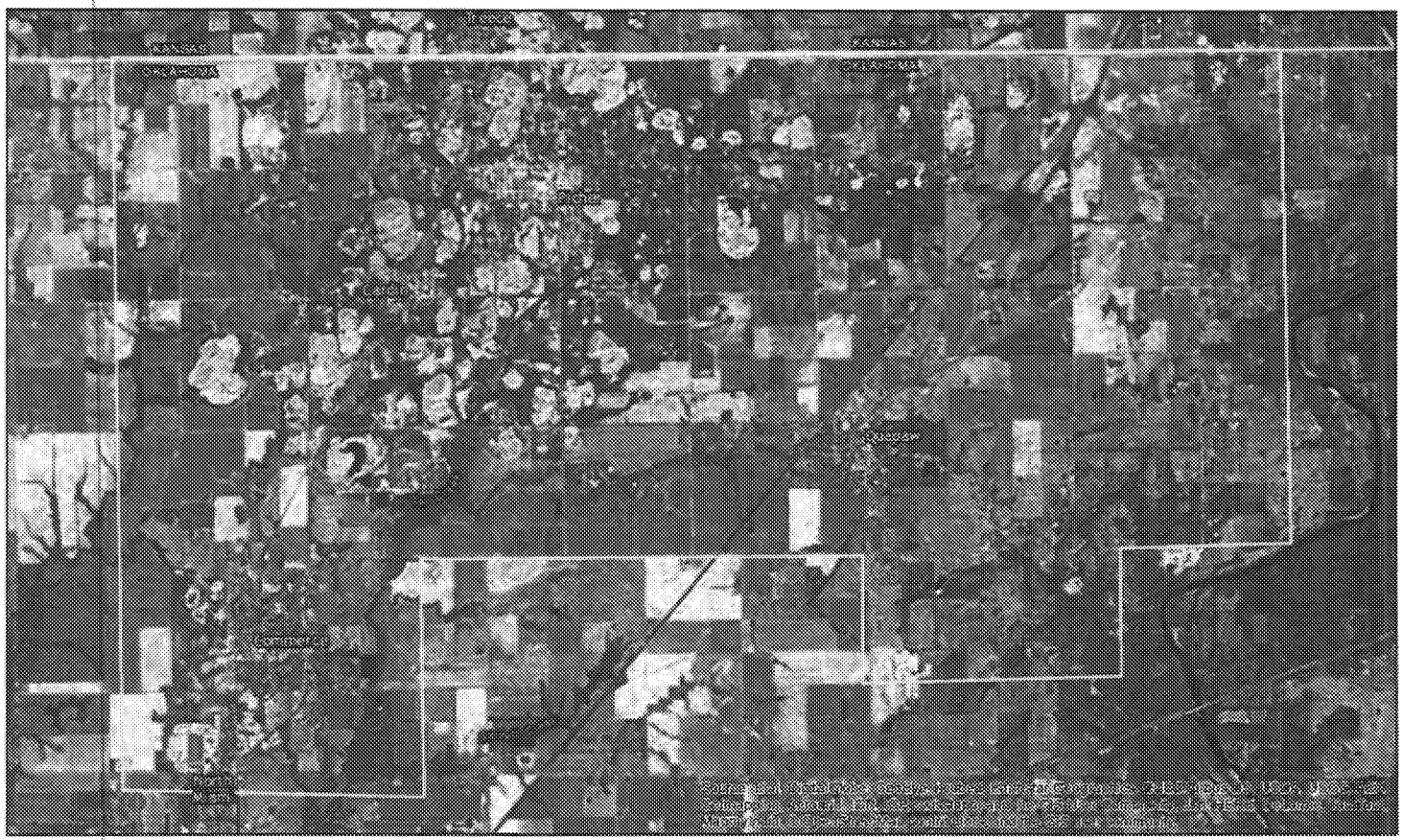
Figure 1 Tar Creek Superfund Site Boundary



We make every effort to provide and maintain accurate, complete, usable, and timely information. However, some data and information on this map may be preliminary or out of date and is provided with the understanding that it is not guaranteed to be correct or complete. Conclusions drawn from, or actions undertaken on the basis of, such data and information are the sole responsibility of the user.

DEQ
OKLAHOMA
Department of Environmental Quality

Legend
Superfund Area

Figure 1:
Tar Creek Superfund
Site Boundary

N
W E
S

Map Created by Brent Stone
on 5/12/2015

0 1 2 4 Miles

2.0 Progress Since the Last Five-Year Review

The fourth five-year review of the site was completed in September 2010. The fourth five-year review report concluded that the RAs implemented at the site were protective of human health and the environment. The fourth five-year review report stated that for OU1, the Roubidoux aquifer continued to meet all health-based primary drinking water standards and is still considered safe for use as a drinking water supply, but noted that the data collected through the sampling program indicated that the Roubidoux aquifer is impacted locally by acid mine water from the Boone aquifer. In addition, the report stated that wells identified as being completed through the Boone into the Roubidoux need to be plugged. The report also said that the operations and maintenance (O&M) plan for the diversion and diking at the Admiralty Mine Site needed to be updated (EPA, 2010c).

For OU2, the fourth Five-Year Review Report stated that the OU2 remedy being implemented is protective of human health and the environment in the remediated areas and this is demonstrated by blood lead data collected from children at the site, with only 2.8 percent of children between the ages of one and five residing at the site at that time having a blood lead level that exceeds 10 micrograms per deciliter (µg/dL). The RA for OU2 is still in progress but in 2010 2,295 properties had been remediated, and others were still to be identified and remediated (EPA, 2010c). In addition, the report stated that final closure of the two soil repositories should be performed in accordance with the OU2 ROD. The report also said that the institutional controls (ICs) called for in the OU2 ROD should be filed in the property records (EPA, 2010c).

For OU4, the fourth five-year review report stated that RA activities began in 2009 and the voluntary relocation being performed under the Lead Impacted Communities Relocation Assistance Trust (LICRAT) was in progress. The voluntary relocation removed most residents from the central core of the mining area and reduced the potential for exposure to site-related contamination. In addition, the report stated that ICs still needed to be filed. The purposes of the ICs are to restrict use of properties where fine tailings were covered, where on-site repositories were constructed, and where properties were acquired by LICRAT. Also, the fourth five-year review report pointed out that the OU4 ROD required an IC to restrict future uses of groundwater from the portion of the Boone aquifer where the mine workings were located. Under the ROD, the IC restricting groundwater was to be implemented under the Oklahoma Water Quality Standard (OWQS) Title 785, Chapter 45, Appendix H (EPA, 2010c).

The fourth five-year review included six issues and recommendations. This report summarizes each recommendation and its current status in Table 1.

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Table 1: Actions Taken Since Fourth Five-Year Review

Number	Issue from Fourth Five-Year Review	Fourth Five-Year Review Recommendations/Follow-Up Actions	Party Responsible	Action Taken	Date of Action
1	No O&M plan exists for the dike and diversion channel for the Admiralty Mine Site (this issue is carried over from the third five-year review). The ODEQ's O&M plan for the dike and diversion channel constructed at the Admiralty Mine Site as part of the OU1 remedy was written in 1987 and facts have arisen that make it outdated. The ODEQ is responsible for maintaining the dike and diversion channel at the Admiralty Mine Site, as part of ODEQ's O&M for OU1. The dike at the Admiralty site requires some maintenance to repair damage noted during the site inspection and mowing.	Develop an O&M Plan for the dike and diversion channel at the Admiralty Mine Site. The ODEQ indicated in the third and fourth five-year reviews that the last O&M plan developed for the diversion dike and channel at the Admiralty Mine Site was prepared in 1987 and new facts may have made it outdated. The O&M plan prepared for the Admiralty Mine Site should be updated. Maintenance needs to be performed to the dike at the Admiralty site. The maintenance items identified during the fourth five-year review site inspection should be performed. ODEQ should provide to EPA a schedule that indicates when the O&M plan will be revised and when the necessary maintenance will be completed. This follow-up action should be completed no later than September 2012.	ODEQ	ODEQ developed an updated O&M plan for the Admiralty Mine Site. The O&M plan covers annual inspections items, abnormal occurrence response plans, performance standards, and annual cost estimates of O&M (ODEQ, 2012a). The annual O&M inspections have identified minor issues that have been rectified by the landowner. The reports state that overall the dike and diversion channel are functioning as intended (ODEQ, 2015d and ODEQ, 2015e).	November 2, 2012
2	A determination regarding the effectiveness of the well plugging program, which was intended to prevent mine water infiltration into the Roubidoux aquifer has not been completed (this issue is carried over from the third five-year review). The Roubidoux Groundwater Monitoring Program has collected data for a period of over 20 years since the RA to plug abandoned Roubidoux	Complete the evaluation of the effectiveness of the well plugging program that is intended to prevent mine water infiltration into the Roubidoux aquifer. It would be beneficial to future long-term decision making if, under the Roubidoux Groundwater Monitoring Program, all the analytical results available from the Roubidoux aquifer were compiled into a single database. The database could then be used to perform statistical and trend analyses on the data to assess long-term changes to the water quality of the Roubidoux	ODEQ	The Roubidoux Groundwater Monitoring Program has included annual sampling events conducted by ODEQ from March 2010 through October 2013. All the analytical results from these sampling events and historical data stretching back to 1997 have been compiled into a single table as an attachment to each report. This table has been used to perform limited statistical and trend analyses on the data	December 2014

Number	Issue from Fourth Five-Year Review	Fourth Five-Year Review Recommendations/Follow-Up Actions	Party Responsible	Action Taken	Date of Action
	wells was completed. In the past, it was believed that the Roubidoux aquifer was being impacted by the mine water; however, only certain indicator parameters were found, and subsequent data collection over twenty years has not found any more reason to believe that the mine water is degrading the Roubidoux. It should be noted that neither EPA nor ODEQ have identified any public drinking water wells at the site that fail to meet the health-based primary drinking water standards (Maximum Contaminant Levels [MCL]) established under the Safe Drinking Water Act (SDWA), and the drinking water supplied from the Roubidoux aquifer at the site is safe for all uses. Nonetheless, all available information indicates that the primary mechanism for mine water to enter the Roubidoux aquifer is infiltration through unplugged abandoned wells or infiltration through wells that have faulty well casings and/or poor seals across the Boone Formation; consequently, it is essential that plugging of abandoned wells continue.	aquifer. If additional data are required to complete the evaluation, then such data should be collected. Recommendations should then be developed regarding the need for continued monitoring and/or additional actions to protect the Roubidoux aquifer if necessary. The evaluation of the effectiveness of the well plugging program should be completed by September 2014 (prior to the next five-year review).		for certain wells in order to assess the long-term changes to the water quality of those particular Roubidoux wells. Each report has listed recommendations with the final report recommending continued monitoring of the Roubidoux aquifer because the mine pool is a potential source of contamination, and because iron and sulfate concentration trends for the Picher wells are increasing (ODEQ, 2014a).	

Number	Issue from Fourth Five-Year Review	Fourth Five-Year Review Recommendations/Follow-Up Actions	Party Responsible	Action Taken	Date of Action
3	ODEQ research has found references to 19 abandoned wells that need to be assessed for plugging (this issue is carried over from the third five-year review). The OU1 ROD recognized that additional abandoned wells completed in the Roubidoux aquifer might be identified after completion of the OU1 RA. The ROD stated that the need to plug additional wells would be evaluated as wells were identified. The existence of the wells found by ODEQ's research in historical records are found, ODEQ should determine whether the well is completed in the Roubidoux aquifer, and ODEQ should plug those abandoned wells completed in the Roubidoux aquifer where it is found to be technically feasible to do so. EPA will assist ODEQ to plug as many wells as can be located. This follow-up action should be completed by September 2012.	Undertake fieldwork to determine whether the 19 wells that ODEQ found in literature actually exist, and evaluate whether plugging any wells found is warranted or feasible. Each well location the ODEQ found in literature should be investigated, located, assessed, and if necessary and technically feasible, plugged in accordance with the OU1 ROD. As additional potential abandoned well locations are found, field work should be undertaken to locate any wells that exist. If any wells are found, ODEQ should determine whether the well is completed in the Roubidoux aquifer, and ODEQ should plug those abandoned wells completed in the Roubidoux aquifer where it is found to be technically feasible to do so. EPA will assist ODEQ to plug as many wells as can be located. This follow-up action should be completed by September 2012.	ODEQ	The ODEQ continues to identify and plug wells. Since the last five year review, ODEQ has plugged two wells (Tulsa Mine and Powerhouse). ODEQ also identified three additional wells, two of which were identified through Sanborn maps (Birthday and Vantage) and one that was uncovered during OU4 RA activities (Netta-White). In addition, two of the 19 wells are identified as public water supplies (Quapaw#2 and Quapaw#5) and are part of the Roubidoux Groundwater Monitoring Program. However, these two wells show impacts from the Boone and should be plugged at earliest opportunity. Nine of the 17 wells are on restricted property and EPA and ODEQ may require assistance from local tribal authorities to access and evaluate the nine wells. Eight wells are in the process of being investigated and evaluated for plugging (ODEQ, 2015a).	Ongoing
4	Remaining actions should be taken to complete the OU2 RA. These actions include, but may not be limited to: 1)assessment of chat in driveways and alleyways in areas of Ottawa County,	Remaining actions should be taken to complete the OU2 RA. These actions include, but may not be limited to: 1)assessment of chat in driveways and alleyways in areas of Ottawa County, including Miami, that are outside of the mining area (approximately 450 in	ODEQ	The fourth five year review report recommended that the remaining OU2 RA be completed. This included the assessment of chat in driveways and alleyways in areas of Ottawa County that are outside	Ongoing

Number	Issue from Fourth Five-Year Review	Fourth Five-Year Review Recommendations/Follow-Up Actions	Party Responsible	Action Taken	Date of Action
	including Miami, that are outside of the mining area (approximately 450 in Miami and 50 in other areas of Ottawa County); 2) assessment of the footprints of homes demolished as part of the voluntary relocation (approximately 450 properties); 3) remediation of residential properties located outside of the boundary of the OU4 voluntary buyout, where access was previously denied, and where soil lead concentrations exceed the remediation goal established in the OU2 ROD (approximately 140 properties). Owners of residential properties where access was previously denied will be offered a final opportunity to have their property re-sampled and remediated if necessary. The next five-year review should also consider whether OU2 can be deleted from the NPL. This deletion of OU2 from the NPL would be a partial deletion of the site. This follow-up action should be completed by September 2015.	Miami and 50 in other areas of Ottawa County); 2) assessment of the footprints of homes demolished as part of the voluntary relocation (approximately 450 properties); 3) remediation of residential properties located outside of the boundary of the OU4 voluntary buyout, where access was previously denied, and where soil lead concentrations exceed the remediation goal established in the OU2 ROD (approximately 140 properties). Owners of residential properties where access was previously denied will be offered a final opportunity to have their property re-sampled and remediated if necessary. The next five-year review should also consider whether OU2 can be deleted from the National Priorities List (NPL). This deletion of OU2 from the NPL would be a partial deletion of the site. This follow-up action should be completed by September 2015.		of the mining area, assessment of the footprints of homes demolished as part of the voluntary relocation, and remediation of residential properties located outside of the boundary of the OU4 voluntary buyout. The fourth five-year review report also stated that the fifth five-year review should consider whether OU2 can be deleted from the NPL. The RA activities for OU2 are nearly complete. It is estimated that approximately 19 properties still require sampling and removal. In September 2014, EPA held an OU2 Milestone Cleanup Event recognizing reduced blood lead in Ottawa County Children. Remedial activities that occurred under OU2 include the remediation of residential yards, residential driveways, public alleyways, churches, city parks, schools, and other HAAs. ODEQ will undertake OU2 RA activities under a cooperative agreement with EPA for the remaining residential property remediation. This will include assessing new properties as they arise, sampling current properties set for remediation, and carrying out remediation for properties deemed appropriate. At this time it is inappropriate	

Number	Issue from Fourth Five-Year Review	Fourth Five-Year Review Recommendations/Follow-Up Actions	Party Responsible	Action Taken	Date of Action
				to delete OU2 from the NPL. However, the next five-year review should consider whether OU2 can be deleted from the NPL. This deletion of OU2 from the NPL would be a partial deletion of the site.	
5	The EPA should complete the evaluation of current surface water and sediment data for Tar Creek to verify that no unacceptable risks to human health and the environment exist in Tar Creek. Numerous studies have been conducted since the third five-year review. These studies have collected surface water and sediment data in Tar Creek and other site streams. If necessary, EPA should collect enough additional data to determine whether potential risks are posed to human health and the environment by the surface water and sediments in streams of the site. The risks should be quantified through a risk assessment. If unacceptable risks are identified, then potential remedial alternatives will be evaluated to address the identified risks. Potential remedial alternatives may include engineered remedies, such as passive treatment through constructed wetlands.	The EPA should complete the evaluation of current surface water and sediment data for Tar Creek to verify that no unacceptable risks to human health and the environment exist in Tar Creek. Numerous studies have been conducted since the third five-year review. These studies have collected surface water and sediment data in Tar Creek and other site streams. If necessary, the EPA should collect enough additional data to determine whether potential risks are posed to human health and the environment by the surface water and sediments in streams of the Tar Creek site. The risks should be quantified through a risk assessment. If unacceptable risks are identified, then potential remedial alternatives will be evaluated to address the identified risks. Potential remedial alternatives may include engineered remedies, such as passive treatment through constructed wetlands. A determination may also be made that it is still technically impractical to address surface water and sediment through an engineered remedy and/or that no further action is required. The risk assessment portion of this follow-up action should be completed by	EPA	This task has not been completed. However, a Screening Level Ecological Risk Assessment (SLERA) has been completed and has suggested preliminary remediation goals that may be appropriate for lead, cadmium, and zinc in sediments (McDonald, 2009).	Ongoing

Number	Issue from Fourth Five-Year Review	Fourth Five-Year Review Recommendations/Follow-Up Actions	Party Responsible	Action Taken	Date of Action
	A determination may also be made that it is still technically impractical to address surface water and sediment through an engineered remedy and/or that no further action is required. The risk assessment portion of this follow-up action should be completed by September 2012. If necessary, an evaluation of remedial alternatives should be completed by September 2014 (prior to the next five-year review).	September 2012. If necessary, an evaluation of remedial alternatives should be completed by September 2014 (prior to the next five-year review).			
6	The IC restricting potable and domestic use of shallow ground water including the Boone aquifer as specified in the OU4 ROD should be implemented. The OU4 ROD calls for ICs restricting the use of the Boone aquifer and also restricting the use of any ground water that is shallower than the Boone. Specifically, the ROD calls for ICs restricting the potable and domestic use of such ground water where concentrations of site-related contaminants exceed the remediation goals established in the ROD. The IC is to be implemented through the OWQS (785 OAC 45 Appendix H).	The IC restricting potable and domestic use of shallow ground water including the Boone aquifer as specified in the OU4 ROD should be implemented. The OU4 ROD calls for ICs restricting the use of the Boone aquifer and also restricting the use of any ground water that is shallower than the Boone. Specifically, the ROD calls for ICs restricting the potable and domestic use of such ground water where concentrations of site-related contaminants exceed the remediation goals established in the ROD.	ODEQ	The OU4 ROD called for ICs restricting the use of the Boone aquifer and also restricting the use of any groundwater that is shallower than the Boone. Specifically, the OU4 ROD called for ICs restricting the potable and domestic use of such groundwater where concentrations of site-related contaminants exceed the remediation goals established in the ROD.	September 2012

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	6	Appendix H of the OWQS states that toxic metals are present and that special well construction methods are required within the OU4 boundary due to contamination in the Boone aquifer, but there are currently no limitations placed on the use of ground water from the Boone aquifer (or other shallower ground water) for potable use, including domestic supply. ODEQ has indicated that it will explore placing a restriction in Appendix H of the OWQS limiting ground water use from the mine pool and the Boone aquifer in the immediate vicinity of the mine pool for public water supply, or domestic use. ODEQ's restriction will include treatment requirements to remove any lead above the MCL of 15 µg/l. EPA suggests that the State of Oklahoma review this IC. This follow-up action should be completed by September 2011.	The IC is to be implemented through the OWQS (785 OAC 45 Appendix H). Appendix H of the OWQS states that toxic metals are present and that special well construction methods are required within the OU4 boundary due to contamination in the Boone aquifer, but there are currently no limitations placed on the use of ground water from the Boone aquifer (or other shallower ground water) for potable use, including domestic supply. The ODEQ has indicated that it will explore placing a restriction in Appendix H of the OWQS limiting ground water use from the mine pool and the Boone aquifer in the immediate vicinity of the mine pool for public water supply, or domestic use. ODEQ's restriction will include treatment requirements to remove any lead above the MCL of 15 micrograms per liter. EPA suggests that the State of Oklahoma review this IC. This follow-up action should be completed by September 2011.	ODEQ	In accordance with the OU4 ROD, ODEQ submitted a proposal to change the "Beneficial Use Designations for Certain Limited Areas of Groundwater" (OWQS 785 Chapter 45, Appendix H). This task was completed in September 2012. The changes specifically stated that special well construction is required to obtain water for potable use and that groundwater testing is required to meet potable use standards for lead, arsenic, and cadmium (ODEQ, 2012b).	September 2012

3.0 Five-Year Review Process

This fifth five-year review for the site has been conducted in accordance with EPA's Comprehensive Five-Year Review guidance dated June 2001 (EPA, 2001). Interviews were conducted with relevant parties; a site inspection was conducted; and applicable data and documentation covering the period of the review were evaluated. The activities conducted as part of this review and specific findings are described in the following paragraphs.

3.1 Administrative Components

The five-year review for this site was initiated by EPA. The review team was led by EPA Region 6 with support provided by ODEQ. The components of the review included community involvement, document review, data review, a site inspection, interviews, and development of this five-year review report, as described in the following paragraphs.

3.2 Community Involvement

A public notice announcing initiation of the five-year review was published in the *Miami News Record* on December 11, 2014. Upon signature, the fifth five-year review report will be placed in the information repositories for the site, including the Miami Public Library in Miami, and at the EPA Region 6 office in Dallas, Texas. A notice will then be published in the *Miami News Record* to summarize the findings of the review and announce the availability of the report at the information repositories. A copy of the public notice is provided as Appendix C to this report.

3.3 Document Review

This fifth five-year review for the site included a review of relevant site documents, including decision documents, construction and implementation reports, sampling reports, and related monitoring data. Documents reviewed are listed in Appendix B.

3.4 Data Review

The Roubidoux Groundwater Monitoring Program continued during the five-year review period that is the subject of this report, and sampling was conducted from March 2010 to October 2013. Thirteen wells were used in the monitoring program, including five monitor wells (MW) installed by ODEQ as part of the Roubidoux Groundwater Monitoring Program (Commerce #5, Quapaw #5, Picher #5, Picher #6, and Picher #7), one municipal supply well located within the mining area (Cardin #1), four wells located on the edge of the mining area (Commerce #4, Ontario Smelter (a private well), Quapaw #4, and the Rural Water District #4 Well #3 [RWD4 #3]), and three wells located outside of the mining area (Miami #3 [replaced Miami #1 in program], Miami #11, and RWD7 #2). However, the Ontario smelter (private) well ceased to be sampled after 2012 due to access issues (ODEQ, 2014a). The locations of the wells are shown on Figure 2.

The 2010 to 2013 results from the Roubidoux Groundwater Monitoring Program are included in Table 2. ODEQ classified wells that produce water with concentrations in excess of the tolerance

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limits for all three indicator parameters (indicator parameters are compounds that indicate possible mine water impacts — sulfate, iron and zinc; *see* pertinent concentrations at the end of this paragraph) as "impacted" by mine water, a well that produces water with concentrations in excess of the background concentrations for all three indicator parameters and above the tolerance limits for two of the indicator parameters as "probably impacted" by mine water, and a well that produces water with concentrations in excess of the background concentrations for two of the three indicator parameters and above the tolerance limits for one of the indicator parameters as "possibly impacted" by mine water. ODEQ classified wells as "Background" if all three indicator parameters were below background concentrations and "Non-impacted" if all three indicator parameters were below tolerance limits but at least one parameter was above background concentrations. The tolerance limits (TL) and background concentrations (BC) for the indicated parameters of mine water contamination are provided. The indicator parameters are sulfate (TL/BC = 82 milligrams per liter [mg/L] and 25 mg/L), iron (0.27 mg/L and 0.062 mg/L), and zinc (0.043 mg/L and 0.009 mg/L) (ODEQ, 2014a).

Two wells sampled in the groundwater monitoring program can be classified as "impacted" by mine water. The Quapaw #5 well results indicate that the average concentrations for sulfate (420.8 mg/L), iron (3.044 mg/L), and zinc (0.143 mg/L) all exceed background concentrations and tolerance limits. In addition, dissolved concentrations of sulfate and iron appear to be increasing since 2000 (ODEQ, 2014a). The Ontario Smelter well sample results indicate that the average concentrations for sulfate (97.74 mg/L), iron (0.401 mg/L) and zinc (0.249 mg/L) exceed tolerance limits established for the Roubidoux. However, the Ontario Smelter well was not able to be sampled in 2012 and 2013 due to access issues.

One well sampled in the groundwater monitoring program can be classified as "probably impacted" by mine water. The Picher #6 well sampling results indicated that within the last five-year review period the average concentrations for sulfate (198.1 mg/L) and iron (0.518 mg/L) exceeded TLs established for the Roubidoux (ODEQ, 2014a).

Four wells sampled in the groundwater monitoring program can be classified as "possibly impacted" by mine water. The Cardin #1, Commerce #4, Picher #5, and Picher #7 wells sample results indicated that average concentrations for sulfate (97.69 mg/L, 135.5 mg/L, 106 mg/L, and 184.5 mg/L, respectively) all exceeded the tolerance limit established for the Roubidoux. However, the last two rounds of sampling indicated that iron concentrations in Picher #7 had exceeded tolerance limits. If this trend continues, Picher #7 may be downgraded to "probably impacted" by mine water (ODEQ, 2014a).

One well sampled in the groundwater monitoring program can be classified as "not impacted" by mine water and five wells were below background. The Commerce #5 well exceeded background concentrations for iron and zinc. The RWD4 #3, Quapaw #4, Miami #11, Miami #3, and RWD7 #2 all had concentrations of indicator parameters either at or below background concentrations established for the Roubidoux (ODEQ, 2014a). No well has an average concentration that exceeds any MCLs.

In 2009, a groundwater monitoring program was started at the future site of the Central Mill Repository (CMR) to determine the impacts of the CMR to the perched groundwater chemistry.

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The sampling program began in 2009 (before the construction of the CMR) and concluded in 2011 (after the construction of the CMR). The program was based on three MWs (FT059-MW1, FT059-MW2, and FT059-MW3). The three wells are completed in the shallow perched groundwater that underlies the CMR. The three wells were sampled three times in 2009, two times in 2010, and three times in 2011 (Table 3). In 2009, exceedances of secondary maximum contaminant levels (SMCL) for iron and manganese were detected in all MWs, while exceedances of MCLs for lead were detected in two MWs, and an exceedance of the MCL for arsenic was detected in one MW. In 2010, exceedances of SMCLs for iron and manganese were detected in all MWs, while exceedances of MCLs for lead were detected in two MWs, and an exceedance of MCL for arsenic was detected in one MW. In 2011, exceedances of SMCLs for iron and manganese were detected in all MWs, while exceedances of MCLs for lead and arsenic were only detected in one MW. These data indicate that metal concentrations in the groundwater had not increased since the construction and operation of the repository began in 2010; however, FT059-MW1 was not sampled in 2011 (CH2M HILL, 2012c and Table 3).

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

		Cond.	Temp.	pH	D.O.	Alk (Field)	Chloride	Sulfate	Tot Dis Sol	Hardiness	Calcium	Magnesium	Sodium	Potassium	Antimony	Arsenic	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Thallium	Zinc
Analysis		(Field)	(Field)	(Field)	(Field)	$CaCO_3$	Cl	SO_4	TDS	$CaCO_3$	Ca	Mg	Na	K	Sb	As	Cd	Cr	Fe	Pb	Mn	Hg	Ni	Se	Tl	Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
Cardin #1																										
10/30/2013	Totals	415	18.88	7.05	0.81	131	<10	57.5	221	191	41.4	19.7	12.1	2.6	<0.002	<0.002	<0.002	<0.01	0.153	<0.005	0.008	<0.00005	<0.01	<0.01	<0.001	0.013
	Dissolved	-	-	-	-	-	-	-	-	-	37.5	18.3	10.9	2.4	<0.002	<0.002	<0.002	<0.01	0.155	<0.005	0.008	<0.00005	<0.01	<0.01	<0.001	<0.005
11/6/2012	Totals	400	18.86	7.34	0.9	111.5	<10	59.9	214	184	40.6	18.2	10.9	2.3	<0.002	<0.002	<0.002	<0.01	0.164	<0.005	0.008	<0.00005	<0.01	<0.01	<0.001	0.037
	Dissolved	-	-	-	-	-	-	-	-	-	40.2	18.4	10.7	2.3	<0.002	<0.002	<0.002	<0.01	0.146	<0.005	0.008	<0.00005	<0.01	<0.01	<0.001	<0.005
11/1/2011	Totals	457	20.06	7.42	1.05	132	10.7	71.9	239	180	44.4	21.6	10.7	2.5	<0.002	<0.002	<0.002	<0.01	0.104	<0.005	0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	44.6	21.4	11	2.6	<0.002	<0.002	<0.002	<0.01	0.109	<0.005	0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/10/2010	Totals	685	20.39	6.08	3.57	146	29.8	176	406	297	68.6	32.6	16.9	3	<0.002	<0.002	<0.002	<0.01	0.0869	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.011
	Dissolved	-	-	-	-	-	-	-	-	-	69.5	31.9	17.5	3	<0.002	<0.002	<0.002	<0.01	0.077	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
3/23/2010	Totals	597	19.49	6.47	2.72	144	28.8	150	430	302	67.4	31.6	16.6	3	<0.002	<0.002	<0.002	<0.01	0.145	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.023
	Dissolved	-	-	-	-	-	-	-	-	-	66.4	31.2	15.7	2.9	<0.002	<0.002	<0.002	<0.01	0.117	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.005
4/21/2008	Totals	467	20.85	7.2	1.35	126	13.7	78.2	242	205	46.6	21.3	11.7	2.6	<0.002	<0.002	<0.002	<0.01	0.193	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.006
	Dissolved	-	-	-	-	-	-	-	-	-	47.4	21.8	11.5	2.5	<0.002	<0.002	<0.002	<0.01	0.169	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.027
10/23/2007	Totals	442	19.05	7.33	0.9	132	11	56.5	216	189	40.7	18.6	10	2.3	<0.002	<0.002	<0.002	<0.01	0.132	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.007
	Dissolved	-	-	-	-	-	-	-	-	-	40.8	19	10	2.3	<0.002	<0.002	<0.002	<0.01	0.118	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
5/8/2007	Totals	384	18.85	7.56	1.12	125	<10	28.2	167	157	38.7	18.4	11.1	2.7	<0.002	<0.002	<0.002	<0.01	0.0957	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	32.2	15.6	9.1	2.3	<0.002	<0.002	<0.002	<0.01	0.076	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2006	Totals	634	21.79	7.2	1.32	160	28	156	375	293	64	29	15	3	<0.002	<0.002	<0.002	<0.01	0.103	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	60	28	15	3	<0.002	<0.002	<0.002	<0.01	0.094	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/11/2006	Totals	368	18.8	7.28	5.32	111	13.5	78.8	238	201	43	20	11	3	<0.002	<0.002	<0.002	<0.01	0.14	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	43	20	11	3	<0.002	<0.002	<0.002	<0.01	0.121	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/17/2005	Totals	487	19.2	7.8	0.9	127	20.8	107	308	262	60	27	13	3	<0.002	<0.002	<0.002	<0.01	0.17	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	69	29	13	3	<0.002	<0.002	<0.002	<0.01	0.156	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.006
4/25/2005	Totals	510	18.3	7.56	1.58	177	21	111	347	260	59	27	14	3	<0.002	<0.002	<0.002	<0.01	0.193	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.036
	Dissolved	-	-	-	-	-	-	-	-	-	58	26	13	3	<0.002	<0.002	<0.002	<0.01	0.152	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/12/2004	Totals	498	18.3	7.62	1.82	199	20.4	107	333	250	59	27	14	3	<0.002	<0.002	<0.002	<0.01	0.139	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.009
	Dissolved	-	-	-	-	-	-	-	-	-	56	26	13	3	<0.002	<0.002	<0.002	<0.01	0.114	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/27/2004	Totals	334	19.6	7.43	3.48	150	14.5	93.3	319	231	50	24	12	3	<0.01	<0.01	<0.005	<0.005	0.132	<0.01	0.009	0.00005	<0.01	<0.01	<0.01	0.033
	Dissolved	-	-	-	-	-	-	-	-	-	50	24	12	3	<0.01	<0.01	<0.005	<0.005	0.112	<0.01	0.009	<0.00005	<0.01	<0.01	<0.01	<0.005
11/6/2003	Totals	595	17.6	6.47	NA	145	27.1	134	388	281	61	30	17	3	<0.002	<0.002	<0.002	<0.01	0.101	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.022
	Dissolved	-	-	-	-	-	-	-	-	-	61	30	17	3	<0.002	<0.002	<0.002	<0.01	0.098	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
	Averages	485	19.3	7.19	1.92	141	18	**97.69**	296	232	52	24	13	2.8	0.003	0.003	0.002	0.01	0.129	0.005	0.01	0.00005	0.01	0.01	0.002	0.011
Commerce #4																										
10/30/2013	Totals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/7/2012	Totals	907	18.61	7.04	5.5	147	59.8	206	565	388	87.5	34.3	45	3.4	<0.002	<0.002	<0.002	<0.01	0.358	<0.005	0.016	<0.00005	<0.01	<0.01	<0.001	0.0702
	Dissolved	-	-	-	-	-	-	-	-	-	86.6	34.3	46.1	3.4	<0.002	<0.002	<0.002	<0.01	0.124	<0.005	0.015	<0.00005	<0.01	<0.01	<0.001	0.051
11/2/2011	Totals	862	19.41	7.09	3.65	169	53.4	188	**504**	375	79.9	35.7	34.4	3.4	<0.002	<0.002	<0.002	<0.01	0.212	<0.005	0.014	<0.00005	<0.01	<0.01	<0.001	0.0303
	Dissolved	-	-	-	-	-	-	-	-	-	85.4	36	35.7	3.6	<0.002	<0.002	<0.002	<0.01	0.161	<0.005	0.014	<0.00005	<0.01	<0.01	<0.001	0.0157
11/10/2010	Totals	837	19.8	6.54	3.87	152	78.5	190	**508**	316	74	30.3	47.6	3.3	<0.002	<0.002	<0.002	<0.01	0.171	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	0.0101
	Dissolved	-	-	-	-	-	-	-	-	-	75.7	30.7	47.8	3.3	<0.002	<0.002	<0.002	<0.01	0.132	<0.005	0.012	<0.00005	<0.01	<0.01	<0.001	<0.01
3/24/2010	Totals	745	17.85	6.76	4.97	161	54.4	192	**553**	354	84.2	33.1	41.2	3.6	<0.002	<0.002	<0.002	<0.01	0.184	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.0135
	Dissolved	-	-	-	-	-	-	-	-	-	81.4	32.5	41	3.6	<0.002	<0.002	<0.002	<0.01	0.165	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.0071
4/22/2008	Totals	727	20.41	7.2	4.22	146	78.5	113	432	256	61.3	25.8	46.1	3.2	<0.002	<0.002	<0.002	<0.01	0.112	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.0119
	Dissolved	-	-	-	-	-	-	-	-	-	58.1	24.7	43.1	3	<0.002	<0.002	<0.002	<0.01	0.0942	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/23/2007	Totals	676	18.32	7.35	2.47	131	<10	61.9	219	186	42.9	19.1	18	2.6	<0.002	<0.002	<0.002	<0.01	0.0944	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.0268
	Dissolved	-	-	-	-	-	-	-	-	-	47.1	21.2	36.5	2.7	<0.002	<0.002	<0.002	<0.01	0.084	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
5/8/2007	Totals	710	20.03	7.37	3.6	136	75.3	125	432	291	71.9	30.9	43.1	3.4	<0.002	<0.002	<0.002	<0.01	0.151	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.0277
	Dissolved	-	-	-	-	-	-	-	-	-	68.8	29.5	41.5	3.3	<0.002	<0.002	<0.002	<0.01	0.129	<0.005	0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2006	Totals	769	20.92	7.11	4.41	162	48.7	161	448	307	74	28	31	4	<0.002	<0.002	<0.002	<0.01	0.106	<0.005	0.01	<0.00005	<0.01	<0.01	<0.001	0.015
	Dissolved	-	-	-	-	-	-	-	-	-	66	28	30	4	<0.002	<0.002	<0.002	<0.01	0.103	<0.005	0.01	<0.00005	<0.01	<0.01	<0.001	0.009
4/11/2006	Totals	412	20.1	8.41	3.54	164	56.5	166	437	311	70	29	36	4	<0.002	<0.002	<0.002	<0.01	0.079	<0.005	0.01	<0.00005	<0.01	<0.01	<0.001	0.027
	Dissolved	-	-	-	-	-	-	-	-	-	72	30	37	4	<0.002	<0.002	<0.002	<0.01	0.079	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/18/2005	Totals	356	19.4	7.95	0.6	117	<10	66	250	189	44	19	9	3	<0.002	<0.002	<0.002	<0.01	0.132	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	45	20	9	3	<0.002	<0.002	<0.002	<0.01	0.104	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/26/2005	Totals	577	19.4	7.7	1.8	NA	60.5	76	342	214	49	22	34	3	<0.002	<0.002	<0.002	<0.01	0.077	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	48	21	34	3	<0.002	<0.002	<0.002	<0.01	0.072	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/12/2004	Totals	614	19	7.47	1.61	183	43.5	126	403	270	65	27	29	3	<0.002	<0.002	<0.002	<0.01	0.09	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	63	26	29	3	<0.002	<0.002	<0.002	<0.01	0.086	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/27/2004	Totals	403	18.7	7.75	3.39	218	59.5	107	409	252	54	24	35	3	<0.01	<0.01	<0.005	<0.005	0.087	<0.01	0.009	<0.00005	<0.01	<0.01	<0.01	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	56	25	35	3	<0.01	<0.01	<0.005	<0.005	0.085	<0.01	0.01	<0.00005	<0.01	<0.01	<0.01	<0.005
11/6/2003	Totals	615	17.9	**6.42**	NA	153	37.9	119	383	260	61	26	28	3	<0.002	<0.002	<0.002	<0.01	0.095	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
	Dissolved	-	-	-	-	-	-	-	-	-	57	25	27	3	<0.002	<0.002	<0.002	<0.01	0.086	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Averages	658	19.3	7.3	3.36	157	51.9	135.5	420	284	65	27	35	3.2	0.003	0.003	0.002	0.01	0.123	0.005	0.011	0.00005	0.01	0.01	0.002	0.014
Commerce #5																										
10/30/2013	Totals	293	19.99	7.3	1.47	114	12.1	14.9	128	128	27.4	13.7	10.1	1.9	<0.002	<0.002	<0.002	<0.01	0.034	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27.7	13.9	10.2	9.5	<0.002	<0.002	<0.002	<0.01	0.032	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
11/7/2012	Totals	304	18.47	7.6	1.89	106.5	15.5	15.9	145	130	27.8	13	10.7	1.8	<0.002	<0.002	<0.002	<0.01	0.08	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	28	13.2	10.8	1.9	<0.002	<0.002	<0.002	<0.01	0.031	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
11/2/2011	Totals	308	19.52	7.78	0.57	107	17.2	13.9	156	109	27.6	13.9	10	1.9	<0.002	<0.002	<0.002	<0.01	0.036	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	28.5	14	10.6	2	<0.002	<0.002	<0.002	<0.01	0.032	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/2/2011	Totals	308	19.52	7.78	0.57	107	17.7	14.1	158	111	27.7	13.9	10	1.9	<0.002	<0.002	<0.002	<0.01	0.042	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.365
	Dissolved	-	-	-	-	-	-	-	-	-	28.5	14	10.8	2	<0.002	<0.002	<0.002	<0.01	0.037	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/10/2010	Totals	292	20.05	6.12	1.58	108	<10	17.5	136	119	27.6	13.2	8.9	1.8	<0.002	<0.002	<0.002	<0.01	0.047	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	28.2	13.3	8.8	1.9	<0.002	<0.002	<0.002	<0.01	0.035	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
3/24/2010	Totals	284	19.42	7.5	1.25	109.5	17.9	15.7	160	126	28.1	13.5	11.1	2	<0.002	<0.002	<0.002	<0.01	0.043	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27.5	13.1	11.2	2	<0.002	<0.002	<0.002	<0.01	0.033	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/22/2008	Totals	279	20.65	7.47	1.11	109	10.5	13.7	157	127	27.1	13	8.2	1.8	<0.002	<0.002	<0.002	<0.01	0.045	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27.3	13	8.1	1.8	<0.002	0.002	<0.002	<0.01	0.035	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/23/2007	Totals	283	18.58	7.65	0.78	109	11.4	14.2	149	129	27.9	13.4	8.3	1.9	<0.002	<0.002	<0.002	<0.01	0.04	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	25	12.3	7.6	1.7	<0.002	0.002	<0.002	<0.01	0.031	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.0076
5/8/2007	Totals	308	20.04	7.74	1.49	103	20	12.1	155	135	27.8	13.8	11.8	2	<0.002	<0.002	<0.002	<0.01	0.042	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27.4	13.8	12	2.1	<0.002	<0.002	<0.002	<0.01	0.031	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2006	Totals	313	21.2	7.74	2.12	115	18	17.4	157	129	28	13	11	2	<0.002	<0.002	<0.002	<0.01	0.033	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	26	13	10	2	<0.002	<0.002	<0.002	<0.01	0.028	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/11/2006	Totals	301	19.9	8.57	1.44	107	15.3	14.6	138	124	26	13	10	2	<0.002	<0.002	<0.002	<0.01	0.038	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27	13	10	2	<0.002	<0.002	<0.002	<0.01	0.026	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/18/2005	Totals	269	20.4	7.81	0.1	145	10.3	13.7	173	130	29	14	8	2	<0.002	<0.002	<0.002	<0.01	0.043	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	31	14	8	2	<0.002	<0.002	<0.002	<0.01	0.023	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/26/2005	Totals	268	18.4	8.17	5.18	NA	<10	13.9	150	121	28	13	8	2	<0.002	<0.002	<0.002	<0.01	0.07	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	28	13	8	2	<0.002	<0.002	<0.002	<0.01	0.034	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/12/2004	Totals	260	17.9	8.64	5.65	152	<10	13	154	124	28	13	8	2	<0.002	<0.002	<0.002	<0.01	0.092	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	28	13	8	2	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond	Temp.	pH	D.O.	Alk (Field)	Chloride	Sulfate	Tot Dis Sol	Hardiness	Calcium	Magnesium	Sodium	Potassium	Antimony	Arsenic	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Thallium	Zinc
		(Field)	(Field)	(Field)	(Field)	$CaCO_3$	Cl	SO_4	TDS	$CaCO_3$	Ca	Mg	Na	K	Sb	As	Cd	Cr	Fe	Pb	Mn	Hg	Ni	Se	Tl	Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
4/27/2004	Totals	252	18.9	7.82	5.75	158	<10	11.8	158	122	25	13	8	2	<0.01	<0.01	<0.005	<0.005	0.093	<0.01	<0.01	0.00005	<0.01	<0.01	<0.01	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	25	13	8	2	<0.01	<0.01	<0.005	<0.005	0.034	<0.01	<0.01	<0.00005	<0.01	<0.01	<0.01	<0.005
4/27/2004	Totals	252	18.9	7.82	5.75	158	<10	11.8	158	123	25	13	8	2	<0.01	<0.01	<0.005	<0.005	0.114	<0.01	<0.01	0.00005	<0.01	<0.01	<0.01	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	26	13	8	2	<0.01	<0.01	<0.005	<0.005	0.039	<0.01	<0.01	0.00005	<0.01	<0.01	<0.01	<0.005
11/6/2003	Totals	294	17.7	7.29	NA	108	15.6	12	155	127	26	13	11	2	<0.002	<0.002	<0.002	<0.01	0.08	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	26	13	11	2	<0.002	<0.002	<0.002	<0.01	0.048	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.01
4/18/2002	Totals	294	20.6	7.5	NA	80	15	11.6	149	128	28	14	11	2	<0.002	<0.002	<0.002	<0.01	0.116	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	27	14	10	2	<0.002	<0.002	<0.002	<0.01	0.082	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
12/13/2001	Totals	282	17.7	7.48	NA	86.5	9.2	40.9	123	126	27	13	10	2	<0.002	<0.002	<0.002	<0.01	0.159	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	27	13	10	2	<0.002	<0.002	<0.002	<0.01	0.12	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
3/9/2001	Totals	296	15.6	7.75	NA	100	13	12.4	165	125	28	14	10	2	<0.002	<0.002	<0.002	<0.01	0.197	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	28	14	10	2	<0.002	<0.002	<0.002	<0.01	0.137	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
10/13/2000	Totals	333	21	7.68	2.89	110	15.7	10.3	174	129	28	14	12	2	<0.002	<0.002	<0.002	<0.01	0.22	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	27	14	11	2	<0.002	<0.002	<0.002	<0.01	0.178	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Averages	289	19.2	7.68	2.33	115	13.5	15.02	152	125	27	13	10	2.1	0.003	0.003	0.002	0.01	0.065	0.005	0.01	0.00014	0.01	0.01	0.002	0.015
Ontario Smelter																										
10/29/2013	Totals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/6/2012	Totals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dissolved	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/1/2011	Totals	258	17.07	7.65	0.45	109	<10	21.1	130	109	26.8	14.4	4.6	1.4	<0.002	<0.002	<0.002	<0.01	**0.401**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.117
	Dissolved	-	-	-	-	-	-	-	-	-	28.1	14.6	4.8	1.5	<0.002	<0.002	<0.002	<0.01	**0.4**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.023
11/10/2010	Totals	273	17.12	6.35	0.43	118	<10	41.8	159	147	29.3	14.9	5	1.5	<0.002	<0.002	<0.002	<0.01	**0.714**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.294
	Dissolved	-	-	-	-	-	-	-	-	-	30.5	15.3	5	1.5	<0.002	<0.002	<0.002	<0.01	**0.641**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
3/24/2010	Totals	835	15.59	6.4	1.04	171	<10	142	385	287	72.5	33.7	9.7	2.7	<0.002	<0.002	<0.002	<0.01	**0.495**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.35
	Dissolved	-	-	-	-	-	-	-	-	-	75.3	35	10.1	2.7	<0.002	<0.002	<0.002	<0.01	**0.481**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.183
4/21/2008	Totals	407	20.26	7.2	1.57	120	<10	62.2	207	185	41	20	6	1.9	<0.002	<0.002	<0.002	<0.01	**0.447**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.308
	Dissolved	-	-	-	-	-	-	-	-	-	39	19	6	1.8	<0.002	<0.002	<0.002	<0.01	**0.386**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.065
10/23/2007	Totals	997	16.23	6.92	1.21	181	<10	111	324	273	112	52	16	4.2	<0.002	<0.002	<0.002	<0.01	**0.549**	<0.005	0.014	<0.00005	<0.01	<0.01	<0.001	1.08
	Dissolved	-	-	-	-	-	-	-	-	-	60	29	12	3.2	<0.002	<0.002	<0.002	<0.01	**0.526**	<0.005	0.01	<0.00005	<0.01	<0.01	<0.001	0.231
5/7/2007	Totals	951	18.38	6.81	1.75	206	<10	**285**	**679**	522	113	54	15	3.9	<0.002	<0.002	<0.002	<0.01	**0.681**	<0.005	0.012	<0.00005	<0.01	<0.01	<0.001	0.999

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
	Dissolved	-	-	-	-	-	-	-	-	-	106	51	14	3.7	<0.002	<0.002	<0.002	<0.01	**0.477**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2006	Totals	378	18.8	7.3	1.06	132	<10	57.2	206	184	41	18	6	2	<0.002	<0.002	<0.002	<0.01	**0.35**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.273
	Dissolved	-	-	-	-	-	-	-	-	-	36	18	6	2	<0.002	<0.002	<0.002	<0.01	**0.334**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.039
4/10/2006	Totals	239	17.8	6.69	1.43	153	<10	130	306	262	25	13	5	2	<0.002	<0.002	<0.002	<0.01	**0.302**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.09
	Dissolved	-	-	-	-	-	-	-	-	-	26	14	5	2	<0.002	<0.002	<0.002	<0.01	0.277	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/17/2005	Totals	404	17.1	7.59	2.5	155	<10	125	348	274	63	29	8	2	<0.002	<0.002	<0.002	<0.01	**0.393**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.251
	Dissolved	-	-	-	-	-	-	-	-	-	68	30	8	2	<0.002	<0.002	<0.002	<0.01	**0.391**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.14
4/25/2005	Totals	402	15.8	7.27	1.4	180	<10	72.5	241	199	44	21	7	2	<0.002	<0.002	<0.002	<0.01	**0.63**	<0.005	0.011	<0.00005	<0.01	<0.01	<0.001	0.689
	Dissolved	-	-	-	-	-	-	-	-	-	43	21	7	2	<0.002	<0.002	<0.002	<0.01	**0.526**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.321
1/28/2005	Totals	756	12.1	7.03	2.63	NA	<10	**282**	**648**	477	-	-	49	13	NA	NA	<0.002	<0.005	**0.512**	<0.005	0.013	NA	NA	NA	NA	1.2
10/11/2004	Totals	445	15.4	7.41	2.09	128	<10	92.4	284	219	57	27	8	2	<0.002	<0.002	<0.002	<0.01	**0.349**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.244
	Dissolved	-	-	-	-	-	-	-	-	-	56	26	8	2	<0.002	<0.002	<0.002	<0.01	**0.343**	0.015	<0.01	<0.00005	<0.01	<0.01	<0.001	0.148
10/11/2004	Totals	445	15.4	7.41	2.09	128	<10	115	327	248	57	27	8	2	<0.002	<0.002	<0.002	<0.01	**0.358**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.251
	Dissolved	-	-	-	-	-	-	-	-	-	54	25	7	2	<0.002	<0.002	<0.002	<0.01	**0.318**	0.021	<0.01	<0.00005	<0.01	<0.01	<0.001	0.169
4/29/2004	Totals	427	17.3	7.5	2.27	134	<10	56.3	233	185	43	22	7	2	<0.01	<0.01	<0.005	<0.005	**0.359**	<0.01	0.006	0.00006	<0.01	<0.01	<0.01	0.299
	Dissolved	-	-	-	-	-	-	-	-	-	28	15	6	2	<0.01	<0.01	<0.005	<0.005	**0.238**	0.012	<0.005	<0.00005	<0.01	<0.01	<0.01	0.089
4/29/2004	Totals	427	17.3	7.5	2.27	134	<10	103	328	236	39	20	7	2	<0.01	<0.01	<0.005	<0.005	**0.359**	<0.01	0.006	<0.00005	<0.01	<0.01	<0.01	0.228
	Dissolved	-	-	-	-	-	-	-	-	-	28	15	6	2	<0.01	<0.01	<0.005	<0.005	**0.249**	<0.01	<0.005	<0.00005	<0.01	<0.01	<0.01	0.037
12/19/2003	Totals	415	14.8	6.64	NA	125	<10	85.5	274	213	46	23	8	2	<0.002	<0.002	<0.002	<0.01	**0.319**	0.026	<0.01	<0.00005	<0.01	<0.01	<0.001	0.236
	Dissolved	-	-	-	-	-	-	-	-	-	46	24	8	2	<0.002	<0.002	<0.002	<0.01	**0.464**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.464
11/4/2003	Totals	252	17.1	7.83	NA	115	<10	16.4	138	126	27	14	5	2	<0.002	<0.002	<0.002	<0.01	**0.316**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.083
	Dissolved	-	-	-	-	-	-	-	-	-	27	14	5	2	<0.002	<0.002	<0.002	<0.01	0.246	0.013	<0.01	<0.00005	<0.01	<0.01	<0.001	0.07
10/6/2003	Totals	257	18.3	7.08	NA	130	<10	14	148	124	26	14	5	2	<0.002	<0.002	<0.002	<0.01	0.208	0.017	<0.01	<0.00005	<0.01	<0.01	<0.001	0.05
	Dissolved	-	-	-	-	-	-	-	-	-	26	14	5	2	<0.002	<0.002	<0.002	<0.01	0.288	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.067
10/6/2003	Totals	257	18.3	7.08	NA	130	<10	16.4	132	126	26	14	5	2	<0.002	<0.002	<0.002	<0.01	0.287	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.065
	Dissolved	-	-	-	-	-	-	-	-	-	26	14	5	2	<0.002	<0.002	<0.002	<0.01	0.224	0.008	<0.01	<0.00005	<0.01	<0.01	<0.001	0.033
7/30/2003	Dis Met	370	18.2	8.19	NA	NA	11.1	126	368	NA	60	29	8	2	NA	NA	NA	NA	**0.41**	0.056	<0.01	NA	<0.01	NA	NA	0.239
	Averages	460	16.9	7.19	1.61	142	10.1	97.74	293	231	47	23	8	2.4	0.003	0.003	0.002	0.009	**0.401**	0.009	0.01	0.00005	0.01	0.01	0.002	0.249
Miami #1																										
4/27/2004	Totals	413	19.6	8.27	3.3	120	78.8	12.6	265	133	29	14	47	3	<0.01	<0.01	<0.005	<0.005	**1.13**	<0.01	0.012	0.00005	<0.01	<0.01	<0.01	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	28	14	45	2	<0.01	<0.01	<0.005	<0.005	0.042	<0.01	<0.005	0.00005	<0.01	<0.01	<0.01	<0.005

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond	Temp.	pH	D.O.	Alk (Field)	Chloride	Sulfate	Tot Dis Sol	Hardiness	Calcium	Magnesium	Sodium	Potassium	Antimony	Arsenic	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Thallium	Zinc
		(Field)	(Field)	(Field)	(Field)	$CaCO_3$	Cl	SO_4	TDS	$CaCO_3$	Ca	Mg	Na	K	Sb	As	Cd	Cr	Fe	Pb	Mn	Hg	Ni	Se	Tl	Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
11/4/2003	Totals	500	15.7	7.15	NA	NA	83.6	12.4	262	133	30	15	50	3	<0.002	<0.002	<0.002	<0.01	**0.372**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.01
	Dissolved	-	-	-	-	-	-	-	-	-	30	15	50	3	<0.002	<0.002	<0.002	<0.01	0.962	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/4/2003	Totals	500	15.7	7.15	NA	NA	84.5	12.5	264	135	29	14	49	3	<0.002	<0.002	<0.002	<0.01	0.057	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	30	15	50	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Averages	471	17	7.52	3.3	120	82.3	12.5	264	134	29	15	49	3	0.005	NA	0.003	0.008	0.281	0.007	0.01	0.00005	0.01	0.01	0.004	0.008
Miami #3																										
10/30/2013	Totals	538	19.97	7.13	1.82	128	84.7	12.9	254	136	29.1	14.1	65	3	<0.002	<0.002	<0.002	<0.01	0.065	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	29	14.5	62.1	2.9	<0.002	<0.002	<0.002	<0.01	0.035	<0.005	<0.005	0.00006	<0.01	<0.01	<0.001	<0.005
11/7/2012	Totals	546	15.97	7.47	1.91	105.5	90	15.8	268	136	29	13.4	57.6	2.6	<0.002	<0.002	<0.002	<0.01	0.03	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	28.1	13.2	55.7	2.5	<0.002	<0.002	<0.002	<0.01	0.024	<0.005	<0.005	0.00006	<0.01	<0.01	<0.001	<0.005
11/2/2011	Totals	546	18.28	7.76	0.58	115	92.3	14.1	268	113	29.1	14.2	51.5	2.7	<0.002	<0.002	<0.002	<0.01	0.077	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	29.3	14.2	54.2	2.8	<0.002	<0.002	<0.002	<0.01	0.084	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/10/2010	Totals	563	19.12	6.17	0.75	111	95	16.7	261	126	29.1	13.7	55.5	2.8	<0.002	<0.002	<0.002	<0.01	0.021	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	30.4	13.9	56.5	2.8	<0.002	<0.002	<0.002	<0.01	0.037	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
3/24/2010	Totals	436	16.8	7.09	3.22	109	81	15.5	262	128	28.4	13.4	49.8	2.8	<0.002	<0.002	<0.002	<0.01	0.031	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27.9	13.2	51.3	2.9	<0.002	<0.002	<0.002	<0.01	0.023	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/22/2008	Totals	537	20.06	7.22	0.66	107	96.9	13.7	286	137	29.5	13.8	58.1	2.8	<0.002	<0.002	<0.002	<0.01	0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	29.1	13.7	56.3	2.8	<0.002	<0.002	<0.002	<0.01	0.113	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/23/2007	Totals	533	16.94	7.28	1.47	114	90.4	14.1	274	138	29.9	14	52.6	2.7	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27.9	13.4	50.6	2.7	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.006
5/8/2007	Totals	523	19.5	7.35	0.49	108	87.5	11.5	266	144	28.7	13.8	53.7	2.9	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	28.6	13.9	52.1	2.8	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2006	Totals	538	18.56	7.52	1.51	116	95.6	16.8	275	129	27	14	54	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27	13	52	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/11/2006	Totals	547	20.1	8.51	2.14	155	94.3	15.3	256	131	28	14	57	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	29	14	57	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/18/2005	Totals	492	19.3	7.7	0.7	125	92.8	12.9	263	138	31	14	54	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	31	14	55	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/18/2005	Totals	492	19.3	7.7	0.7	125	91.6	13.7	258	138	32	14	54	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	34	15	54	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/26/2005	Totals	527	18.8	7.77	1.47	NA	96.8	14	282	131	30	14	56	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
	Dissolved	-	-	-	-	-	-	-	-	-	29	14	57	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/26/2005	Totals	527	18.8	7.77	1.47	NA	97.4	15.4	283	130	29	14	56	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	29	14	56	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/12/2004	Totals	506	16.5	8	1.65	102	97.2	13.4	293	134	30	14	57	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	32	15	56	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/12/2004	Totals	506	16.5	8	1.65	102	95.7	13.6	291	132	28	13	54	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	30	14	56	3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Averages	522	18.4	7.53	1.39	116	92.5	14.34	271	133	29.3	14	55	2.9	0.002	0.002	0.002	0.01	0.03	0.005	0.009	0.00005	0.01	0.01	0.001	0.006
Miami #11																										
10/30/2013	Totals	332	19.6	7.35	2.72	104	23.7	12.2	164	121	25.7	13.3	21	1.7	<0.002	<0.002	<0.002	<0.01	0.05	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	25.6	13.6	21.3	1.6	<0.002	<0.002	<0.002	<0.01	0.047	<0.005	<0.005	<0.00015	<0.01	<0.01	<0.001	<0.005
11/7/2012	Totals	324	18.33	7.55	1	99	25.4	14.2	164	122	25.5	12.5	18.5	1.5	<0.002	<0.002	<0.002	<0.01	0.045	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	0.021
	Dissolved	-	-	-	-	-	-	-	-	-	24.7	12.4	18.2	1.4	<0.002	<0.002	<0.002	<0.01	0.038	<0.005	<0.005	<0.00015	<0.01	<0.01	<0.001	<0.005
11/2/2011	Totals	337	19.23	7.82	0.84	105	25.6	13	151	101	25.6	13	17.2	1.5	<0.002	<0.002	<0.002	<0.01	0.051	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	25.5	13.2	18.4	1.6	<0.002	<0.002	<0.002	<0.01	0.063	<0.005	<0.01	<0.00015	<0.01	<0.01	<0.001.	<0.01
11/10/2010	Totals	322	18.8	6.37	4.51	105	23.2	14.4	146	113	25.3	12.6	17	1.5	<0.002	<0.002	<0.002	<0.01	0.043	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	26.5	12.9	17.3	1.6	<0.002	<0.002	<0.002	<0.01	0.042	<0.005	<0.01	<0.00015	<0.01	<0.01	<0.001	<0.01
3/24/2010	Totals	290	17.4	7.35	2.24	104	26.8	14.2	171	116	25.9	13	20.1	1.6	<0.002	<0.002	<0.002	<0.01	0.071	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	25.2	12.7	20.5	1.6	<0.002	<0.002	<0.002	<0.01	0.05	<0.005	<0.01	<0.00015	<0.01	<0.01	<0.001	<0.005
5/8/2007	Totals	345	19.1	7.73	1.3	104	33.2	11.8	168	128	24.9	13	24.2	1.6	<0.002	<0.002	<0.002	<0.01	0.065	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	24.7	12.9	23.5	1.6	<0.002	<0.002	<0.002	<0.01	0.035	<0.005	<0.01	<0.00015	<0.01	<0.01	<0.001	<0.005
5/8/2007	Totals	345	19.1	7.73	1.3	104	34.4	11.4	171	127	25.2	13	24.3	1.6	<0.002	<0.002	<0.002	<0.01	0.055	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	25.1	13	23.2	1.6	<0.002	<0.002	<0.002	<0.01	0.026	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2006	Totals	353	19.4	7.74	1.24	111	35.9	15.6	178	117	22	12	22	2	<0.002	<0.002	<0.002	<0.01	0.081	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	22	12	22	2	<0.002	<0.002	<0.002	<0.01	0.058	<0.005	<0.01	0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2006	Totals	353	19.4	7.74	1.24	275	35.1	15.5	183	115	23	12	23	2	<0.002	<0.002	<0.002	<0.01	0.08	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	23	12	23	2	<0.002	<0.002	<0.002	<0.01	0.05	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Averages	333	18.9	7.49	1.82	123	29.3	13.59	166	118	25	13	21	2	0.002	0.002	0.002	0.01	0.053	0.005	0.009	0.00008	0.01	0.01	0.001	0.007
Picher #5 - MW																										
10/30/2013	Totals	703	19.17	6.82	1.11	147	23	171	426	329	70.4	34.1	21.4	3.3	<0.002	<0.002	<0.002	<0.01	0.168	<0.005	0.007	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	71.6	34.2	21.8	3.5	<0.002	<0.002	<0.002	<0.01	0.138	<0.005	0.007	<0.00005	<0.01	<0.01	<0.001	<0.005

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
10/30/2013	Totals	688	19.24	6.72	1.83	173	25.9	169	425	328	70.6	34.9	21.8	3.2	<0.002	<0.002	<0.002	<0.01	0.172	<0.005	0.007	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	71.1	33.6	21.8	3.4	<0.002	<0.002	<0.002	<0.01	0.137	<0.005	0.007	<0.00005	<0.01	<0.01	<0.001	<0.005
11/7/2012	Totals	671	17.43	6.98	1.29	121	26.1	160	413	301	67.7	30.6	20	3	<0.002	<0.002	<0.002	<0.01	0.144	<0.005	0.007	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	65.4	29.8	19.4	2.9	<0.002	<0.002	<0.002	<0.01	0.129	<0.005	0.007	<0.00005	<0.01	<0.01	<0.001	<0.005
11/7/2012	Totals	671	17.43	6.98	1.29	121	26.1	163	399	306	68.6	31.1	20.3	3	<0.002	<0.002	<0.002	<0.01	0.146	<0.005	0.007	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	62.9	28.8	18.8	2.7	<0.002	<0.002	<0.002	<0.01	0.13	<0.005	0.007	<0.00005	<0.01	<0.01	<0.001	<0.005
11/1/2011	Totals	431	20.18	7.66	0.71	117	30	48.4	223	146	36.8	18.2	19.5	2.6	<0.002	<0.002	<0.002	<0.01	0.239	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	38	18.8	20	2.7	<0.002	<0.002	<0.002	<0.01	0.223	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	<0.01
11/1/2011	Totals	431	20.18	7.66	0.71	117	29.6	48.4	213	146	36.9	18	19.6	2.6	<0.002	<0.002	<0.002	<0.01	0.238	<0.005	0.012	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	37.8	18.7	19.7	2.6	<0.002	<0.002	<0.002	<0.01	0.216	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	<0.01
11/10/2010	Totals	601	19.43	**5.61**	1.14	128	25.7	153	362	258	60.1	27.6	18	2.9	<0.002	<0.002	<0.002	<0.01	0.141	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	61.7	27.9	17.8	2.9	<0.002	<0.002	<0.002	<0.01	0.102	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/10/2010	Totals	601	19.43	**5.61**	1.14	128	26.1	155	354	260	60.8	28.1	18.3	2.9	<0.002	<0.002	<0.002	<0.01	0.144	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	63.2	28.5	18.2	2.8	<0.002	<0.002	<0.002	<0.01	0.102	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
3/24/2010	Totals	412	18.76	7.25	1.35	124	31.3	69.5	286	198	34.5	16.6	21.7	2.6	<0.002	<0.002	<0.002	<0.01	0.119	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	33.5	16.2	22	2.6	<0.002	<0.002	<0.002	<0.01	0.096	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
3/24/2010	Totals	412	18.76	7.25	1.35	124	31.1	72.3	287	198	35	17	21.6	2.6	<0.002	<0.002	<0.002	<0.01	0.112	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	33	15.9	22.3	2.6	<0.002	<0.002	<0.002	<0.01	0.09	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/22/2008	Totals	604	21.67	7.26	2.35	135	26	135	383	264	59.5	27.5	17	2.8	<0.002	<0.002	<0.002	<0.01	0.113	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	59.6	27.8	16.8	2.8	<0.002	<0.002	<0.002	<0.01	0.11	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/23/2007	Totals	605	19.25	7.17	2.5	137	30	119	332	265	57.4	26.5	17.9	2.9	<0.002	<0.002	<0.002	<0.01	0.118	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	58.2	27.3	17.5	2.9	<0.002	<0.002	<0.002	<0.01	0.115	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.042
10/23/2007	Totals	605	19.25	7.17	2.5	137	28.9	122	356	268	57.9	26.8	17.6	2.9	<0.002	<0.002	<0.002	<0.01	0.118	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	53.2	25	16.4	2.6	<0.002	<0.002	<0.002	<0.01	0.101	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
5/8/2007	Totals	442	20.03	7.59	1.56	119	38.9	57.2	256	194	40.9	20.1	25.8	2.8	<0.002	<0.002	<0.002	<0.01	0.116	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	37.4	18.7	23.5	2.9	<0.002	<0.002	<0.002	<0.01	0.11	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2006	Totals	635	21.46	7.23	0.88	139	27.4	141	373	282	64	28	17	3	<0.002	<0.002	<0.002	<0.01	0.118	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	58	27	17	3	<0.002	<0.002	<0.002	<0.01	0.108	<0.005	<0.01	<0.00015	<0.01	<0.01	<0.001	<0.005
4/11/2006	Totals	483	23.9	8.51	2.68	157	34.4	68.3	243	189	39	19	21	3	<0.002	<0.002	<0.002	<0.01	**0.629**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	41	20	21	3	<0.002	<0.002	<0.002	<0.01	0.112	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/11/2006	Totals	483	23.9	8.51	2.68	157	34.4	69.8	245	189	40	20	21	3	<0.002	<0.002	<0.002	<0.01	**0.227**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
	Dissolved	-	-	-	-	-	-	-	-	-	42	20	21	3	<0.002	<0.002	<0.002	<0.01	0.1	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/17/2005	Totals	544	21.8	7.81	0.3	124	27.1	119	332	264	60	27	18	3	<0.002	<0.002	<0.002	<0.01	0.098	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	71	30	18	3	<0.002	<0.002	<0.002	<0.01	0.046	<0.005	<0.01	0.00015	<0.01	<0.01	<0.001	<0.005
10/17/2005	Totals	544	21.8	7.81	0.3	124	28.3	118	307	265	61	27	18	3	<0.002	<0.002	<0.002	<0.01	0.107	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	73	30	18	3	<0.002	<0.002	<0.002	<0.01	0.043	<0.005	<0.01	0.0001	<0.01	<0.01	<0.001	0.009
4/25/2005	Totals	581	18.5	7.56	2.91	132	25.4	132	373	273	61	28	17	3	<0.002	<0.002	<0.002	<0.01	0.093	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	62	28	17	3	<0.002	<0.002	<0.002	<0.01	0.061	<0.005	<0.01	0.00011	<0.01	<0.01	<0.001	<0.005
10/12/2004	Totals	569	18.3	7.68	2.33	122	26.4	140	398	279	63	29	17	3	<0.002	<0.002	<0.002	<0.01	0.171	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	62	28	17	3	<0.002	<0.002	<0.002	<0.01	0.151	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/27/2004	Totals	536	20.7	7.33	3.19	142	28.3	126	384	253	55	26	19	3	<0.01	<0.01	<0.005	<0.005	**0.433**	<0.01	0.007	0.00005	<0.01	<0.01	<0.01	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	55	27	18	3	<0.01	<0.01	<0.005	<0.005	**0.39**	<0.01	0.007	0.00008	<0.01	<0.01	<0.01	<0.005
11/5/2003	Totals	590	14	6.52	NA	NA	25.6	135	381	278	61	29	18	3	<0.002	<0.002	<0.002	<0.01	**0.232**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	59	28	18	3	<0.002	<0.002	<0.002	<0.01	**0.213**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
4/18/2002	Totals	591	19.9	7.11	NA	136	25	121	377	271	62	29	17	3	<0.002	<0.002	<0.002	<0.01	**0.332**	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	62	29	17	3	<0.002	<0.002	<0.002	<0.01	**0.323**	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
12/13/2001	Totals	527	15.4	7.21	NA		35.6	94.8	429	216	49	24	23	3	<0.002	<0.002	<0.002	<0.01	**0.54**	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	49	24	23	3	<0.002	<0.002	<0.002	<0.01	**0.393**	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	0.014
3/9/2001	Totals	580	19.1	7.22	NA		24.3	119	375	266	58	28	17	3	<0.002	<0.002	<0.002	<0.01	0.173	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	57	28	17	3	<0.002	<0.002	<0.002	<0.01	0.156	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
10/11/2000	Totals	571	20.2	7.15	NA		24.3	101	366	280	55	27	17	3	<0.002	<0.002	<0.002	<0.01	0.218	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	56	27	17	3	<0.002	<0.002	<0.002	<0.01	0.206	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
2/25/2000	Totals	621	20.2	7.07	NA	130	30	129	379	284	60	28	19	2	<0.002	<0.002	<0.002	<0.01	0.223	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	59	28	18	3	<0.002	<0.002	<0.002	<0.01	0.216	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
8/12/1999	Totals	550	23	7.45	1.95	140	23.9	118	106	268	62	28	19	2	<0.002	<0.002	<0.002	<0.01	0.169	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7/22/1999	Totals	490	19.5	7.05	1.39	135	24.5	120	370	262	64	29	22	3	<0.002	<0.002	<0.002	<0.01	0.146	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	64	29	21	3	<0.002	<0.002	<0.002	<0.01	0.116	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
3/25/1999	Totals	440	15	7.04	5.64	130	30.4	107	342	292	55	26	19	2.7	<0.002	<0.002	<0.002	<0.01	0.21	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	55	25	18	2.7	<0.002	<0.002	<0.002	<0.01	<0.01	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
12/15/1998	Totals	380	20	7.25	NA	NA	36.5	34	273	191.7	40	19	19	1.3	<0.002	<0.002	<0.002	<0.01	0.068	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	40	19	19	2	<0.002	<0.002	<0.002	<0.01	0.044	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
8/25/1998	Totals	480	21	7.06	NA	NA	37.1	60	345	236	55	25	19	3	<0.002	<0.002	<0.002	<0.01	0.122	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	55	25	19	3	<0.002	<0.002	<0.002	<0.01	0.069	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
7/31/1998	Totals	485	21	7.07	NA	NA	31.7	38	352	260	57	27	19	3	<0.002	<0.002	<0.002	<0.01	0.08	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	57	27	17	3	<0.002	<0.002	<0.002	<0.01	0.064	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
3/20/1998	Totals	325	17	7.06	NA	NA	59.7	29.9	42	180	39	18	19	3	<0.002	<0.002	<0.002	<0.01	0.096	<0.005	NA	<0.0005	<0.025	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	38	17	18	3	<0.002	<0.002	<0.002	<0.01	0.058	<0.005	NA	<0.0005	<0.025	<0.01	<0.001	<0.005
12/4/1997	Totals	400	18	7.17	NA	NA	34.5	41.1	271	220	49	21	18	3	<0.002	<0.002	<0.002	<0.01	0.08	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	48	21	17	3	<0.002	<0.002	<0.002	<0.01	0.075	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
9/16/1997	Totals	550	22	6.94	NA	NA	31.7	105.3	371	283	57	26	17	3	<0.002	<0.002	<0.002	<0.01	0.136	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	55	25	16	3	<0.002	<0.002	<0.002	<0.01	0.133	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
8/15/1997	Totals	550	22	7.3	NA	NA	44	117	375	248	60	27	17	3	<0.002	<0.002	<0.002	<0.01	0.145	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	59	26	17	3	<0.002	<0.002	<0.002	<0.01	0.069	<0.005	NA	<0.0005	<0.01	<0.01	<0.001	<0.01
	Averages	536	19.7	7.21	1.8	133	30.2	106	330	250	55	25	19	3	0.002	0.002	0.002	0.01	0.159	0.005	0.01	0.00023	0.01	0.01	0.001	0.008
Picher #6 - MW																										
10/29/2013	Totals	787	19.84	6.66	2.79	186	10.6	**284**	**599**	474	98.2	46	22.1	3.2	<0.002	<0.002	<0.002	0.01	**0.454**	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	0.008
	Dissolved	-	-	-	-	-	-	-	-	-	95.7	48.7	21.2	3.4	<0.002	<0.002	<0.002	<0.01	**0.534**	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	0.005
11/6/2012	Totals	945	18.63	7.12	3.37	154	11.4	324	644	508	106	49.9	20.5	3.2	<0.002	<0.002	<0.002	0.01	**0.554**	<0.005	0.014	<0.00005	<0.01	<0.01	<0.001	0.014
	Dissolved	-	-	-	-	-	-	-	-	-	102	48.9	20.5	3.1	<0.002	<0.002	<0.002	<0.01	**0.509**	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	0.014
11/6/2012	Totals	945	18.63	7.12	3.37	154	11.2	**328**	**628**	510	105	49.7	20.6	3.1	<0.002	<0.002	<0.002	0.011	**0.546**	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	0.013
	Dissolved	-	-	-	-	-	-	-	-	-	102	48.9	20.3	3.1	<0.002	<0.002	<0.002	<0.01	**0.5**	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	0.014
11/1/2011	Totals	874	22.25	7.25	2.53	170	10.4	**266**	**574**	476	90.3	45.3	17	3	<0.002	<0.002	<0.002	<0.01	**0.796**	<0.005	0.014	<0.00005	<0.01	<0.01	<0.001	0.018
	Dissolved	-	-	-	-	-	-	-	-	-	97.4	47	17.7	3.1	<0.002	0.002	<0.002	<0.01	**0.827**	<0.005	0.015	<0.00005	<0.01	<0.01	<0.001	0.02
11/9/2010	Totals	790	20.06	**5.55**	3.96	161	<10	**262**	**541**	397	87.7	41.4	17.1	2.8	<0.002	<0.002	<0.002	<0.01	**0.418**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.010
	Dissolved	-	-	-	-	-	-	-	-	-	89.1	41.4	17	2.8	<0.002	<0.002	<0.002	<0.01	**0.404**	<0.005	0.011	<0.00005	<0.01	<0.01	<0.001	<0.010
11/9/2010	Totals	790	20.06	**5.55**	3.96	161	<10	**271**	**536**	398	88.2	41.7	17.1	2.8	<0.002	<0.002	<0.002	<0.01	**0.423**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.010
	Dissolved	-	-	-	-	-	-	-	-	-	89.2	41.4	16.9	2.8	<0.002	<0.002	<0.002	<0.01	**0.412**	<0.005	0.01	<0.00005	<0.01	<0.01	<0.001	<0.010
3/23/2010	Totals	773	20.71	**5.98**	4.06	155	10.3	244	**533**	371	85.5	40.3	16.4	2.8	<0.002	<0.002	<0.002	<0.01	**0.427**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.01
	Dissolved	-	-	-	-	-	-	-	-	-	84.5	39.5	16.2	2.8	<0.002	<0.002	<0.002	<0.01	**0.402**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.009
3/23/2010	Totals	773	20.71	**5.98**	4.06	155	10.4	243	**534**	374	83.7	39.7	16.2	2.8	<0.002	<0.002	<0.002	<0.01	**0.427**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.001
	Dissolved	-	-	-	-	-	-	-	-	-	84.6	39.8	16.2	2.8	<0.002	<0.002	<0.002	<0.01	**0.401**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.009
4/21/2008	Totals	662	21.89	7.1	4.24	136	<10	186	405	312	69	32.6	14.4	2.4	<0.002	<0.002	<0.002	<0.01	**0.369**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.008

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

		Cond.	Temp.	pH	D.O.	Alk (Field)	Chloride	Sulfate	Tot Dis Sol	Hardiness	Calcium	Magnesium	Sodium	Potassium	Antimony	Arsenic	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Thallium	Zinc
Analysis		(Field)	(Field)	(Field)	(Field)	$CaCO_3$	Cl	SO_4	TDS	$CaCO_3$	Ca	Mg	Na	K	Sb	As	Cd	Cr	Fe	Pb	Mn	Hg	Ni	Se	Tl	Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
	Dissolved	-	-	-	-	-	-	-	-	-	68.6	32.9	14	2.4	<0.002	<0.002	<0.002	<0.01	**0.339**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.007
4/21/2008	Totals	662	21.89	7.1	4.24	136	<10	184	397	313	70.9	33.5	14.8	2.4	<0.002	<0.002	<0.002	<0.01	**0.379**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.009
	Dissolved	-	-	-	-	-	-	-	-	-	70.3	33.4	14.3	2.4	<0.002	<0.002	<0.002	<0.01	**0.355**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.007
10/22/2007	Totals	619	16.4	7.25	4.05	143	10.2	171	387	312	68.9	31.9	13.5	2.3	<0.002	<0.002	<0.002	<0.01	**0.351**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.008
	Dissolved	-	-	-	-	-	-	-	-	-	66.7	31.8	13.5	2.3	<0.002	<0.002	<0.002	<0.01	**0.275**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.009
10/22/2007	Totals	619	16.4	7.25	4.05	143	10.2	170	406	310	68.4	31.9	13.4	2.3	<0.002	<0.002	<0.002	<0.01	**0.35**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.014
	Dissolved	-	-	-	-	-	-	-	-	-	66.5	31.5	13.4	2.3	<0.002	<0.002	<0.002	<0.01	0.259	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.011
5/7/2007	Totals	616	20.06	7.22	1.97	138	<10	177	375	286	63.6	30.8	13.7	2.4	<0.002	<0.002	<0.002	<0.01	**0.325**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	63.7	30.8	14	2.4	<0.002	<0.002	<0.002	<0.01	**0.302**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
5/7/2007	Totals	616	20.06	7.22	1.97	138	<10	175	381	290	64	30.9	13.6	2.3	<0.002	<0.002	<0.002	<0.01	**0.327**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	63.4	30.4	13.8	2.3	<0.002	<0.002	<0.002	<0.01	**0.307**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/7/2006	Totals	602	21.4	6.94	4.17	141	<10	144	339	273	56	27	12	2	<0.002	<0.002	<0.002	<0.01	**0.302**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.008
	Dissolved	-	-	-	-	-	-	-	-	-	55	27	12	2	<0.002	<0.002	<0.002	<0.01	0.274	<0.005	<0.01	0.00005	<0.01	<0.01	<0.001	0.008
4/10/2006	Totals	511	20.3	8.11	2.62	134	10	142	315	258	56	26	13	2	<0.002	<0.002	<0.002	<0.01	**0.309**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	59	27	13	2	<0.002	<0.002	<0.002	<0.01	0.284	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/10/2006	Totals	511	20.3	8.11	2.62	134	10	143	316	258	54	25	13	2	<0.002	<0.002	<0.002	<0.01	**0.301**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	57	26	13	2	<0.002	<0.002	<0.002	<0.01	0.222	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/27/2005	Totals	453	17.8	7.73	3.79	125	10	125	313	249	58	26	12	2	<0.002	0.002	<0.002	<0.01	0.296	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	59	26	12	2	<0.002	0.002	<0.002	<0.01	0.238	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/27/2005	Totals	453	17.8	7.73	3.79	125	10	125	307	251	63	27	12	2	<0.002	0.002	<0.002	<0.01	0.298	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.006
	Dissolved	-	-	-	-	-	-	-	-	-	59	26	12	2	<0.002	<0.002	<0.002	<0.01	0.282	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.006
4/25/2005	Totals	510	18.6	7.77	3.24	NA	<10	125	333	251	60	26	12	2	<0.002	0.002	<0.002	<0.01	**0.345**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.006
	Dissolved	-	-	-	-	-	-	-	-	-	58	26	12	2	<0.002	0.002	<0.002	<0.01	**0.341**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.007
4/25/2005	Totals	510	18.6	7.77	3.24	NA	<10	126	336	251	61	26	12	2	<0.002	0.002	<0.002	<0.01	**0.338**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.006
	Dissolved	-	-	-	-	-	-	-	-	-	56	25	12	2	<0.002	0.002	<0.002	<0.01	**0.331**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.006
10/11/2004	Totals	553	19.1	7.44	2.06	193	<10	170	417	303	71	30	13	2	<0.002	0.002	<0.002	<0.01	**0.531**	<0.005	0.012	<0.00005	<0.01	<0.01	<0.001	0.021
	Dissolved	-	-	-	-	-	-	-	-	-	71	30	13	2	<0.002	0.002	<0.002	<0.01	**0.507**	<0.005	0.012	<0.00005	<0.01	<0.01	<0.001	0.02
4/27/2004	Totals	555	20.9	7.26	4.92	157	<10	156	407	293	63	29	14	2	<0.01	<0.01	<0.005	<0.005	**0.444**	<0.01	0.011	0.00005	<0.01	<0.01	<0.01	0.015
	Dissolved	-	-	-	-	-	-	-	-	-	62	29	13	2	<0.01	<0.01	<0.005	<0.005	**0.414**	<0.01	0.011	0.00005	<0.01	<0.01	<0.01	0.019
12/9/2003	Totals	537	18.2	6.83	NA	135	<10	150	380	280	65	29	13	2	<0.002	0.002	<0.002	<0.01	**0.464**	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	0.016
	Dissolved	-	-	-	-	-	-	-	-	-	60	27	12	2	<0.002	0.002	<0.002	<0.01	**0.337**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.015

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
12/9/2003	Totals	537	18.2	6.83	NA	135	<10	150	381	277	64	29	13	2	<0.002	0.002	<0.002	<0.01	**0.46**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.014
	Dissolved	-	-	-	-	-	-	-	-	-	61	27	12	2	<0.002	0.002	<0.002	<0.01	**0.337**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.016
4/18/2002	Totals	565	20.3	7.24	NA	105	7.1	86	364	280	63	27	13	2	<0.002	<0.002	<0.002	<0.01	**0.6**	<0.005	0.011	<0.0005	<0.01	<0.01	<0.001	0.015
	Dissolved	-	-	-	-	-	-	-	-	-	65	27	12	2	<0.002	<0.002	<0.002	<0.01	**0.563**	<0.005	0.011	<0.0005	<0.01	<0.01	<0.001	0.017
12/13/2001	Totals	569	18.9	7.13	NA	110	6.7	152	370	276	65	27	13	2	<0.002	0.003	<0.002	<0.01	**0.677**	<0.005	0.012	<0.0005	0.01	<0.01	<0.001	0.016
	Dissolved	-	-	-	-	-	-	-	-	-	65	27	13	2	<0.002	0.003	<0.002	<0.01	**0.653**	<0.005	0.012	<0.0005	<0.01	<0.01	<0.001	0.016
2/26/2001	Totals	863	19.1	7.08	NA	165	8.8	358	623	483	111	42	16	3	<0.002	0.004	<0.002	<0.01	**1.669**	<0.005	0.024	<0.0005	0.032	<0.01	<0.001	0.079
	Dissolved	-	-	-	-	-	-	-	-	-	111	42	16	3	<0.002	0.004	<0.002	<0.01	**1.659**	<0.005	0.025	<0.0005	0.032	<0.01	<0.001	0.078
10/17/2000	Totals	900	20.5	6.94	2.72	110	6.7	307	836	874	153	57	17	3	<0.002	0.004	<0.002	<0.01	**2.304**	<0.005	0.027	<0.0005	0.03	<0.01	<0.001	0.11
	Dissolved	-	-	-	-	-	-	-	-	-	152	57	17	3	<0.002	0.004	<0.002	<0.01	**2.295**	<0.005	0.028	<0.0005	0.033	<0.01	<0.001	0.112
	Averages	659	19.6	7.08	3.41	144	9.8	198.1	447	351	76	34	15	2	0.002	0.002	0.002	0.01	**0.518**	0.005	0.012	0.00011	0.012	0.01	0.001	0.016
Picher #7																										
10/29/2013	Totals	855	19.25	6.74	2.9	172	12.2	**346**	**681**	551	109	55.4	18.2	3.6	<0.002	<0.002	<0.002	0.01	**0.278**	<0.005	0.014	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	109	54.8	17.9	3.9	<0.002	<0.002	<0.002	<0.01	**0.325**	<0.005	0.018	<0.00005	<0.01	<0.01	<0.001	<0.005
10/29/2013	Totals	858	19.55	6.68	2.18	181	12	**334**	**676**	552	109	54.9	18.2	3.6	<0.002	<0.002	<0.002	0.01	**0.276**	<0.005	0.014	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	109	54.7	17.9	3.9	<0.002	<0.002	<0.002	<0.01	**0.326**	<0.005	0.015	<0.00005	<0.01	<0.01	<0.001	<0.005
11/6/2012	Totals	933	19.24	7	1.42	162.5	12.9	**351**	**689**	565	114	53.6	16.9	3.5	<0.002	<0.002	<0.002	0.01	**0.537**	<0.005	0.017	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	110	52.3	16.6	3.4	<0.002	<0.002	<0.002	<0.01	**0.431**	<0.005	0.017	<0.00005	<0.01	<0.01	<0.001	<0.005
11/1/2011	Totals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dissolved	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
11/9/2010	Totals	835	21.74	5.96	1.59	165	12.1	**277**	**545**	419	90.3	43.2	14.7	3.1	<0.002	<0.002	<0.002	<0.01	0.204	<0.005	0.014	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	92.8	43	14.7	3	<0.002	<0.002	<0.002	<0.01	0.201	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
3/23/2010	Totals	829	20.82	6.28	2.96	176	11.3	**263**	**651**	467	100	48.1	14.2	3.4	<0.002	<0.002	<0.002	<0.01	**0.317**	<0.005	0.013	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	102	49.4	14.3	3.4	<0.002	<0.002	<0.002	<0.01	0.285	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/21/2008	Totals	779	22.21	7.09	1.92	155	11	240	490	393	85.3	41.9	12.5	3.1	<0.002	<0.002	<0.002	<0.01	0.176	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	81	40.4	11.6	2.9	<0.002	<0.002	<0.002	<0.01	0.187	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/22/2007	Totals	700	16.05	7.3	1.38	151	12	194	447	347	73.4	35.8	11.7	2.8	<0.002	<0.002	<0.002	<0.01	0.079	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	68.5	34.4	11.3	2.8	<0.002	<0.002	<0.002	<0.01	0.071	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
5/8/2007	Totals	647	19.65	7.41	1.14	148	11.8	198	405	307	67.5	34.3	12.2	2.9	<0.002	<0.002	<0.002	<0.01	0.08	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	66.9	34.5	11.9	2.8	<0.002	<0.002	<0.002	<0.01	0.075	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/7/2006	Totals	652	19.81	7.04	2.04	153	12.3	175	397	329	65	33	12	3	<0.002	<0.002	<0.002	<0.01	0.124	<0.005	0.006	<0.00005	<0.01	<0.01	<0.001	<0.005

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
	Dissolved	-	-	-	-	-	-	-	-	-	60	31	11	3	<0.002	<0.002	<0.002	<0.01	0.113	<0.005	0.006	<0.00005	<0.01	<0.01	<0.001	<0.005
4/11/2006	Totals	482	19.6	8.2	1.43	117	17.5	103	257	216	44	23	13	3	<0.002	<0.002	<0.002	<0.01	0.079	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	47	23	13	3	<0.002	<0.002	<0.002	<0.01	0.065	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/17/2005	Totals	527	20.4	7.82	0.2	179	11.4	137	326	280	62	30	11	3	<0.002	<0.002	<0.002	<0.01	0.064	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	72	32	11	3	<0.002	<0.002	<0.002	<0.01	0.062	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/25/2005	Totals	524	18.3	7.71	1.87	174	10.1	125	341	261	59	28	11	3	<0.002	<0.002	<0.002	<0.01	0.09	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	56	28	11	3	<0.002	<0.002	<0.002	<0.01	0.09	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/12/2004	Totals	483	17.9	7.83	1.31	129	13.5	112	306	244	54	26	12	3	<0.002	<0.002	<0.002	<0.01	0.127	<0.005	<0.01	0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	55	27	12	3	<0.002	<0.002	<0.002	<0.01	0.121	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/27/2004	Totals	480	20.2	7.5	4.35	105	12.6	112	335	237	51	26	12	3	<0.01	<0.01	<0.005	<0.005	0.078	<0.01	0.005	0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	49	26	12	3	<0.01	<0.01	<0.005	<0.005	0.072	<0.01	<0.005	0.00005	<0.01	<0.01	<0.001	<0.005
11/5/2003	Totals	563	14.7	6.89	NA	NA	<10	141	374	284	60	31	12	3	<0.002	<0.002	<0.002	<0.01	0.166	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	59	31	12	3	<0.002	<0.002	<0.002	<0.01	0.16	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
4/19/2002	Totals	525	20.2	7.38	NA	95	14.1	112	332	255	54	27	13	3	<0.002	<0.002	<0.002	<0.01	0.092	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	53	27	13	2	<0.002	<0.002	<0.002	<0.01	0.073	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
12/13/2001	Totals	455	16.9	7.6	NA	98	18	93.3	241	211	45	23	14	3	<0.002	<0.002	<0.002	<0.01	0.063	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	45	23	13	3	<0.002	<0.002	<0.002	<0.01	0.049	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
3/9/2001	Totals	546	17.7	7.48	NA	115	14.6	121	351	257	55	28	13	2	<0.002	<0.002	<0.002	<0.01	0.173	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	54	28	13	2	<0.002	<0.002	<0.002	<0.01	0.16	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
10/17/2000	Totals	453	16.9	7.25	NA	125	15.7	71.1	282	215	45	22	13	2	<0.002	<0.002	<0.002	<0.01	0.163	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	45	22	13	2	<0.002	<0.002	<0.002	<0.01	0.159	<0.005	<0.01	<0.0005	<0.01	<0.01	<0.001	<0.01
	Averages	638	19	7.22	1.91	144	12.9	184.5	428	336	70	35	13	3	0.002	0.002	0.002	0.01	0.163	0.005	0.011	0.00014	0.01	0.01	0.001	0.007
Quapaw #4																										
10/31/2013	Totals	295	19.12	7.09	1.49	117	11.6	14.3	129	126	26.4	14.2	7.8	1.5	<0.002	<0.002	<0.002	<0.01	0.025	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	22.9	11.9	7.7	1.4	<0.002	<0.002	<0.002	<0.01	0.02	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2012	Totals	284	18.23	7.34	0.58	101	10.8	15.5	144	128	26.5	13.2	6.1	1.3	<0.002	<0.002	<0.002	<0.01	0.031	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	0.007
	Dissolved	-	-	-	-	-	-	-	-	-	25.7	12.9	5.8	1.3	<0.002	<0.002	<0.002	<0.01	0.036	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
11/8/2012	Totals	284	18.23	7.34	0.58	101	10.8	15.7	134	127	26.3	13	6	1.3	<0.002	<0.002	<0.002	<0.01	0.032	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	0.006
	Dissolved	-	-	-	-	-	-	-	-	-	25	12.6	5.6	1.2	<0.002	<0.002	<0.002	<0.01	0.026	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
11/3/2011	Totals	276	15.3	7.72	0.8	110	17.6	14.3	128	104	26.4	13.6	6.3	1.4	<0.002	<0.002	<0.002	<0.01	0.026	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	26.3	13.8	6.9	1.4	<0.002	<0.002	<0.002	<0.01	0.034	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
11/11/2010	Totals	263	17.89	5.73	0.48	NA	<10	15.7	142	117	26.2	13.2	5.3	1.3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	26	13	5.1	1.3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/11/2010	Totals	263	17.89	5.73	0.48	NA	<10	15.2	141	116	25.8	13.1	5.2	1.3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	26	13	5.1	1.3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	0.019	<0.001	<0.01
3/25/2010	Totals	228	17.16	6.97	0.86	105	<10	14.7	141	121	26.4	13.2	7.2	1.5	<0.002	<0.002	<0.002	<0.01	0.026	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.031
	Dissolved	-	-	-	-	-	-	-	-	-	25.8	12.9	7.6	1.6	<0.002	<0.002	<0.002	<0.01	0.021	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
3/25/2010	Totals	228	17.16	6.97	0.86	105	<10	14.8	142	119	26.7	13.3	7.1	1.5	<0.002	<0.002	<0.002	<0.01	0.022	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.012
	Dissolved	-	-	-	-	-	-	-	-	-	25.9	13.2	7.4	1.5	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/22/2008	Totals	263	20.35	7.54	1.35	102	<10	13.2	144	123	26.4	13.4	5.6	1.4	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	25.6	13.1	5.3	1.3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/24/2007	Totals	280	17.87	7.4	1.46	109	10.8	14.3	137	127	27.1	13.7	6.7	1.5	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	23.4	12	5.8	1.3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.01
5/9/2007	Totals	287	19.85	7.28	1.12	104	13.4	12.6	145	132	26.2	13.7	9	1.7	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.043
	Dissolved	-	-	-	-	-	-	-	-	-	26.6	13.4	8.6	1.6	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.041
11/9/2006	Totals	276	19.12	7.39	0.52	118	18.6	20	160	134	29	14	12	2	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27	13	11	2	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/12/2006	Totals	270	18.8	8.53	1.03	92	<10	15.2	118	118	24	13	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	25	13	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/18/2005	Totals	258	19.9	7.96	1.58	96	18.6	16.4	184	136	30	14	11	2	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	30	14	11	2	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/26/2005	Totals	261	16.8	8.04	1.57	NA	<10	13.5	138	119	26	13	6	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	25	13	6	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/13/2004	Totals	242	17.4	7.86	1.43	124	<10	12.7	149	121	27	14	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27	13	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.005
10/13/2004	Totals	242	17.4	7.86	1.43	124	<10	12.8	147	121	27	13	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	27	14	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/28/2004	Totals	275	19.4	7.31	2.29	146	<10	11.8	152	122	25	13	8	2	<0.01	<0.01	<0.005	<0.005	<0.02	<0.01	<0.005	0.00005	<0.01	<0.01	<0.01	0.005
	Dissolved	-	-	-	-	-	-	-	-	-	24	13	7	2	<0.01	<0.01	<0.005	<0.005	<0.02	<0.01	<0.005	<0.00005	<0.01	<0.01	<0.01	<0.005
11/6/2003	Totals	249	17.7	7.03	NA	107	<10	11.1	129	120	25	13	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	24	13	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/6/2003	Totals	249	17.7	7.03	NA	107	<10	11.1	131	121	24	13	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
	Dissolved	-	-	-	-	-	-	-	-	-	25	13	5	1	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Averages	264	18.2	7.31	1.11	110	11.6	14.25	142	123	26	13	7	1	0.002	0.002	0.002	0.01	0.022	0.005	0.009	0.00005	0.01	0.01	0.001	0.009
Quapaw #5																										
10/31/2013	Totals	1627	18.94	6.42	1.79	308	96.5	**467**	**1120**	822	185	83.6	65.3	8.2	<0.002	0.005	<0.002	<0.01	**4.02**	<0.005	**0.052**	<0.00005	<0.01	<0.01	<0.001	0.186
	Dissolved	-	-	-	-	-	-	-	-	-	158	78.1	64.3	8.6	<0.002	0.006	<0.002	<0.01	**3.83**	<0.005	**0.05**	<0.00005	<0.01	<0.01	<0.001	0.168
10/31/2013	Totals	1643	19.17	6.46	1.23	292	95.5	**470**	**1110**	824	187	83.8	66.2	8.4	<0.002	0.005	<0.002	<0.01	**4.05**	<0.005	**0.052**	<0.00005	<0.01	<0.01	<0.001	0.187
	Dissolved	-	-	-	-	-	-				164	81.3	66.5	8.7	<0.002	0.006	<0.002	<0.01	**3.96**	<0.005	**0.052**	<0.00005	<0.01	<0.01	<0.001	0.175
11/8/2012	Totals	1694	19.65	6.49	1.29	256	98.6	552	**1170**	842	170	80.8	65.1	8.6	<0.002	0.008	<0.002	<0.01	**4.75**	<0.005	**0.067**	<0.00005	0.01	<0.01	<0.001	0.21
	Dissolved	-	-	-	-	-	-	-	-	-	172	81.8	64.4	8.6	<0.002	0.006	<0.002	<0.01	**4.6**	<0.005	**0.066**	<0.00005	0.011	<0.01	<0.001	0.2
11/3/2011	Totals	1599	15.66	6.76	1.29	294	104	**514**	**1130**	684	161	80.8	55.6	9.1	<0.002	0.008	<0.002	<0.01	**3.94**	<0.005	**0.052**	<0.00005	<0.01	<0.01	<0.001	0.135
	Dissolved	-	-	-	-	-	-	-	-	-	172	82.5	56.8	9.4	<0.002	0.006	<0.002	<0.01	**3.96**	<0.005	**0.055**	<0.00005	<0.01	<0.01	<0.001	0.139
11/11/2010	Totals	1532	18.93	**6.13**	3.53	NA	97.2	**544**	**1110**	708	166	76.2	57.1	8.8	<0.002	<0.002	<0.002	<0.01	**3.01**	<0.005	0.037	<0.00005	<0.01	<0.01	<0.001	0.123
	Dissolved	-	-	-	-	-	-	-	-	-	168	75.4	55.9	8.8	<0.002	0.007	<0.002	<0.01	**3**	<0.005	0.036	<0.00005	<0.01	<0.01	<0.001	0.128
3/25/2010	Totals	1227	14.93	**6.39**	3.28	260	94.4	**465**	**1110**	732	162	71.4	54.1	9.1	<0.002	0.004	<0.002	<0.01	**3.14**	<0.005	0.028	<0.00005	<0.01	<0.01	<0.001	0.132
	Dissolved	-	-	-	-	-	-	-	-	-	160	71.6	54.7	9	<0.002	0.003	<0.002	<0.01	**2.8**	<0.005	0.023	<0.00005	<0.01	<0.01	<0.001	0.122
4/23/2008	Totals	1497	21.15	6.5	1.8	265	99.1	**456**	**1080**	807	158	74.2	56.9	8.4	<0.002	0.004	<0.002	<0.01	**2.88**	<0.005	0.026	<0.00005	<0.01	<0.01	<0.001	0.135
	Dissolved	-	-	-	-	-	-	-	-	-	156	73.4	54.8	8.3	<0.002	0.006	<0.002	<0.01	**2.77**	<0.005	0.036	<0.00005	<0.01	<0.01	<0.001	0.126
4/23/2008	Totals	1497	21.15	6.5	1.8	265	98.5	**464**	**1100**	808	161	75.9	57.5	8.4	<0.002	0.005	<0.002	<0.01	**2.92**	<0.005	0.031	<0.00005	<0.01	<0.01	<0.001	0.138
	Dissolved	-	-	-	-	-	-	-	-	-	158	73.2	54.9	8.3	<0.002	0.006	<0.002	<0.01	**2.79**	<0.005	0.034	<0.00005	<0.01	<0.01	<0.001	0.129
10/24/2007	Totals	1503	17.23	6.8	5.94	279	95.4	**429**	**1040**	703	158	73.5	53	8.3	<0.002	0.005	<0.002	<0.01	**2.77**	<0.005	0.033	<0.00005	<0.01	<0.01	<0.001	0.13
	Dissolved	-	-	-	-	-	-	-	-	-	144	67.6	48.1	7.4	<0.002	0.005	<0.002	<0.01	**2.42**	<0.005	0.032	<0.00005	<0.01	<0.01	<0.001	0.126
10/24/2007	Totals	1503	17.23	6.8	5.94	279	95.4	**459**	**1020**	707	160	75.1	53.2	8.4	<0.002	0.005	<0.002	<0.01	**2.81**	<0.005	0.034	<0.00005	<0.01	<0.01	<0.001	0.132
	Dissolved	-	-	-	-	-	-	-	-	-	142	66.6	48.9	7.4	<0.002	0.004	<0.002	<0.01	**2.33**	<0.005	0.03	<0.00005	<0.01	<0.01	<0.001	0.116
5/9/2007	Totals	1477	20.6	6.7	1.46	264	92.9	**264**	**1000**	716	154	75	54.2	8.6	<0.002	<0.002	<0.002	<0.01	**2.62**	<0.005	0.026	<0.00005	<0.01	<0.01	<0.001	0.121
	Dissolved	-	-	-	-	-	-	-	-	-	154	74	53.5	8.4	<0.002	0.004	<0.002	<0.01	**2.45**	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.114
11/9/2006	Totals	1446	19.93	6.78	1.39	272	95.4	**391**	**968**	709	156	69	50	8	<0.002	0.004	<0.002	<0.01	**2.48**	<0.005	0.035	<0.00005	<0.01	<0.01	<0.001	0.113
	Dissolved	-	-	-	-	-	-	-	-	-	143	69	49	8	<0.002	0.004	<0.002	<0.01	**2.42**	<0.005	0.035	0.00005	<0.01	<0.01	<0.001	0.11
4/12/2006	Totals	1497	20.3	7.7	1.29	244	93.6	**434**	**992**	767	151	69	54	8	<0.002	<0.002	<0.002	<0.01	**2.62**	<0.005	0.027	<0.00005	<0.01	<0.01	<0.001	0.118
	Dissolved	-	-	-	-	-	-	-	-	-	150	68	53	8	<0.002	0.005	<0.002	<0.01	**2.57**	<0.005	0.037	<0.00005	<0.01	<0.01	<0.001	0.112
4/12/2006	Totals	1497	20.3	7.7	1.29	244	93.8	**422**	**993**	764	150	69	54	8	<0.002	<0.002	<0.002	<0.01	**2.61**	<0.005	0.026	<0.00005	<0.01	<0.01	<0.001	0.119
	Dissolved	-	-	-	-	-	-	-	-	-	147	67	53	8	<0.002	<0.002	<0.002	<0.01	**2.53**	<0.005	0.037	<0.00005	<0.01	<0.01	<0.001	0.11

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond	Temp.	pH	D.O.	Alk (Field)	Chloride	Sulfate	Tot Dis Sol	Hardiness	Calcium	Magnesium	Sodium	Potassium	Antimony	Arsenic	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Thallium	Zinc
		(Field)	(Field)	(Field)	(Field)	$CaCO_3$	Cl	SO_4	TDS	$CaCO_3$	Ca	Mg	Na	K	Sb	As	Cd	Cr	Fe	Pb	Mn	Hg	Ni	Se	Tl	Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
10/18/2005	Totals	1378	20.8	7.11	3.8	308	95.1	**417**	**1020**	358	162	72	53	8	<0.002	0.005	<0.002	<0.01	**2.44**	<0.005	0.036	<0.00005	<0.01	<0.01	<0.001	0.139
	Dissolved	-	-	-	-	-	-	-	-	-	168	73	50	7	<0.002	0.005	<0.002	<0.01	**2.34**	<0.005	0.038	<0.00005	<0.01	<0.01	<0.001	0.143
4/26/2005	Totals	1350	19.2	7.1	1.93	NA	92.4	**412**	**1020**	733	159	72	52	7	<0.002	0.005	<0.002	<0.01	**2.86**	<0.005	0.039	<0.00005	<0.01	<0.01	<0.001	0.167
	Dissolved	-	-	-	-	-	-	-	-	-	152	68	51	7	<0.002	0.005	<0.002	<0.01	**2.68**	<0.005	0.039	<0.00005	<0.01	<0.01	<0.001	0.159
10/13/2004	Totals	1341	18.6	7.01	2.43	247	95.9	**410**	**1010**	739	159	70	53	7	<0.002	0.005	<0.002	<0.01	**3.06**	<0.005	0.043	<0.00005	<0.01	<0.01	<0.001	0.178
	Dissolved	-	-	-	-	-	-	-	-	-	144	65	48	7	<0.002	0.005	<0.002	<0.01	**2.75**	<0.005	0.042	<0.00005	<0.01	<0.01	<0.001	0.16
4/28/2004	Totals	1372	21.7	6.87	1.75	260	104	**455**	**1083**	754	148	71	59	8	<0.01	<0.01	<0.005	<0.005	**3.68**	<0.01	**0.05**	<0.00005	<0.01	<0.01	<0.01	0.208
	Dissolved	-	-	-	-	-	-	-	-	-	147	72	58	7	<0.01	**0.011**	<0.005	<0.005	**3.58**	<0.01	0.049	<0.00005	<0.01	<0.01	<0.01	0.194
11/6/2003	Totals	1427	18.5	6.41	NA	265	102	**401**	**1050**	751	146	70	58	8	<0.002	**0.005**	<0.002	<0.01	**3.72**	<0.005	0.046	<0.00005	<0.01	<0.01	<0.001	0.222
	Dissolved	-	-	-	-	-	-	-	-	-	147	71	59	8	<0.002	**0.005**	<0.002	<0.01	**3.69**	<0.005	0.047	<0.00005	<0.01	<0.01	<0.001	0.213
4/18/2002	Totals	1231	21	6.77	NA	160	86.6	**305**	**890**	665	135	63	47	7	<0.002	**0.003**	<0.002	<0.01	**3.072**	<0.005	0.037	<0.0005	<0.01	<0.01	<0.001	0.08
	Dissolved	-	-		-			-	-	-	130	61	46	7	<0.002	**0.003**	<0.002	<0.01	**2.943**	<0.005	0.037	<0.0005	<0.01	<0.01	<0.001	0.08
12/14/2001	Totals	1237	15.3	6.96	NA	185	80.3	**376**	**828**	610	133	61	49	7	<0.002	**0.003**	<0.002	<0.01	**2.762**	0.012	0.037	<0.0005	<0.01	<0.01	<0.001	0.135
	Dissolved	-	-		-			-	-	-	126	59	**48**	7	<0.002	**0.004**	<0.002	<0.01	**2.619**	<0.005	0.037	<0.0005	<0.01	<0.01	<0.001	0.141
3/9/2001	Totals	1144	20.2	7	NA	200	69.2	**293**	**814**	558	124	57	41	6	<0.002	**0.003**	<0.002	<0.01	**2.325**	<0.005	0.036	<0.0005	<0.01	<0.01	<0.001	0.118
	Dissolved	-	-		-			-	-	-	148	74	33	3	<0.002	**0.003**	<0.002	<0.01	**2.599**	<0.005	0.036	<0.0005	<0.01	<0.01	<0.001	0.115
10/13/2000	Totals	1166	21.5	7.02	3.21	230	71.3	**279**	**825**	907	NA	NA	42	NA	<0.002	**0.003**	<0.002	<0.01	**2.832**	<0.005	0.036	<0.0005	<0.01	<0.01	<0.001	0.132
	Dissolved	-	-	-	-	-	-	-	-	-	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Averages	1,430	19.2	6.8	2.44	256	93.4	**420.8**	**1,021**	725	154	72	54	8	0.002	0.005	0.002	0.01	**3.044**	0.005	0.039	0.00012	0.01	0.01	0.001	0.143
RWD4 #3																										
10/31/2013	Totals	308	18.55	7.3	0.7	110	20.7	11.2	140	137	27.7	16.1	8.3	1.7	<0.002	<0.002	<0.002	<0.01	0.023	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	28	16.3	9.2	8.6	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.005	<0.00005	<0.01	<0.03	<0.001	<0.005
11/8/2012	Totals	305	19.47	7.5	1.59	101.5	19.8	11.6	145	137	27.6	14.8	8.2	1.6	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	28.2	15	8.1	1.6	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.005	<0.00005	<0.01	<0.03	<0.001	<0.005
11/3/2011	Totals	305	16.03	7.77	2.3	109	24.1	11	140	115	27.3	15.5	7.3	1.6	<0.002	<0.002	<0.002	<0.01	0.023	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	26.9	16.3	7.3	1.6	<0.002	<0.002	<0.002	<0.01	0.025	<0.005	<0.01	<0.00005	<0.01	<0.03	<0.001	<0.01
11/3/2011	Totals	305	16.03	7.77	2.3	109	18.4	10	144	114	27.5	15.5	7.1	1.6	<0.002	<0.002	<0.002	<0.01	0.023	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	27.3	15.6	7.3	1.6	<0.002	<0.002	<0.002	<0.01	0.025	<0.005	<0.01	<0.00005	<0.01	<0.03	<0.001	<0.01
11/11/2010	Totals	300	19.11	6.58	1.12	NA	16.8	10.8	158	127	27.5	14.9	7.5	1.6	<0.002	<0.002	<0.002	<0.01	0.022	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	28.2	15.2	7.6	1.6	<0.002	<0.002	<0.002	<0.01	0.025	<0.005	<0.01	<0.00005	<0.01	<0.03	<0.001	<0.01
3/25/2010	Totals	245	15.66	7.13	2.78	108	18.2	11.9	151	135	27.3	14.9	7.2	1.6	<0.002	<0.002	<0.002	<0.01	0.023	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

		Cond.	Temp.	pH	D.O.	Alk (Field)	Chloride	Sulfate	Tot Dis Sol	Hardiness	Calcium	Magnesium	Sodium	Potassium	Antimony	Arsenic	Cadmium	Chromium	Iron	Lead	Manganese	Mercury	Nickel	Selenium	Thallium	Zinc
Analysis		(Field)	(Field)	(Field)	(Field)	$CaCO_3$	Cl	SO_4	TDS	$CaCO_3$	Ca	Mg	Na	K	Sb	As	Cd	Cr	Fe	Pb	Mn	Hg	Ni	Se	Tl	Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
	Dissolved	-	-	-	-	-	-	-	-	-	27.2	15	7.3	1.6	<0.002	<0.002	<0.002	<0.01	0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/23/2008	Totals	297	21.47	7.05	0.98	107	18.1	<10	157	135	28.1	15.3	6.9	1.6	<0.002	<0.002	<0.002	<0.01	0.039	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-		-	-	-	26.8	14.7	6.6	1.6	<0.002	<0.002	<0.002	<0.01	0.033	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/24/2007	Totals	295	18.31	7.58	0.55	113	17.7	<10	141	137	27.1	15.1	6.8	1.6	<0.002	<0.002	<0.002	<0.01	0.026	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-		-	-	-	24.3	13.6	6	1.3	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
5/9/2007	Totals	298	19.75	7.52	0.93	125	17.8	<10	151	141	26.8	15.1	7.2	1.5	<0.002	<0.002	<0.002	<0.01	0.024	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-		-	-	-	26.6	15	7.1	1.6	<0.002	<0.002	<0.002	<0.01	0.021	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
5/9/2007	Totals	298	19.75	7.52	0.93	125	17.7	<10	147	143	26.5	15	7	1.5	<0.002	<0.002	<0.002	<0.01	0.022	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-		-	-	-	26.6	15	7.1	1.6	<0.002	<0.002	<0.002	<0.01	0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/9/2006	Totals	299	20.28	7.69	1.25	116	18.1	11	160	135	27	15	7	2	<0.002	<0.002	<0.002	<0.01	0.025	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-		-	-	-	26	15	7	2	<0.002	<0.002	<0.002	<0.01	0.022	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/12/2006	Totals	309	19.4	7.98	0.86	99	17.9	10.5	134	130	25	15	7	2	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-		-	-	-	27	15	7	2	<0.002	<0.002	<0.002	<0.01	0.022	<0.005	0.015	<0.00005	<0.01	<0.01	<0.001	<0.005
10/18/2005	Totals	295	20.4	8.09	1.05	141	17.7	10.4	168	140	29	16	7	2	<0.002	<0.002	<0.002	<0.01	0.025	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-		-	-	-	28	15	6	2	<0.002	<0.002	<0.002	<0.01	0.022	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/26/2005	Totals	282	18.4	8.01	1.91	NA	16.5	10.2	157	133	28	15	6	2	<0.002	<0.002	<0.002	<0.01	0.031	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-		-	-	-	28	15	6	2	<0.002	<0.002	<0.002	<0.01	0.026	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/13/2004	Totals	275	18.9	7.97	2.3	157	16.6	10.2	154	132	29	16	7	2	<0.002	<0.002	<0.002	<0.01	0.026	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	28	15	6	2	<0.002	<0.002	<0.002	<0.01	<0.02	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
4/28/2004	Totals	273	19.9	7.42	3.34	124	15.2	<10	160	135	26	15	6	2	<0.01	<0.01	<0.005	<0.005	0.026	<0.01	<0.005	0.00005	<0.01	<0.01	<0.01	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	26	15	6	2	<0.01	<0.01	<0.005	<0.005	0.027	<0.01	<0.005	0.00005	<0.01	<0.01	<0.01	<0.005
4/28/2004	Totals	273	19.9	7.42	3.34	124	15.2	<10	159	132	25	15	6	2	<0.01	<0.01	<0.005	<0.005	0.025	<0.01	<0.005	0.00005	<0.01	<0.01	<0.01	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	26	15	6	2	<0.01	<0.01	<0.005	<0.005	0.029	<0.01	<0.005	<0.00005	<0.01	<0.01	<0.01	<0.005
11/7/2003	Totals	283	17.7	6.65	NA	110	14.8	<10	133	135	27	15	6	2	<0.002	<0.002	<0.002	<0.01	0.044	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	27	15	6	2	<0.002	<0.002	<0.002	<0.01	0.038	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/7/2003	Totals	283	17.7	6.65	NA	110	14.6	<10	136	134	27	16	6	2	<0.002	<0.002	<0.002	<0.01	0.045	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	27	16	6	2	<0.002	<0.002	<0.002	<0.01	0.038	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Averages	291	18.8	7.45	1.66	117	17.7	10.46	149	133	27	15	7	2	0.003	0.003	0.002	0.009	0.026	0.006	0.009	0.00005	0.01	0.013	0.002	0.006
RWD7 #2																										
10/31/2013	Totals	1202	21.1	7.59	1.21	139	266	12.8	579	169	35.3	17.9	205	5.5	<0.002	<0.002	<0.002	<0.01	0.154	<0.005	0.005	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	35.1	17.6	205	5.5	<0.002	<0.002	<0.002	<0.01	0.115	<0.005	0.005	<0.00005	<0.01	<0.01	<0.001	<0.005

Table 2: Analytical Data for Tar Creek Roubidoux Groundwater Monitoring Program

Analysis		Cond. (Field)	Temp. (Field)	pH (Field)	D.O. (Field)	Alk (Field) $CaCO_3$	Chloride Cl	Sulfate SO_4	Tot Dis Sol TDS	Hardiness $CaCO_3$	Calcium Ca	Magnesium Mg	Sodium Na	Potassium K	Antimony Sb	Arsenic As	Cadmium Cd	Chromium Cr	Iron Fe	Lead Pb	Manganese Mn	Mercury Hg	Nickel Ni	Selenium Se	Thallium Tl	Zinc Zn
Unit		µS/cm	°C		mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l	mg/l
MCL/(SMCL)				(6.5 – 8.5)			250	250	500						0.006	0.01	0.005	0.1	0.3	0.015	0.05	0.002	0.1	0.05	0.002	5
Roub. T.L.								82											0.207							0.043
Roub. Back								25											0.062							0.009
11/8/2012	Totals	1191	20.4	7.59	5.2	126.5	**273**	14.3	**580**	165	35.1	16.3	187	5.4	<0.002	<0.002	<0.002	<0.01	0.231	<0.005	0.006	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	35.7	16.8	188	5.3	<0.002	<0.002	<0.002	<0.01	0.117	<0.005	0.006	<0.00005	<0.01	<0.01	<0.001	<0.005
11/3/2011	Totals	1197	20.4	7.78	0.55	141	**278**	11.8	**571**	143	35.5	17.1	164	5.4	<0.002	<0.002	<0.002	<0.01	0.145	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	35.2	17.2	169	5.6	<0.002	<0.002	<0.002	<0.01	0.108	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
11/11/2010	Totals	1175	21.3	6.97	0.47	NA	**262**	17.6	**586**	155	35.4	16.7	179	5.6	<0.002	<0.002	<0.002	<0.01	0.124	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.01
	Dissolved	-	-	-	-	-	-	-	-	-	35.7	16.7	179	5.6	<0.002	<0.002	<0.002	<0.01	0.105	<0.005	<0.01	<0.00005	<0.01	0.021	<0.001	<0.01
3/25/2010	Totals	1047	18.7	7.36	1.09	144	**269**	13.7	**602**	159	35.7	16.6	179	5.7	<0.002	<0.002	<0.002	<0.01	0.141	<0.005	<0.01	<0.00005	<0.01	0.014	<0.001	0.028
	Dissolved	-	-	-	-	-	-	-	-	-	34.4	16.4	180	5.7	<0.002	<0.002	<0.002	<0.01	0.113	<0.005	<0.01	<0.00005	<0.01	0.011	<0.001	<0.005
5/9/2008	Totals	1169	22.5	7.37	3.55	148	277	12.4	**592**	171	35.3	16.7	176	5.7	<0.002	<0.002	<0.002	<0.01	0.0784	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	35.2	16.5	175	5.6	<0.002	<0.002	<0.002	<0.01	0.105	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
10/24/2007	Totals	1189	20.2	7.72	0.39	142	277	13.4	**596**	168	36.2	17.4	177	5.7	<0.002	<0.002	<0.002	<0.01	0.144	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.012
	Dissolved	-	-	-	-	-	-	-	-	-	32.5	15.7	162	5.2	<0.002	<0.002	<0.002	<0.01	0.0811	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	0.007
5/9/2007	Totals	1181	22.4	7.62	1.41	143	272	13	**573**	170	35.3	17.4	184	6.2	<0.002	<0.002	<0.002	<0.01	0.118	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	34.6	17.5	182	6	<0.002	<0.002	<0.002	<0.01	0.0946	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/9/2006	Totals	1446	20	6.78	1.39	270	**286**	18.6	**606**	159	37	16	172	6	<0.002	<0.002	<0.002	<0.01	0.087	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	32	16	164	5	<0.002	<0.002	<0.002	<0.01	0.076	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
11/9/2006	Totals	1446	20	6.78	1.39	275	**287**	18.8	**598**	160	36	16	171	6	<0.002	<0.002	<0.002	<0.01	0.09	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Dissolved	-	-	-	-	-	-	-	-	-	33	16	167	6	<0.002	<0.002	<0.002	<0.01	0.075	<0.005	<0.01	<0.00005	<0.01	<0.01	<0.001	<0.005
	Averages	1,224	20.7	7.36	1.67	170	275	14.6	**568**	162	35	16.7	178	5.6	0.002	0.002	0.002	0.01	0.115	0.005	0.009	0.00005	0.01	0.011	0.001	0.008

Notes:
Cond. = conductivity
Temp. = temperature
Alk = alkalinity
µs/cm = microSiemens per centimeter
°C = degree Celsius
mg/L = milligram per liter
MCL = maximum containment levels as of May, 2009 (EPA, 2009)
SMCL = secondary maximum containment levels as of May, 2009 (EPA, 2009)
Roub. T. L. = Roubidoux tolerance limit
Roub. Back = Roubidoux background
Bold = indicates an MCL or SMCL exceedance
NA = not analyzed
- = not relevant

Table 3: Metal Concentrations in Groundwater Samples Central Mill (FT059)/Repository Monitor Wells

		Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Analysis		Al	Sb	As	Ba	Be	Cd	Ca	Cr (total)	Co	Cu	Fe	Pb	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl	V	Zn
Unit		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL/(SMCL)		(50 - 200)	6	10	2000	4	5	Na	100	Na	1300/(1000)	300	15*	Na	-50	2	Na	Na	50	100	Na	2	Na	5000
Acute*		Na	Na	360	Na	Na	161	Na	Na	Na	71	Na	477	Na	Na	2	4582	Na	20	44	Na	1400	Na	379
Chronic*		Na	Na	190	Na	Na	3	Na	50	Na	42	Na	19	Na	Na	1	509	Na	5	Na	Na	Na	Na	343
FT059-MW1		**Dissolved Metals**																						
5/6/2009	Result	100	1	5.4	14.5	5	5	549000	10	20	31.7	**139000**	1	19000	**1040**	0.2	20	4950	1	10	11000	1	20	51.7
	Qualifier	U	U	JH	=	U	U	=	U	U	JH	**JH**	U	=	=	=	U	=	U	U	=	U	U	JH
7/28/2009	Result	100	2	9.2	11.8	5	5	488000	10	20	20	**11400**	2	13200	**843**	0.2	20	3510	2	10	6280	2	20	20
	Qualifier	U	U	=	=	U	U	=	U	U	U	**J**	U	=	**J**	=	U	=	U	U	=	U	U	U
10/14/2009	Result	100	5	7.9	14.6	5	5	590000	10	20	20	**12200**	5	112200	**968**	0.2	20	3640	5	10	6330	5	20	27.5
	Qualifier	U	U	=	=	U	U	=	U	U	U	=	U	=	**J**	U	U	=	U	U	=	U	U	JH
9/1/2010	Result	100	0.2	4	10.1	5	5	544000	10	20	20	**14600**	0.4	8110	**840**	0.2	20	2690	0.4	10	4220	0.2	20	20
	Qualifier	U	U	=	=	U	U	=	U	U	U	=	U	=	=	=	U	=	U	U	=	U	U	U
FT059-MW1		**Total Metals**																						
5/6/2009	Result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Qualifier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/28/2009	Result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Qualifier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/14/2009	Result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Qualifier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9/1/2010	Result	100	0.2	**10.4**	10.9	5	5	522000	10	20	20	**23000**	**19.3**	8080	**822**	0.2	20	2770	0.4	10	4070	0.2	20	42.7
	Qualifier	U	U	=	=	U	U	=	U	U	U	=	=	=	=	=	U	=	U	U	=	U	U	=
FT059-MW2		**Dissolved Metals**																						
5/7/2009	Result	100	1	7.9	24.8	5	5	511000	10	20	20	**42900**	1	47600	**2790**	0.2	20	10600	1	10	60000	1	20	**506**
	Qualifier	U	U	JH	=	U	U	=	U	U	U	=	U	=	=	=	U	=	U	U	=	U	U	**JH**
7/28/2009	Result	100	2	**13.1**	18.2	5	5	491000	10	20	20	**39700**	2	40100	**2010**	0.2	20	10100	2	10	30000	2	20	**493**
	Qualifier	U	U	=	=	U	U	=	U	U	U	=	U	=	=	=	U	=	U	U	=	U	U	**J**
10/14/2009	Result	100	5	**10.5**	19.3	5	5	597000	10	20	20	**33200**	5	28300	**865**	0.2	20	11600	5	5	20900	5	20	**270**
	Qualifier	U	U	=	=	U	U	=	U	U	U	=	U	=	=	U	U	=	U	U	=	U	U	**JH**
8/31/2010	Result	100	0.2	**15.5**	15.4	5	5	535000	10	20	20	**37000**	0.4	22600	**523**	**0.2**	20	11000	0.4	10	18800	0.2	20	**308**
	Qualifier	U	U	=	=	U	U	=	U	U	U	=	U	=	=	=	U	=	U	U	=	U	U	=
12/8/2010	Result	500	2	**11.2**	50	25	25	595000	50	100	100	**34200**	2	24400	**590**	0.2	100	11400	2	50	18500	2	100	**310**
	Qualifier	U	U	=	U	U	U	=	U	U	U	=	U	=	=	U	U	=	U	U	=	U	U	=
6/16/2011	Result	20	2	**12.6**	14.1	1	1	550000	2	1	**6.6**	**38900**	1	21300	**439**	0.2	**8.9**	9300	5	1	17900	1	5	**282**
	Qualifier	U	U	=	=	U	U	=	U	U	=	=	U	=	=	U	=	J	U	U	=	U	U	=
9/29/2011	Result	**441**	2	**21.1**	16.1	1	1	604000	**3.1**	**2.9**	**2.5**	**40300**	**34.4**	24200	**552**	0.2	**6.1**	10100	5	1	18000	1	5	**574**
	Qualifier	**J+**	U	=	=	U	U	=	=	=	=	**J**	=	=	=	U	=	=	U	U	=	U	U	=

Table 3: Metal Concentrations in Groundwater Samples Central Mill (FT059)/Repository Monitor Wells

		Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Analysis		Al	Sb	As	Ba	Be	Cd	Ca	Cr (total)	Co	Cu	Fe	Pb	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl	V	Zn
Unit		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL/(SMCL)		(50 – 200)	6	10	2000	4	5	Na	100	Na	1300/(1000)	300	15*	Na	-50	2	Na	Na	50	100	Na	2	Na	5000
Acute*		Na	Na	360	Na	Na	161	Na	Na	Na	71	Na	477	Na	Na	2	4582	Na	20	44	Na	1400	Na	379
Chronic*		Na	Na	190	Na	Na	3	Na	50	Na	42	Na	19	Na	Na	1	509	Na	5	Na	Na	Na	Na	343
12/7/2011	Result	200	4	9.8	20	2	2	614000	4	2.4	1.3	33500	2	24500	629	0.2	15.7	10500	10	2	19800	2	10	246
	Qualifier	U	U	=	U	U	U	=	U	=	U	=	U	=	=	U	J	=	U	U	=	U	U	=
FT059-MW1		Total Metals																						
5/7/2009	Result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Qualifier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/28/2009	Result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Qualifier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/14/2009	Result	100	2	12.9	19.7	5	5	564000	10	20	27	30900	45.7	26200	811	0.2	20	10500	2	10	18700	2	20	340
	Qualifier	U	U	=	=	U	U	=	U	U	JH	=	=	=	=	U	U	=	U	U	=	U	U	JH
8/31/2010	Result	100	0.2	17	14.6	5	5	515000	10	20	20	37200	10.9	21800	493	0.2	20	10700	0.4	10	18000	0.2	20	345
	Qualifier	U	U	=	=	U	U	=	U	U	U	=	=	=	=	=	U	=	U	U	=	U	U	=
12/8/2010	Result	500	2	12.3	50	25	25	592000	50	100	100	37000	5.5	24200	587	0.2	100	11100	2	50	18300	2	100	325
	Qualifier	U	U	=	U	U	U	=	U	U	U	=	=	=	=	U	U	=	U	U	=	U	U	=
6/16/2011	Result	20	2	15.8	14.1	1	1	546000	2	1	2	39500	5.4	20600	451	0.2	8.4	8940	5	1	16300	1	5	305
	Qualifier	U	U	=	=	U	U	=	UJ	U	U	=	=	=	=	U	J	=	U	U	=	U	U	=
9/29/2011	Result	599	2	42	15.4	1	2.9	603000	3.5	2.8	24.8	61000	349	28000	619	0.2	5.4	9980	5	1	18400	1	5	961
	Qualifier	=	U	=	=	U	=	=	=	=	=	J	=	=	=	U	J	=	U	U	=	U	U	=
12/7/2011	Result	200	2	13.7	18	1	1	702000	2	2.8	1.5	35000	4.8	23600	556	0.022	14.9	10400	5	1	19200	2	5	262
	Qualifier	U	U	=	=	U	U	J	U	=	U	J	=	=	J	U	J	=	U	U	=	U	U	J
FT059-MW3		Dissolved Metals																						
5/6/2009	Result	100	1	8.7	30.5	5	5	357000	10	31	25.8	55400	1	59900	6160	0.2	20	6310	1	10	81300	1	20	253
	Qualifier	U	U	JH	=	U	U	=	U	=	JH	=	U	=	=	=	U	=	U	U	=	U	U	JH
7/28/2009	Result	100	2	7.6	24.2	5	5	272000	10	48.6	20	63400	2	55000	9570	0.2	20	3970	2	10	69800	2	20	94
	Qualifier	U	U	=	=	U	U	=	U	=	U	=	U	=	=	=	U	=	U	U	=	U	U	J
10/14/2009	Result	100	5	8.4 =	30.5 =	5	5	344000	10	41.3	20	60400	5	67400	9140	0.2	20	5650	5	10	86900	5	20	80.9
	Qualifier	U	U	=	=	U	U	=	U	=	U	=	U	=	=	U	U	=	U	U	=	U	U	JH
8/31/2010	Result	100	0.2	4	32.2	5	5	304000	10	22.2	20	34500	0.4	60600	5530	0.2	20	5120	0.4	10	76600	0.2	20	20
	Qualifier	U	U	=	=	U	U	=	U	=	U	=	U	=	=	=	U	=	U	U	=	U	U	U
12/8/2010	Result	500	2	3.3	50	25	25	314000	50	100	100	60300	2	62900	9600	0.2	100	5000	2	50	77200	2	100	100
	Qualifier	U	U	=	U	U	U	=	U	U	U	=	U	=	=	U	U	U	U	U	=	U	U	U
6/14/2011	Result	20	2	2.2	29.3	1	1	308000	2	58.2	2	86200	1	62200	12500	0.2	12.5	3900	5	1	77200	1	5	26.8
	Qualifier	U	U	J+	=	U	U	=	U	=	U	=	U	=	=	U	=	J	U	U	=	U	U	UC
9/29/2011	Result	278	2	9.6	24.7	1	1	397000	7.4	28.7	2	49900	1	58200	7370	0.2	5.7	5720	5	1	72900	1	2.4	91.1
	Qualifier	UC	U	=	=	U	U	=	=	=	U	J	U	=	=	U	=	=	U	U	=	U	U	=

Table 3: Metal Concentrations in Groundwater Samples Central Mill (FT059)/Repository Monitor Wells

		Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Thallium	Vanadium	Zinc
Analysis		Al	Sb	As	Ba	Be	Cd	Ca	Cr (total)	Co	Cu	Fe	Pb	Mg	Mn	Hg	Ni	K	Se	Ag	Na	Tl	V	Zn
Unit		µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L	µg/L
MCL/(SMCL)		(50 – 200)	6	10	2000	4	5	Na	100	Na	1300/(1000)	300	15*	Na	-50	2	Na	Na	50	100	Na	2	Na	5000
Acute*		Na	Na	360	Na	Na	161	Na	Na	Na	71	Na	477	Na	Na	2	4582	Na	20	44	Na	1400	Na	379
Chronic*		Na	Na	190	Na	Na	3	Na	50	Na	42	Na	19	Na	Na	1	509	Na	5	Na	Na	Na	Na	343
12/7/2011	Result	200	4	4.8	30.2	2	2	386000	4	26.4	1.7	**36400**	2	57200	**6030**	0.2	**14.5**	5780	10	2	70600	2	10	149
	Qualifier	U	U	=	J	U	U	=	U	=	U	=	U	=	=	U	**J**	=	U	U	=	U	U	=
FT059-MW3		**Total Metals**																						
5/6/2009	Result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Qualifier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7/28/2009	Result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Qualifier	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10/14/2009	Result	128	2	9.8	48	5	5	344000	10	46.8	29.4	**64600**	**76.4**	66400	**9340**	0.2	20	5310	2	10	81400	2	20	317
	Qualifier	=	U	=	=	U	U	=	U	=	JH	=	=	=	=	U	U	=	U	U	=	U	U	JH
8/31/2010	Result	100	0.2	9.2	41	5	5	314000	10	21.7	20	**56300**	**15.2**	62200	**5390**	0.2	20	5340	0.4	10	79200	0.2	20	61.8
	Qualifier	U	U	=	=	U	U	=	U	=	U	=	=	=	=	=	U	=	U	U	=	U	U	=
12/8/2010	Result	500	2	3.7	50	25	25	325000	50	100	100	**59000**	2.2	65100	**9350**	0.2	100	5000	2	50	78800	2	100	100
	Qualifier	U	U	=	U	U	U	=	U	U	U	=	=	=	=	U	U	U	U	U	=	U	U	U
6/14/2011	Result	20	2	3.3	28.7	1	1	302000	2	60.6	2	**92100**	1.3	61600	**13100**	0.2	**13.2**	3810	5	1	77400	1	5	30.6
	Qualifier	U	U	=	=	U	U	=	UJ	=	U	=	UC	=	=	U	J	=	U	U	=	U	U	UC
9/29/2011	Result	250	2	8.6	19.4	1	1	396000	4.6	21	2	**49900**	1.6	57000	**4950**	0.2	**4.3**	5700	5	1	70400	1	5	78.9
	Qualifier	UC	U	=	=	U	U	=	=	=	U	**J**	=	=	=	U	**J**	=	U	U	=	U	U	=
12/7/2011	Result	200	4	5.2	28.8	2	2	395000	4	25	0.89	**41300**	2	58700	**6020**	0.2	**13.2**	6050	10	2	72300	2	10	144
	Qualifier	U	U	=	=	U	U	J	U	=	U	**J**	U	J	**J**	U	**J**	=	U	U	=	U	U	J

Notes:

* = Oklahoma Water Quality Standards obtained from 785 OAC 45 Appendix G. Values for Cadmium, copper, lead, nickel, silver, and zinc are calculated based on a hardness of 400 mg/L, which is the maximum default recommended by EPA in calculating water quality standards.

*Remediation goal from OU4 ROD – also the MCL

µg/L = microgram per liter

MCL = maximum containment level

SMCL = secondary maximum containment level

bold = MCL/SMCL exceedance

shaded = Water Quality Standard exceedance

- = analysis not performed

= = detected concentration

J = estimated concentration

JH = estimated concentration, results biased high

NA = not applicable

U = not detected

Figure 2: Roubidoux Monitoring Well Locations

We make every effort to provide and maintain accurate, complete, usable, and timely information. However, some data and information on this map may be preliminary or out of date and is provided with the understanding that it is not guaranteed to be correct or complete. Conclusions drawn from, or actions undertaken on the basis of, such data and information are the sole responsibility of the user.

DEQ
OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Legend

Figure 2:
Roubidoux Monitoring
Well Locations

N
W E
S

Map Created by Brent Stone
on 5/15/2015

0 1.5 3 6 Miles

3.5 Site Inspections

An SI was conducted at the site from January 14 to 16, 2015. The completed SI checklist is provided in Appendix E. Photographs taken during the SI are provided in Appendix F.

The Admiralty Mine Site dike and diversion channel at Douthat Bridge was visited during the SI. The stream channel improvements that divert Lytle Creek to an upper reach of Tar Creek appeared to be functioning as designed. There were no signs that the stream was eroding the channel. Riprap was present along the cut-banks of the channel. The dike was in good condition and there was no evidence of erosion, slides, burrows, or sloughing.

Five wells (Tulsa Mine, Powerhouse well, Quapaw #5, Quapaw #2, and Picher #5) that enter the Roubidoux aquifer were visited during the SI. The Tulsa Mine and Powerhouse wells were plugged in January 2015. Plugging these wells is imperative to protect the Roubidoux aquifer from Boone aquifer contamination. The three additional wells are municipal water supply wells. After action monitoring documents that Quapaw #5 exceeds indicator parameter criteria for determining impacted wells. Quapaw #2 is a backup well for Quapaw and while it does not exceed MCLs it has shown historical exceedances of indicator parameters and has a connection to the Roubidoux. ODEQ has concerns about these two wells (*i.e.*, Quapaw #5 and Quapaw #2), and intends to have discussions with the City of Quapaw regarding plugging these wells.

The Roubidoux Groundwater Monitoring Program has sampled approximately 13 wells completed in the Roubidoux aquifer. The results of the Roubidoux Groundwater Monitoring Program are documented in After Action Monitoring Reports and described in Section 3.4.

The OU2 ROD addresses lead-contaminated soil in residential yards and HAAs. HAAs are areas which are areas frequented by children, such as parks and schoolyards. Contaminated soils excavated from residential yards and HAAs were disposed at two on-site repositories (South Repository and state-line Repository). Both OU2 repositories were secured by locked gates and barbed wire fence. Although the SI occurred during winter, it was apparent that the repositories are well vegetated. Remediation of residential yards for OU2 was completed in the towns of Afton, Cardin, Commerce, Fairland, Miami, Narcissa, North Miami, Peoria, Picher, Quapaw, and Wyandotte. Drive-by inspections of remediated properties were conducted in Quapaw, Commerce, and Miami. Remediated properties included yards, driveways, and alleyways. Yards that were inspected appeared to be in good condition and had vegetation. Driveways and alleyways that were inspected also appeared in good condition and were easily identified from the presence of fresh limestone. Existing data on blood lead levels in children at the site have demonstrated that the OU2 remediation has been effective.

The OU4 ROD addresses source materials, smelter wastes, rural residential yard contamination, transition zone soil contamination, and contamination in water drawn from rural residential wells. The voluntary buyout (LICRAT) conducted under OU4 was completed in 2011. Residents of Picher, Cardin, and Hockerville, Oklahoma were relocated through the LICRAT program. The LICRAT buyout for residents of Picher, Cardin, and Hockerville was completed in 2011. Treece, Kansas, was later added to the buyout. The Treece buyout was documented in an ESD regarding the OU4 ROD. In 2009, EPA provided $3.5 million to the Kansas Department of Health and

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Environment (KDHE) to fund the buyout of qualified occupants in Treece. The Treece buyout was handled by the Treece Relocation Assistance (TRA) Trust with the support of KDHE. The Treece buyout was completed in 2012.

Source material from rural residential yard cleanups was placed in the OU4 repository located on E 40 Rd. The OU4 repository was visited during the site inspection. The OU4 repository was behind a locked gate and fence. However, the hinge on the gate was damaged and was in need of repair (*has since been fixed*). Chat washing/sale operations (at Sooner Pile and Atlas Pile) were visited during the SI. Several distal properties were visited during the SI. Remedial action was occurring during the SI at Distal 8 (Catholic 40) and Distal 6A (*see* Figure 3 for the locations of the distal areas). During the SI, source material was being hauled from Distal 6A to a subsidence area on S 605 Rd. Distal 8 was being seeded during the SI. Distal 6 (CP104), Distal 7 North, and Distal 1 North were visited. Distal 6 and Distal 1 North had good vegetative growth present. However, Distal 7 North had sparse vegetation and according to the Quapaw Tribe, source material was left near the drainage that runs through the property. The 605 subsidence, located near Hockerville and which is being used as the repository for Distal 6A, was visited during the SI. At the time of the SI, 72,000 tons of transition zone (TZ) soil and source material had been placed into this subsidence area. The county-owned subsidence, also located near Hockerville, was visited during the SI. This subsidence has the potential for accepting source material from other distal properties. Another subsidence located near Hockerville, which is now filled with construction and demolition waste, was also visited. This subsidence has been capped. This repository had obvious cap settling. In addition, it was clear that all-terrain vehicles (ATV) had been driving over the repository cap. Additional soil should be placed on the settling cap.

3.5 Interviews

During the course of the five-year review, interviews were conducted by ODEQ with several parties involved with the site, including: (1) ODEQ; (2) EPA Region 6; (3) Tribal Nations; (4) Ottawa County Health Department; (5) U.S. Fish and Wildlife Service; and (6) Local Environmental Action Demanded (LEAD); Interview questionnaires were sent to 14 individuals, and responses were received from 13. Interview record forms documenting the issues discussed during these interviews are provided in Appendix D.

Ottawa County residential property owners whose properties were remediated by EPA under OU2 and OU4 signed acknowledgment of completion forms accepting all work that was performed. In addition, the City of Miami accepted the remedial work that was performed in their alleyways.

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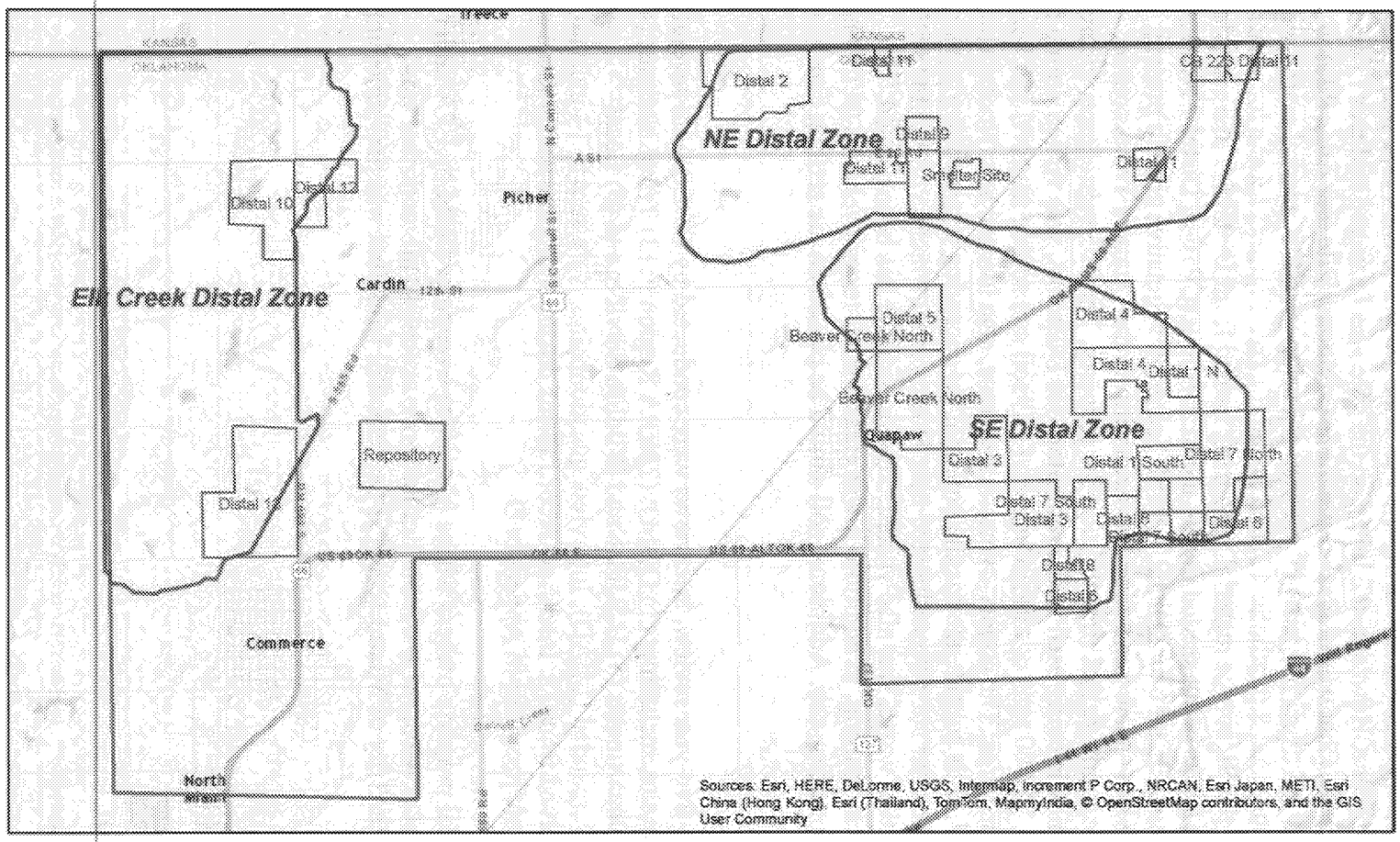
Figure 3. Distal Areas



We make every effort to provide and maintain accurate, complete, usable, and timely information. However, some data and information on this map may be preliminary or out of date and is provided with the understanding that it is not guaranteed to be correct or complete. Conclusions drawn from, or actions undertaken on the basis of, such data and information are the sole responsibility of the user.

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Legend
- Distal Areas
- Distal Zones
- Superfund Area

Figure 3:
Distal Areas

Map Created by Brent Stone
on 5/14/2015

0 1 2 4 Miles

Overall, the interviewees had a favorable impression of the work completed at Tar Creek OU2. The fact that children's blood lead levels have been significantly reduced was an important factor. However, there are mixed feelings about the work completed in OU4, and several individuals interviewed expressed frustration with the progress of the project. Frustration has been focused on the amount of unfinished work, cost overruns stemming from inadequate site characterization, and the lack of usable land due to the removal of transition zone soils. EPA and ODEQ are in the process of addressing the concerns expressed in the interview records through implementation of the September 2014 RAO Report (as discussed in Section 4.4). Additionally, some concerns were expressed about the lack of addressing the contamination in Tar Creek proper and the use of subsidence areas as repositories.

Effects on the community have been perceived as generally positive due to the removal of chat and contaminated soils on residential properties, decreased blood lead levels in children, and an overall reduction in risk. Additionally, an economic benefit has been experienced in the community due the Superfund jobs training initiative. However, some negative effects were reported by interviewees which mainly focused on unfinished work and the loss of TZ soils related to the OU4 RA some property owners are reported to be upset and this is creating access issues. EPA and ODEQ are presently addressing individual property owner concerns.

Community concerns surround mine water discharge and seeps and water from the CMR that flows into Tar Creek, which eventually empties into Spring River and Grand Lake. Traffic and dust issues related to the heavy use of the county roads have become a concern in the community. Additionally, concerns remain within the community about the impacts to the Roubidoux aquifer. The Roubidoux aquifer meets MCLs and is safe for use as a drinking water supply.

When solicited for suggestions and recommendations, many interviewees responded with an assortment of ideas and suggestions. These suggestions can be generally described as either technical or managerial. Technical suggestions included installing passive treatment systems to reduce contaminant of concern (COC) loading rates to Tar Creek, encapsulating chat under paved roads, and addressing TZ soils in manner that makes them more viable. Managerial suggestions mainly focused on a stronger EPA presence at the site and increased information sharing amongst the stakeholders. Many of the downstream Tribes believed they were not entirely informed about actions at the site.

Generally, ODEQ believes it is informed about actions at the site. In addition, many tribal responses indicated that the tribes generally believe that they have been informed about progress at the site, but admit they would like to see increased information sharing. There are, however, tribal members that believe that they are not being informed. These tribal members also request increased information sharing. Other stakeholders gave mixed responses as to whether they believed they were well informed. Regardless, it is clear that all parties involved would like more substantial information sharing. EPA continues to conduct numerous scheduled conference calls and in-person meeting with site stakeholders.

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The tribes would like to see EPA reduce the amount of unilateral decision making. ODEQ would like a more substantial role in the decision making process. EPA has Cooperative Agreements with both ODEQ and the Quapaw Tribe to further engage them in the RA process.

4.0 Technical Assessment

The five-year review must determine whether the remedy at a site is protective of human health and the environment. EPA guidance lists three questions to be used to provide a framework for organizing and evaluating data and information and to ensure all relevant issues are considered when determining the protectiveness of a remedy. These questions are answered for the site in the following paragraphs. At the end of the section is a summary of the technical assessment.

4.1 Question A: Is the Remedy Functioning as Intended by the Decision Documents?

The documents that memorialize the remedy selection decisions for the site are the June 1984 ROD for OU1, the August 1997 ROD for OU2, the March 2000 Action Memorandum for OU3, the February 2008 ROD for OU4, and the April 2010 ESD for the OU4 ROD. For OU1, O&M at the Admiralty Mining Site is ongoing and the Roubidoux Groundwater Monitoring Program was completed in 2014. The RA for OU2 continues under a Cooperative Agreement with ODEQ. OU3 was a removal response action and requires no further action. The remedial design (RD)/RA for distal properties and several Phase 1 RA activities have been completed or are currently ongoing under OU4. The OU4 RA began in 2009 and it is projected to take 30 years to complete. This section discusses the RA performance, O&M, costs, ICs, monitoring activities, opportunities for optimization, and early indicators of potential remedy problems.

RA Performance

Based on the data review, the SI, document reviews, and site interviews it appears that the various Tar Creek Superfund Site remedies selected in the OU1, OU2, and OU4 RODs are functioning as intended.

As noted in previous five-year reviews, the diking and diversion work performed as part of the OU1 remedy was not successful at reducing the discharges of acid mine water to Tar Creek; however, it did affect recharge to the mines associated with rainfall events. Therefore, the diking and diversion portion of the remedy was at best only partially effective (EPA, 1994). Since the last five-year review, ODEQ has plugged two wells identified at the site that were completed in the Roubidoux aquifer. EPA and ODEQ continue to evaluate the need to plug abandoned Roubidoux wells as they are identified and located. ODEQ discovered three additional wells potentially completed in the Roubidoux aquifer. There are still 19 wells that require further evaluation and possibly plugging if it is technically feasible (ODEQ, 2006a and ODEQ, 2015a). Two of the 19 wells are part of the Roubidoux Groundwater Monitoring Program and are identified as probably and potentially impacted by the overlying mine workings. In addition, nine of the remaining 17 wells are located on restricted property and are not accessible by ODEQ. Therefore, eight wells still require investigation and assessment to determine the feasibility of being plugged. As noted in a July 22, 2014 letter, EPA considers the OU1 RA complete as soon as well plugging activities have been completed, and all future activities will fall under O&M (EPA, 2014c).

Remedial action for OU2 is still ongoing and there are still activities necessary to assess potential soil contamination associated with chat present in yards, alleyways and driveways in portions of

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Ottawa County outside the mining area. The RA for OU2 is still in progress under the cooperative agreement EPA has entered into with ODEQ regarding OU2. Under that agreement, ODEQ will undertake the remediation of OU2 with EPA oversight. EPA continues to take calls from Ottawa County residents for residential yard remediation.

Until 2012, the Centers for Disease Control (CDC)'s blood lead level of concern in children six years old and younger was 10 μg/dL, but that has changed and now the CDC is saying that there is no safe blood lead level for young children.[1] EPA has used a blood lead level of 5 μg/dL as a benchmark in its recent analyses. In Ottawa County, the percentage of children with blood lead levels that exceed 5 μg/dL has decreased from 11.6 to 3.7 percent from 2007 to 2014. The 3.7 percent calculated for 2014 is slightly higher than the average for Oklahoma (2.4 percent) (Oklahoma State Department of Health [OSDH], 2015). However, the blood lead data collected from children have demonstrated that the OU2 RA has been effective.

Final closure of the OU2 South Repository (adjacent to the CMR) has been completed and a deed notice was filed on the property in 2014. At the time of this report, the OU2 County Repository is undergoing final closure and a deed notice will be filed on the property. Final closure has been performed in accordance with the OU2 ROD.

The voluntary relocation performed by LICRAT and funded by EPA as part of the OU4 remedy has been completed in Ottawa County. The Treece, Kansas buyout was handled by the TRA Trust with the support of KDHE. The Treece buyout was completed in 2012. The voluntary relocation has removed 628 residences, 74 businesses, and 125 renters from the most impacted portions of the mining area and has reduced the potential for exposure to site-related contamination.

RA activities for OU4 began in late 2009 and to date 56 chat piles and chat bases totaling approximately 1.6 million tons of chat, transition zone soils, and fine tailings have been remediated and 309,787 tons of chat sold, and four subsidence features have been filled. OU4 RA is ongoing.

Operation and Maintenance

The ROD for OU1 does not specifically state what O&M activities were to occur at the site. However, the ROD does mention O&M and costs related to the dikes and diversion work. O&M activities are currently underway at the Admiralty Mining Site near Douthat Bridge. O&M activities are being performed for the dikes and diverted creek channels at the site. The updated O&M plan was completed in 2012. Annual inspections are performed for the diversion and dike remedy at the Admiralty site and annual inspections items include; abnormal occurrence response plans, performance standards, and annual cost estimates of O&M (ODEQ, 2012a). As

[1] *See* Centers for Disease Control, *Preventing Lead Poisoning in Young Children* (1991) at p. 7 ("Blood lead levels at least as low as 10 μg/dL are associated with adverse effects"). Later the CDC revised its position saying that there was no safe level for lead in young children. *See CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention"* (November 26, 2013) ("CDC will emphasize that the best way to end childhood lead poisoning is to prevent, control or eliminate lead exposures. Since no safe blood lead level in children has been identified, a blood lead "level of concern" cannot be used to define individuals in need of intervention.".)

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mentioned in the previous five-year review the Muncie and Big John sites located in Kansas will no longer require O&M (EPA, 2010). In a letter dated July 22, 2014, EPA indicated that it was moving toward OU1 RA completion, with completion of ODEQ well-plugging activities being the last RA activity for OU1. Once the RA is complete, OU1 will move entirely into O&M (EPA, 2014c).

The RA for OU2 is ongoing. The OU2 ROD calls for O&M to maintain the repositories. It also calls for supplemental ICs (discussed below). Both soil repositories used for OU2 have been vegetated to prevent or reduce erosion. The OU2 ROD calls for a clean soil cap on any parts of the repositories where the soil lead concentrations exceed the remediation goal (500 parts per million [ppm]).

The RA for OU4 is ongoing. However, the CMR and other areas where source materials are disposed (*e.g.*, subsidence features) will require O&M activities once the OU4 RA is complete.

Costs of O&M

The OU1 ROD states that O&M costs related to the diking and diversion portion of the selected remedy would be approximately $5,000 per year. No costs associated with the Roubidoux Groundwater Monitoring Program were provided in the OU1 ROD. O&M costs associated with the O&M of the Admiralty Mine Site dike and stream diversion provided by ODEQ totaled $1,221. Maintenance of the dikes and diversion channels has been minimal since the OU1 RA was completed. The Roubidoux Groundwater Monitoring Program has been revised through the years to obtain the data necessary to assess the water quality of the aquifer. Sampling of the Roubidoux currently occurs on an annual basis to ensure that the drinking water supply is safe.

The OU2 ROD states that O&M associated with maintaining the soil repositories and ICs would be $60,000 per year. RA activities are ongoing, and no O&M costs have been incurred associated with OU2.

O&M associated with the selected OU4 remedy will be approximately $375,000 per year from Year 3 through Year 22 of the remedy, eventually decreasing to $125,000 per year in about Year 23 of OU4 response actions (EPA, 2008).

Implementation of ICs

ICs are generally defined as non-engineered instruments such as administrative and legal tools that do not involve construction or physically changing the site and that help minimize the potential for human exposure to contamination and/or protect the integrity of a remedy by limiting land and/or resource use (EPA, 2005). ICs may include deed notices, easements, covenants, restrictions, or other conditions on deeds, and/or groundwater and/or land use restriction documents (EPA, 2001). The following paragraphs describe the ICs implemented at the site, the potential effect of future land use plans on ICs, and any plans for changes to site contamination status.

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The OU1 ROD did not call for the use of ICs (EPA, 1984). Potential ICs for OU2 are listed in the OU2 ROD (EPA, 1997).

The OU2 ROD stipulated that all ICs may not be necessary, or that some would only be used in special circumstances as dictated by conditions encountered at a specific property during the RA. In addition, the ROD stated that authorities of other government entities might be required to implement some of the ICs *(e.g.,* zoning restrictions would require the municipal authority, lease restrictions might require DOI authority, etc.). The OU2 ROD further stated that many ICs, such as community-wide health education, community-wide blood lead monitoring, and community-wide lead-contaminated dust reduction activities were appropriate for application in residential areas throughout Ottawa County (EPA, 1997).

As noted in the preceding five-year review, the following ICs have been implemented under OU2:

1. EPA issued fact sheets describing the safe uses of mine tailings;
2. The Oklahoma Childhood Lead Poisoning Prevention Program (OCLPPP) carried out by the Ottawa County Health Department (OCHD) in conjunction with the OSDOH has provided childhood lead poisoning prevention education through community and tribal health fairs, Head Start and child care programs, and community organizations and events;
3. The OCHD has conducted blood lead screenings; and,
4. ODEQ has placed deed notices on residential properties (as part of the voluntary relocation for OU4) and repositories calling property owner's attention to the presence of contamination.

To help ensure that site chat sales continue and that chat is used in a manner that is protective of human health and the environment under the OU4 ROD, chat that is used on-site or off-site must be managed according to the criteria provided in the Chat Rule, 40 CFR Part 278, and its preamble.[2] Under the remedy selected in the OU4 ROD, only the uses described in the preamble (including EPA's June 2007 fact sheet; EPA530-F-07-016B) and the transportation construction project uses described in 40 CFR Part 278 will be allowed for site chat. The OU4 ROD provides that chat sales are part of the remedy for OU4 chat (EPA, 2008).

The ICs concerning blood lead monitoring, health education, and lead-contaminated dust reduction activities are currently being implemented through agreements between the EPA, ODEQ, and OCHD or as part of the OU2 RA. EPA funds the OCHD to perform blood lead screening and health education activities at the site (EPA, 2010b). Outside of the RA work, lead-contaminated dust reduction activities are part of the ongoing community education efforts. Once the RA activities for OU2 are completed, EPA will work with the various authorities (city, county, state, and federal) to implement any of the additional ICs necessary to maintain the protectiveness of the OU2 remedy.

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[2] The Chat Rule can be found at 72 Fed. Reg. 39235 (July 18, 2007). It can also be found at http://www.epa.gov/epaoswer/other/mining/chat/.

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As part of the ICs for OU2, a deed notice has been filed on the South Repository (Flint property) regarding the presence of chat and soils exceeding the 500-milligram per kilogram (mg/kg) remediation goal. The deed notice was filed in 2012 after the final inspection and closure of the South Repository. The South Repository was visited during the SI and the repository cap was well vegetated with a good stand of grass. After final inspection and closure of the County Repository, a deed notice will be filed on that property. This task should be completed during 2015. The remedy selected in the OU4 ROD calls for ICs and O&M activities to be implemented at locations where source materials are covered in place. Locations where ICs and O&M activities are to be implemented under the OU4 ROD include tailing ponds that are covered and the on-site repositories and that would be covered when closure is completed. These and other ICs included in the selected remedy for OU4 are detailed in Table 4. The table also describes the status of the IC as determined during this five-year review:

Table 4: Status of Institutional Controls

Location/Area IC Applied	IC Objective	IC Instrument	Responsible Organization	Current Status
Covered Fine Tailings	Restrict future use of the property to protect the integrity of the engineered cover system.	Deed Notice and Easement filed pursuant to Oklahoma Statute 27A § 2-7-123(B)	ODEQ For property where DOI is the trustee, ICs will be established in coordination with DOI.	No status change since ROD issued.
On-site Repositories	Restrict future use of the property to protect the integrity of the engineered containment system.	Deed Notice and Easement filed pursuant to Oklahoma Statute 27A § 2-7-123(B)	ODEQ For property where DOI is the trustee, ICs will be established in coordination with DOI.	Deed notices have been filed on two subsidence area repositories: CB223 and CB143/146/147. The deed notices were filed in 2014.
Property Acquired via Voluntary Relocation	Restrict future use of the property to prevent exposure of residential or commercial inhabitants to chemicals above the Final Remediation Goals.	Deed Notice and Easement filed pursuant to Oklahoma Statute 27A § 2-7-123(B)	ODEQ The controls shall be in effect until the state determines that the area is safe for reuse.	Deed notices have been filed on properties acquired via the voluntary relocation.
Shallow Groundwater	Restrict future uses of groundwater from the portion of the Boone aquifer (or shallower) for potable or domestic supply that is impacted by site-related contaminants	OWQS Title 785, Chapter 45, Appendix H	ODEQ	ODEQ changed the "Beneficial Use Designations for Certain Limited Areas of Groundwater" (OWQS 785 Chapter 45, Appendix H). Under this change, special well construction is required to obtain water for potable use and groundwater testing is

Location/Area IC Applied	IC Objective	IC Instrument	Responsible Organization	Current Status
	above the Final Remediation Goals.			required to meet potable use standards for lead, arsenic, and cadmium (ODEQ, 2012b and OWRB, 2013).

Monitoring Activities

The Roubidoux Groundwater Monitoring Program under OU1 has continued through 2014. The program has been implemented by ODEQ and funded by EPA to assess and monitor the effectiveness of the well plugging portion of the remedy in terms of protection of the Roubidoux aquifer. EPA is working toward completion of the RA for OU1. It will be appropriate for O&M to begin once the requirements of the NCP in 40 CFR 300.435(f) are met (EPA, 2014c). ODEQ will consider continuing the Roubidoux Groundwater Monitoring Program under state funding. The data collected through the sampling indicate that the Roubidoux aquifer is impacted locally by acid mine water. The mechanism for acid mine water migration into the Roubidoux is not totally clear. To-date, the data collected regarding the connection between the Boone and Roubidoux aquifers indicate that the primary pathway for groundwater and contaminants to migrate into the Roubidoux aquifer from the Boone aquifer and mine workings has been through abandoned wells, wells that have faulty casings and/or poor seals across the Boone Formation, and through unplugged abandoned boreholes (CH2M HILL, 2008, and ODEQ, 2006a). The drinking water supplied from the Roubidoux aquifer in the mining area continues to meet the health-based primary drinking water standards (i.e., MCLs) and is considered safe for use as a drinking water supply.

Opportunities for Optimization

Optimization means efforts at any phase of the removal or remedial response to identify and implement specific actions that improve the effectiveness and cost-efficiency of that phase. Such actions may also improve the remedy's protectiveness and long-term implementation, which may facilitate progress towards site completion. To identify these opportunities, regions may use a systematic site review by a team of independent technical experts or apply other approaches to identify opportunities for greater efficiency and effectiveness. In September 2014, EPA and the Office of Superfund Remediation and Technology Innovation (OSRTI) finalized the RAO Report prepared for OU1 and OU4. In the report, several optimization opportunities are outlined for OU1 and OU4. For OU1 the optimization team recommended that all efforts be continued to protect the Roubidoux aquifer. Protection of the aquifer is far simpler than remediation of the aquifer should it become impacted; consequently, protection of the Roubidoux aquifer should remain a high priority for all stakeholders. Tasks that will assist in the protection of the Roubidoux aquifer include: (1) plugging wells connecting the Boone to the Roubidoux immediately upon discovery; (2) ceasing the practice of injecting the high concentration, highly leachable, chat fines into the Boone aquifer; and (3) continuing to monitor the hydrodynamics between the Boone and Roubidoux aquifers (EPA, 2014d).

Recommendations identified as a priority by the optimization report for OU4 include prioritizing remedial activities based on COC loading rates, and stopping the loading of COCs to the watershed and riparian areas. A wide variety of loading rates exist from the various mine-related

wastes that are considered source material. Bull rock and larger chat fractions have lower COC concentrations and lower rates of leaching. The main concerns with regard to loading rates are the seeps from the mines and chat piles adjacent to surface water. For this reason, stabilizing these seeps from chat piles/bases and mines should be a primary objective. In addition, according to the optimization team, steps should be taken to prevent additional surface erosion and stormwater runoff from chat piles and chat bases bordering surface waters. The optimization team also suggested working with the trustees (including the USFWS) to begin the remediation and restoration of riparian areas (EPA, 2014d).

EPA has begun a pilot project whereby, in lieu of extensive excavation of contaminated soils, EPA is adding soil amendments high in phosphates to bind metals in soil, making them less bioavailable. This pilot project will inform EPA as to whether to continue excavation of contaminated TZ soils. It is hoped that more topsoil may be preserved by adding phosphate-containing soil amendments. In addition to preserving topsoil, an objective of the pilot study is to reduce metals bioavailability to acceptable levels while decreasing the volume of TZ soils being excavated and disposed at the CMR (EPA, 2014d).

Early Indicators of Potential Remedy Problems

As noted in previous five-year reviews, the discharges of acid mine water to Tar Creek have not decreased significantly since the construction of the dikes and diversion channels. No other problems were noted during the SI.

4.2 Question B: Are the Exposure Assumptions, Toxicity Data, Cleanup Levels, and RAOs Used at the Time of the Remedy Selection Still Valid?

This section addresses changes in environmental standards, newly promulgated standards, and "To Be Considered" standards (TBC), changes in exposure pathways, changes in toxicity and other contaminant characteristics, and changes in risk assessment methods during the five-year review period, and progress toward meeting RAOs.

Changes in Standards, Newly Promulgated Standards, and TBCs

Applicable or Relevant and Appropriate Requirements (ARAR) for this site were identified in the RODs for OU1, OU2 and OU4; previous five-year review reports; and site documents. This five-year review included identification of and evaluation of changes in the ROD-specified ARARs and TBCs to determine whether such changes may affect the protectiveness of the selected remedy. The ARARs and TBCs identified by the RODs for the site include chemical-, action-, and location- requirements. These ARARs and TBCs are described below.

OU1 ROD (signed on June 6, 1984)

Chemical-Specific Requirements:

No contaminant-specific requirements were identified in the OU1 ROD. However, the first five-year review report identified the following chemical-specific ARARs for the OU1 remedy:

1. OWQS, Oklahoma Administrative Code (OAC) 785:45.

2. Regulations regarding the discharge of wastewater to surface waters, Water Quality Criteria, 40 CFR §131.
3. National Primary Drinking Water Standards, 40 CFR §141.
4. National Secondary Drinking Water Standards, 40 CFR §143.

Action-Specific Requirements:

No action-specific requirements were identified in the OU1 ROD.

Location-Specific Requirements:

The following location-specific ARARs were identified in the OU1 ROD:

1. Executive Order on Floodplain Management, Executive Order No. 11988.
2. Executive Order on Protection of Wetlands, Executive Order No. 11990.

However, these location-specific ARARs are only applicable to the construction of the diking and diversion structures, and this construction is no longer occurring at the site. Therefore, as a practical matter, they are not applicable to site remediation; should additional construction activities occur that affects flood plains or wetlands, these ARARs may be applicable.

OU2 ROD (signed on August 27, 1997)

Chemical-Specific Requirements:

No chemical-specific requirements were identified in the OU2 ROD.

Action-Specific Requirements:

1. Regulations regarding the transportation of hazardous materials, 49 CFR §107, and §171-§177.
2. CWA requirements regarding the use of best management practices (BMP) and monitoring of discharges to ensure compliance with effluent discharge limitations, 40 CFR §122.41 and §125.100.
3. Clean Air Act (CAA) requirements to control particulate emissions to ambient air, 40 CFR §50 and §60.

Location-Specific Requirements:

1. National Historic Preservation Act requirements to minimize effects to historic landmarks and to coordinate activities with the State Historic Preservation Officer (SHPO), 16 USC 470, et. Seq. and 40 CFR §6.301.
2. Archeological and Historic Preservation Act requirements to minimize effects on historical and archeological data and to coordinate activities with the SHPO, 16 USC 469, 40 CFR §6.301(b), and 36 CFR §800.

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3. Historic Sites, Buildings, and Antiquities Act requirements to avoid undesirable impacts to such landmarks and to coordinate activities with the SHPO, 16 USC 461-467, and 40 CFR §6.301(a).
4. Endangered Species Act of 1973, Federal Migratory Bird Act, and Oklahoma Wildlife Statutes regulations and requirements requiring that endangered species and their habitat be conserved, and that consultation occur with the DOI and the Oklahoma State Department of Wildlife if such areas are affected, 16 USC 1531-1543, 50 CFR Parts 17 and 402, 40 CFR §6.302(h), 16 USC 703-712, and Oklahoma Statutes Title 29, Section 5-412.
5. Oklahoma Water Statutes limitations on the placement or discharge of deleterious, noxious, or toxic substances into affected waters of Oklahoma, Oklahoma Statutes Title 29, Section 7-401.
6. Rivers and Harbors Act of 1899 and CWA Section 404 requirements related to the Nationwide Permit for discharge of dredged or fill materials, 33 CFR §330 and 33 USC 1344.

OU4 ROD (signed on February 20, 2008)

Chemical-Specific Requirements:

Federal Safe Drinking Water Act MCL of 0.015 mg/L for lead, 40 CFR §141.8.

Action-Specific Requirements:

1. Regulations regarding the transportation of hazardous materials, 49 CFR §107, and §171-§177.
2. CWA requirements regarding the use of pollution prevention plans (PPP) and BMPs and monitoring of discharges to assure compliance with effluent discharge limitations, 40 CFR §122.26.
3. CAA requirements to control particulate emissions to ambient air, 40 CFR §50.6 (PM_{10}) and §50.12 (Lead).
4. SDWA addressing the UIC regulations for a Class V injection well, regarding injection of source materials into mine rooms, 40 CFR §144 UIC Program.
5. Oklahoma Solid Waste Management Act, monitoring of injected fluid, 27A O.S. §2-6-701 et seq., Management of Solid Waste, Title 252 OAC, Chapter 652 UIC.
6. CWA, a watershed-based approach will be taken to address the potential effects RAs may have on the local watersheds, §404 33 CFR §320-§330 and 40 CFR §230.
7. OWQS, monitoring wells installed during RA will be designed to comply with standards, OAC 785:45 Appendix H Beneficial Use Designations for Certain Limited Areas of Groundwater.
8. Oklahoma Statutes, ODEQ will file the deed notice upon completion of construction at each individual property requiring engineering controls, 27A §2-7-123(B).

9. Oklahoma Solid Waste Management Act and Management of Solid Waste, the design and construction of the repositories and covers for fine tailing ponds in the remedy will comply with established requirements, 27A O.S. §2-10-101 et seq., Title 252 OAC, Chapter 515.

Location-Specific Requirements:

1. National Historic Preservation Act requirements to minimize effects to historic landmarks, 16 USC 470, et. Seq., and 40 CFR §6.301(b).
2. Endangered Species Act of 1973 regulations and requirements requiring that endangered species and their habitat be conserved, 16 USC 1531-1544, 40 CFR §6.302(h).

Newly/Updated Promulgated Standards:

Action-Specific Requirements:

1. Criteria for the Safe and Environmentally Productive Use of Granular Mine Tailings known as "Chat." Chat Rule. 40 CFR §260 and §278.
2. Special Well Construction and Testing for the Boone Aquifer at the Tar Creek Superfund Site Ottawa County, Oklahoma. OAC 785:45, Appendix H.

To help ensure that site chat sales continue and that chat is used in a manner that is protective of human health and the environment, under the OU4 ROD, chat that is used on-site or off-site must be managed according to the criteria provided in the Chat Rule, 40 CFR Part §278, and its preamble.[3] Under the remedy selected in the OU4 ROD, only the uses described in the preamble (including EPA's June 2007 fact sheet; EPA530-F-07-016B) and the transportation construction project uses described in 40 CFR Part §278 will be allowed for site chat. The OU4 ROD provides that chat sales are part of the remedy for OU4 chat (EPA, 2008).

The update to the OWQS was an action item for ODEQ in the previous five-year review report. The OU4 ROD required that groundwater be restricted via the OWQS Title 785, Chapter 45, Appendix H. Appendix H states that the Boone aquifer in Ottawa County is a Class II groundwater source suitable for use as a water supply, for agriculture, and municipal and industrial processes. In accordance with the OU4 ROD, the ODEQ submitted a proposal to change the "Beneficial Use Designations for Certain Limited Areas of Groundwater" (OWQS 785 Chapter 45, Appendix H). The changes specifically state "Acidic conditions, mine voids, and toxic metals (arsenic, lead, and cadmium) may be present in the Boone aquifer." Therefore, special protective well construction is required to seal off the Boone from the underlying Roubidoux aquifer. For Boone wells, competent groundwater testing is required for potable and domestic use; and treatment may be required when groundwater exceeds the MCLs for lead (15 μg/L), arsenic (10 μg/L), and cadmium (5 μg/L) (OWRB, 2013).

[3] The Chat Rule can be found at 72 Fed. Reg. 39235 (July 18, 2007). It can also be found at http://www.epa.gov/epaoswer/other/mining/chat/.

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The ODEQ, OWRB, and federal regulations have not been revised to the extent that the effectiveness of the remedy at the site would be called into question. No new regulations have been issued by the State of Oklahoma or the federal government that would call into question the effectiveness of the remedy.

Changes in Exposure Pathways

There are no changes to the human health and ecological exposure pathways since completion of the previous five-year review. There are no new exposure pathways not identified in the RODs.

Future land uses are not expected to change, and agricultural uses and rural residential uses will remain dominant on the site.

Changes in Toxicity and Other Contaminant Characteristics.

There have been no changes in toxicity characteristics or other contaminant characteristics for the site that would impact the protectiveness of the remedy.

Until 2012, the CDC's blood lead level of concern in children six years old and younger was 10 μg/dL, but that has changed and now the CDC is saying that there is no safe blood lead level for young children.[4] EPA has used a blood lead level of 5 μg/dL as a benchmark in its recent analyses.

In May 2013, the cadmium reference concentration (RfC) was updated in EPA's Regional Screening Levels (RSL) table to 1.0E-05 milligrams per cubic meter (mg/m^3) from the United States Agency for Toxic Substances and Disease Registry (ATSDR). Interestingly, the cadmium RfC was reported to be changed to this exact value in 2009 and is documented in the previous five-year review (EPA, 2010c). The May 2013 change appears to be from an RfC value of 2.0E-05 mg/m^3 established by the California Environmental Protection Agency. Based on the assessment derived in the previous five-year review report for the change in cadmium's RfC, this change in toxicity characteristics does not impact the protectiveness of the remedy (EPA, 2013b).

Progress Toward Meeting the RAOs

The well plugging efforts performed for OU1 have been effective at removing this pathway for migration of acid mine water into the Roubidoux aquifer. Although data indicate that the Roubidoux aquifer is impacted locally, primary drinking water standards have not been exceeded in public water supply wells and the Roubidoux aquifer remains a usable source of drinking water.

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[4] *See* Centers for Disease Control, *Preventing Lead Poisoning in Young Children* (1991) at p. 7 ("Blood lead levels at least as low as 10 μg/dL are associated with adverse effects"). Later the CDC revised its position saying that there was no safe level for lead in young children. *See CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention"* (November 26, 2013) ("CDC will emphasize that the best way to end childhood lead poisoning is to prevent, control or eliminate lead exposures. Since no safe blood lead level in children has been identified, a blood lead "level of concern" cannot be used to define individuals in need of intervention.".)

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The OU2 RA has attained the RAOs where remediation has been completed. Data indicate that the percentage of children residing at the site with elevated blood lead levels has declined significantly since the OU2 RA began. The OU2 RA is ongoing, and the remaining areas of the site to be addressed will meet the RAOs once the RA is complete.

The OU4 RA is ongoing and certain RAOs have been met where the remediation has been completed. The LICRAT buyout and the TRA Trust buyout have removed most children and adolescents from the site areas with the largest concentrations of source materials (*i.e.*, the areas with the most chat piles, most chat bases, and most fine tailings deposits), and has prevented them from coming in direct contact, through ingestion or inhalation, with soils and source material that exceed 500 ppm.

Water drawn from two rural residential wells completed in the Boone aquifer exceeded the groundwater lead remediation goal established in the OU4 ROD. These wells were GW2429-4 and GW2429-8. The property owner at GW2429-4 allowed access for confirmation sampling, but declined access for the remediation described in the ROD. The property owner at GW2429-8 declined access for both confirmation sampling and remediation. Therefore, no RA activities to address the rural residential wells were conducted (CH2M HILL, 2011a). In addition, another resident was identified in the site interviews of this five-year review as having contaminated groundwater. Therefore, it appears that the RAO of preventing site residents from the ingestion of water from private wells that contains lead in concentrations exceeding the National Primary Drinking Water Standards is not being met.

The RAO that aimed to prevent terrestrial fauna from coming in direct or indirect contact, through the ingestion exposure pathway, with cadmium-, lead-, or zinc-contaminated source materials and soils where concentrations exceed their respective remediation goals of 10-mg/kg, 500-mg/kg, and 1,100-mg/kg goals has been met on properties where TZ soils have been completely removed. This is only a small part of the site, however. It is not known whether the ongoing soil amendment pilot study being performed on the Catholic 40 and Distal 6A (*see* Figure 3) will meet the this RAO, which is directed at protecting fauna. This determination will be made at the conclusion of the pilot study.

The RAO aimed at preventing riparian biota including waterfowl from coming into contact, through the ingestion exposure pathway, with unacceptable concentrations of cadmium, lead, and zinc in surface water and sediment by eliminating all discharges of cadmium, lead, and zinc from source materials to surface water has not been met. Progress is being made towards this goal through the RA efforts to remove source materials at the site.

4.3 Question C: Has any Other Information Come to Light that Could Call into Question the Protectiveness of the Remedy?

The type of other information that might call into question the protectiveness of the remedy include potential future land use changes in the vicinity of the site or other expected changes in site conditions or exposure pathways. No other information has come to light as part of this fifth five-year review for the site that would call into question the protectiveness of the site remedy. EPA is

presently conducting a remedial investigation (RI) for OU5, including a baseline human health risk assessment (BHHRA).

4.4 Technical Assessment Summary

The technical assessment, based on the data review, SI, technical evaluation, and interviews indicates that the RAs selected for the site have been implemented as intended by the DDs. Various other federal, state, tribal, and local government agencies are conducting studies and carrying out actions at the site to address the many environmental, health, and safety concerns associated with the site.

The drinking water supplied from the Roubidoux aquifer meets MCLs and is safe for use as a drinking water supply. However, sampling data from the Roubidoux Groundwater Monitoring Program show local impacts to the Roubidoux aquifer evidenced by exceedances of TLs developed for specific indicator parameters. The Roubidoux Groundwater Monitoring Program has been used to evaluate the effectiveness of the well plugging portion of the OU1 remedy at preventing acid mine water migration from the Boone aquifer to the Roubidoux aquifer. Statistical trend analysis of the data collected between 2003 and 2006 indicates that the aquifer is relatively stable with respect to the analytes measured by sampling, including the indicator parameters (CH2M HILL, 2007d). No statistical trend analysis was performed on data collected from 2010-2013 but a cursory review of data presented in the Final Tar Creek After Action Monitoring Report indicate that iron and sulfate (two indicator parameters) concentrations are generally increasing in several MWs since 2006 (ODEQ, 2014a).

The OU1 ROD stipulated that EPA would evaluate the need to plug additional abandoned wells at the site as they were identified. ODEQ, in conjunction with EPA, continues to identify, evaluate, and plug wells where technically feasible. ODEQ plugged two wells since the last five-year review. At least nine wells identified as potential candidates for plugging are on restricted property.

The O&M plan for the diking and diversion channel at the Admiralty site has been updated by ODEQ. The O&M plan covers annual inspections of the diking and diversion channel, abnormal occurrence response plans, performance standards, and annual cost estimates of O&M (ODEQ, 2012a). The annual O&M inspections for OU1 have identified minor issues that have been rectified by the landowner. The reports state that overall the dike and diversion channel are functioning as intended (ODEQ, 2015d and ODEQ, 2015e). However, after the closure of RA activities at OU1, the O&M plan may need to be updated to include Roubidoux groundwater monitoring.

Until the fourth five-year review (2010), EPA's five-year review reports found that the fund balancing ARARs waiver related to surface water, as determined by the OU1 ROD, continued to be appropriate for the site. The 2010 five-year review, however, found that some of the exposure assumptions and the potential risks posed to human health and the environment for surface water and sediments at the site, as stated in the OU1 ROD, are no longer valid. Specifically, fish tissue data collected by ODEQ demonstrated at that time that potential risks to human health exist through consumption of fish caught from Tar Creek, the Spring and Neosho Rivers, and Grand

Lake. It was also determined at that time that metals contained within site sediments are biologically available and pose risks to ecological receptors. Likewise, it was found that the concentrations of site-related contaminants in Tar Creek surface water continue to exceed the OWQS, and this is still the case in 2015. The narrative and numerical criteria in the OWQS are designed to maintain and protect the beneficial surface water use classification of "Fish and Wildlife Propagation." Under the OWQS there are numerical "Toxic Substance" concentration limits for surface water with both "acute" and "chronic" standards listed. Under 785 OAC 45 OWQS, "acute toxicity" means the surface water concentration of a toxic substance is such that it means greater than or equal to 50 percent lethality to appropriate test organisms in a test sample. Under those same standards, "chronic toxicity" means the surface water concentration of a toxic substance is such that there is a statistically significant difference (at the 95 percent confidence level) between longer term survival and/or reproduction or growth of the appropriate test organisms in a test sample and a control. Teratogenicity and mutagenicity are considered to be effects of chronic toxicity. In Tar Creek, Lytle Creek, and Elm Creek at the site, EPA stated in the 2010 five-year review that cadmium, lead, and zinc concentrations in surface water samples exceed the OWQS chronic toxicity standard, and zinc concentrations also exceed the acute toxicity standard. This is still the case in 2015. Finally, the 2010 five-year review report stated that initial construction costs for the constructed passive wetland southeast of Commerce are considered reasonable and may indicate that such a system could be an economically feasible engineered remedy for surface water at the site. For these reasons, in the 2010 fourth five-year review, EPA stated that the fund balancing ARARs waiver included in the OU1 ROD may no longer be appropriate and should be reevaluated. Accordingly, EPA has initiated the RI/feasibility study (FS) for OU5.

The remediation work conducted under the RA for OU2 is still ongoing. In various Ottawa County residential areas, chat found in alleyways and driveways has been excavated and disposed at several OU2 repositories or at the CMR. EPA has continued to address any remaining properties that may require remediation due to the presence of chat or contaminated soils with concentrations of lead above the remediation goals established in the OU2 ROD. In April 2015, EPA entered into a cooperative agreement with ODEQ under which ODEQ will address the remaining aspects of the OU2 RA. Some of the repositories used for the disposal of contaminated soils from OU2 have been closed in accordance with the requirements of the OU2 ROD, and deed notices have been filed on the properties (except for the County Repository, which is still in the process of being closed).

In addition, the OCLPP carried out by the Ottawa County Health Department in conjunction with the OSDH has provided childhood lead poisoning prevention education through community and tribal health fairs, Head Start and child care programs, and community organizations and events. The OU2 RA activities and the OCLPP have worked together to create significant reductions in blood lead levels of children in Tar Creek and Ottawa County. Until 2012, the CDC's blood lead level of concern in children six years old and younger was 10 µg/dL, but that has changed and now the CDC is saying that there is no safe blood lead level for young children.[5] EPA has used a

[5] *See* Centers for Disease Control, *Preventing Lead Poisoning in Young Children* (1991) at p. 7 ("Blood lead levels at least as low as 10 µg/dL are associated with adverse effects"). Later the CDC revised its position saying that there was no safe level for lead in young children. *See CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of*

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blood lead level of 5μg/dL as a benchmark in its recent analyses. In Ottawa County, the percentage of children with blood lead levels that exceed 5μg/dL has decreased from 11.6 percent to 3.7 percent from 2007 to 2014. The 3.7 percent calculated for 2014 is slightly higher than the average for Oklahoma (2.4 percent) (OSDH, 2015). However, the blood lead data collected from children demonstrated that the OU2 RA has been effective.

The voluntary relocation performed by LICRAT in Ottawa County, Oklahoma, was completed in 2011. The voluntary relocation performed by the TRA Trust in Treece, Kansas, was completed in 2012. The voluntary relocation removed most of the residents from the most impacted areas at the site, reducing the risk of exposure to site contaminants. A total of 628 residences, 74 businesses, and 125 renters were relocated from impacted areas to the surrounding communities. Chat sales will continue to remove source materials from the site, limiting the volume of chat that will have to be addressed as part of the OU4 RA and limiting the land area that will be restricted as part of the OU4 RA. To date, 309,787 tons of chat and developmental rock have been sold to nearby chat processors.

The OU4 ROD calls for ODEQ to restrict groundwater under the authority of the OWQS Title 785, Chapter 45, Appendix H. Appendix H states that the Boone aquifer in Ottawa County is a Class II groundwater source suitable for use as a water supply for agriculture, and municipal and industrial processes. This information is amended with a remark stating "Toxic metals, special well construction required." However, the method of special well construction is not specified, nor is any statement made regarding how the toxic metals are to be discovered or addressed if they are found in water (EPA, 2008). In accordance with the OU4 ROD, the ODEQ revised the "Beneficial Use Designations for Certain Limited Areas of Groundwater" (OWQS 785 Chapter 45, Appendix H). The changes generally state that special well construction is required to obtain water for potable use and that groundwater testing is required to meet potable use standards for lead, arsenic, and cadmium (OWRB, 2013).

In September 2014, EPA and OSRTI finalized the RAO Report prepared for OU4 and OU1. In the report, several optimization opportunities are outlined for OU1 and OU4. For OU1 the optimization team recommended that all efforts be continued to protect the Roubidoux aquifer including; plugging wells, ceasing fine injections into the Boone aquifer, and monitoring the Roubidoux aquifer (EPA, 2014d).

Recommendations identified as a priority by the optimization report for OU4 include prioritizing remedial activities based on COC loading rates and to stop the loading of COCs to the watershed and riparian areas. The main contributors to loading rates are the seeps from the mines, and from the chat piles and chat bases adjacent to surface water. For this reason, stabilizing these seeps from chat piles/bases and mines should be a primary objective. In addition, steps should be taken to prevent additional surface erosion and storm water runoff from chat piles and chat bases bordering surface waters (EPA, 2014d).

Primary Prevention" (November 26, 2013) ("CDC will emphasize that the best way to end childhood lead poisoning is to prevent, control or eliminate lead exposures. Since no safe blood lead level in children has been identified, a blood lead "level of concern" cannot be used to define individuals in need of intervention.".)

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EPA has begun a pilot project whereby, in lieu of extensive excavation of contaminated soils, EPA is adding soil amendments high in phosphates to bind metals in soil, making them less bioavailable. This pilot project will inform EPA as to whether to continue excavation of contaminated TZ soil. It is hoped that more topsoil may be preserved by adding phosphate-containing soil amendments. In addition to preserving topsoil, an objective of the pilot study is to reduce metals bioavailability to acceptable levels while decreasing the volume of TZ soils being excavated and disposed at the CMR (EPA, 2014d).

5.0 Issues

Table 5 summarizes the current site issues.

Table 5: Issues Identified During the Fifth Five-Year Review

Issues	Affects Current Protectiveness	Affects Future Protectiveness
ODEQ research has found references to abandoned wells that need to be assessed to determine whether these wells should be plugged (this issue is carried over from the fourth five-year review). The OU1 ROD recognized that additional abandoned wells completed in the Roubidoux aquifer might be identified after completion of the OU1 RA. The ROD stated that the need to plug additional wells would be evaluated as wells were identified. The existence of the wells, which were found by ODEQ's research in historical documents, has not been verified. Fieldwork will be necessary to verify the existence of these wells and to determine whether they are completed in the Roubidoux aquifer and are in need of plugging.	No	Yes
While significant progress has been made, and 2,940 residential properties have been addressed, there is work remaining before the OU2 RA is complete (this issue is carried over from the fourth five-year review). Residential yard remediation has been completed in the towns of Afton, Fairland, Narcissa, Peoria, Miami, Wyandotte, Picher, Quapaw, North Miami, Commerce, and Cardin. EPA continues to take calls from Ottawa County residents for residential yard remediation. The next five-year review should consider whether OU2 can be deleted from the NPL. This deletion of OU2 from the NPL would be a partial deletion of the site.	No	Yes
An assessment of the surface water and sediment data for Tar Creek should be completed to verify if a human health or ecological threat exists (this issue is carried over from the fourth five-year review). The third and fourth five-year reviews recommended that the current surface water and sediment data for Tar Creek be evaluated to verify that no threat to human health exists in Tar Creek.	No	Yes
The soil cover at the Hockerville subsidence area is settling, has been vandalized, and is in need of repair. The Hockerville subsidence area was filled with construction and demolition debris in 2012. During the SI, which was part of this five-year review, the soil cover was found to have visible damage that was due to general settling of the cap, and also due to vandalism in the form of tire tracks made by ATVs.	No	No
The CMR, which was constructed to handle OU4 related source material, requires general maintenance. Engineering options for preventing water from seeps from entering Tar Creek should be evaluated.	No	No
ODEQ should evaluate the need to continue the groundwater monitoring program under state-funded OU1 O&M. EPA intends to work toward completing RA activities at OU1 after well plugging is complete.	No	No
EPA has begun the OU4 soil amendment pilot studies based on the recommendation of the September 2014 RAO report.	No	No

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6.0 Recommendations and Follow-up Actions

Table 6 provides recommendations to address the current site issues.

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Table 6: Recommendations to Address Current Site Issues

Issue	Recommendations/Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-Up Actions: Affects Protectiveness (Y/N)	
					Current	Future
ODEQ research has found references to abandoned wells that need to be assessed to determine whether these wells should be plugged (this issue is carried over from the fourth five-year review). The OU1 ROD recognized that additional abandoned wells completed in the Roubidoux aquifer might be identified after completion of the OU1 RA. The ROD stated that the need to plug additional wells would be evaluated as wells were identified. The existence of the wells, which were found by ODEQ's research in historical documents, has not been verified. Fieldwork will be necessary to verify the existence of these wells and to determine whether they are completed in the Roubidoux aquifer and are in need of plugging.	ODEQ shall undertake actions to determine whether the wells that ODEQ found in the literature actually exist, and evaluate whether it is necessary to plug these wells. Each well location found in the literature should be investigated, located, assessed, and if necessary and technically feasible, plugged in accordance with the OU1 ROD. Since the last five-year review, ODEQ has plugged two wells.	ODEQ	EPA	9/30/2020	N	Y
While significant progress has been made, and 2,940 residential properties have been addressed, work remains before the OU2 RA is complete (this issue is carried over from the fourth five-year review). Residential yard remediation has been completed in the towns of Afton, Fairland, Narcissa, Peoria, Miami, Wyandotte, Picher, Quapaw, North Miami, Commerce and Cardin. EPA continues to take calls from Ottawa County residents for residential yard remediation. The next five-year review should consider whether OU2 can be deleted from the NPL. This deletion of OU2 from the NPL would be a partial deletion of the site.	ODEQ shall undertake remaining actions to complete the OU2 RA. Currently, EPA operates a telephone hotline for Ottawa County residents to request soil sampling. The next five-year review should consider whether OU2 can be deleted from the NPL. This deletion of OU2 from the NPL would be a partial deletion of the site.	ODEQ	EPA	9/30/2020	N	Y

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Issue	Recommendations/Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-Up Actions: Affects Protectiveness (Y/N)	
					Current	Future
An assessment of the surface water and sediment data for Tar Creek should be completed to verify if a human health or ecological threat exists (this issue is carried over from the fourth five-year review). The third and fourth five-year reviews recommended that the current surface water and sediment data for Tar Creek be evaluated to verify that no threat to human health exists in Tar Creek.	EPA should complete the evaluation of current surface water and sediment data for Tar Creek and other site streams to verify that no unacceptable risks to human health and the environment exist in Tar Creek and the other streams. Numerous studies of the site have been conducted over the past decade. These studies have collected surface water and sediment data in Tar Creek and other site streams. EPA should perform a data gap analysis to determine whether gathering additional surface water and sediment data is necessary. If EPA finds that additional surface water and sediment data are needed, EPA should collect enough additional data to determine whether there are risks to human health and the environment associated with exposure to surface water and sediments in streams of the site.	EPA	EPA	9/30/2020	N	Y
The soil cover at the Hockerville subsidence area is settling, has been vandalized, and is in need of repair. The Hockerville subsidence area was filled with construction and demolition debris in 2012. During the site inspection, which was part of this five-year review, the soil cover was found to have visible damage that was due to general settling of the cap, and also due to vandalism in the form of tire tracks made by ATVs.	ODEQ should repair the cover at the Hockerville subsidence area. Additional soil should be added to repair the soil cover and the cover grade should be re-established. EPA Cooperative Agreements with ODEQ and the Quapaw Tribe includes repository O&M.	ODEQ	EPA	9/30/2017	N	N
The CMR, which was constructed to handle OU4 related source material, requires general maintenance. Engineering options for	ODEQ and the Quapaw Tribe should conduct general maintenance at the CMR. EPA Cooperative Agreements with ODEQ and the Quapaw Tribe includes repository operations	ODEQ/ Quapaw Tribe	EPA	9/30/2017	N	N

Issue	Recommendations/Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Follow-Up Actions: Affects Protectiveness (Y/N)	
					Current	Future
preventing water from seeps from entering Tar Creek should be evaluated.	and maintenance. The CMR has received source material from distal properties as part of the OU4 RA since 2010 and is at approximately 20 percent capacity.					
ODEQ should evaluate the need to continue the groundwater monitoring program under state funded OU1 O&M. EPA intends to work toward completing RA activities at OU1 after well plugging is complete.	ODEQ should complete an evaluation of the need to continue the groundwater monitoring program under state-funded OU1 O&M and revise the O&M plan if necessary.	ODEQ	ODEQ	9/30/2020	N	N
EPA has begun the OU4 soil amendment pilot studies based on the recommendation of the 2014 RAO report.	EPA will develop the short and long term performance standards and metrics to measure and determine protectiveness.	EPA	EPA	9/30/2020	N	N

7.0 Protectiveness Statement

The remedy at OU1 is protective of human health and the environment with respect to groundwater. With respect to surface water, the remedy at OU1 does not meet ARARs, but those ARARs have been waived under 40 CFR § 300.430(1)(i)(C)(6).

The remedy at OU2 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date at residential yards and at areas frequented by children (*i.e.,* HAAs) have adequately addressed all exposure pathways in those yards and HAAs that could result in unacceptable risks in these areas. There are approximately 19 residential yards that are currently scheduled to be sampled to determine if remediation will be required, and EPA estimates that it will take one year to complete remediation if necessary for the residential yards. ODEQ will continue to evaluate additional residential properties and HAAs as they become known and assess the need for sampling and remediation under a Cooperative Agreement.

The remedy at OU3 is protective of human health and the environment.

The remedy at OU4 is expected to be protective of human health and the environment upon completion. In the interim, remedial activities completed to date have adequately addressed all exposure pathways that could result in unacceptable risks at the smelter site, at all rural residential yards, at the following chat piles: CP058, CP059, CP088, CP091, CP092, CP093, CP093-S1, CP093-S2, CP093-S3, CP093-S4, CP093-S5, CP094, CP094-S1, CP097, CP098, CP099, CP100, CP101, CP102, CP103, CP104, and CP105; at the following chat bases: CB011, CB044, CB046, CB048, CB049, CB053, CB143, CB146, CB147, CB156, CB157, CB216, CB219, CB221, CB222, CB223, CB230, CB231, CB232, CB233, CB234, CB235, CB236, CB237, CB238, CB239, CB240, CB241, CB241-S1, CB241-S2, CB242, and CB243; and at the following fine tailings deposits: FT063. There are 83 chat piles, 213 chat bases, and 62 fine tailings deposits that still must be addressed, and EPA estimates that it will take 30 years to complete this work.

EPA has begun the RI/FS process at OU5 and has not completed a BHHRA or a baseline ecological risk assessment (BERA) at this date; consequently, no protectiveness determination can be made.

Well plugging called for in the selected OU1 remedy addressed the primary route of potential human exposure by protecting the Roubidoux aquifer, and, in this way, preventing the possibility that hazardous substances would be ingested in drinking water drawn from the Roubidoux. EPA/ODEQ has plugged and abandoned 85 wells as part of the OU1 remedy. Sampling data indicate that the Roubidoux aquifer continues to meet all health-based primary drinking water standards. Exceedances of secondary drinking water standards for iron and sulfate at four wells have been identified. Secondary drinking water standards are aesthetically based values. The previous five-year review established that some of the exposure assumptions and the potential risks posed to human health and the environment for surface water and sediments at the site that were described in the OU1 ROD are no longer valid (EPA, 2010c). Fish tissue data collected by ODEQ demonstrate that risks to human health exist through consumption of fish caught from Tar

Creek, the Spring and Neosho Rivers, and Grand Lake (ODEQ, 2008b). Metals contained within site sediments are biologically available and pose risks to ecological receptors (MacDonald, et al., 2009). In Tar Creek, Lytle Creek, and Elm Creek at the Tar Creek Site, EPA found that cadmium, lead, and zinc concentrations in surface water samples exceed the OWQS chronic toxicity standard, and zinc concentrations also exceed the acute toxicity standard. With the exceptions noted above for OU1, the Roubidoux Groundwater Monitoring Program, and O&M activities for the site are all protective for the short and long terms.

The remedy at OU2 is expected to be protective of human health and the environment in all areas where remediation has been completed. There have been 2,940 properties remediated during the OU2 RA and during the removal actions that preceded the RA. Remaining properties in need of remediation are being evaluated. The RA for OU2 is ongoing and is scheduled to be completed by the next five-year review. Human health and the environment are being protected by the remedy for OU2.

The action implemented during the removal action for OU3 is protective of human health and the environment. The laboratory chemicals left at the former Eagle-Picher Office Complex were removed from the site and properly disposed.

The RA for OU4 is currently ongoing. The remedy at OU4 is expected to be protective of human health and the environment upon completion, and, in the interim, exposure pathways that could result in unacceptable risks are being controlled. The LICRAT voluntary relocation in Picher, Cardin, and Hockerville, Oklahoma, was completed in 2011. The voluntary relocation in Treece, Kansas, was completed in 2012, under a Kansas trust—the TRA Trust. Chat sales continue at the site. Appendix H of the OWQS 785 OAC 45 was amended in order to limit the use of groundwater from the Boone aquifer. RA on three rural residential properties, a smelter site, and multiple distal groups (which include chat piles and chat bases) has been completed. EPA has begun a pilot project whereby, in lieu of extensive excavation of contaminated soils, EPA is adding soil amendments high in phosphates to bind metals in soil, making them less bioavailable. This pilot project will inform EPA as to whether to continue excavation of contaminated TZ soils. It is hoped that more topsoil may be preserved by adding phosphate-containing soil amendments. In addition to preserving topsoil, an objective of the pilot study is to reduce metals bioavailability to acceptable levels while decreasing the volume of TZ soils being excavated and disposed at the CMR (EPA, 2014d).

EPA is presently conducting an RI for OU5. No OU5 remedy has been selected.

8.0 Next Review

The next five-year review, the sixth for the site, should be completed during or before September 2020.

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Appendix A: Existing Site Information

1.0 Site Chronology

A chronology of significant site events and dates is included in Table 7. Sources of this information are listed in Appendix B.

Table 7: Chronology of Site Events

EVENT	DATE
Lead and zinc mining activities began in the Picher field of the Tri-State Mining District.	Early 1900's
Mining activities ceased in the Picher field.	1970's
Acid mine water began flowing to the surface and draining into Tar Creek.	November 1979
Governor of Oklahoma appointed the Tar Creek Task Force to investigate the environmental impacts associated with the acid mine drainage.	June 1980
First investigations conducted by several government agencies under the Tar Creek Task Force to assess the environmental impacts associated with the acid mine drainage at the site.	1980 and 1981
The Tar Creek site is proposed to the National Priorities List (NPL).	July 27, 1981
Report submitted to the Tar Creek Task Force documenting the impacts of acid mine drainage within the Tar Creek basin.	October 1981
EPA signs a Cooperative Agreement with the OSDH to conduct the RI/FS for OU1.	June 16, 1982
The Remedial Investigation for OU1 is conducted.	July 1982 – March 1983
The Feasibility Study for OU1 is conducted.	May –December 1983
The Tar Creek site is formally added to the NPL.	September 8, 1983
A ROD for OU1 is signed. The selected remedy included surface water diversion and construction of dikes at 3 locations, plugging abandoned Roubidoux wells, and a 2 year after action monitoring program to evaluate the effectiveness of the selected remedies.	June 6, 1984
The EPA sends RD/RA notice letters to 7 companies and 8 individuals as PRPs to allow them to complete the RD/RA for OU1.	June 15, 1984
The OWRB lowers the designated use of Tar Creek to habitat limited fishery and secondary recreation water body.	1985
RA construction for OU1 is completed.	December 22, 1986
A two year surface and ground water monitoring program is implemented by the OWRB to assess the effectiveness of the OU1 remedy.	1987 – 1988
EPA signs a referral to the US Department of Justice to implement cost recovery against 7 companies identified as PRPs.	December 30, 1987
The Roubidoux Groundwater Monitoring Program is begun at the site by the OWRB to assess potential impacts of acid mine water on the Roubidoux Aquifer.	1991
EPA enters into a Consent Decree with 6 PRPs to recover costs related to the RI/FS, ROD, and emergency response actions related to OU1.	June 10, 1991
US Public Health Service's Indian Health Service notifies EPA by letter that 34% of children routinely tested near the Tar Creek site have blood lead levels that exceed the CDC's level of 10 μg/dL.	January 21, 1994
EPA completes the First Five-Year Review for the Tar Creek Site. The First Five-Year Review recommends continuing the Roubidoux	April 1994

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EVENT	DATE
Groundwater Monitoring Program. Also, the creation of a second OU is recommended to address human health concerns related to mining wastes.	
EPA conducts sampling at the Tar Creek site in support of a Baseline Human Health Risk Assessment and RI/FS for the residential portion of OU2.	August 1994 – July 1995
EPA issues an action memorandum authorizing a removal response action to address lead contaminated soils at High Access Areas.	August 15, 1995
EPA issues notice to the PRPs and DOI providing them the opportunity to conduct or finance the removal action at the High Access Areas.	August 25, 1995
EPA conducts removal response action at HAAs.	September – December 1995
EPA issues Special Notices to PRPs providing them the opportunity to undertake the RI/FS/RD for the residential portion of OU2.	November 17, 1995
EPA issues an action memorandum authorizing a removal response action to address lead contaminated soils at 300 residential properties.	March 21, 1996
Remediation of HAAs and residences conducted as a removal response action by the USACE.	June 1996 – December 1997
EPA issues the Baseline Human Health Risk Assessment for OU2. It indicates that lead in soil is the primary contaminant of concern and oral ingestion of soil is the primary exposure route of concern.	August 1996
EPA issues RI report for residential portion of OU2.	January 1997
EPA issues FS report for residential portion of OU2.	February 1997
A ROD for OU2 is signed. The selected remedy included excavation of soils in residential yards contaminated with lead above 500 ppm down to a depth of 18 inches, replacement of the contaminated soil with clean backfill, and disposal of the contaminated soil in an on-site repository.	August 27, 1997
Removal action for remediation of the High Access Areas and residential yards continues as a Remedial Action conducted by the USACE.	January 1998
EPA enters into cooperative agreements with the ITEC, Quapaw Tribe, and ODEQ to provide funding for RI/FS activities for nonresidential portions of OU2.	1998 & 1999
EPA issues an action memorandum authorizing a removal response action to remove laboratory chemicals stored at the Eagle-Picher Office Complex in Cardin, Oklahoma, and designates this response as OU3.	March 2, 2000
EPA conducts the removal response for OU3. EPA determines that No Further Action is warranted to address OU3.	March 28 – May 23, 2000
The EPA completes the Second Five-Year Review for the Tar Creek Site.	April 2000
The USACE completes remediation of the 1,300th residential property under the RA for OU2. The USACE work for OU2 is completed. The EPA hires the RACs contractor to continue the residential yard remediation work for the OU2 RA.	July 2000
The ODEQ issues report documenting results of the Roubidoux Groundwater Monitoring Program for OU1.	September 2002
The EPA, USACE, and DOI sign a Memorandum of Understanding for the Tar Creek site.	May 1, 2003
The ODEQ continues the Roubidoux Groundwater Monitoring Program based on recommendation from their May 2003 report.	November 2003
An AOC is signed with the DOI and 2 mining companies to conduct the RI/FS for OU4.	December 9, 2003
The ODEQ plugs 5 abandoned Roubidoux wells at the site.	April 2004
~~The EPA completes the Third Five-Year Review for the Tar Creek site.~~	~~September 2005~~
Field work for the OU4 RI/FS is conducted.	April – October 2005
LICRAT was established and began the voluntary buyout.	July 2006
EPA publishes the RI/FS for OU4.	July 2007

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EVENT	DATE
EPA signs the ROD for OU4.	February 20, 2008
EPA begins OU4 RA.	October 2009
Construction of Central Mill Repository begins.	January 2010
EPA signs ESD for OU4 ROD.	April 2010
The EPA completes the Fourth Five-Year Review for the Tar Creek site.	September 2010
LICRAT Buyout Complete under OU4 ROD.	November 2011
Treece Buyout Complete under OU4 ESD.	September 20, 2012
ODEQ completes Tar Creek After Action Monitoring Part 2 of Roubidoux aquifer.	October 2013
EPA proposes to transfer OU2 from EPA lead to ODEQ lead.	July 2014
EPA proposed completion of remedial action of OU1.	July 2014
Remedial Action Optimization Report completed.	September 2014
EPA completed remediation of 10 Distal packages, the former smelter property, 4 residences, and construction of the Central Mill Repository under OU4.	January 2010 – September 2014
EPA completed remediation of 579 properties through implementation of 9 RA projects under OU2.	2009-September 2014
EPA completed remediation of 2,940 total properties under OU2.	September 2014
EPA OU2 Milestone Cleanup Event.	September 2014
RAC Reports submitted.	2009-2014
EPA and ODEQ sign CA for Distal 6a.	April 2015
EPA signed the first CA with the Quapaw Tribe for OU4 RA activities.	April 2015
OU5 RI/FS activities begin.	July 2015
RA Reports for CB223, CB143/CB146/CB147 group, Distal 5, Distal 6, Distal 7 North, and Distal 7 South approved.	September 2015

2.0 Background

This section describes the physical setting of the site, including a description of the land use, resource use, and environmental setting. This section also describes the history of contamination associated with the site, the initial response actions taken at the site, and the basis for each of the initial response actions. RAs performed subsequent to the initial response actions for each of the OUs defined for the site are described in Section 3 below.

2.1 Physical Characteristics

The Tar Creek Superfund Site is primarily located in Ottawa County, Oklahoma, in the far northeastern corner of the state (Figure 1). In April 2010, EPA decided to add Treece, Kansas, to the site. Specifically, EPA decided to relocate the residents of Treece, KS to help prevent exposure to the source material deposits at the site. The decision to relocate the residents of Treece, KS was documented in an ESD regarding the OU4 ROD issued in April 2010 (EPA, 2010a). The Tar Creek Superfund Site has no distinct boundaries, but it includes the Oklahoma portion of the Tri-State Mining District (TSMD) along with other areas in Ottawa County where mining waste has come to be located. The TSMD is located in the border region of Kansas, Missouri, and Oklahoma. The Picher Field was the Oklahoma portion of the TSMD centered on the town of Picher, Oklahoma. Extensive lead and zinc mining took place in the Picher Field between the early 1900's and the 1970's. The Tar Creek Superfund Site is about 40 square miles in size. The principal communities within the mining area include Picher, Quapaw, Cardin, Commerce, Miami, and North Miami. The residents of Picher and Cardin were relocated under OU4 and those communities are now generally abandoned. The contamination at the site resulted from past mining activities. The Cherokee County Superfund Site in Kansas and the Oronogo-Duenweg and Newton County Superfund Sites in Missouri comprise the Kansas and Missouri portions of the TSMD (EPA, 1994).

Tar Creek and its primary tributary Lytle Creek comprise the principal drainage system within the Picher Field. Tar Creek is characterized as a small ephemeral stream with standing pools. The headwaters of Tar Creek are located in Cherokee County, Kansas (located north of Ottawa County on the Kansas-Oklahoma border). Tar Creek then flows southward through the Picher Field between the towns of Picher and Cardin, to the east of Commerce and Miami, and it then flows to its confluence with the Neosho River. Tar Creek and Lytle Creek drain approximately 53 square miles. Other principal drainage features near the site in Ottawa County include the Neosho River (located south of the site), the Spring River (located east of the site), and Grand Lake (located in southern Ottawa County) (EPA, 1994).

The Picher Field (including most of the Tar Creek Superfund Site) is located on the eastern edge of the Central Lowland Provinces. Eastern portions of the site are located in the Ozark Plateau. The Central Lowland Province is a nearly flat, treeless prairie. The Ozark Plateau is a broad, low structure dome centered in southwestern Missouri and northwestern Arkansas. The natural land surface at the site is mostly flat and gently slopes to the south towards the Neosho River, to the east towards the Spring River, and to the west towards Elm Creek. However, much of the land surface has been modified by the mining activities. There are numerous large tailings piles, composed of primarily limestone and chert, present on the land surface. In addition, numerous

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collapsed structures from subsidence and cave-ins of mine shafts are also present on the land surface (EPA, 1984).

Contaminated groundwater at the site occurs within the Boone Formation (also known as the Boone aquifer). The Boone Formation is composed primarily of limestone, dolomite, and chert, with lesser amounts of sandstone and shale. Lead and zinc ore were mined from various members of the Boone Formation. Within the mining area, water quality within the Boone aquifer is poor due to acidity and high dissolved metals concentrations. The Boone aquifer is not used as a primary source of drinking water at the site. However, the OU4 RI did identify 13 private residential wells completed in the Boone aquifer that were being used as a source of drinking water at the site. Of the 13 wells tested during the RI, only two were found to be impacted above the final remediation goals (Section 4.2, Progress Toward Meeting the RAOs). The OU4 ROD includes provisions for these two residences to be provided with an alternate drinking water supply as part of the OU4 RA (EPA, 2008). Outside of the mining district, the Boone aquifer is used as a primary drinking water source. In areas where the Boone Formation outcrops at the surface, the aquifer is unconfined. Where the Boone Formation is overlain by confining strata, the aquifer is confined. At the Tar Creek Superfund Site, the Boone aquifer is both unconfined and confined. In the southern portion of the site, the potentiometric surface within the aquifer exceeds the land surface elevation. This results in artesian conditions, and groundwater discharges from abandoned wells, boreholes, mine shafts, and collapsed structures. This groundwater is acidic and contains high metals concentrations, and hence it is referred to as acid mine water or acid mine discharge. This discharge then flows into Tar Creek (EPA, 1994).

Also of interest at the site is the Roubidoux aquifer. The Roubidoux aquifer is composed of cherty limestone with several sand sequences near its base. The Roubidoux aquifer lies beneath the Boone aquifer, and the two are separated by 410 feet to 520 feet of limestone and shale of the Chattanooga Shale, the Jefferson City Dolomite, and the Cotter Dolomite. Where present, the Chattanooga Shale acts as an aquitard and restricts groundwater flow between the Boone aquifer and Roubidoux aquifer. The Chattanooga Shale is absent in most portions of the site. Hydrologically, the Cotter and Jefferson City Dolomites are considered a part of the Roubidoux aquifer (ODEQ, 2006b). The Roubidoux aquifer is a major source of drinking water in the area of the site (EPA, 1994). The cities of Quapaw, Commerce, Miami, and several rural water districts obtain their water supplies from the Roubidoux aquifer (EPA, 1984).

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2.2 Land and Resource Use

Land ownership at the Site can be classified as private or Indian-owned. Under an 1833 treaty, the United States set aside the Quapaw Reserve, located in Ottawa County, Oklahoma, consisting of approximately 12,600 acres of land. A majority of these lands are individually owned allotted lands with 'restrictions against alienation.' These lands are managed under the supervision of the United States Bureau of Indian Affairs (BIA) (BIA, 2005).

Due to the size of the site, land use is varied. The site encompasses residential, commercial, and industrial areas within the towns, while most land use outside of towns is agricultural (EPA, 1997). Approximately 19,500 people lived in the mining area or close proximity to the mining area (EPA, 2008). Tar Creek flows approximately through the center of the site, and it discharges into the Neosho River south of the site. The Neosho River discharges into Grand Lake in southern Ottawa County. Groundwater under the site is found within both the Boone aquifer and Roubidoux aquifer. The Boone aquifer at the site is not currently used as a drinking water supply, but there are some private wells completed within the Boone aquifer. The Roubidoux aquifer is regionally used as a water supply (EPA, 1994).

2.3 History of Contamination

Lead and zinc mining activities first began at the site in the early 1900's. During the early mining period, most mining was conducted by small operators on 20 to 40 acre tracts. Each operator conducted their own mining, drilling, and milling activities (EPA, 1984). Mining activities occurred within a 50 to 150 foot thick ore bearing zone within the Boone Formation. The maximum depth of mining was approximately 385 feet below ground surface. Mining was accomplished using room and pillar techniques. To remove the ore, large rooms, some with ceilings as high as 100 feet, were connected by horizontal tunnels known as drifts. Pillars were left within the rooms to support the ceilings (EPA, 1994). The lead and zinc ores were milled locally and generally sent to locations outside of Ottawa County for smelting (except for the small smelter that operated in Hockerville, OK). Rapid expansion of mining activities occurred during the 1920's, and mining activities reached their peak around 1925. Each mine holding usually had its own mill. During the 1930's, large central mills came into operation, and most mining operations ceased operating their own mills. During the peak of mining activities, 130,410 tons of lead and 749,254 tons of zinc were produced annually. Large scale underground mining activities ended in 1958 (Brown and Root, 1997). Smaller mining operations continued in the Picher Field through the 1960's, and all mining activities at the site ceased in the 1970's (EPA, 2000b).

Zinc smelting operations were not known to have occurred in the Tar Creek area. Lead smelting of the material mined in the Tar Creek area was dominated by the Eagle-Picher Company, which operated a smelter in nearby Joplin, Missouri. However, the Ontario Smelting Company did operate a lead smelter near Hockerville, Oklahoma. Ontario Smelting Company operated this smelter from 1918 until 1924. The smelter was then purchased by the Eagle-Picher Company, who operated the smelter until the early 1930's, when the smelting operations ceased. There were no other smelting operations known to have occurred in the Tar Creek area (USACE, 2002).

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Groundwater infiltration into the mines was a continual problem. This groundwater inflow was controlled through the use of pumps (EPA, 1984). When mining operations ceased, it is estimated that underground cavities with a volume of 100,000 acre-feet (161,000,000 cubic yards) had been created. In addition, approximately 100,000 exploratory boreholes were located within the Picher Field, mostly in Oklahoma. 1,064 mine shafts existed within the Oklahoma portion of the mining district. In addition, numerous water wells, used for milling operations, were abandoned (EPA, 2000b).

During the active mining period, large scale pumping had created a large cone of depression, effectively dewatering the Boone aquifer in the mining area. Exposed sulfide minerals, primarily marcasite and pyrite (both iron sulfide), were oxidized by exposure to the moist air in the mines. When mining activities ceased, pumping was also ceased, and the abandoned mines began to flood. The oxidized sulfide minerals were now much more soluble in water. As the mines filled with groundwater, the oxidized sulfide minerals began to dissolve, generating acid mine water. The acid mine water then reacted with the surrounding rock, and many of the metals present began to leach from the rock into the groundwater. As a result, the acid mine water contained high concentrations of zinc, lead, cadmium, sulfate, and iron (EPA, 1994).

In addition to the acid mine water, the mining activities at the site resulted in the accumulation on the ground surface of mining wastes. Large volume tailings piles (known as 'chat'), some as high as 200 feet, were left at the site. Many of the tailings piles are still present across the site, mostly around the towns of Picher and Cardin. In addition, numerous abandoned floatation ponds filled with fine sediments from milling and chat processing operations are also present at the site (EPA, 2008).

Three general types of mining wastes are present at the site. 'Development' rock is large diameter (4" to 2') rock that was generated during the opening of mine shafts or drifts. Development rock generally poses no contamination problem. 'Chat' is mine tailings from the milling process. Chat contains a mixture of gravel (typically 3/8" in diameter) and finer-grained materials. Fine tailings or "fines" are the fine-grained sediments collected in the flotation ponds (EPA, 2000b). The fine tailings present in chat and flotation ponds typically pose an environmental concern.

In March 2004, the chat piles at the site contained approximately 51.2 million tons of waste (AATA, 2005). The chat has historically been used as a source material for the concrete and asphalt industries and as a gravel source. Other uses of the chat have included railroad ballast, sandblasting and sandbag sand, roadway, driveway, alleyway, and parking lot aggregate, general fill material in residential areas, and impact absorbing material in playgrounds. Sales of chat have been a significant source of income in the local area. Based on estimates of historical aerial photographs, less than 50 percent of the original volume of chat remains in the area. The fines were collected into flotation ponds as part of the gravity separation milling process. Most of the ponds have since evaporated and are now dry. An inventory conducted in 2005 as part of the Remedial Investigation (RI) for OU4 identified 83 chat piles occupying 767 acres with 31 million cubic yards of mine waste, and 243 chat bases (or former piles) occupying 2,079 acres with an estimated 6.7 million cubic yards mine waste. Fine tailings generated from milling and

washing chat were found in 63 ponds occupying 820 acres and totaled approximately 9 million cubic yards of mine waste (EPA, 2008).

Historical mining activities within the TSMD have also contaminated sediments at the Tar Creek Superfund Site. An Advanced Screening Level Ecological Risk Assessment (SLERA) performed in 2009 documented exceedances of site specific toxicity thresholds for sediments in Spring and Neosho River basins (MacDonald et al., 2010). This study indicated that contaminants of potential concern (COPCs) present in surface water, sediments, pore water, and soils within riparian and aquatic habitats posed a potential risk to ecological receptors at the site. The assessment indicated that exposure to metals in sediments poses moderate to high risks to benthic invertebrates at approximately 45% of the locations sampled during the study, including portions of Tar Creek and Lytle Creek (MacDonald et al., 2010).

2.4 Initial Response

By 1979, the abandoned mines had become completely flooded due to groundwater infiltration and due to surface water inflow into the abandoned mine shaft openings and subsidence features. In low-lying areas along the southern portion of the site (near Commerce), the potentiometric surface exceeded the ground surface. This resulted in the surface discharge of acid mine water from abandoned boreholes and mine shafts (EPA, 2000b). This surface discharge then emptied into Tar Creek and other surface water bodies in the watershed. As a result, most of the downstream biota in Tar Creek was killed. The bottom of the creek became stained red due to ferric hydroxide deposition, and red stains appeared on bridge abutments and cliffs in the Neosho River downstream of its confluence with Tar Creek (EPA, 1994).

In 1980, the Governor of Oklahoma established the Tar Creek Task Force to investigate the effects of the acid mine discharge. The Task Force was composed of various local, state, and federal agencies. The OWRB was appointed as the lead state agency. The initial investigations were conducted by the Task Force in 1980 and 1981. The conclusions from the Tar Creek Task Force's studies included the following:

- There were no significant health risks associated with the air pathway at the Tar Creek Superfund Site;
- The Neosho River, Spring River, and Grand Lake could be used as a raw water source for public water supplies;
- The fish from areas sampled in these water bodies were safe for consumption; and,
- Most of the metals present in the acid mine water were precipitated out of the water and into the sediments in Tar Creek prior to its confluence with the Neosho River. The sediments in Tar Creek provided a long-term sink for metals that effectively removed them from most biological processes, and the sediments did not pose a health risk. Other than aesthetic alteration at the confluence of Tar Creek and the Neosho River, there was no impact on the Neosho River from the acid mine drainage in Tar Creek.
- The Task Force identified the primary threat at the site as the potential for contamination of the Roubidoux aquifer (EPA, 1994).

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The EPA proposed the Tar Creek Superfund Site to the NPL in July 1981, based on information from the Task Force's investigations. The NPL is the list, compiled by EPA, of uncontrolled hazardous substance releases in the United States that are priorities for long-term remedial evaluation and response. On June 16, 1982, the EPA provided funding through a Cooperative Assistance Agreement with the Oklahoma State Department of Health (OSDH) to conduct a Remedial Investigation/Feasibility Study (RI/FS) at the site. The OSDH was the principal Oklahoma agency at the site for the State of Oklahoma. The OWRB, under an interagency agreement with the ODSH, conducted the RI/FS for the Site. The site was listed on the NPL on September 8, 1983. The EPA signed a ROD for the site on June 6, 1984 (EPA, 1994). The remedy selected and implemented under the ROD is discussed in Section 3.

In 1994, the EPA conducted the first five-year review of the Tar Creek Superfund Site. While conducting this five-year review, the Indian Health Service in Miami, Oklahoma, notified the EPA by letter of elevated blood lead levels in children routinely tested as part of their participation in the United States Department of Agriculture's (USDA) Women, Infant, and Children (WIC) program. The letter stated that 34% of the 192 children tested had blood lead levels above 10 micrograms per deciliter (µg/dL), which is the level above which the Centers for Disease Control (CDC) considered at that time to be elevated in children.[6] The letter stated that although location did not appear to be a factor, a majority of the children did live within 5 miles of a chat pile (EPA, 1994). Also, EPA Region 7 had been conducting investigations of the Cherokee County (Kansas), and the Oronogo-Duenweg (Missouri) Superfund Sites. Data obtained from EPA Region 7's investigations indicated that mine wastes (including chat piles) represented an unacceptable risk to human health and the environment (EPA, 1994).

In the summary portion of the first five-year review, EPA stated that the studies conducted for the 1984 ROD did not include a risk assessment. Risk assessment guidance had not been developed at the time the 1984 ROD was signed, and the primary emphasis at the Tar Creek Superfund Site was on groundwater and surface water impacts related to the acid mine water. The first five-year review recommended that a second OU be designated at the site for the mining wastes. It was also recommended that studies be undertaken to determine the impacts of the chat piles and flotation ponds on human health and the environment. The studies were to include blood lead studies, environmental sampling of High Access Areas (HAAs are frequented or likely to be frequented by young children such as schools, playgrounds, day cares, and parks), mapping of all mine wastes, classification of surface mine wastes through environmental sampling and testing, sampling of leachate from mine wastes, and sampling of airborne particulates near mine wastes (EPA, 1994). As a result of the five-year review recommendations, surface and groundwater contamination at the site became OU1, and impacts related to the mining waste, including HAAs and residential properties, became OU2 (EPA, 2000b).

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[6] *See* Centers for Disease Control, *Preventing Lead Poisoning in Young Children* (1991) at p. 7 ("Blood lead levels at least as low as 10 µg/dL are associated with adverse effects"). Later the CDC revised its position saying that there was no safe level for lead in young children. *See CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention"* (November 26, 2013) ("CDC will emphasize that the best way to end childhood lead poisoning is to prevent, control or eliminate lead exposures. Since no safe blood lead level in children has been identified, a blood lead "level of concern" cannot be used to define individuals in need of intervention.".)

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EPA addressed HAAs and residential areas of OU2 first. From August 1994 through July 1995, the EPA conducted sampling through its removal program (the removal program is, generally speaking, the part of the Superfund program generally responsible for conducting emergency and early response activities) to determine the nature and extent of the contamination in residential areas of the site. The Phase I sampling for OU2 addressed HAAs, and the Phase II sampling for OU2 took place at residences that were inhabited or potentially inhabited by children. Twenty-eight HAAs and 2,070 residential properties were sampled as part of the OU2 site assessment. The data were used to complete the OU2 Baseline Human Health Risk Assessment (BHHRA) and Residential RI Reports. The OU2 BHHRA concluded that lead in soil was the primary contaminant of concern and that ingestion of contaminated soil was the only exposure pathway that posed a significant risk to human health. These activities led the EPA to conclude that the lead contaminated soil in residential areas posed an imminent and substantial endangerment to human health (EPA, 2000b).

Due to the concerns related to exposures to lead contaminated soil, the EPA issued an action memorandum on August 15, 1995, that authorized removal response actions at HAAs at the Site (EPA, 2000b). The removal response action began in September 1995 and was completed in December 1995. The removal response action for the HAAs was known as the Phase I removal action. The Phase I removal action was conducted by EPA through its Emergency Response Cleanup Services (ERCS) contractor, Reidel Environmental Services, and by its Superfund Technical Assessment and Response Team (START) contractor, Ecology and Environment, Inc. (Washington Group International, 2002).

The removal response action beginning in September 1995 included the excavation of lead and/or cadmium contaminated surface soils with concentrations exceeding 500 parts per million (ppm) and 100 ppm respectively from 0 to 12 inches below ground surface (bgs) and 1,000 ppm lead and/or 100 ppm cadmium from 12 to 18 inches bgs. This means that in areas where the lead concentration exceeded 500 ppm from 0 to 12 inches bgs and/or the cadmium concentration exceeded 100 ppm, the soil was excavated. When the lead concentration exceeded 1,000 ppm and/or the cadmium concentration exceeded 100 ppm in the 12 to 18 inch bgs interval, then soil from that interval was also excavated. On large properties where unauthorized excavation could be controlled, such as parks and schools, the criteria were modified to 500 ppm lead and/or 100 ppm cadmium from 0 to 12 inches bgs (the 12 to 18 inch increment was dropped). When contamination remained above the cleanup levels at 18 inches bgs, a barrier (orange construction fence material) was place in the bottom of the excavation as a warning that contamination remained below the barrier. Each excavation was then backfilled with clean soil. Seventeen of the 28 HAAs that were evaluated required a response action (EPA, 2000b).

The EPA issued an action memorandum on March 21, 1996, that authorized a removal response action at residences at the Site (EPA, 2000b). This removal response action was known as the Phase II removal action, and it included both residential properties and HAAs. The EPA entered into an Interagency Agreement (IAG) with the United States Army Corps of Engineers (USACE) to conduct the Phase II removal action. The USACE contracted with Morrison Knudson Corporation (MK) to complete the work (USACE, 2002).

This removal action was conducted in a manner similar to the removal conducted at the HHA under Phase I, except that a cleanup level of 500 ppm for lead was chosen. This cleanup level

was based on the BHHRA and EPA Region 6 experience at other lead cleanup sites. Approximately 2,070 residential homes in Picher, Cardin, Quapaw, Commerce, and North Miami were evaluated. The second five-year review stated that approximately 65% of these properties contained soil lead in residential yards at concentrations that exceeded 500 ppm in at least one part of the yard. The Phase II removal response activities were conducted from June 1996 until December 1997. The following criteria were used to prioritize the properties:

- Top priority was given to homes with children less than 6 years of age who had blood lead levels in excess of 10 μg/dL, and where the soil lead concentrations had been determined to be a significant contributor to elevated blood lead levels; and,
- The next highest priority was given to homes where the soil lead concentration exceeded 1,500 ppm (EPA, 2000b).

During the Phase I (HAAs) and Phase II (residential properties) removal response actions, remediation was performed at 20 HAAs, one commercial property (used by the EPA, USACE, and their various contractors for on-site support facilities), and 227 residential properties. Approximately 84,417 cubic yards of soil were removed from these properties during the removal actions (E&E, 2000, USACE, 2002, and Washington Group International, 2002).

In September 1998, the Quapaw Tribe of Oklahoma requested assistance from the EPA to conduct response activities at an abandoned office complex located in Cardin, Oklahoma. The land was owned by the Quapaw tribe, and had been leased by Eagle-Picher Industries, Inc. from 1945 until 1981. A drum containing residual cyanide had been discovered in one of the site buildings during work conducted in 1998. EPA performed evaluations of the atmosphere inside this building and determined that no cyanide above background levels were present (EPA, 2000a).

In March 1999, the Inter-Tribal Environmental Council (ITEC) conducted a site reconnaissance of the Eagle-Picher Industries, Inc. office complex property in advance of the completion of an RI/FS being conducted by the ITEC and Quapaw Tribe for the EPA. During this Site reconnaissance, 120 containers of laboratory chemicals were discovered at the site. The EPA conducted a Hazardous Characterization, again at the request of the ITEC, in May and June 1999. These chemicals were inventoried, categorized, segregated, and over-packed in preparation of future disposal by the BIA. The BIA informed the EPA that it did not have the funding or expertise to remove the chemicals from the Site (EPA, 2000a).

On March 2, 2000, an action memorandum was issued by EPA approving a time-critical removal action at the Eagle-Picher Office Complex – Abandoned Mining Chemicals. This portion of the Site was designated OU3. The action memorandum determined that the chemicals posed an imminent and substantial endangerment to the public health or welfare or the environment. This determination was made on the basis that the containers in which the chemicals were stored had to be placed outside, where they were exposed to the elements. The EPA was concerned that eventually the containers would deteriorate, releasing the chemicals into the environment (EPA, 2000a).

On March 28, 2000, the emergency removal action was conducted. The laboratory chemicals were removed from the Site and transported to facilities appropriate for their disposal. The EPA

was unable to dispose of some low-level, radioactive uranyl acetate. The EPA remobilized to the Site on May 23, 2000. This material was removed from the site and transported to an off-site location for treatment and disposal (EPA, 2000c, and EPA 2000d). The EPA determined that no further action was required in relation to OU3 (EPA, 2004).

On December 9, 2003, the EPA signed an Administrative Order on Consent (AOC) with three Potentially Responsible Parties (PRPs), including the U.S. Department of the Interior (DOI), Blue Tee Corp., and Gold Fields Mining Corporation, to conduct the RI/FS for OU4. Under the terms of the AOC, the EPA prepared the risk assessments for OU4 based on data collected by the PRPs and EPA. A three-phased Site Reconnaissance was conducted from March 29 to April 28, 2005. Field sampling and investigations were conducted in May and concluded in October 2005. The RI/FS reports were issued in July 2007 (EPA, 2008).

During the course of the OU4 investigations, EPA performed a pilot project consisting of several field studies regarding injection of chat and fine tailings into flooded mine cavities to determine whether this could be a cost-effective disposal technique. Following the pilot injection, EPA found that the physical placement of chat and fine tailings in flooded mine rooms does initially impact mine water; however, the data indicated that the mine water chemistry rapidly begins to return to pre-placement conditions (EPA, 2008). In another pilot under the RI/FS, the United States Department of the Interior (DOI), with the cooperation of the Quapaw Tribe, is promoting responsible chat sales, using Best Management Practices (BMP) to reduce the volume of millions of tons of mining waste. Both pilots, Indian-owned chat sales and the disposal of chat in mine cavities, were response action alternatives considered in the OU4 FS (EPA, 2008).

In April 2009, EPA proceeded with OU2 RA activities within Ottawa County aimed at identifying residents that may not have had an opportunity to participate in past property remediation programs under OU2. The program identifies properties where landowners wanted to have their properties sampled and remediated. Due to the large scope of work, the remedial construction was performed over time through discrete "RA Projects". RA Projects completed during this program include: (1) South Repository Closure Modifications, (2) Southeast Commerce Site, (3) Ottawa County Towns RA, (4) City of Miami Ward 3 RA, (5) City of Miami Phase II RA, (6) City of Miami Phase III RA, (7) Ottawa County RA, (8) Ottawa County Phase III, and (9) Ottawa County Phase IV. These OU2 RA Projects were completed on properties that consisted of residential driveways, residential yards, HAAs, public alleyways, parks, and churches. EPA remediated 579 properties, resulting in the removal of 31,011 cubic yards, restoring approximately 62.6 acres. This set of OU2 RA projects was completed by September 2014 (EPA, 2013a and EPA, 2014a).

OU4 includes the parts of the Site (both urban and rural) that are not currently used for residential purposes or which are sparsely used for residential purposes, where mine and mill wastes and smelter waste have been deposited, stored, disposed of, placed, or otherwise come to be located. OU4 Source Material RA began in October 2009 and is currently ongoing. OU4 addresses the core mining areas of the Site where the largest chat and fines deposits are located, it also addresses distal areas where the population is sparse and the chat piles are smaller and generally dispersed. All of these areas have mining, milling, smelting, or other operation related wastes. The OU4 distal area is divided into three distinct distal areas (Figure 3): (1) Northeast

Distal Area, (2) Southeast Distal Area, and (3) Elm Creek Distal Area. Within these distinct distal areas, source material locations were grouped together to form distal groups where work can be conducted. There are sixteen (16) distal groups containing numerous chat piles, chat bases, and fine tailing ponds (Figure 3). The Central Mill Repository was constructed in 2010 and is the final resting place of waste from distal group remediation (CH2M HILL, 2011). To date, the CMR has received 993,171 tons of chat, 418,349 tons of transition zone soils, 200,082 tons of fine tailings, and 22,698 tons of smelter debris (Table 8).

EPA is presently conducting a Remedial Investigation (RI) for OU5. No OU5 remedy has been selected.

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Table 8: Annual Production Summary

	Destination: Processor (Reuse), Tons			Destination: Repository, Tons									Destination: Repository, CY		
Production Period	Chat	Reuse Woodchips	Development Rock	Chat	TZ Soils	Fine Tailings	Wood/Scrap Metal/Concrete	Root balls and tree roots	Residential Soil	Development Rock	Imported Gravel classified as Dirty after removal from the site	Smelter Waste	OU2 Residential Soil, CY	Quapaw Tribe Loads, CY	Commerce Loads, CY
2010	46940.52	317.61	21653.12	496072.07	303919.39	116562.00	17446.51	2698.35	3556.28	10053.65	NA	0.00	0.00	NA	0.00
2011	199724.02	0.00	0.00	205989.25	36760.05	50551.10	39086.83	759.03	0.00	0.00	NA	10017.96	7788.20	NA	0.00
2012	2995.19	0.00	0.00	82753.01	34993.68	30016.39	5342.72	346.17	346.17	0.00	NA	12680.23	7071.00	NA	5796.00
2013	38473.87	0.00	0.00	137058.61	29845.44	2903.03	0.00	461.97	0.00	0.00	899.29	0.00	8849.50	540.00	0.00
2014	0.00	0.00	0.00	71298.37	13830.34	0.00	0.00	13.71	0.00	0.00	287.91	0.00	0.00	0.00	0.00
Total	288133.60	317.61	21653.12	993171.31	419348.90	200032.52	61876.06	4279.23	3902.45	10053.65	1187.20	22698.19	23708.70	540.00	5796.00

	Destination: CB223 (Subsidence Feature), Tons		C&D Debris, CY	Hockerville, Tons	605 Hole
Production Period	Recycled Limestone to CB223	Chat, Fine Tailings & Development Rock	To the Repository (Estimated)	TZ Soils	
2010	268.38	44908.61	0.00	0.00	
2011	Filled and Capped	Filled and Capped	42912.00	5434.53	
2012	-	-	5492.00	Filled and Capped	
2013	-	-	Filled and Capped	-	
2014	-	-	-	-	

Notes:
NA = Not available

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2.5 Basis for Taking Action

The purpose of the response actions conducted at the Tar Creek Superfund Site was to protect public health and welfare and the environment from releases or threatened releases of hazardous substances from the site. Discharges of acid mine water from the abandoned mines to surface water and possible direct migration to the underlying Roubidoux aquifer threatened human health and the environment. In addition, exposure to lead contamination in residential soils was determined to be associated with human health risks higher than the acceptable range. The primary threats that the Tar Creek Superfund Site posed to public health and safety and the environment were: the potential contamination of water supply wells completed in the Roubidoux aquifer from acid mine water (no such contamination has been found to date); possible direct dermal contact with acid mine water where groundwater discharges at the surface; severe ecological impacts to Tar Creek (the stream) as a result of the acid mine water discharges; incidental ingestion of lead contaminated soils; incidental ingestion of drinking water; and incidental ingestion of fine particles that are interspersed with the larger chat particles, incidental ingestion of fine tailings materials, and incidental ingestion of smelter wastes in soil (EPA, 1984, EPA, 1997, and EPA, 2008).

3.0 Remedial Actions

This section provides a description of the remedy objectives, remedy selection, and remedy implementation for the three OUs (OU1, OU2, and OU4) for which RODs have been signed by EPA for the site. It also describes the ongoing operation and maintenance (O&M) activities performed at the site in the period since completion of the fourth five-year review. The three OUs for which RODs have been signed are: (a) OU1 (surface water/groundwater); (b) OU2 (residential properties and HAAs); and (c) OU4 (chat piles, distal properties, mine and mill waste, and smelter waste). Two additional OUs have been designated at the site: (a) OU3 (Eagle-Picher Office Complex - abandoned mining chemicals); and (b) OU5 (sediments and surface water). OU3 was addressed through a removal action, and the EPA has determined that no further action is necessary. EPA is presently conducting a Remedial Investigation (RI) for OU5. No OU5 remedy has been selected yet.

Remedial Action Objectives

The specific remedial objectives of the OU1 RA were:

- Mitigate the potential threat to public health and the environment by preventing contamination of the Roubidoux aquifer from acid mine water; and,
- Minimize the damage to Tar Creek [the stream] from acid mine water discharges (EPA, 1994).

The specific remedial objective of the OU2 RA was:

- Reduce ingestion by humans, especially children, of surface soil in residential areas contaminated with lead at a concentration greater than or equal to 500 ppm (EPA, 1997).

The specific remedial objectives of the OU4 RA are:

- Prevent children and adolescents from coming in direct contact, through the ingestion and inhalation exposure pathways, with lead contaminated source material where lead concentrations exceed 500 ppm;
- Prevent terrestrial fauna from coming in direct or indirect contact, through the ingestion exposure pathway, with cadmium-, lead-, or zinc-contaminated source materials and soils where cadmium, lead, and zinc concentrations exceed their respective remediation goals of 10.0 mg/kg, 500 mg/kg, and 1100 mg/kg respectively;
- Prevent riparian biota including waterfowl from coming into contact, through the ingestion exposure pathway, with unacceptable concentrations of cadmium, lead, and zinc in surface water and sediment by eliminating all discharges of cadmium, lead, and zinc from source materials to surface water;
- Prevent children from direct contact, through the ingestion and inhalation exposure, with lead-contaminated soil where soil lead concentrations exceed 500 ppm; and,
- Prevent site residents from the ingestion of water from private wells that contains lead in concentrations exceeding the National Primary Drinking Water Standards (EPA, 2008).

3.1 Remedy Selection

Three RODs have been issued by EPA for the Tar Creek Superfund Site. The OU1 ROD addressed the impacts associated with surface water discharges of acid mine water and the migration of acid mine water from the Boone aquifer to the underlying Roubidoux aquifer. The ROD for OU2 addressed surface soil contamination in residential areas at the site. The OU4 ROD addressed mining waste including chat piles and tailings ponds, smelter wastes, soils contaminated by mining and smelter wastes, a limited number of residential properties with lead-contaminated soils (that were not addressed under OU2), and private residential wells impacted by site related contaminants. The site has also been addressed through other response actions (the two removal response actions for OU2 and the removal action for OU3) as described in Section 2.4.

The ROD for OU1 was signed on June 6, 1984, to address the mitigation of surface water and groundwater discharges of acid mine water to Tar Creek and to prevent the potential contamination of the Roubidoux aquifer through acid mine water migration from the overlying Boone aquifer. Elements of OU1 included response actions to address contaminated groundwater as a result of acid mine water seepage, and actions to address contaminated surface water as a result of acid mine water discharges (EPA, 1984).

The remedy described in the 1984 ROD for OU1 included the following elements:

- Abandoned wells completed in the Roubidoux aquifer were to be plugged. Each well was to be cleared of obstructions. The wells were then to be plugged from the bottom to the surface using acid resistant cement.
- Surface water diversion and diking structures were to be constructed around two major inflow areas to prevent surface water inflow into the abandoned mines. The two inflow areas were identified as the abandoned mine shafts called Muncie and Big John. These

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two inflow areas combined were thought to represent 75% of the total surface inflows into the abandoned mines. It was thought that the elimination of these inflow points would cause the groundwater levels in the mines to drop and, as a result the amount of acid mine water discharged to the surface would be reduced or eliminated. It was predicted that the Admiralty location would become an inflow point after the initial diking and diversion work was completed, so the ROD allowed for additional diking and surface water diversion around this location if deemed necessary.

- A surface water and groundwater monitoring program was to be conducted for two years. The purpose of the monitoring was to assess the effectiveness of the RAs at preventing contamination of the Roubidoux aquifer and reducing the acid mine water discharges into Tar Creek.
- A fund-balancing waiver to certain Applicable or Relevant and Appropriate Requirements (ARARs) was granted. The waiver was invoked in the ROD declaration based on the prohibitively high costs that would be associated with other engineered solutions to address the surface water contamination in Tar Creek. It was determined that these costs would drain the Superfund and put at risk the EPA's ability to address other releases under CERCLA and the NCP (EPA, 1984, and EPA, 2000b).
- The ROD stated that future RAs would be required if the selected alternatives did not adequately mitigate the risk to human health (EPA, 1984).

The ROD for OU2, residential areas, was signed on August 27, 1997. This ROD addressed soils in residential yards and HAAs contaminated with lead (EPA, 1997).

The remedy described in the ROD for OU2 (residential areas) included the following elements:

- Excavation of soils in residential areas and HAAs containing lead with concentrations greater than or equal to 500 ppm up to a depth of 18 inches. If lead concentrations exceed 500 ppm below 18 inches, a marker consisting of geotextile fabric or other suitable material would be placed in the excavation prior to backfilling to warn of contamination below the barrier. Each excavation was backfilled with clean top soil.
- Excavation of obvious hot spots (places where chat contamination was readily observable at the surface).
- Establishing new vegetation using sod or re-seeding.
- Backfilling of traffic areas and driveways with road base materials.
- On site disposal of excavated materials at a permanent long-term disposal area.
- Institutional controls (ICs) which may include the following:

    1. Restrictions and management controls on unsafe uses of mine tailings;
    2. Restrictions and management controls on activities that would cause recontamination of remediated properties;
    3. Restrictions and management controls on activities that would contaminate clean site property with mine tailings;

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4. Restrictions and management controls intended to prevent future exposure of children to unacceptable levels of lead in the soil at new residential developments that are located in areas with high lead levels in soil;
5. Restrictions and management controls on building and construction activities in order to prevent building and construction practices that would increase exposure to lead-contaminated soils;
6. Restrictions and management controls on access to contaminated property through physical barriers (e. g., fencing) or notices (e. g., warning signs);
7. Public health and environmental ordinances and controls related to lead exposure and management of mine tailings;
8. Placing notices in property deeds regarding contamination;
9. Sampling and analysis of lead sources;
10. Blood lead monitoring;
11. Health education; and,
12. Lead-contaminated dust reduction activities.

- Measures to prevent the recontamination of residential properties, or that would reduce the potential for recontamination of residential properties included:

    1. Vegetating poorly vegetated or unvegetated areas;
    2. Capping with soil;
    3. Capping with base coarse material or paving;
    4. Applying dust suppressants or other dust control measures;
    5. Controlling drainage;
    6. Consolidation of source materials;
    7. Containment of source materials; and,
    8. Abating lead sources to prevent releases into the environment that would recontaminate remediated areas (EPA, 1997).

The OU2 ROD also included several provisions to address lead contaminated soils at the site and within Ottawa County. The ROD expanded the site to include all portions of Ottawa County that were impacted by mining wastes, including HAAs outside the mining area and the entire floodplain of Tar Creek. The ROD contained a provision to cover or replace chat material in alleyways, parking lots, roads, driveways, and other such areas located near residences with road base materials such as gravel or crushed limestone. The ROD called for expanding the use of physical barriers to restrict access to mining wastes located near residences as deemed appropriate (EPA, 1997).

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The ROD for OU2 provided for the establishment of ground cover, such as grass, in bare contaminated soils at certain residences, located generally outside the mining area but within Ottawa County. Finally, the ROD stipulated that, at certain residences located generally outside the mining area but within Ottawa County, where medical monitoring has found that a resident has elevated blood lead levels close to or above 10 μg/dL, and where the residential yard is contaminated with lead at concentrations at or above 500 ppm, the soil would be excavated and replaced as called for under the selected remedy (EPA, 1997).

The ROD for OU4 was signed on February 20, 2008. This ROD addressed source materials (*i.e.*, chat, fine tailings, and smelter wastes), rural residential yard soil contamination, transition zone soil contamination (*i.e.*, the soil under and extending outward from a chat base or a tailings pond), and contamination in water drawn from rural residential wells. The OU4 ROD stated that the remedy would be implemented in two phases over a period of 30 years (EPA, 2008).

The remedy described in the ROD for OU4 included the following elements:

Phase 1 of the remedy selected under the OU4 ROD addresses voluntary relocation of residents in the area shown in Figure 4. Phase 1 also provides for chat sales. Phase 1 addresses source materials in a manner that reduces the overall footprint of contamination and reduces the need for land use restrictions, ICs, and O&M.

- Residents located in Picher, Cardin and Hockerville were voluntarily relocated following the procedures and priorities established by the Lead Impacted Communities Relocation Assistance Trust (LICRAT) (Residents of Treece, KS were added to the relocation, under a Kansas trust—the Treece Relocation Assistance (TRA) Trust , in 2010 –see below)
- Chat and chat bases from distal areas, including associated historic chat covered haul roads and non-operating railroad grades, are being excavated to the underlying native soil, transported and released to an on-site chat processor or future processing location located in a previously contaminated area of the site, injected into the mine workings, or disposed in an on-site repository.
- Transition Zone (TZ) soils (soils around and underneath source materials) are being addressed by excavation followed by natural soil rebuilding. [Note: EPA has begun a pilot project whereby, in lieu of extensive excavation of contaminated soils, EPA is adding soil amendments high in phosphates to bind metals in soil, making them less bioavailable. This pilot project will inform EPA as to whether to continue excavation of contaminated TZ soil. It is hoped that more topsoil may be preserved by adding phosphate-containing soil amendments. In addition to preserving topsoil, an objective of the pilot study is to reduce metals bioavailability to acceptable levels while decreasing the volume of TZ soils being excavated and disposed at the CMR (EPA, 2014d).
- Smelter wastes were all excavated and disposed in an on-site repository. Smelter affected soils were managed in the same manner as transition zone soils.
- Fine tailings are being injected into mine workings or covered in place, with the latter being the predominant disposal method. The covered fine tailings are being consolidated to reduce the footprint of the final cover.

- Source material in Tar, Lytle, Elm or Beaver Creek or other site waterways, was given priority under the OU4 ROD, but, generally speaking, EPA has emphasized cleaning up the distal areas. The optimization plan that EPA is now following emphasizes addressing source material in site waterways on a priority basis through either excavation and/or the installation of a flexible membrane liner, as needed as determined by EPA. As an interim measure, sheet piling, berms, constructed wetlands, or other engineering controls will be installed for near-stream source materials to help prevent contamination from migrating to surface water.
- An alternative water supply would be provided to any household where mining-related contaminants in water drawn from rural residential wells exceed 0.015 milligrams/liter (mg/L) for lead for rural households. Rural households that were within the area that had been designated for relocation under the LICRAT relocation program, but which did not elect to participate in the relocation program, have been included in the households receiving an alternative water supply (estimated to be two residences).
- Rural residential yard soil that was found to have concentrations of soil lead that exceed 500 ppm has been excavated to a maximum depth of 12 inches, and the excavated area has been backfilled with clean soil, contoured to promote drainage, and revegetated. This includes some residential yards that were identified for relocation.
- On-site repositories have been constructed to accept site source materials for final disposal. On-site repositories will be closed when they reach capacity or at completion of the RA. Closure will be accomplished by covering the repositories with a soil cover, contouring to promote drainage, and revegetating the soil cover. (EPA, 2008).

Figure 4: LICRAT Buyout Areas

Figure 4:
LICRAT Buyout
Area

We make every effort to provide and maintain accurate, complete, usable, and timely information. However, some data and information on this map may be preliminary or out of date and is provided with the understanding that it is not guaranteed to be correct or complete. Conclusions drawn from, or actions undertaken on the basis of, such data and information are the sole responsibility of the user.

DEQ
OKLAHOMA
Department of Environmental Quality

Legend
LICRAT Buyout Area
Superfund Area

Map Created by Brent Stone
on 5/12/2015

0 1 2 4 Miles

Phase 2 of the remedy selected under the OU4 ROD addresses certain source areas that remain after Phase 1 cleanup activities. These areas may include unmarketable chat bases, tailings ponds, and chat that remain undisposed and unsold in distal areas of the site. Chat sales will continue until the last five years of Phase 2.

- The remedy will be reviewed, at a minimum, every five years since hazardous substances would remain on site with concentrations that exceed concentration levels that allow for unrestricted use and unrestricted exposure. The remedy will be reviewed to ensure protection of human health and the environment. As part of the five-year review, EPA will evaluate the progress of chat sales. Chat piles and bases remaining after 10 years will be evaluated for commercial viability. This determination will be made using input from the chat/land owners, appropriate tribal representatives, and the commercial operators.
- Unmarketable chat piles and bases will be excavated, transported and released to an on-site chat processor or future processing location in a previously contaminated area of the site, injected into mine workings, or disposed of in an on-site repository. Where chat/land owners will not release the unmarketable chat, they will be asked to provide a plan, including a schedule, for its final disposition consistent with the OU4 ROD. If EPA finds that the plan or schedule is unacceptable, EPA may take legal action. Scheduled disposition under the owners' plans must be completed within five years.
- Historic haul roads and non-operating railroad grades that are contaminated will be managed the same as chat bases.
- ICs and O&M activities will be implemented, as needed as determined by EPA, at repositories and covered, fine tailings ponds.
- Environmental monitoring will be conducted, as needed as determined by EPA, to test for contamination in ambient and near source air, surface water, groundwater, and sediment during remediation activities.
- Other actions included in the selected remedy for OU4 are discussed below.

Chat sales were selected as part of the CERCLA remedy. The OU4 ROD states that although EPA does not own and will not purchase chat, it will assist chat sales participants. The responsible sale of chat under the Chat Rule, 40 CFR Part 278, will decrease the amount of chat on site in a way that brings added benefits to the community while reducing exposure risks.

As part of the OU4 ROD, a watershed-based approach is being taken, including development of a baseline hydrology model to reflect the existing land uses in the basin and to reflect any rainfall storage within the source materials. Runoff is expected to increase as the capacity of the soil to absorb rainfall on site decreases, and the model may be used in the future to manage increased runoff and stream flow.

Under the selected remedy, ICs include deed notices placed on land parcels that are contained in the site. Such ICs would notify current and potential future deed holders of the presence of any wastes left on site. The IC instrument to restrict land use is a Deed Notice and Easement filed pursuant to Oklahoma Statute 27A § 2-7-123(B). An additional IC is to be implemented to restrict use of groundwater from the Boone aquifer (or shallower) for potable or domestic supply

when that water source is impacted with site-related contaminants above the final remediation goals. The IC instrument for groundwater is to be implemented through the Oklahoma Water Quality Standards (OWQS) Title 785, Chapter 45, Appendix H (EPA, 2008). Appendix H currently states that toxic metals are present in the Boone Aquifer and that special well construction methods and sampling are required within the OU4 boundary due to contamination in the Boone aquifer.

To ensure that injection of chat complies with Underground Injection Control (UIC) regulations for a mine backfill well, a site-wide hydrogeological study was performed (CH2M HILL, 2010). The study addressed the requirements of the regulations and examined whether there is hydraulic connectivity between the Picher Field and the Commerce mine workings. The study also identified strategic subsurface locations for injection in order to maximize the number of potential injection sites and evaluate the long-term effectiveness of this method.

As part of addressing in-stream source materials, removed source materials will be returned to the nearby chat piles, chat bases, or tailings ponds from which it appears that they came, as determined by EPA, prior to remediation of such chat piles, bases or tailings ponds. When in-stream chat outside of the distal area is returned to its point of origin, the owners of the chat may sell it or dispose of it as is outlined in the OU4 ROD (EPA, 2008).

In April 2010, EPA issued an ESD describing a change that was made to the remedy selected under the OU4 ROD. The ESD explains that, consistent with the OU4 ROD, EPA decided to complete a voluntary relocation of residents in Treece, Kansas as part of the OU4 RA (EPA, 2010a).

3.2 Remedy Implementation

After the ROD for OU1 was issued, the surface water diversion and diking work at the Big John and Muncie Mine sites proceeded as part of the RA. The diking and diversion work at the Admiralty Mine site also proceeded. The construction at these three sites was completed on December 22, 1986 (EPA, 1994).

The work to clear and plug the 66 abandoned Roubidoux wells identified in the OU1 ROD began in September 1985, when IT Corporation was contracted by the OWRB to conduct the work. Of the 66 identified wells, 4 wells could not be located, 7 wells were found to be shallow (not completed in the Roubidoux aquifer), 3 wells were still in use, 2 wells had been properly plugged and abandoned, and access was not granted at one well location. In addition, 2 wells were not plugged due to high cost, and at 4 of the wells, it was not physically feasible to plug the entire well, so a cement plug was placed at the floor of the mine workings. The remaining 43 wells were properly plugged and abandoned (IT, 1985). After completion of the initial work, 17 additional wells were identified. The OWRB contracted with Engineering Enterprises, Inc. to conduct the additional work. Of the 17 wells, 13 were plugged and abandoned. Two wells were determined to be shallow vent holes or dewatering wells, and were not plugged. Two wells were not plugged due to technical difficulties. The additional work was completed in October 1986 (EEI, 1986).

Following construction activities at OU1, a two-year monitoring and surveillance program was conducted to assess the effectiveness of the RA activities at mitigating the acid mine drainage discharges to Tar Creek and at preventing the migration of the acid mine water to the Roubidoux aquifer. Surface water flow measurements and water quality data were collected at locations along and near Tar Creek to determine if the pollutant loading to Tar Creek had changed as a result of the RA construction activities. Water levels were monitored in the Blue Goose Mine (considered to be indicative of the water levels within the Boone aquifer and related to the discharge volumes from the mines to Tar Creek) to determine if the water levels within the Boone aquifer and the mine workings had decreased. Finally, water quality data were collected from public water supply wells completed within the Roubidoux aquifer to assess the water quality after completion of the well plugging activities. These monitoring activities were conducted in 1987 and 1988. The results of the monitoring and surveillance program were detailed in a report submitted by the OWRB to the EPA in 1991 and summarized in the first Five-Year Review Report (EPA, 1994). Further discussion regarding the results of this monitoring are provided in Section 3.4.

After the OU2 ROD was issued, the removal actions being conducted for the HAAs and residential properties were transitioned into the RA for OU2. The EPA and the USACE signed an IAG in September 1999. The USACE conducted the OU2 Remedial Design RD/RA under the direction of the EPA. MK was the contractor selected by the USACE to perform the RD/RA for OU2 (USACE, 2002).

MK began remediation at the site in February 1998. During assessment activities conducted between 1996 and 2000, approximately 2,774 properties were identified that required assessment sampling for lead in soils. Of these properties, 2,380 were assessed for lead contamination, and 2,106 exceeded the 500 ppm remediation goal for lead (88% of the assessed properties) (Washington Group International, 2002). The USACE and MK conducted remediation at 1,300 properties during the RA. These 1,300 properties were the original properties identified by the OU2 ROD as requiring remediation. The USACE and MK completed the RA for the 1,300 properties identified at the time the OU2 ROD was signed in July 2000. MK and the USACE demobilized from the site in September, 2000 (USACE, 2002).

After July 2000, the EPA contracted directly with CH2M HILL, Inc. to complete the RA for the remaining 565 properties still to be addressed at the site. A total of 649 properties were remediated by CH2M HILL. The remediation efforts at these properties were conducted from September 2000 to March 2006. This number includes 140 properties administered by the BIA, 495 additional residential properties, and 14 additional HAAs (7 schools located in Miami, one school located in Picher, 1 school playground located in Picher, 4 daycare facilities located in Miami, and the Mutt Mantle Ball Field in Ottawa County) (CH2M HILL, 2007a). During the various sampling efforts conducted during this period, certain properties were determined to be contaminated but the cities that had these properties within their boundaries elected to perform the remediation work. The City of Afton elected to remediate the Afton Little League Ball Park, and the City of Fairland elected to remediate the Fairland Little League Ball Parks. The remediation was accomplished by paving over each of the identified contaminated areas. The City of Miami completed remediating multiple park properties under an agreement with EPA. In 2005, the City of Commerce, under an agreement with ODEQ, began implementing the

remediation of the 98 remaining properties that were located within the city limits. Through January 2010, more than 2,295 residential properties and HAAs were remediated as part of either the removal response actions or the OU2 RA (EPA, 2010b).

In April 2009, EPA proceeded with the OU2 RA within Ottawa County. This OU2 RA program was aimed at identifying residents that may not have had an opportunity to participate in past property remediation programs under OU2. The goals of the program were to assess and identify properties in need of remediation and to carry out the needed remediation. This program relied on public participation, calling on residents to contact EPA and notify EPA of areas that the residents would like to have remediated. Due to the large scope of work, the RA was performed over time, through discrete RA projects. Properties cleaned up through this program included residential yards, residential driveways, public alleyways, and HAAs (EPA, 2013A).

The City of Commerce, under an agreement with ODEQ, continued implementing the remediation of properties that were located within city limits. The City of Commerce remediated approximately 54 properties and excavated 5,796 CY. Properties were backfilled and covered with sod (Commerce, 2011 and Commerce 2012).

OU2 RA projects began in late 2009 and were completed by September 2014. In all, these OU2 RA projects were responsible for remediating 579 properties, excavating 31,011 CY, and restoring 62.6 acres (EPA, 2013a and EPA, 2014a).

In April 2015 cooperative agreement, EPA and ODEQ agreed that ODEQ would undertake the OU2 remedial action, as described in the OU2 ROD, at the remaining OU2 properties it is estimated that approximately 19 properties still require remediation. Since 1994, approximately 2,940 residential properties and HAAs have been remediated under the RA for OU2 (EPA, 2014a). In September 2014, EPA celebrated the OU2 Milestone Cleanup Event recognizing the reduction of blood lead levels in Ottawa County children.

The ROD for OU4 was signed on February 20, 2008. The OU4 ROD addressed source materials (*i.e.*, chat, fine tailings, and smelter wastes), rural residential yard soil contamination, transition zone soil contamination (*i.e.*, the soil under and extending outward from a chat base or a tailings pond), and contamination in water drawn from rural residential wells. The OU4 ROD stated that the remedy would be implemented in two phases over a period of 30 years (EPA, 2008).

OU4 addresses the undeveloped rural and urban areas of the Site where mining and mill residues and smelter wastes have been placed, deposited, stored, disposed of, or otherwise come to be located as a result of mining, milling, smelting, or related operations. OU4 includes rural residential years located in Ottawa County outside of city or town limits, except for yards that were addressed under OU2. The RD for OU4 Source Removal consisted of a four part design package that included the *Final Remedial Design Report, Residential Yards and Wells and Smelter Site Remedy* (CH2M HILL, 2009a), *Final Remedial Design Report, Distal Areas* (CH2M HILL 2009b), *Final Remedial Design Report, Chat in Stream* (CH2M HILL, 2009c), and *Final Remedial Design Report, Central Mill Fine Tailings Pond and Repository* (CH2M HILL, 2011b).

Phase 1 of the remedy selected under the OU4 ROD addresses voluntary relocation of residents in the area shown in Figure 4. Phase 1 also provides for chat sales. Phase 1 addresses source materials in a manner that reduces the overall footprint of contamination and reduces the need for land use restrictions, ICs, and O&M. Phase 2 of the OU4 remedy addresses certain source areas that will remain after the Phase 1 cleanup activities are complete. These areas may include chat bases, tailings ponds, unmarketable chat piles and bases, and the chat that remains from the consolidation of distal area chat. Chat sales will continue.

Several Phase 1 RA construction activities have been completed under OU4. Under the OU4 ROD, the residents of the on-site towns of Picher, Cardin, and Hockerville were relocated from these areas which have high concentrations of source materials (*i.e.*, the mill tailings known as chat and fines). As explained in a 2010 ESD, EPA expanded the relocation effort to include the residents of Treece, Kansas. EPA funded the Lead Impacted Communities Relocation Assistance Trust (LICRAT), through ODEQ, and LICRAT purchased the Ottawa County properties at issue, and carried out the relocation effort with minimal EPA oversight. A similar trust—the TRA Trust—was established in Kansas to address the Treece relocation. The LICRAT buyout began in 2009 and was completed in 2011. The Treece buyout was completed in 2012. A total of 628 residences, 74 businesses, and 125 renters were relocated from impacted areas (ODEQ, 2011). The Central Mill Repository (CMR) was constructed from the Central Mill Fine Tailings Pond (CMFTP). The CMR is being constructed in a phased build-out approach. The Phase I construction is complete, and the CMR is receiving source material. The CMR is capable of receiving an estimated 7.6 million CY of source material and will be the repository for much of the OU4 RA activities (CH2M HILL, 2011b). Three rural residential yards were remediated under the Phase 1 RA in 2010. Approximately 3,556 tons of soils containing lead concentrations that exceed the remediation goal of 500 mg/kg were excavated from the rural residential yards and transported to the CMR (CH2M HILL, 2011a). The smelter site remediation was completed in November 2011. Approximately, 42,889 tons of source material was transported from the smelter site to the CMR (CH2M HILL, 2012). The fine tailings pilot study (FTPS) was completed in January 2012. The FTPS met the overall objectives set for the project. In particular, the volume of tailings that was injected per well exceeded the projected volume. The FTPS injected approximately 58,063 CY of fine tailings. However, the cost involved with executing the injections exceeded those estimated in the OU4 ROD, and key assumptions outlined in the OU4 ROD were not met (CH2M HILL, 2013). In addition, multiple chat piles and chat bases from several distal groups have been excavated and transported to the CMR and have been consolidated in subsidence features (CH2M HILL 2011a, CH2M HILL 2012, CH2M HILL 2012b, CH2M HILL 2013b, CH2M HILL 2014, and CH2M HILL 2015).

Several Phase 1 RA construction activities under OU4 are ongoing. EPA/ODEQ continues to excavate and transport chat bases and chat piles from distal areas. Marketable chat sales are ongoing and chat piles and bases can be purchased at the following website http://projects.ch2m.com/TCOU4chat/. To date, 309,787 tons of chat and developmental rock have been sold to nearby chat processors (Table 8). All chat purchased must be used in accordance with the Chat Rule as provided in the OU4 ROD. The OU4 ROD stipulated that transition zone (TZ) soils be excavated along with source material. The volume of transition zone soil found to be contaminated has greatly exceeded estimates in the RI/FS. In addition, removal of contaminated transition zone soil has essentially removed certain remediated

properties of topsoil. Consequently, EPA has begun a pilot project whereby, in lieu of extensive excavation of contaminated soils, EPA is adding soil amendments high in phosphates to bind metals in soil, making them less bioavailable. This pilot project will inform EPA as to whether to continue excavation of contaminated TZ soil. It is hoped that more topsoil may be preserved by adding phosphate-containing soil amendments. In addition to preserving topsoil, an objective of the pilot study is to reduce metals bioavailability to acceptable levels while decreasing the volume of TZ soils being excavated and disposed at the Central Mill Repository (EPA, 2014d). If this pilot project is successful, and soil amendments successfully remediate transition zone soil, this remediation approach may become the EPA's principal means of addressing contaminated transition zone soil. The OU4 ROD already provides for the use of soil amendments to help revegetate excavated areas. The OU4 ROD does not contemplate the use of soil amendments as the principal remediation technique for the transition zone soils. Consequently, if the pilot project is successful, EPA may take administrative actions, consistent with the NCP, to make this soil amendment technique part of the remedy. The pilot project is being conducted by the Quapaw Tribe of Oklahoma on its land known as the Catholic 40 and on the distal area of the site known as Distal 6A (Figure 3).

Phase 2 RA construction activities under OU4 are yet to be implemented due to the ongoing activities of Phase 1. Phase 2 activities will be implemented during the last 5 years of the remedy, years 26 through 30, to make the remedy more cost efficient.

3.3 Operation and Maintenance and Long-Term Monitoring

The State of Oklahoma, through the OWRB and, since 1993, the ODEQ (the ODEQ was formed in 1993 and took over Superfund responsibilities in the State of Oklahoma from the ODSH and OWRB at that time), is responsible for conducting the Roubidoux Groundwater Monitoring Program (also referred to in site documents as the Long-Term Monitoring [LTM] Program or After Action Monitoring [AAM] Program) activities, well plugging activities, and O&M for OU1. These activities are conducted through a Cooperative Agreement between the ODEQ and EPA.

The ROD for OU1 does not specifically state what O&M activities were to occur at the site. However, the ROD does mention O&M and costs related to the dikes and diversion work. The ROD also stipulated that a two-year monitoring and surveillance program would be conducted after construction of the selected remedies to assess the effectiveness of the RA at mitigating the acid mine discharges to Tar Creek and at preventing the migration of the acid mine water to the Roubidoux aquifer (EPA, 1984). The results of the two-year monitoring and surveillance program were summarized and presented in the first five-year review report. After completion of the two-year monitoring program, it was determined that the Roubidoux Groundwater Monitoring Program would continue for OU1 to further investigate potential impacts to the Roubidoux aquifer from acid mine water. The First Five-Year Review Report stated that after completion of this program, monitoring of the water quality in the Roubidoux aquifer would be accomplished through the normal sampling conducted by the various water supply operators as required by the Safe Drinking Water Act (SDWA) (EPA, 1994). The Roubidoux Groundwater Monitoring Program was conducted in two phases. Phase I activities were presented in the

Second Five-Year Review Report (EPA, 2000b). The results of Phase II were presented in the Third Five-Year Review (EPA, 2005).

After completion of the Phase II Roubidoux Groundwater Monitoring Program, the ODEQ implemented a follow-up groundwater monitoring program with the approval of the EPA. The ODEQ determined that the monitoring conducted by local water supply operators was inadequate for purposes of monitoring the water quality in the Roubidoux aquifer. The ODEQ's reasons for this conclusion were: the analytical parameters and frequency of sampling vary between individual water suppliers; the sampling procedures are not consistent between water suppliers; and the sampling is conducted without an approved Quality Assurance Project Plan (QAPP). The ODEQ therefore recommended the groundwater monitoring program to provide consistent analytical testing procedures and sampling schedules and to ensure the quality and consistency of the data (ODEQ, 2002a).

Beginning in November 2003, the Roubidoux Groundwater Monitoring Sampling Program involved the sampling of 14 wells located at or near the site. These wells included 3 monitoring wells installed by the ODEQ, 10 municipal supply wells, and one private well. Each well was sampled twice a year for 5 years. During implementation, several changes were made to the sampling program. Well Miami #1 became inoperable before the October 2004 sampling event and was replaced by Miami #3. Wells Miami #11 and RWD7 #2 were added as background wells in November 2006, the former because of its location between the mine area and Miami, and the latter because of its westerly location (ODEQ, 2009). This phase of sampling under the Roubidoux Groundwater Monitoring Program concluded in April 2008 (ODEQ, 2008a). In 2009, the ODEQ entered a new cooperative agreement with EPA to continue the Roubidoux Groundwater Monitoring Program, which was named the Tar Creek After-Action Monitoring Part 2 (TCAAM2). The former (Part 1) being completed under the previous cooperative agreement. TCAAM2 consisted of five rounds of groundwater sampling beginning in March 2010 and ending in October 2013 (ODEQ, 2014).

It should be noted that neither the EPA nor ODEQ have identified any public drinking water wells at the site that fail to meet the Maximum Contaminant Levels (MCLs) established under the SDWA. However, data do indicate that secondary (aesthetically-based) maximum contaminant levels (SMCLs) for the indicator parameters sulfate and iron (indicator parameters are compounds that indicate possible mine water impacts) were exceeded in four wells completed in the Roubidoux. In one of these wells indicator parameters were so high that it is certain that the well is impacted by mine water from the Boone aquifer. In two other wells the indicator parameters are so high that it is probable that the wells are impacted by mine water from the Boone aquifer. (ODEQ, 2014). It should be noted that neither the EPA nor ODEQ have identified any public drinking water wells at the site that fail to meet the Maximum Contaminant Levels (MCLs) established under the SDWA.

The ROD for OU1 recognized that additional abandoned Roubidoux wells might be identified in the future. The ROD contained provisions calling for evaluation of the need to plug additional wells that were discovered if warranted (EPA, 1984). The ODEQ identified 19 wells that required further assessment (ODEQ, 2006b). The ODEQ completed plugging efforts of the Tulsa Mine well and the powerhouse piezometer in February 2015. Both wells were plugged with Type 1 Portland cement. In addition, the ODEQ discovered two additional wells, one located in north

Picher and the other located on the Distal 8 property (Catholic 40) (*see* Figure 3) that require evaluation. Future wells that the ODEQ would like to plug include the Quapaw #5 and Quapaw #2 wells (ODEQ, 2015). The EPA and ODEQ continue to evaluate the need to plug abandoned Roubidoux wells when wells are identified and located.

The third and fourth five-year review reports both identified the lack of an O&M plan for the dike and diversion channel at the Admiralty Mine as an issue. Based on recommendations, ODEQ developed an updated O&M plan for the Admiralty Mine site. The O&M plan was completed on November 2, 2012. Under the O&M plan, annual inspections are performed for the diversion and dike remedy at the Admiralty Mine site and annual inspection elements include: an Abnormal Occurrence Response Plan, Performance Standards, and annual cost estimates of O&M (ODEQ, 2012). Annual inspection elements also include: (1) inspecting the sealed mine shaft for settlement and for depressions which could collect runoff and permit percolation into the sealed shaft, (2) checking slopes of diversion dike for deterioration and inspecting the crown for settlement and for depressions that could hold water, and (3) inspecting the diversion channel for blockage of flow by flood debris, vegetation, or beaver dams.

As part of the Admiralty Site O&M plan, an Abnormal Occurrence Response Plan was developed. In the Abnormal Occurrence Response Plan, "abnormal occurrence" is defined as a 100-year flood event. Abnormal situations that may occur as the result of a 100-year flood include: (1) failure to contain flow behind the dike, (2) breaking of the dike, (3) areas of deteriorated vegetation, and (4) identification of new subsidence areas. Under the abnormal occurrence response plan, if damage is minimal, the necessary minor repairs are executed. If major damage has occurred, the plan initially calls for temporary repairs to contain the damage. Once the damage is contained, the plan calls for an investigation to determine the cause of the damage. Once cause is determined, a solution including permanent repairs is developed.

The Admiralty Site O&M plan also includes Performance Standards. These Performance Standards are considered adequate under normal weather conditions and include the following provisions: (1) flow from the watershed should be contained in the channel, (2) storm flows should rarely top the dike, (3) water should not accumulate over the sealed shaft areas, (4) depressions, ruts, holes, or breaches in the dike and the absence of vegetation on the dike that may lead to erosion should be corrected (ODEQ, 2012). The dikes and stream channel diversion work completed at the Admiralty Mine site was inspected as part of the site inspection for this five-year review.

In a letter dated July 22 2014, EPA indicated that the OU1 RA was moving toward completion, with completion of ODEQ well-plugging activities being the last RA activity for OU1. Once RA is complete, OU1 will move entirely into O&M (EPA, 2014c).

The OU2 ROD selected remedy called for excavated contaminated soil to be disposed of at an on-site repository. Consistent with the OU2 ROD, EPA constructed on-site repositories in areas that were already contaminated. Then EPA disposed of the contaminated residential area soil in these repositories. To close the repositories, EPA made sure that the surface of the disposal areas had soil lead concentrations less than 500 ppm, and vegetated the disposal areas. Also consistent with the OU2 ROD, EPA worked with ODEQ to ensure that ICs were placed on the repositories.

ICs included an environmental easement prohibiting certain practices on the repositories that would damage the soil cover. The ICs provided ODEQ with future access to inspect the repositories. ICs also included deed notices to alert purchasers of the repositories and of the prohibitions. The repositories used during the course of the RA, now closed, are presently being used as pasture land for grazing. The North Repository, used and operated by previous contractors at the site, was closed by CH2M HILL (CH2M HILL, 2007a). At the request of EPA, CH2M HILL installed a fence and gates to prevent unauthorized access onto the County Repository, which will be used by Ottawa County employees and local residents to deposit impacted soil from county road maintenance and excavation for local utility work (CH2M HILL, 2007b). The South Repository was closed in 2006 through a process of final site grading, leveling, removal of bulk debris, and vegetative cover establishment. After the work was completed, the property owner expressed concern that the vegetative cover was not well established. On June 4, 2010 an agreement was executed between the property owner and EPA outlining the modifications necessary to restore the property to a condition that would be suitable for cattle grazing or raising hay. The site modifications at the South Repository restored approximately 23 acres. The restoration efforts were completed by May 2011 (EPA, 2013A). On October 19, 2012 the ODEQ filed an executed deed notice that outlined the land use restrictions for the property and identified suitable re-uses for the land (EPA, 2013A).

The EPA determined that no further action was warranted to address OU3, and O&M activities are not required for OU3 (EPA, 2000a).

The RA is currently ongoing for OU4 and no OU4 O&M activities are currently occurring at the Site. However, ICs in the form of Deed Notices have been filed on all the properties that participated in the LICRAT buyout. Deed Notices were filed on all properties and a database of the notices is located in Table 9a. The Kansas Department of Health and Environment has filed Environmental Use Controls on all the properties that participated in the TRA buyout, which are listed in Table 9b.

Table 9a: Deed Notices of LICRAT Buyout

	LICRAT Parcel Number	Address	Deed Date	Deed Book Number	Deed Page Number	Document Number	Deed Recording Date	Assessor Parcel Number
1	P1G1001	704 S Francis	5/17/2007	839	500	1-2007-002560	5/17/2007	6660-00-009-001-0-000-00
2	P1G1002	120 E 9th St	9/9/2008	873	222	1-2008-005292	9/10/2008	6700-00-001-004-0-000-00
3	P1G1004-L	737 S Oneida	12/29/2008	879	541	1-2008-007370	12/30/2008	6720-00-018-013-0-000-00
4	P1G1005	125 Tar River	8/21/2009	893	787	1-2009-004344	8/24/2009	6020-00-006-001-0-000-00
5	P1G1006	106 River	5/29/2007	840	192	1-2007-002746	5/29/2007	6020-00-007-005-0-000-0
6	P1G1007	1281 S 605 Rd	8/30/2007	847	257	1-2007-004765	8/30/2007	0000-14-029-023-0-008-00
7	P1G1008	208 River	7/20/2007	844	28	1-2007-003840	7/20/2007	6020-00-002-001-0-000-00
8	P1G1012	502 N Netta	8/28/2007	847	73	1-2007-004699	8/29/2007	6540-00-004-001-0-001-00
9	P1G1013	312 S College	5/24/2007	840	61	1-2007-002692	5/24/2007	6720-00-001-011-0-000-00
10	P1G1014	710 N Picher	6/5/2007	840	781	1-2007-002908	6/5/2007	6540-00-001-004-0-000-00
11	P1G1015	504 N Picher	6/14/2007	841	424	1-2007-003110	6/14/2007	6540-00-005-009-0-000-00
12	P1G1017	104 Main St	5/29/2007	840	187	1-2007-002743	5/29/2007	6010-00-013-001-0-000-00 6010-00-013-005-0-000-00
13	P1G1019	514 S Francis	5/22/2007	839	644	1-2007-002630	5/22/2007	6660-00-001-029-0-000-00
14	P1G1020	501 N Main	5/17/2007	839	502	1-2007-002561	5/17/2007	6540-00-007-007-0-000-00
15	P1G1021	404 W A St	4/29/2010	907	732	1-2010-002036	4/29/2010	6620-00-006-001-0-000-00 6620-00-007-008-0-000-00
16	P1G1022	206 E 12 St	10/4/2007	850	419	1-2007-005661	10/4/2007	6700-00-010-015-0-000-00
17	P1G1023	123 E 9th St	7/12/2007	843	568	1-2007-003737	7/16/2007	6700-00-006-001-0-000-00
18	P1G1025	701 N Picher	8/28/2007	847	167	1-2007-004735	8/29/2007	6540-00-002-004-0-000-00
19	P1G1027A	100 S Columbus	2/2/2007	903	348	1-2010-000570	2/3/2010	6210-00-002-001-0-000-00
20	P1G1029	210 S Picher	5/29/2007	840	190	1-2007-002745	5/29/2007	6180-00-013-004-0-000-00
21	P1G1030	590 2 St	5/17/2007	839	506	1-2007-002563	5/17/2007	6010-00-002-016-0-000-00
22	P1G1031-L	733 S Oneida	12/29/2008	879	543	1-2008-007321	12/30/2008	6720-00-018-013-0-000-00
23	P1G1032	712 N Picher	6/5/2007	840	777	1-2007-002906	6/5/2007	6540-00-001-003-0-001-00
24	P1G1033	509 N Main	5/17/2007	839	508	1-2007-002564	5/17/2007	6540-00-007-004-0-000-00
25	P1G1035	213 E 11th St	8/14/2008	871	524	1-2008-004785	8/14/2008	6700-00-007-012-0-000-00
26	P1G1036	221 N Main	5/17/2007	839	504	1-2007-002562	5/17/2007	6010-00-005-013-0-000-00
27	P1G1038	701 S Ottawa	9/25/2007	849	499	1-2007-005403	9/25/2007	6720-00-007-017-0-000-00
28	P1G1039	512 N Columbus	5/24/2007	840	63	1-2007-002693	5/24/2007	6540-00-007-009-0-000-00
29	P1G1040	104 N Columbus	5/17/2007	839	498	1-2007-002559	5/17/2007	6210-00-002-002-0-000-00
30	P1G1041	313 N Treece	9/25/2009	896	59	1-2009-004993	9/25/2009	6620-00-003-002-0-000-00
31	P1G1044	301 E 11th St	6/5/2007	840	779	1-2007-002907	6/5/2007	6700-00-008-011-0-000-00
32	P1G1045	675 E 2 St	5/22/2007	839	642	1-2007-002629	5/22/2007	6010-00-007-006-0-001-00
33	P1G1046	515 N Picher	2/14/2008	859	303	1-2008-000929	2/15/2008	6540-00-006-003-0-000-00
34	P1G1048	900 S Gladys St	6/14/2007	841	428	1-2007-003112	6/14/2007	6700-00-006-004-0-000-00
35	P1G2046	621 E 2 St.	6/7/2007	841	105	1-2007-002961	6/7/2007	6010-00-007-006-0-000-00
36	P1G2047	600 S Cherokee	10/11/2007	851	126	1-2007-005831	10/11/2007	6720-00-008-001-0-001-00

	LICRAT Parcel Number	Address	Deed Date	Deed Book Number	Deed Page Number	Document Number	Deed Recording Date	Assessor Parcel Number
37	P1G2049	739 S Main	6/14/2007	841	426	1-2007-003111	6/14/2007	6540-00-007-003-0-000-00
38	P1G2050	329 Treece	12/6/2007	855	156	1-2007-007017	12/7/2007	6620-00-003-001-0-000-00
39	P1G2051	216 N D St	8/30/2007	847	252	1-2007-004762	8/30/2007	6620-00-005-007-0-000-00
40	P1G2052	135 S Frisco	6/7/2007	841	103	1-2007-002960	6/7/2007	6540-00-005-008-0-000-00
41	P1G2053	301 S Cherokee	7/26/2007	844	315	1-2007-003945	7/27/2007	6555-00-000-018-0-000-00 6555-00-000-022-0-000-00
42	P1G2054	800 S Connel	4/2/2009	885	414	1-2009-001745	4/3/2009	6720-00-001-019-0-000-00
43	P1G2056-L	200 N Treece	9/16/2008	873	677	1-2008-005450	9/17/2008	6620-00-005-005-0-000-00
44	P1G2058	200 S Frusco	9/25/2007	849	494	1-2007-005399	9/25/2007	6180-00-009-002-0-000-00 6180-00-009-003-0-000-00 6180-00-009-001-0-000-00
45	P1G2060	124 N Vantage	6/14/2007	841	422	1-2007-003109	6/14/2007	6555-00-000-005-0-000-00 6555-00-000-008-0-000-00 6555-00-000-009-0-000-00
46	P1G2062-L	700 N Main	12/29/2008	879	539	1-2008-007319	12/30/2008	6540-00-002-006-0-001-00
47	P1G2063	501 W A St	6/14/2007	841	430	1-2007-003113	6/14/2007	6630-00-000-003-0-000-00
48	P1G2066	205 N Vantage	9/5/2007	847	745	1-2007-004946	9/10/2007	6620-00-005-002-0-000-0
49	P1G2068-L	200 E 9th St	10/16/2008	875	533	1-2008-006048	10/16/2008	6700-00-002-009-0-000-00
50	P1G2070	530 E 7th St	9/7/2007	847	743	1-2007-004945	9/10/2007	6660-00-011-017-0-000-00
51	P1G2071-L	190 Wade St	10/2/2008	874	672	1-2008-005785	10/3/2008	6010-00-006-015-0-000-00
52	P1G2074-L	603 N Netta	8/29/2007	847	157	1-2007-004728	8/29/2007	6550-00-001-001-0-000-00
53	P1G2076	730 S Cherokee	8/9/2007	845	440	1-2007-004276	8/9/2007	6720-00-007-011-0-000-00
54	P1G2077	207 E 10th St	8/9/2007	845	442	1-2007-004277	8/9/2007	6700-00-007-007-0-000-00
55	P1G2079	314 N Treece	8/6/2007	845	233	1-2007-004207	8/8/2007	6620-00-002-008-0-000-00
56	P1G2080	988 E 1st St	9/6/2007	847	620	1-2007-004893	9/7/2007	6020-00-005-004-0-000-00
57	P1G2082	705 W Carl Patterson	12/27/2007	856	98	1-2007-007333	12/28/2007	6200-00-004-010-0-000-00 6200-00-004-007-0-000-00
58	P1G2083	200 S Picher	8/6/2007	845	231	1-2007-004206	8/8/2007	6180-00-013-001-0-000-00
59	P1G2085	203 N Vantage	8/29/2007	847	163	1-2007-004732	8/29/2007	6620-00-005-003-0-000-00
60	P1G2086	160 N Main	10/30/2009	898	30	1-2009-005604	10/30/2009	6010-00-007-001-0-000-00 6610-00-007-001-0-000-00
61	P1G2087	309 N Treece	8/6/2007	845	235	1-2007-004208	8/8/2007	6620-00-003-003-0-000-00
62	P1G2088	204 S Netta	2/14/2008	859	301	1-2008-000928	2/15/2008	6180-00-012-001-0-000-00
63	P1G2089	465 S Ethel	8/1/2007	844	684	1-2007-004061	8/1/2007	6520-00-019-013-0-000-00
64	P1G2090-L	531 N Netta	11/7/2008	877	528	1-2008-006690	11/19/2008	6540-00-005-001-0-000-00
65	P1G2091-L	515 S Francis	10/28/2008	876	337	1-2008-006308	10/30/2008	6660-00-002-011-0-000-00
66	P1G2092	548 W A St	10/4/2007	850	415	1-2007-005659	10/4/2007	6620-00-007-001-0-000-00
67	P1G2094	209 N Vantage	3/18/2008	861	271	1-2008-001520	3/19/2008	6620-00-005-001-0-000-00
68	P1G2095	631 N Netta	10/30/2007	852	590	1-2007-006270	11/1/2007	6550-00-001-008-0-000-00 6550-00-001-007-0-000-00 6550-00-001-006-0-000-00

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	LICRAT Parcel Number	Address	Deed Date	Deed Book Number	Deed Page Number	Document Number	Deed Recording Date	Assessor Parcel Number
69	P1G2096	205 E 10th St	8/28/2007	847	79	1-2007-004702	8/29/2007	6700-00-007-006-0-000-00
70	P1G2099	302 E 11th St	8/30/2007	847	255	1-2007-004764	8/30/2007	6700-00-009-001-0-000-00
71	P1G2100	107 E 11th St	9/14/2007	848	457	1-2007-005125	9/17/2007	6700-00-0100-006-0-000-00
72	P1G2101	503 N Main	8/23/2007	846	574	1-2007-004593	8/24/2007	6540-00-007-006-0-000-00
73	P1G2102	133 N Frisco	10/2/2008	874	670	1-2008-005784	10/3/2008	6555-00-000-002-0-000-00
74	P1G2103	806 S Gladys	8/29/2007	847	160	1-2007-004730	8/29/2007	6700-00-001-003-0-000-00
75	P1G2104-L	307 S Cherokee	12/19/2008	879	266	1-2008-007210	12/19/2008	6720-00-001-025-0-000-00
76	P1G2105	500 N Columbus	8/29/2008	847	155	1-2007-004727	8/29/2007	6540-00-007-008-0-000-00
77	P1G2107	800 S Gladys	9/14/2007	848	455	1-2007-005124	9/17/2007	6700-00-001-002-0-000-00 6700-00-001-001-0-000-00
78	P1G2108	528 N Connell	11/15/2007	853	674	1-2007-006596	11/15/2007	6710-17-029-023-0-022-00
79	P1G2111	201 E 11th St	9/6/2007	847	622	1-2007-004894	9/7/2007	6700-00-010-008-0-000-00
80	P1G2113	601 N Netta	8/29/2007	847	157	1-2007-004728	8/29/2007	6550-00-001-001-0-000
81	P1G2116	202 E 11th St	8/28/2007	847	77	1-2007-004701	8/29/2007	6700-00-007-014-0-000-00
82	P1G2117	140 Frisco	8/21/2007	846	379	1-2007-004527	8/22/2007	6630-00-000-011-0-000-00
83	P1G2118	125 N Frisco	8/23/2007	846	570	1-2007-004591	8/24/2007	6555-00-000-011-0-000-00
84	P1G2119	151 N Main ST	9/14/2007	848	461	1-2007-005127	9/17/2007	6010-00-006-019-0-000-00 6010-00-006-008-0-000-00
85	P1G2120	1122 S Ella St	9/12/2007	848	463	1-2007-005128	9/17/2007	6710-21-029-023-0-022-00
86	P1G2122	216 E 12th St	8/28/2007	847	75	1-2007-004700	8/29/2007	6700-00-010-012-0-000-00
87	P1G2123	600 S College	6/16/2009	889	632	1-2009-003072	6/17/2009	6720-00-005-001-0-000-00
88	P1G2124	623 E 2nd St	4/23/2010	907	746	1-2010-002043	4/29/2010	6010-00-007-004-0-000-00
89	P1G2125	101 E 10th St	8/23/2007	846	572	1-2007-004592	8/24/2007	6700-00-007-001-0-000-00
90	P1G2126-L	511 N Picher	10/23/2007	876	68	1-2008-006189	10/24/2007	6540-00-006-004-0-000-00
91	P1G2127-L	179 N Main St	10/9/2008	875	187	1-2008-005918	10/9/2008	6010-00-006-017-0-000-00
92	P1G2128	704 W 2nd St	11/13/2007	853	587	1-2007-006547	11/14/2007	6200-00-004-001-0-000-00
93	P1G2129-L	110 River	11/6/2008	877	74	1-2008-006500	11/7/2008	6020-00-007-004-0-000-00
94	P1G2132	504 N Main	3/25/2010	905	753	1-2010-001395	3/26/2010	6540-00-006-004-0-002-00 6540-00-006-005-0-000-00
95	P1G2133L	801 N Netta	5/20/2010	909	42	1-2010-002449	5/21/2010	6580-00-006-007-0-000-00
96	P1G2134	4101 S 69 Hwy	11/12/2008	877	252	1-2008-006579	11/13/2008	000-32-029-023-0-0003-00
97	P1G2135	1280 S 605 Rd	7/15/2008	869	663	1-2008-004126	7/15/2008	0000-14-029-023-0-004-00
98	P1G2137-L	509 N Columbus	10/28/2008	876	335	1-2008-006307	10/30/2008	6540-00-008-006-0-000-00
99	P1G2138	720 S Cherokee	6/26/2008	868	708	1-2008-003810	6/27/2008	6720-00-007-006-0-000-00
100	P1G2139	500 W A Street	5/28/2009	888	621	1-2009-002737	5/28/2009	Personal Property tax-Leased land
101	P1G2140A	711 N Netta	3/30/2010	906	150	1-2010-001489	3/31/2010	6550-00-002-004-0-000-00
102	P1G2140	711 N. Netta	11/29/2007	854	582	1-2007-006876	11/29/2007	6550-00-002-001-0-000-00
103	P1G2141	500 S Emily	1/8/2008	856	665	1-2008-000129	1/8/2008	6660-00-002-017-0-000-00
104	P1G2142	211 E 10th St	10/4/2007	850	417	1-2007-005660	10/4/2007	6700-00-007-010-0-000-00
105	P1G2145	180 S Vantage	9/18/2007	848	713	1-2007-005212	9/19/2007	6555-00-000-023-0-001-00

	LICRAT Parcel Number	Address	Deed Date	Deed Book Number	Deed Page Number	Document Number	Deed Recording Date	Assessor Parcel Number
106	P1G2145	180 S Vantage	9/18/2007	848	713	1-2007-005212	9/19/2007	6555-00-000-020-0-000-00 6555-00-000-023-0-000-00
107	P1G2146-L	160 Wade St	10/9/2008	875	189	1-2008-005919	10/9/2008	6010-00-006-011-0-000-00
108	P1G2147-L	210 N Main St	10/9/2008	875	191	1-2008-005920	10/9/2008	6010-00-008-001-0-000-00
109	P1G2148	1101 S. Pearl St	10/31/2007	852	584	1-2007-006268	10/31/2007	6700-00-010-010-0-000-00
110	P1G3001	517 S Emily	2/14/2008	859	297	1-2008-00926	2/15/2008	6660-00-003-013-0-000-00
111	P1G3002	306 River	11/8/2007	853	321	1-2007-006449	11/9/2007	6020-00-002-001-0-000-00
112	P1G3003	507 S Cherokee	9/14/2007	848	459	1-2007-005126	9/17/2007	6720-00-003-018-0-000-00
113	P1G3008	260 N Wade St	11/13/2007	853	591	1-2007-006549	11/14/2007	6010-00-005-003-0-000-00
114	P1G3009	213 E 9th St	11/6/2008	853	178	1-2007-006397	11/7/2007	6700-00-005-003-0-000-00
115	P1G3012	216 S Alta	5/13/2008	865	497	1-2008-002781	5/14/2008	6520-00-009-021-0-000-00
116	P1G3013	271 S Wade St	9/27/2007	849	731	1-2007-005484	9/28/2007	6010-00-002-011-0-000-00
117	P1G3019	505 S Francis	10/23/2007	852	1	1-2007-006077	10/23/2007	6660-00-0020-007-0-000-00
118	P1G3021	215 S Netta	10/9/2007	850	728	1-2007-005750	10/9/2007	6180-00-0013-014-0-000-00
119	P1G3022	106 N Onedia	2/14/2008	859	299	1-2008-000927	2/15/2008	6200-00-001-008-0-000-00 6200-00-001-003-0-000-00
120	P1G3023	314 N Treece	10/11/2007	851	129	1-2007-005833	10/11/2007	6700-00-009-011-0-000-00
121	P1G3025 P1G3025A	321 S Emily	12/9/2009	901	207	1-2009-006539	12/23/2009	6520-00-012-010-0-000-00 6520-00-012-012-0-000-00
122	P1G3026	600 S Alta	12/6/2007	855	160	1-2007-007019	12/7/2007	6660-00-006-017-0-000-00
123	P1G3027	303 E 11th St	1/9/2008	856	713	1-2008-000160	1/9/2008	6700-00-008-009-0-001-00
124	P1G3028		11/20/2007	854	199	1-2007-006732	11/20/2007	6700-00-009-009-0-000-00
125	P1G3029	305 N Main St	11/13/2007	853	597	1-2007-006552	11/14/2007	6010-00-004-015-0-000-00
126	P1G3030	100 N Ella Street	5/20/2009	889	353	1-2009-002962	6/12/2009	6520-00-002-019-0-000-00
127	P1G3031	397 N Main St	9/16/2008	873	681	1-2008-005452	9/17/2008	6010-00-004-009-0-000-00
128	P1G3033	103 Wade St	5/27/2010	909	445	1-2010-002594	5/28/2010	6010-00-001-007-0-000-00
129	P1G3035	314 S Alta	11/15/2007	853	672	1-2007-006595	11/15/2007	6520-00-012-020-0-000-00
130	P1G3036	445 S Emily	11/29/2007	854	580	1-2007-006875	11/29/2007	6520-00-020-005-0-000-00
131	P1G3037		1/28/2008	858	186	1-2008-00557	1/29/2008	6700-00-004-001-0-000-00
132	P1G3038	300 E 8th St	11/13/2008	877	313	1-2008-006595	11/13/2008	6710-21-029-023-0-001-00
133	P1G3041	700 S Ottawa	10/31/2007	852	582	1-2007-006267	10/31/2007	6720-00-018-001-0-000-00
134	P1G3045	701 S Cherokee	11/6/2007	853	175	1-2007-006395	11/7/2007	6720-00-006-017-0-000-00
135	P1G3047	212 S Alta	4/10/2008	863	216	1-2008-002019	4/11/2008	6520-00-009-017-0-000-00
136	P1G3049	208 S Vantage	11/8/2007	853	319	1-2007-006448	11/9/2007	6180-00-010-004-0-000-00
137	P1G3050	620 S Cherokee	1/6/2010	902	8	1-2010-000081	1/7/2010	6720-00-008-005-0-000-00 720-00-008-005-0-001-00
138	P1G3051	105 E 11th St	11/8/2007	853	312	1-2007-006444	11/9/2007	6700-00-010-004-0-000-00
139	P1G3053		11/20/2007	854	195	1-2007-006730	11/20/2007	6700-00-010-019-0-000-00
140	P1G3054	322 N Connell	12/27/2007	856	100	1-2007-007334	12/28/2007	6660-00-005-014-0-000-00
141	P1G3056-L	313 S Emily	10/6/2008	876	343	1-2008-006311	10/30/2008	6520-00-012-002-0-000-00

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142	P1G3059	322 S Alta	11/6/2007	853	173	1-2007-006394	11/7/2007	6520-00-012-023-0-000-00
143	P1G3060		12/6/2007	855	162	1-2007-007020	12/7/2007	6700-00-005-012-0-000-00
144	P1G3061A	505 North Connell	11/10/2009	898	739	1-2009-005829	11/12/2009	6710-16-029-023-0-015-00
145	P1G3063	255 N Wade St	11/8/2007	853	317	1-2007-006447	11/9/2007	6010-00-002-015-0-000-00 6010-00-002-014-0-000-00 6010-00-002-012-0-000-00
146	P1G3064	1061 S 605 Rd	1/17/2008	857	483	1-2008-000361	1/18/2008	0000-14-029-023-0-007-00
147	P1G3065-L	720 - 722 S College	11/25/2008	878	67	1-2008-006811	11/26/2008	6720-00-006-008-0-000-00
148	P1G3066	621 S Cherokee	12/6/2007	855	169	1-2007-007024	12/7/2007	6720-00-005-028-0-000-00
149	P1G3069-L	302 N River	10/28/2008	876	339	1-2008-006309	10/30/2008	6020-00-001-003-0-000-00
150	P1G3070	314 E 8th St.	3/18/2008	861	273	1-2008-001521	3/19/2008	6710-21-029-023-0-014-00
151	P1G3071	312 E 8th St	3/18/2008	861	269	1-2008-001519	3/19/2008	6710-21-029-023-0-013-00
152	P1G3073-L	170 N Harlin	10/28/2008	876	341	1-2008-006310	10/30/2008	6010-00-001-001-0-000-00
153	P1G3075	300 S Alta	11/13/2007	853	593	1-2007-006550	11/14/2007	6520-00-012-013-0-000-00
154	P1G3077	136 2nd St	5/20/2008	866	83	1-2008-002945	5/21/2008	6010-00-011-001-0-000-00 6010-00-011-002-0-000-00
155	P1G3078	247 River	2/17/2009	882	485	1-2009-000843	2/18/2009	6010-00-011-012-0-000-00
156	P1G3081	601 S Oneida	4/10/2008	863	218	1-2008-002020	4/11/2008	6720-00-017-021-0-000-00
157	P1G3082	310 S Alta	11/13/2007	853	595	1-2007-006551	11/14/2007	6520-00-012-018-0-000-00
158	P1G3085	308 E 8th St	3/18/2008	861	267	1-2008-001518	3/19/2008	6710-21-029-023-0-012-00
159	P1G3086	413 S Emily	1/28/2008	858	193	1-2008-000561	1/29/2008	6520-00-017-007-0-000-00
160	P1G3087	454 S Alta	12/20/2007	855	739	1-2007-007237	12/21/2007	6520-00-020-023-0-000-00
161	P1G3088	614 S Oneida	6/17/2008	868	115	1-2008-003537	6/18/2008	6720-00-020-001-0-001-00
162	P1G3094	463 S Connell	2/14/2008	859	289	1-2008-000921	2/15/2008	6520-00-022-015-0-000-00
163	P1G3096	230 McGhee St	1/8/2008	856	662	1-2008-000127	1/8/2008	6010-00-011-007-0-000-00
164	P1G3098	466 S Francis	2/26/2008	860	61	1-2008-001131	2/26/2008	6520-00-022-031-0-000-00
165	P1G3098A	466 S Francis	5/13/2010	908	551	1-2010-002316	5/14/2010	6520-00-022-022-0-000-00 6520-00-022-026-0-000-00 6520-00-022-028-0-000-00
166	P1G3099	504 S Alta	12/6/2007	855	165	1-2007-007022	12/7/2007	6660-00-003-017-0-000-00
167	P1G3101	216 E 9th	11/15/2007	853	670	1-2007-006594	11/15/2007	6700-00-002-007-0-000-00
168	P1G3102	390 1st St	11/29/2007	854	585	1-2007-006878	11/29/2007	6010-00-007-001-0-000-00
169	P1G3103	528 S Ottawa	12/20/2007	855	743	1-2007-007240	12/21/2007	6720-00-016-008-0-000-00
170	P1G3104	161 Wade St	1/3/2008	856	455	1-2008-000059	1/4/2008	6010-00-001-019-0-001-00
171	P1G3105	508 S Francis	12/4/2007	855	18	1-2007-006970	12/5/2007	6660-00-001-021-0-000-00
172	P1G3108	113 McGhee St	12/27/2007	856	92	1-2007-007330	12/28/2007	6010-00-008-011-0-000-00
173	P1G3110	214 E 9th St	12/27/2007	856	94	1-2007-007331	12/28/2007	6700-00-002-007-0-001-00 6520-00-002-016-0-000-00
174	P1G3111	606 S Emily	12/6/2007	855	167	1-2007-007023	12/7/2007	6660-00-007-023-0-000-00
175	P1G3113	411 S Emily	12/18/2007	855	625	1-2007-007201	12/18/2007	6520-00-017-004-0-000-00

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176	P1G3115	607 S Emily	12/4/2007	855	16	1-2007-006969	12/5/2007	6660-00-006-009-0-000-00
177	P1G3117	115 N Ethel	3/18/2008	861	275	1-2008-001522	3/19/2008	6520-00-000-002-0-000-00 6520-00-001-004-0-000-00
178	P1G3119	514 S Emily	12/18/2007	855	627	1-2007-007202	12/18/2007	6660-00-002-031-0-000-00
179	P1G3121	512 S Ella St	2/5/2008	858	665	1-2008-000742	2/6/2008	6660-00-004-025-0-000-00
180	P1G3124	305 N River	4/17/2008	863	749	1-2008-002203	4/18/2008	6010-00-010-012-0-000-00
181	P1G3125	619 3rd St.	2/14/2008	859	291	1-2008-000922	2/15/2008	6010-00-008-007-0-000-00
182	P1G3126	416 S Emily	2/5/2008	859	163	1-2008-000866	2/13/2008	6520-00-016-024-0-000-00
183	P1G3127	456 Ella St	2/26/2008	860	59	1-2008-001130	2/26/2008	6520-00-019-025-0-000-00 6520-00-019-027-0-000-00
184	P1G3128	408 S Emily	1/28/2008	858	188	1-2008-000558	1/29/2008	6520-00-016-020-0-000-00
185	P1G3130	104 N Ella St	2/12/2008	859	165	1-2008-000867	2/13/2008	6520-00-002-014-0-000-00
186	P1G3134	522 N Picher	2/14/2008	859	293	1-2008-000923	2/15/2008	6540-00-005-012-0-000-00
187	P1G3137	2170 S 570 Rd	5/1/2008	864	679	1-2008-002520	5/2/2008	0000-02-029-023-0-001-02
188	P1G3138	4275 S Hwy 69	9/5/2008	873	57	1-2008-005219	9/5/2008	0000-32-029-023-0-002-00
189	P1G3139	201 McGhee St	5/29/2008	866	658	1-2008-003132	5/30/2008	6010-00-008-016-0-000-00
190	P1G3140	116 N Oneida	8/19/2008	871	691	1-2008-004866	8/19/2008	6200-00-001-001-0-001-00
191	P1G3142	314 S Emily	4/15/2008	863	483	1-2008-002118	4/16/2008	6520-00-013-018-0-000-00
192	P1G3143	629 S Cherokee	5/16/2008	865	667	1-2008-002853	5/19/2008	6720-00-005-034-0-000-00
193	P1G3144A	620 South Ottawa	5/13/2010	908	553	1-2010-002317	5/14/2010	6720-00-017-001-0-000-00
194	P1G3144-L	627 S Ottawa	1/20/2009	880	702	1-2009-000291	1/21/2009	6720-00-008-033-0-000-00
195	P1G3146	418 S College	5/8/2008	865	305	1-2008-002713	5/8/2008	6720-00-002-010-0-000-00
196	P1G3147	113 N Ethel	5/1/2008	864	682	1-2008-002522	5/2/2008	6520-00-001-007-0-000-00
197	P1G3148	198 Harlin	5/13/2008	865	491	1-2008-0022778	5/14/2008	6010-00-001-014-0-000-00 6010-00-001-015-0-000-00
198	P1G3149	322 S Francis	10/16/2008	875	535	1-2008-006049	10/16/2008	6520-00-014-023-0-000-00
199	P1G3150	501 S Emily	8/20/2009	893	724	1-2009-004319	8/21/2009	6660-00-003-001-0-000-00
200	P1G3151	715 S Francis	4/15/2009	863	481	1-2008-002117	4/16/2008	6660-00-010-011-0-000-00
201	P1G3153	463 S Emily	5/16/2008	865	669	1-2008-002854	5/19/2008	6520-00-020-013-0-000-00
202	P1G3155	608 S Alta	5/8/2008	865	307	1-2008-002714	5/8/2008	6660-00-006-026-0-000-00
203	P1G3156	531 S Ethel	5/20/2008	866	86	1-2008-002947	5/21/2008	6660-00-004-014-0-001-00
204	P1G3156A	531 S Ethel	7/21/2009	892	49	1-2009-003761	7/21/2009	6660-00-004-014-0-001-00
205	P1G3158	737 1/2 S Oneida	12/29/2008	880	546	1-2009-000277	1/15/2009	6720-00-019-008-0-000-00
206	P1G3159	314 N Netta	6/26/2008	868	705	1-2008-003809	6/27/2008	6620-00-003-007-0-000-00 6620-00-003-008-0-000-00
207	P1G3161	466 S Emily	4/10/2008	863	214	1-2008-002018	4/11/2008	6520-00-021-031-0-000-00
208	P1G3162	801 S Pearl	7/14/2008	870	707	1-2008-004499	8/4/2008	6700-00-003-001-0-000-00
209	P1G3164	507 W Carl Patterson	4/17/2008	863	747	1-2008-002202	4/18/2008	6180-00-010-017-0-000-00
210	P1G3164A	507 W Carl Patterson	5/19/2009	888	248	1-2009-002602	5/19/2009	6180-00-010-014-0-000-00

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211	P1G3165	707 S Francis	11/25/2008	878	80	1-2008-006818	11/16/2008	6660-00-010-008-0-000-00 6660-00-010-004-0-000-00
212	P1G3166	600 S Ella St	3/12/2010	905	255	1-2010-001225	3/12/2010	6660-00-005-017-0-000-00 6660-00-005-022-0-000-00
213	P1G3171	538 S College	7/10/2008	869	500	1-2008-004038	7/10/2008	6720-00-004-004-0-000-00
214	P1G3172	923 W A St	5/29/2008	866	656	1-2008-003131	5/30/2008	6200-00-001-001-0-000-00
215	P1G3175	604 S Ottawa	5/20/2008	866	93	1-2008-002952	5/21/2008	6720-00-017-001-0-001-00
216	P1G3176	213 S Vantage	6/17/2008	868	113	1-2008-003536	6/18/2008	6180-00-011-019-0-000-00
217	P1G3177	130 McGhee St	5/20/2008	866	95	1-2008-002953	5/21/2008	6010-00-011-008-0-000-00
218	P1G3178	301 N Wade St	6/26/2008	868	703	1-2008-003808	6/27/2008	6010-00-003-001-0-000-00 6010-00-003-015-0-000-00 6010-00-003-016-0-000-00
219	P1G3178A	301 North Wade	3/4/2010	904	723	1-2010-001097	3/4/2010	6010-00-002-008-0-000-00
220	P1G3182-L	57300 E 30 Rd	11/12/2008	877	258	1-2008-006582	11/13/2008	0000-20-029-023-0-003-0
221	P1G3183	59401 E 20 Rd	5/13/2008 8/22/2008	865 872	493 96	1-2008-002779 1-2008-004953	5/14/2008 8/22/2008	0000-22-029-023-0-007-00
222	P1G3185	601 S Emily	1/29/2009	881	398	1-2009-000318	1/30/2009	6660-00-006-001-0-000-00
223	P1G3185A	605 South Emily	12/29/2009	901	408	1-2009-006614	12/29/2009	6660-00-006-006-0-000-00
224	P1G3186	265 N River	8/19/2008	871	693	1-2008-004867	8/19/2008	6010-00-011-010-0-000-00 6010-00-011-011-0-000-00
225	P1G3187	443 S Francis	5/20/2008	866	88	1-2008-002948	5/21/2008	6520-00-021-004-0-000-00
226	P1G3188	400 S Emily	6/5/2008	868	111	1-2008-003535	6/18/2008	6520-00-016-017-0-000-00
227	P1G3189	508 S Ella St	10/16/2008	875	538	1-2008-006051	10/16/2008	6660-00-004-019-0-000-00
228	P1G3191	638 S College	6/6/2008	867	418	1-2008-003358	6/9/2008	6720-00-005-012-0-000-00
229	P1G3193	425 S Emily	5/29/2008	866	660	1-2008-003133	5/30/2008	6520-00-017-011-0-000-00 6520-00-017-014-0-000-00
230	P1G3195	512 S Alta	8/12/2008	871	30	1-2008-004728	8/13/2008	6660-00-003-029-0-000-00 6660-00-003-024-0-000-00
231	P1G3196	616 N Picher	5/29/2008	866	654	1-2008-003130	5/30/2008	6540-00-003-003-0-000-00
232	P1G3196A P1G3196AA	616 North Picher	5/27/2010	909	447	1-2010-002595	5/28/2010	6550-00-001-005-0-000-00 6550-00-001-004-0-000-00
233	P1G3198	100 N Connell	7/22/2008	870	253	1-2008-004312	7/22/2008	6560-00-000-001-0-000-00
234	P1G3200	103 E 10th	2/17/2009	882	489	1-2009-000845	2/18/2009	6700-00-007-004-0-000-00
235	P1G3200	103 E 10th	6/5/2008	867	241	1-2008-003288	6/6/2008	6700-00-007-002-0-000-00
236	P1G3201	610 S Emily	6/5/2008	867	233	1-2008-003284	6/6/2008	6660-00-007-030-0-000-00
237	P1G3202	506 S Emily	7/15/2008	869	661	1-2008-004125	7/15/2008	6660-00-002-019-0-000-00
238	P1G3203	308 E 11th	6/5/2008	867	235	1-2008-003285	6/6/2008	6700-00-009-004-0-000-00
239	P1G3204	430 S Alta	7/10/2008	869	504	1-2008-004040	7/10/2008	6520-00-020-017-0-000-00
240	P1G3204	430 S Alta	11/7/2008	878	71	1-2008-006813	11/26/2008	6590-00-020-021-0-000-00
241	P1G3205	500 S College	6/5/2008	867	239	1-2008-003287	6/6/2008	6720-00-003-002-0-000-00
242	P1G3209	318 E 12th	6/5/2008	867	237	1-2008-003286	6/6/2008	6700-00-009-007-0-000-00
243	P1G3209A	316 E 12th	5/20/2010	909	46	1-2010-002451	5/21/2010	6700-00-009-008-0-000-00

	LICRAT Parcel Number	Address	Deed Date	Deed Book Number	Deed Page Number	Document Number	Deed Recording Date	Assessor Parcel Number
244	P1G3210	428 S Alta	11/18/2008	877	534	I-2008-006693	11/19/2008	6520-00-017-031-0-000-00
245	P1G3211	306 McGhee St	6/26/2008	868	701	I-2008-003807	6/27/2008	6010-00-010-001-0-000-00
246	P1G3212	186 Wade St	7/21/2008	870	249	I-2008-004309	7/22/2008	6010-00-001-017-0-000-00
247	P1G3213	217 S Emily	7/10/2008	869	502	I-2008-004039	7/10/2008	6520-00-009-008-0-000-0
248	P1G3215	750 E 1st St	8/28/2008	873	194	I-2008-005276	9/8/2008	6010-00-013-018-0-000-00
249	P1G3216-L	620 S Oneida	11/15/2008	878	658	I-2008-007044	12/10/2008	6720-00-020-008-0-000-00
250	P1G3217	208 N Netta	8/7/2008	871	105	I-2008-004622	8/8/2008	6620-00-004-004-0-000-00
251	P1G3218	700 S Cherokee	5/29/2008	866	652	I-2008-003129	5/30/2008	6720-00-007-001-0-001-00
252	P1G3220	111 N Ethel	7/10/2010	913	564	I-2010-003920	8/13/2010	6520-00-002-001-0-000-00
253	P1G3220A-2	102 E Central	2/25/2010	904	501	I-2010-001009	2/26/2010	6520-00-001-009-0-000-00 6520-00-001-010-0-000-00 6520-00-001-011-0-000-00 6520-00-001-016-0-000-00
254	P1G3222		4/10/2008	863	212	I-2008-002017	4/11/2008	6540-00-002-003-0-000-00
255	P1G3223	1290 S 607 Rd	8/25/2008	875	435	I-2008-006014	10/15/2008	0000-14-029-023-0-009-00
256	P1G3224	1290 S 607 Rd	5/13/2008	865	495	I-2008-002780	5/14/2008	1380-00-000-000-0-001-00
257	P1G3225	60551 E 13 Rd	4/15/2008	863	485	I-2008-002119	4/16/2008	0000-14-029-023-0-010-00
258	P1G3226	58601 E 30th Rd	2/10/2009	882	179	I-2009-000708	2/10/2009	0000-28-029-023-0-008-01
259	P1G3B02	222 W A St	1/15/2010	902	484	I-2010-000287	1/20/2010	6620-00-004-002-0-000-00
260	P1G3B03-L	3401 S Hwy 69	2/26/2009	883	268	I-2009-001045	2/26/2009	0000-29-029-023-0-004-01
261	P1G3B04	3401 S Hwy 69	3/6/2008	860	489	I-2008-001277	3/7/2008	0000-29-029-023-0-004-0
262	P1G3B06	212 W Picher	2/26/2008	860	63	I-2008-00132	2/26/2008	6180-00-013-009-0-000-00
263	P1G3B07	150 S Vantage	2/2/2010	903	350	I-2010-000571	2/3/2010	6555-00-000-012-0-000-00
264	P1G3B09	631 S Francis	2/28/2008	864	329	I-2008-002367	4/25/2008	6660-00-010-001-0-000-00
265	P1G3B10	2 & Wade	11/20/2007	854	197	I-2007-006731	11/20/2007	6010-00-006-014-0-000-00
266	P1G3B11	77 1st St	11/8/2007	853	315	I-2007-006446	11/9/2007	6010-00-001-001-0-000-00
267	P1G3B12	214 Treece	1/17/2008	857	481	I-2008-000360	1/18/2008	
268	P1G3B13	607 Rd - Quapaw	12/4/2007	855	12	I-2007-006967	12/5/2007	1380-00-003-005-0-000-00
269	P1G3B14	526 N Connell	3/25/2010	905	751	I-2010-001394	3/26/2010	6640-00-008-003-0-001-00
270	P1G3B15	318 N Netta	12/4/2007	855	14	I-2007-006968	12/5/2007	6620-00-003-009-0-000-00
271	P1G3B16	508 N Connell	4/15/2008	863	478	I-2008-002116	4/16/2008	6540-00-008-008-0-000-00
272	P1G3B17	208 N Vantage	4/29/2010	908	555	I-2010-002318	5/14/2010	6620-00-006-003-0-000-00
273	P1G3B19	202 S Netta	7/31/2008	870	713	I-2008-004502	8/4/2008	6180-00-013-011-0-000-00
274	P1G4B01	215 S Francis	11/12/2008	877	254	I-2008-006580	11/13/2008	6520-00-008-009-0-000-00 6520-00-008-001-0-000-00
275	P1G4B02	505 N Connell	3/18/2009	884	532	I-2009-001482	3/18/2009	6710-21-029-023-0-002-00
276	P1G4B03	200 S Connell	12/10/2008	878	660	I-2008-007045	12/10/2008	6180-00-016-001-0-000-00;
277	P1G4B04	315 E 3 St.	4/9/2009	886	44	I-2009-001902	4/9/2009	6520-00-007-020-0-000-00
278	P1G4B04A	315 E 3 St	5/27/2010	909	437	I-2010-002590	5/28/2010	6520-00-007-009-0-000-00 6520-00-007-011-0-000-00

	LICRAT Parcel Number	Address	Deed Date	Deed Book Number	Deed Page Number	Document Number	Deed Recording Date	Assessor Parcel Number
279	P1G4B05	515 S Connell	5/18/2010	909	452	I-2010-002598	5/28/2010	6660-00-001-011-0-000-00 6660-00-001-015-0-000-00
280	P1G4B06	131 S Connell	12/29/2008	879	547	I-2008-007323	12/30/2008	6520-00-006-009-0-000-00
281	P1G4B07	109 W A St	11/25/2008	878	75	I-2008-006815	11/26/2008	6560-00-000-00H-0-000-00
282	P1G4B08	127 N Connell	1/29/2009	881	392	I-2009-000515	1/30/2009	6710-21-029-023-0-005-00
283	P2-1	318 South Alta	9/15/2009	895	410	I-2009-004819	9/15/2009	6520-00-012-021-0-000-00
284	P2-101	103 South Ethel	7/30/2009	892	587	I-2009-003958	8/3/2009	6520-00-003-001-0-000-00
285	P2-107	2300 South 590 Rd	6/25/2009	890	295	I-2009-003264	6/26/2009	0000-22-029-023-0-006-01
286	P2-109L	437 South Connell	5/27/2010	909	439	I-2010-002591	5/28/2010	6520-00-022-001-0-000-00
287	P2-111	110 South Ella	10/28/2009	897	685	I-2009-005548	10/28/2009	6520-00-002-023-0-000-00
288	P2-113	101 North Ethel	12/15/2009	900	695	I-2009-006417	12/16/2009	6520-00-002-010-0-000-00
289	P2-113A	101 North Ethel	4/29/2010	907	736	I-2010-002038	4/29/2010	6520-00-002-021-0-000-00
290	P2-116	213 South Emily	8/3/2009	892	593	I-2009-003961	8/3/2009	6520-00-009-007-0-000-00
291	P2-118	590 East 20 Rd	6/30/2009	890	498	I-2009-003334	7/1/2009	0000-22-029-023-0-009-00
292	P2-119	109 South Ethel	6/30/2009	890	496	I-2009-003333	7/1/2009	6520-00-003-003-0-000-00
293	P2-12	104 North Oneida	3/19/2009	884	594	I-2009-001503	3/20/2009	6200-00-001-005-0-000-00
294	P2-120	212 South Emily	7/30/2009	892	584	I-2009-003956	8/3/2009	6520-00-008-018-0-000-00
295	P2-122	200 South Emily	8/25/2009	894	682	I-2009-004598	9/2/2009	6520-00-008-013-0-000-00
296	P2-123T	403 South Francis						
297	P2-125	60545 East 20 Rd	4/13/2010	906	706	I-2010-001697	4/13/2010	0000-23-029-023-0-002-00
298	P2-126T	214 South Francis						
299	P2-130	506 West 2 St	8/24/2009	894	183	I-2009-004399	8/26/2009	6180-00-010-011-0-000-00
300	P2-131L	116 South Emily	9/1/2009	895	168	I-2009-004728	9/10/2009	6640-00-000-032-0-000-00
301	P2-132	214 South Frisco	8/21/2009	893	789	I-2009-004345	8/24/2009	6180-00-009-004-0-001-00
302	P2-134	208 South Treece	11/10/2009	898	737	I-2009-005828	11/12/2009	No records in tax assessor office
303	P2-135	607 West Carl Patterson	2/17/2010	904	169	I-2010-000845	2/18/2010	6200-00-005-001-0-000-00 6200-00-005-002-0-000-00
304	P2-136	216 South Vantage	8/25/2009	894	181	I-2009-0004398	8/26/2009	6180-00-0010-009-0-001-00
305	P2-137T	209 South Vantage						
306	P2-138	214 South Vantage	9/10/2009	895	162	I-2009-004725	9/10/2009	6180-00-010-008-0-000-00
307	P2-13T	321 East 12 St						
308	P2-142L	218 South Netta	9/10/2009	895	164	I-2009-004726	9/10/2009	6180-00-012-009-0-000-00
309	P2-144L	526 South College	8/10/2009	893	791	I-2009-004346	8/24/2009	6720-00-003-011-0-000-00
310	P2-15	412 South Francis	2/17/2009	882	487	I-2009-000844	2/18/2009	6520-00-15-017-0-000-00
311	P2-19	111 South Ethel	1/21/2009	882	767	I-2009-00942	2/23/2009	6520-00-003-006-0-000-00
312	P2-2	300 South Emily	2/27/2009	883	414	I-2009-001091	2/27/2009	6520-00-013-013-0-000-00 6520-00-013-013-0-001-00
313	P2-22	200 South Treece	2/2/2009	881	514	I-2009-000565	2/2/2009	6180-00-011-001-0-000-00
314	P2-23A		4/13/2010	906	703	I-2010-001695	4/13/2010	6780-00-009-003-0-000-00
315	P2-24	322 South Emily	3/24/2009	884	814	I-2009-0001600	3/25/2009	6520-00-013-023-0-000-00

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316	P2-25	286 Main St	1/20/2009	880	707	1-2009-000294	1/21/2009	6010-00-008-006-0-000-00
317	P2-29	200 West F St	1/29/2009	881	394	1-2009-000516	1/30/2009	6540-00-003-001-00-000-00
318	P2-30L	308 North Netta	5/27/2010	909	450	I-2010-002597	5/28/2010	6620-00-003-006-0-000-00
319	P2-32A	706 West State Line Rd	9/1/2009	894	678	1-2009-004596	9/2/2009	6680-00-003-002-0-000-00
320	P2-33	60751 East 10th Rd	2/27/2009	883	411	1-2009-001089	2/27/2009	0000-14-029-0236-0-012-00
321	P2-35 (P2N-1A?)	702 West State Line Rd	4/14/2009	886	613	1-2009-0021435	4/22/2009	6680-00-004-001-0-001-00
322	P2-37	56251 East 10 Rd	3/30/2009	885	228	1-2009-001681	3/31/2009	0000-18-029-023-0-007-00
323	P2-51	524 North Picher	4/9/2009	886	46	1-2009-001903	4/9/2009	6540-00-005-012-0-001-00
324	P2-51(B) LOT	165 Wade	12/29/2009	901	412	1-2009-006616	12/29/2009	6010-00-001-019-0-000-00
325	P2-51B		9/1/2009	894	677	I-2009-004595	9/2/2009	6010-00-001-018-0-000-00
326	P2-55	521 North Picher	5/19/2009	888	246	1-2009-002601	5/19/2009	6540-00-006-001-0-000-00 6540-00-006-001-0-000-00
327	P2-59	204 River St	5/27/2009	888	619	1-2009-002736	5/28/2009	6020-00-02a-000-0-000-00 6020-00-003-001-0-001-00
328	P2-61	34 2nd St	5/28/2009	888	623	1-2009-002739	5/28/2009	6020-00-004-003-0-000-00
329	P2-62	357 1/2 Cardin Lane	6/16/2009	889	634	1-2009-003073	6/17/2009	0000-30-029-023-0-026-01
330	P2-64A	285 Main St	6/25/2009	890	285	1-2009-003259	6/26/2009	6010-00-005-009-0-000-00
331	P2-65	104 North Wade	5/27/2009	888	613	1-2009-002730	5/28/2009	6010-00-006-001-0-000-00
332	P2-66L	202 River St	8/13/2009	893	449	1-2009-004198	8/14/2009	6020-00-003-002-0-000-00
333	P2-67	303 McGhee	6/11/2009	889	355	1-2009-002963	6/12/2009	6010-00-009-012-0-000-00
334	P2-68	183 Tar River	8/5/2009	893	217	1-2009-004126	8/10/2009	6020-00-006-001-0-001-00
335	P2-70	2501 South 550 Rd	7/1/2009	890	565	1-2009-003353	7/1/2009	0000-20-029-023-0-005-00 0000-23-029-022-0-001-00
336	P2-71	631 3rd St	10/30/2009	898	32	1-2009-005605	10/30/2009	6010-00-008-009-0-000-00
337	P2-72	55800 East 30 Rd	8/24/2009	894	176	1-2009-004395	8/26/2009	0000-24-029-022-0-017-00
338	P2-74	184 Tar River	6/11/2009	889	357	1-2009-002964	6/12/2009	6020-00-005-001-0-001-00
339	P2-76	221 McGhee	9/10/2009	895	166	1-2009-004727	9/10/2009	6010-00-008-014-0-000-00
340	P2-77	402 2nd St	5/19/2009	888	250	1-2009-002603	5/19/2009	6010-00-002-001-0-000-00
341	P2-78	701 McGhee	7/7/2009	891	108	1-2009-003474	7/8/2009	6010-00-012-003-0-001-00
342	P2-79	190 Tar River	5/28/2009	888	622	1-2009-002738	5/28/2009	6020-00-006-002-0-000-00 6020-00-005-002-0-000-00 6020-00-007-001-0-001-00
343	P2-79A P2-79AA	ES River bet 1st & 2nd	4/13/2010	906	705	1-2010-001696	4/3/2010	6020-00-005-002-0-000-00 6020-00-007-001-0-001-00
344	P2-81L	501 3rd St	6/25/2009	890	291	1/2009-003262	6/26/2009	6010-00-005-007-0-000-00
345	P2-82L	274 Wade St	6/25/2009	890	287	1-2009-003260	6/26/2009	6010-00-005-007-0-000-00
346	P2-83	302 Wade St	6/25/2009	890	289	1-2009-003261	6/26/2009	6010-00-004-001-0-000-00
347	P2-86	191 River St	7/14/2009	891	587	1-2009-003657	7/16/2009	6010-00-012-006-0-000-00
348	P2-87L	214 Main St	6/25/2009	890	293	1-2009-003263	6/26/2009	6010-00-008-005-0-000-00
349	P2-88T	231 McGhee						

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	LICRAT Parcel Number	Address	Deed Date	Deed Book Number	Deed Page Number	Document Number	Deed Recording Date	Assessor Parcel Number
350	P2-9	202 South Vantage	1/22/2009	881	93	I-2009-000389	1/23/2009	6180-00-010-001-0-000-00
351	P2-92	WS Emily bet Cntrl & 6	12/22/2009	901	209	I-2009-006540	12/23/2009	6660-00-002-023-0-000-00
352	P2-93L	456 South Alta	7/21/2009	892	46	I-2009-003759	7/21/2009	6520-00-020-026-0-000-00
353	P2-95L	455 South Ethel	6/18/2009	892	44	I-2009-003758	7/21/2009	6520-00-019-009-0-000-00
354	P2-96	109 North Ethel	8/14/2009	893	489	I-2009-004210	8/14/2009	6520-00-002-003-0-000-00
355	P2-97	216 South Emily	11/5/2009	898	403	I-2009-005740	11/6/2009	6520-00-008-019-0-000-00 6520-00-008-021-0-000-00
356	P2-B1	301 South Connell	11/5/2009	898	405	I-2009-005741	11/6/2009	6520-00-014-001-0-000-00 6520-00-014-013-0-000-00
357	P2-B10	120 North Connell	12/15/2009	900	685	I-2009-006412	12/16/2009	6560-00-000-00D-0-000-00
358	P2-B11L	57785 East 40 Rd	3/30/2010	906	144	I-2010-001486	3/31/22010	0000-32-029-0230-002-02
359	P2-B16	128 North Connell						
360	P2-B18	100 South Connell	11/10/2009	899	63	I-2009-005892	11/16/2009	6210-00-001-001-0-000-00
361	P2-B1A	301 South Connell	2/25/2010	904	498	I-2010-001007	2/26/2010	6520-00-014-005-0-000-00 6520-00-014-020-0-000-00
362	P2-B21	207 West 2nd St	5/13/2010	908	547	I-2010-002314	5/14/2010	6210-00-001-006-0-0100-00
363	P2-B24	617 East 1st St	8/4/2009	893	445	I-2009-004195	8/14/2009	6010-00-013-011-0-000-00
364	P2-B25	3010 South 560 Rd	12/11/2009	901	410	I-2009-006615	12/29/2009	0000-25-029-022-0-003-00
365	P2-B26	47 1st St	8/4/2009	892	840	I-2009-004044	8/4/2009	6010-00-012-011-0-000-00
366	P2-B28	200 F Northeast	7/31/2009	892	591	I-2009-003960	8/3/2009	6600-00-007-006-0-000-00
367	P2-B28A	200 F Northeast	2/17/2010	904	173	I-2010-000847	2/18/2010	6600-00-007-006-0-000-00
368	P2-B3 P1G3010	419 s Connell	2/2/2010	903	340	I-2010-000565	2/3/2010	6520-00-015-004-0-000-00
369	P2-B3A	125 North Connell	9/15/2009	895	408	I-2009-004818	9/15/2009	6710-21-029-023-0-006-00
370	P2-B5	2nd & Emily	1/19/2010 12/22/2009	902 902	486 14	I-2010-000288 I-2010-000084	1/20/2010 1/7/2010	6520-00-005-010-0-000-00 6520-00-005-021-0-000-00
371	P2-B52A	207 South Connell	12/29/2009	901	406	I-2009-006613	12/29/2009	6520-00-007-004-0-000-00
372	P2-B52B	514 West A St	10/16/2009	897	383	I-2009-005415	10/16/2009	6620-00-007-004-0-001-00
373	P2-B6	319 South Connell	10/16/2009	897	379	I-2009-005413	10/16/2009	6520-00-014-008-0-000-00
374	P2-B7	321 1/2 East 12th St	1/19/2010	902	476	I-2010-000283	1/20/2010	0000-28-029-023-0-007-00
375	P2-B8	323 South Connell	2/17/2010	904	175	I-2010-000848	2/18/2010	6520-00-014-010-0-000-00
376	P2-B88	55904 East 30 Rd	3/10/2010	905	85	I-2010-001170	3/10/2010	0000-24-029-022-0-017-01
377	P2-B8A	323 South Connell	4/29/2010	907	733	I-2010-002039	4/29/2010	6520-00-014-010-0-000-00
378	P2N-15	607 North Connell Ave	2/27/2009	883	412	I-2009-001090	2/27/2009	6710-16-029-023-0-013-00
379	P2N-6	1301 South 592 Rd	8/13/2009	893	447	I-2009-004196	8/14/2009	0000-15-029-023-0-005-00
380	P2N-9	61500 East 20 Rd	7/14/2009	891	458	I-2009-003618	7/15/2009	0000-13-029-023-0-013-01 0000-13-029-023-0-013-02
381	P3-1	436 South Francis	3/26/2010	906	20	I-2010-001424	3/26/2010	6520-00-022-017-0-000-00
382	P31-1	515 South Ethel	10/16/2009	897	375	I-2009-005411	10/16/2009	6660-00-004-010-0-000-00
383	P3-2	150 South Frisco	5/27/2010	909	443	I-2010-002593	5/28/2010	6630-00-000-014-0-000-00
384	P32-3T	273 Wade						
385	P32-4L	105 North Ethel	1/6/2010	902	12	I-2010-000083	1/7/2010	6520-00-002-007-0-000-00

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386	P32-6	714 North Picher	9/1/2009	894	671	I-2009-004591	9/2/2009	6540-00-001-002-0-000-00
387	P32-6A	WS Picher bet G & H St	3/31/2010	906	252	I-2010-001511	4/1/2010	6540-00-001-003-0-000-00
388	P32-7	720 North Picher	9/1/2009	894	675	I-2009-004594	9/2/2009	6540-00-001-001-0-000-00
389	P3-33L	934 North Connell	1/20/2010	904	179	I-2009-000850	2/18/2010	6580-00-001-001-0-000-00
390	P3-4	167 Main	10/19/2009	897	446	I-2009-005441	10/20/2009	6010-00-006-016-0-000-00
391	P3-4A		11/5/2009	898	408	I-2009-005743	11/6/2009	6540-00-002-008-0-000-00
392	P3-54UL	430 South Francis	10/23/2009	897	596	I-2009-005489	10/23/2009	6520-00-015-031-0-000-00
393	P3-56UL	228 Meghee	8/25/2009	894	177	I-2009-004396	8/26/2009	6010-00-011-006-0-000-00
394	P3-57UL	153 West F	8/8/2009	896	681	I-2009-005223	10/9/2009	6540-00-002-006-0-001-00
395	P3-58	SS K St & W Ottawa	12/22/2009	901	211	I-2009-006541	12/23/2009	6680-00-002-003-0-001-00
396	P3-58AB	WS Emily bet 5 & Cntrl	2/25/2010	904	502	I-2010-001010	2/26/2010	6520-00-009-020-0-000-00
397	P3-6	501 North Netta	10/16/2009	897	377	I-2009-005412	10/16/2009	6540-00-005-006-0-000-00
398	P3-60AB	511 South Francis	4/27/2010	908	792	I-2010-002415	5/18/2010	6660-00-002-011-0-000-00
399	P3-63U	201 South Emily	2/3/2010	903	346	I-2010-000569	2/3/2010	6520-00-009-001-0-000-00
400	P3-63UA	169 Main	3/31/2010	906	250	1-2010-001510	4/1/2010	6010-00-006-018-0-000-00
401	P3-65AB	630 South Cherokee	4/22/2010	907	331	1-2010-001888	4/23/2010	6720-00-008-017-0-000-00
402	P3-66AB	442 S Emily	4/27/2010	907	744	1-2010-002042	4/29/2010	6520-0-021-020-0-000-00
403	P3-67AB	440 South Emily	4/27/2010	907	742	1-2010-0002041	4/29/2010	6520-00-021-017-0-000-00
404	P37-1	711 South Emily	11/13/2009	899	66	1-2009-005893	11/16/2009	6660-00-011-008-0-000-00
405	P37-2	423 South Francis	1/4/2010	902	482	1-2010-000286	1/20/2010	6520-00-016-012-0-000-00
406	P37-3	206 South Alta	12/15/2009	900	689	1-2009-006414	12/16/2009	6520-00-007-003-0-000-00 6520-00-009-015-0-000-00
407	P37-4	301 South Emily	3/12/2010	905	258	1-2010-001227	3/12/2010	6520-00-012-001-0-000-00 6520-00-012-004-0-000-00
408	P37-5	462 South Emily	3/3/2010	905	256	1-2010-001226	3/12/2010	6520-00-021-029-0-000-00
409	P37-6	316 South Emily	12/17/2009	901	404	1-2009-006612	12/29/2009	6520-00-013-021-0-000-00
410	P37-7	701 South Oneida	12/8/2009	900	383	1-2009-006303	12/9/2009	6720-00-018-017-0-000-00 6720-00-018-017-0-000-00
411	P37-8	620 North Connell	12/18/2009	902	10	1-2010-000082	1/7/2010	6600-00-008-001-0-000-00
412	P39-2	SS 2st bet McGhee & River 5/20/10		909	48	1-2010-002452	5/21/2010	6010-00-012-003-0-000-00 6010-00-002-003-0-000-00
413	P39-3	592 Rd - Quapaw	11/10/2009	989	734	1-2009-005826	11/12/2009	1200-00-002-006-0-000-00
414	P39-5	218 South Picher	3/30/2010	906	148	1-2010-001488	3/31/2010	6180-00-013-010-0-000-00
415	P39-7	WS River bet 2 & 3 st	4/29/2010	908	561	1-2010-002321	5/14/2010	6010-00-011-009-0-000-00
416	P3-B20	220 South Connell	5/13/2010	908	549	1-2010-002315	5/14/2010	6180-00-016-009-0-000-00
417	P3-B34	321 East 12th St	1/19/2010	902	478	1-2010-000284	1/20/2010	0000-28-029-023-0-005-00
418	P3-B35	214 South Connell	2/25/2010	904	500	1-2010-001008	2/26/2010	6180-00-016-007-0-001-00
419	P3-B36	NS of 1st Bet Harlin &	5/28/2010	909	448	1-2010-002596	5/28/2010	6010-00-001-005-0-000-00
420	P3-B38	SS of Harlin & Cardin	5/27/2010	909	441	1-2010-002592	5/28/2010	0000-30-029-023-0-026-00
421	P3-B39AB	213 South Connell	2/17/2010	904	171	1-2010-000846	2/18/2010	6520-00-007-006-0-000-00 6520-00-007-007-0-000-00

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422	F3-B40	203 South Connell	3/26/2010	906	18	1-2010-001423	3/26/2010	6520-00-007-002-0-000-00
423	P3-B46AB	217 & 217 1/2 S. Connell	5/20/2010	909	44	1-2010-002450	5/21/2010	6520-00-007-008-0-000-00
424	F3-B47	218 North Connell	2/2/2010	903	344	1-2010-000568	2/3/2010	6180-00-016-008-0-000-00
425	F3-B49	219 North Connell	2/17/2010	904	727	1-2010-001101	3/4/2010	6180-00-016-007-0-000-00
426	F3-B51	212 S Connell	4/22/2010	907	328	1-2010-001886	4/23/2010	6180-00-016-005-0-000-00
427	P3G0001	458 South Emily	11/19/2009 11/9/2009 11/9/2009	900 900 900	308 310 312	I-2009-006271 I-2010-006272 I-2010-006273	12/8/2009 12/8/2009 2/16/2010	6520-00-021-027-0-000-00
428	P3G0003	624 North Picher	2/11/2010	904	30	1-2010-000776	2/16/2010	6540-00-003-002-0-000-00
429	P3G0005	212 South Alta	12/15/2009	900	693	1-2009-006416	12/16/2010	652-00-009-017-0-000-00
430	P3G0006	205 S Emily	10/30/2009	898	140	1-2009-005640	11/2/2009	6520-00-009-003-0-000-00
431	P3G0012	306 S Alta	2/11/2010	904	32	I-2010-000777	2/16/2010	6520-00-012-016-0-000-00
432	P3G0014	514 S Ella St	5/13/2010	908	557	1-2010-002319	5/14/2010	6660-00-004-028-0-000-00
433	P3G0014A	514 S Ella St	5/13/2010	908	559	1-2010-002320	5/14/2010	6660-00-004-017-0-000-00
434	P3G0018	637 S Oneida	12/26/2009	904	177	1-2010-000849	2/18/2010	6720-00-017-035-0-000-00 6720-00-017-001-0-000-00
435	P3G0020	417 South Francis	10/16/2009	897	381	1-2009-005414	10/16/2009	6520-00-016-008-0-000-00
436	P3G0021	11630 Road	3/30/2010	906	146	1-2010-001487	3/31/2010	1200-00-002-001-0-000-00 1200-00-002-009-0-000-00
437	P3G0021A	1751 S 592 Rd	3/30/2010	906	146	1-2010-001487	3/31/2010	1200-00-002-001-0-000-00 1200-00-002-009-0-000-00
438	PFB-1	437 South Ethel, Picher	6/24/2005	788	603	I-2005-003893	7/1/2005	6520-00-019-001-0-000-00
439	PFB-15	600 East 2nd Street, Picher	5/4/2005 7/7/2005	784 789	308 301	1-2005-002655 I-2005-004074	5/6/2005 7/8/2005	6520-00-010-001-0-000-00
440	PFB-17	2200 South 610 Road, Quapaw	7/13/2005 3/23/2009	789 884	567 712	I-2005-004186 I-2009-001570	7/14/200 3/23/2009	0000-24-029-023-0-007-00
441	FFB-20	602 North Picher, Picher	6/17/2005	787	517	I-2005-003589	6/17/2005	6540-00-003-005-0-000-00
442	PFB-22	609 South Emily, Picher	5/13/2005	785 788	45 198	1-2005-002839 I-2005-003771	5/13/2005	6660-00-006-012-0-000-00
443	PFB-25	127 North Frisco, Picher	8/1/2005 8/1/2005	786 791	580 518	I-2005-003313 I-2005-004795	8/9/2005	6555-00-000-003-0-000-00
444	PFB-26	509 South Emily, Picher	6/17/2005	787	515	I-2005-003588	6/17/2005	6660-00-003-009-0-000-00
445	PFB-27	201 South Vintage, Picher	5/13/2005 6/24/2005	785 788	47 605	1-2005-002840 I-2005-003894	5/13/2005 07/01/2005	6180-00-011-011-0-000-00
446	PFB-28	601 West Carl Patterson Avenue, Picher	6/3/2005 6/30/2005 6/30/2005	786 788 789	585 600 246	I-2005-003316 I-2005-003891	7/1/2005	6180-00-009-008-0-000-00
447	PFB-35	126 North Connell, Picher	5/27/2005 6/30/2005	786 788	266 595	I-2005-003179 I-2005-003887	7/1/2005	6560-00-000-00E-0-000-00
448	PFB-45	503 North Main, Picher	8/23/2007	846	574	I-2007-004593	8/24/2007	6540-00-007-006-0-000-00
449	PFB-54	200 South Ella, Picher	6/3/2005 8/14/2005	786 793	588 2	I-2005-003318 I-2005-005168	6/6/2005 8/26/2005	6520-00-010-013-0-000-00 6520-00-010-016-0-000-00
450	PFB-56	606 South Alta, Picher	undated	787	63	I-2005-003439	6/10/2005	6660-00-006-021-0-000-00
451	PFB-6	700 West 2nd Street, Picher	7/12/2005	790	120	I-2005-004326	7/20/2005	6200-00-004-003-0-000-00

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			5/19/2005	785	589	I-2005-003002	5/20/2005	
452	PFB-60	270 North Wade, Cardin	5/13/2005 7/7/2005	785 789	41 299	I-2005-002837 I-2005-004073	5/13/2005 07/08/2005	6010-00-005-006-0-000-00
453	PFB-61	710 South Emily, Picher	7/28/2005	791	211	I-2005-004668	8/2/2005	6660-00-010-025-0-000-00
454	PFB-64	408 South Alta Street, Picher	6/3/2005 7/13/2005	786 789	582 595	I-2005-003314 I-2005-004197	6/6/2005 7/14/2005	6520-00-017-017-0-000-00
455	PFB-66	200 South Alta, Picher	5/13/2005 7/14/2005	785 790	43 118	I-2005-002838 I-2005-004325	5/13/2005 07/20/2005	6520-00-009-013-0-000-00
456	TV-10	504 S College	8/22/2008	872	97	I-2008-004954	8/22/2008	6720-00-003-004-0-000-00
457	TV-100	401 South Emily	1/22/2009	881	95	I-2009-000390	1/23/2009	6520-00-017-003-0-000-00 6520-00-017-001-0-000-00
458	TV-101L	420 South Emily	9/4/2009	895	170	I-2009-004729	9/10/2009	6520-00-016-027-0-000-00
459	TV-103L	412 South Emily	9/4/2009	895	172	I-2009-004730	9/10/2009	6520-00-016-022-0-000-00
460	TV-104	449 S Connell	10/20/2008	874	666	I-2008-005782	10/3/2008	6520-00-022-003-0-000-00
461	TV-107L	603 East 2nd St	7/30/2009	892	585	I-2009-003957	8/3/2009	6520-00-003-010-0-000-00
462	TV-109L	513 South Connell	11/23/2009	899	750	I-2009-006124	11/30/2009	6660-00-001-008-0-000-00
463	TV-110	58700 E 30 Rd	12/29/2008	879	553	I-2008-007326	12/30/2008	0000-21-029-023-0-013-00
464	TV-111L	424 South Emily	12/15/2009	900	687	I-2009-006413	12/16/2009	6520-00-016-030-0-000-00 6520-00-016-028-0-000-00
465	TV-112L	311 East 10th St	3/30/2010	906	142	I-2010-001485	3/31/2010	6700-00-008-050-0-000-00
466	TV-116	402 E 12th St	9/4/2008	873	12	I-2008-005193	9/5/2008	0000-21-029-023-0-010-00
467	TV-118	445 S Francis	9/16/2008	873	679	I-2008-005451	9/17/2008	6520-00-021-006-0-000-00
468	TV-11A	301 East 10th St	3/6/2009	883	724	I-2009-001224	3/9/2009	6700-00-008-001-0-000-00
469	TV-11C	701 S Emily	8/7/2008	871	100	I-2008-004619	8/8/20009	6660-00-011-001-0-000-00
470	TV-122	323 E 12th St	10/23/2008	876	66	I-2008-006188	10/24/2008	0000-20-029-023-0-006-00
471	TV-123L	435 S Francis	12/12/2008	878	819	I-2008-007102	12/15/2008	6520-00-021-001-0-000-00
472	TV-12A	206 East 10th St	11/12/2008	877	256	I-2008-006581	11/13/2008	6700-00-005-011-0-000-00
473	TV-12B	212 East 10th St	8/13/2009	893	448	I-2009-004197	8/14/2009	6700-00-005-007-0-000-00
474	TV-12C	609 S Oneida	8/14/2008	871	520	I-2008-004783	8/14/2008	6720-00-017-027-0-000-00
475	TV-13	717 S Francis	7/21/2009	892	42	I-2009-003757	7/21/2009	6660-00-010-013-0-000-00
476	TV-14	457 S Emily	9/25/2008	874	668	I-2008-005783	10/3/2008	6520-00-020-011-0-000-00
477	TV-16	447 S Ethel	12/29/2008	879	555	I-2008-007327	12/30/2008	6520-00-019-003-0-000-00 6520-00-019-008-0-000-00
478	TV-16A	447 South Ethel	2/2/2010	903	352	I-2010-000572	2/3/2010	6520-00-019-017-0-000-00
479	TV-18L	542 South College	11/20/2009	899	443	I-2009-006011	11/20/2009	6720-00-004-009-0-000-00
480	TV-1L	718 S College	11/25/2008	878	69	I-2008-006812	11/26/2008	6720-00-006-008-0-000-00
481	TV-2	316 East 10th St	8/14/2008	871	522	I-2008-004787	8/14/2008	6720-00-004-006-0-000-00
482	TV-21	604 South Ella	3/5/2009	883	644	I-2009-001197	3/6/2009	6660-00-005-022-0-000-00
483	TV-23	501 S Francis	11/5/2008	876	771	I-2008-006453	11/6/2008	6660-00-002-001-0-000-00
484	TV-25	315 South Francis	1/15/2009	880	544	I-2009-000226	1/15/2009	6520-00-013-007-0-000-00
485	TV-26	603 S Ethel	11/5/2008	876	779	I-2008-006456	11/6/2008	6660-00-005-001-0-000-00

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486	TV-30	411 South Francis	1/20/2009	880	705	I-2009-000293	1/21/2009	6520-00-016-006-0-000-00
487	TV-31	501 S Connell	7/31/2008	870	709	I-2008-004500	8/4/2008	6660-00-001-001-0-000-00
488	TV-32L	309 East 9th St	12/29/2008	879	551	I-2008-007325	12/30/2008	6700-00-004-005-0-000-00 6700-00-004-001-0-000-00
489	TV-36	310 S Cherokee	8/28/2008	872	502	I-2008-005058	8/29/2008	6720-00-002-020-0-000-00
490	TV-37	459 S Francis	8/28/2008	872	498	I-2008-005056	8/29/2009	6520-00-021-012-0-000-00
491	TV-38	100 East 10th St	9/30/2008	874	530	I-2008-005739	10/1/2008	6700-00-006-007-0-000-00
492	TV-39	313 East 8th St	12/29/2008	879	549	I-2008-007324	12/30/2008	6700-00-002-005-0-000-00 6700-00-002-006-0-000-00
493	TV-4	620 S College	9/4/2008	873	8	I-2008-005190	9/5/2008	6720-00-005-006-0-000-00
494	TV-40	453 S Connell	8/12/2008	871	364	I-2008-004725	8/13/2008	6520-00-022-008-0-000-00
495	TV-41L	509 South Francis	4/27/2010	907	740	I-2010-002040	4/29/2010	6660-00-002-011-0-000-00
496	TV-46	448 South Emily	1/20/2009	880	709	I-2009-000295	1/21/2009	6520-00-021-022-0-000-00
497	TV-47	443 S Emily	8/28/2008	880	548	I-2009-000228	1/15/2009	6200-00-003-001-0-000-00
498	TV-48	509 S Emily	11/18/2008	877	530	I-2008-006691	11/19/2008	6660-00-004-003-0-000-00 6660-00-004-006-0-000-00
499	TV-49	455 S Emily	8/7/2008	871	107	I-2008-004623	8/8/2008	6520-00-020-008-0-000-00
500	TV-50	805 S Pearl	1/20/2009	880	711	I-2009-000296	1/21/2009	6700-00-003-003-0-000-00
501	TV-52	110 East 10th St	1/15/2009	880	542	I-2009-000225	1/15/2009	6700-00-006-005-0-000-00
502	TV-53	308 E 5th St	8/7/2008	871	102	I-2008-004620	8/8/2008	6660-00-001-017-0-000-00
503	TV-54	709 S Emily	12/10/2008	880	699	I-2009-000289	1/21/2009	6660-00-011-004-0-000-00 6660-00-011-006-0-000-00
504	TV-55	708 S Francis	12/2/2008	878	260	I-2008-006892	12/2/2008	6660-00-009-022-0-000-00
505	TV-56	700 S Emily	1/29/2009	881	396	I-2009-000517	1/30/2009	6660-00-010-017-0-000-00
506	TV-57	638 S Oneida	8/19/2008	871	673	I-2008-004854	8/19/2008	6720-00-020-017-0-000-00
507	TV-60	466 S Ella	9/25/2008	874	288	I-2008-005649	9/26/2008	6520-00-019-031-0-000-00
508	TV-61	551 S Oneida	7/31/2008	870	711	I-2008-004501	8/4/2008	6720-00-016-020-0-000-00
509	TV-62A	102 East 12th St	9/25/2009	896	57	I-2009-004992	9/25/2009	6700-00-010-021-0-000-00
510	TV-62B	101 East 11th St	12/15/2009	900	683	I-2009-006411	12/16/2009	6700-00-010-001-0-000-00
511	TV-63	304 East 10th St	undated	873	59	I-2009-005220	9/5/2008	6700-00-004-007-0-000-00
512	TV-64	713 S Ottawa	12/15/2009	900	691	I-2009-006415	12/16/2009	6720-00-007-023-0-000-00
513	TV-65	505 S Emily	8/12/2008	871	368	I-2008-004727	8/13/2008	6660-00-003-005-0-000-00
514	TV-68	102 East 11th St	12/12/2008	878	817	I-2008-007101	12/15/2008	6700-00-007-018-0-000-00 6700-00-007-017-0-000-00
515	TV-69	309 East 10th St	11/5/2008	876	775	I-2008-006454	11/6/2008	6700-00-008-003-0-000-00
516	TV-7	307 East 11th St	undated	870	255	I-2008-004313	7/22/2008	6700-00-008-007-0-000-00
517	TV-70	526 S Cherokee	8/28/2008	872	500	I-2008-005057	8/29/2008	6720-00-009-001-0-000-00
518	TV-71	708 S Emily	11/25/2008	878	77	I-2008-006816	11/26/2008	6660-00-010-021-0-000-00
519	TV-72	604 S Emily	9/9/2008	873	224	I-2008-005293	9/10/2008	6660-00-007-017-0-000-00
520	TV-73	714 S Francis	11/25/2008	878	73	I-2008-006814	11/26/2008	6660-00-009-030-0-000-00
521	TV-79		10/2/2008	874	664	I-2008-005781	10/3/2008	6700-00-007-020-0-000-00

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	LICRAT Parcel Number	Address	Deed Date	Deed Book Number	Deed Page Number	Document Number	Deed Recording Date	Assessor Parcel Number
522	TV-8	415 S Emily	8/12/2008	871	366	I-2008-004726	8/13/2008	6520-00-017-009-0-000-00
523	TV-82	612 S Ella	12/1/2008	900	7	I-2009-006148	12/1/2009	6660-00-005-025-0-000-00
524	TV-84	712 S Francis	11/18/2008	877	532	I-2008-006692	11/19/2008	6660-00-009-026-0-000-00
525	TV-86	200 East 12th St	7/7/2009	891	110	I-2009-003475	7/8/2009	6700-00-010-018-0-000-00
526	TV-87	2071 S 570 Rd	9/25/2008	874	290	I-2008-005650	9/26/2008	0000-20-029-023-0-001-01
527	TV-87A	2170 South 570 Rd	11/5/2009	898	401	I-2009-005739	11/6/2009	0000-20-029-023-0-001-04
528	TV-88	613 S Ottawa	8/14/2008	871	526	I-2008-004786	8/14/2008	6720-00-008-027-0-000-00
529	TV-89U	601 S Cherokee	12/8/2009	900	387	I-2009-006305	12/9/2009	6720-00-005-021-0-000-00
530	TV-90L	412 S Alta	11/25/2008	878	79	I-2008-006817	11/26/2008	6520-00-017-027-0-000-00
531	TV-94	614 S Ella	8/28/2008	872	504	I-2008-005059	8/29/2008	6660-00-005-029-0-000-00
532	TV-96	323 South Francis	3/13/2009	884	231	I-2009-001360	3/13/2009	6520-00-013-010-0-000-00
533	TV-99	603 S Ottawa	undated	873	14	I-2008-005194	9/5/2008	6720-00-008-021-0-000-00 6720-00-009-020-0-000-00

Notes

"Addition" and "Legal Description" fields have been omitted for posterity

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Table 9b: Kansas Department of Health and Environment Bureau of Environmental Remediation Identified Sites List Information

Treece, KS, Relocation
305 Main St., Treece, KS
Project Code C301172724

-	EUCA Number	Date Recorded	Land Use Restrictions	Water Use Restrictions	Notification to Agency
1	12-EUC-0012	7/19/2012	No public area uses Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	restriction on water well construction	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation excavations prohibited unless for highway infrastructure or utilities and when proper soil management is undertaken.
2	12-EUC-0027	3/1/2013	No public area uses Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	Restriction on water well construction written approval from KDHE required prior to installation.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.
3	12-EUC-0028	3/1/2013	No public area uses Other land use restriction: no non-residential uses, scraping or excavation except for adjacent highway infrastructure or utilities. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	Restriction on water well construction written approval from KDHE required prior to installation.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.
4	12-EUC-0029	3/1/2013	No public area uses Other land use restriction: no non-residential uses, scraping or excavation except for adjacent highway infrastructure or utilities. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	Restriction on water well construction written approval from KDHE required prior to installation.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.
5	12-EUC-0030	1/16/2014	Other land use restriction: no non-residential use purposes. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	restriction on water well construction	Notification to workers prior to excavation Other activity requiring notification: prior written approval from KDHE for installation of water wells. Excavation for adjacent highway infrastructure or utilities when proper soil management is undertaken.

6	12-EUC-0031	3/1/2013	No public area uses Other land use restriction: no non-residential uses, scraping or excavation except for adjacent highway infrastructure or utilities. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	Restriction on water well construction written approval from KDHE required prior to installation.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.
7	12-EUC-0032	3/1/2013	No public area uses Other land use restriction: no non-residential uses, scraping or excavation except for adjacent highway infrastructure or utilities. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	Restriction on water well construction written approval from KDHE required prior to installation.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.
8	12-EUC-0033	1/31/2013	Other land use restriction: no excavation or scraping. No non-residential uses. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except minimal livestock grazing, pasturing, and haying. no residential uses	Other water use restriction: prior written approval from KDHE required restriction on water well construction engineer to prevent contamination of any underlying deep aquifer from any contaminated shallow aquifer.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.
9	12-EUC-0034	3/1/2013	No public area uses Other land use restriction: no non-residential uses, scraping or excavation except for adjacent highway infrastructure or utilities. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	Restriction on water well construction written approval from KDHE required prior to installation.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.
10	12-EUC-0035	3/1/2013	No public area uses Other land use restriction: no non-residential uses, scraping or excavation except for adjacent highway infrastructure or utilities. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	Restriction on water well construction written approval from KDHE required prior to installation.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.

11	12-EUC-0036	3/1/2013	No public area uses Other land use restriction: no non-residential uses, scraping or excavation except for adjacent highway infrastructure or utilities. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	Restriction on water well construction written approval from KDHE required prior to installation.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.
12	12-EUC-0037	3/1/2013	No public area uses Other land use restriction: no non-residential uses, scraping or excavation except for adjacent highway infrastructure or utilities. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses except for minimal livestock grazing, pasturing, and haying. no residential uses	Restriction on water well construction written approval from KDHE required prior to installation.	Notification prior to land use changes Notification prior to property transfer Notification to workers prior to excavation associated with excavations for highway infrastructure or utilities as long as proper soil management is undertaken with KDHE.
13	12-EUC-0038	10/3/2013	Other land use restriction: no soil disturbances unless granted written approval by KDHE, no non-residential uses allowed. Preserve survey markers and/or monitoring stations Restrict the Construction of Buildings or Other Physical Structures no agricultural uses limited livestock grazing, pasturing, and haying allowed. no residential uses	Other water use restriction: prior approval from KDHE required. Restriction on water well construction design must prevent contamination of any underlying deep aquifer.	Notification to workers prior to excavation

Notes

The State of Kansas created a public state trust to oversee the voluntary relocation of residents in and around Treece, KS that were affected by impacts from historical mining operations and the loss of infrastructure when relocation occurred in neighboring Picher, OK. Residents outside of Treece, but served by the City of Treece public water system are also included in the relocation efforts.

Federal funding was approved in October 2009 and the state trust and funding finalized in May 2010. $3,888,888 is available for the relocation program. Property appraisals began in October 2010 and initial offers are anticipated in late November to December 2010. All residents seeking the buyout were moved as of 2013. Remaining vacant lands were purchased and sold at auction in 2014 with an Environmental Use Control restricting occupancy. Project was completed in 2014.

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3.4 Progress Since Initiation of Remedial Action

A two-year monitoring and surveillance program was conducted for the OU1 remedy during 1987 and 1988 by the OWRB. The data obtained from these activities were reviewed by the EPA's Robert S. Kerr Environmental Research Laboratory (RSKERL). RSKERL submitted a report in September 1989 (RSKERL, 1989). The OWRB documented the results and findings, including a summary of the conclusions of the RSKERL review, in a report submitted to the EPA in April 1991 (OWRB, 1991). The OWRB provided the following conclusions, which were summarized in the first five-year review report:

- The volume of the acid mine water discharged to Tar Creek was not significantly impacted by the OU1 RA;
- The concentrations of most constituents in the acid mine water discharges were decreasing. The cause of the decreasing concentrations was not known, but the OWRB stated the decreases were most likely the result of natural processes;
- The surface water quality was not significantly improved in Tar Creek, and the diking and diversion work was at best only partially effective; and,
- Although some public water supply wells in the Roubidoux aquifer were affected by acid mine water, insufficient data existed to evaluate the effectiveness of the well plugging activities. Neither EPA nor ODEQ identified any public drinking water wells at the site that failed to meet the MCLs established under the SDWA, and the drinking water at the site was determined to be safe for all uses.

The EPA concurred with these findings (EPA, 1994).

The EPA provided further findings and conclusions based on the data in the first five-year review report. These findings and conclusions included the following:

- The surface water data collected from Tar Creek were insufficient to perform statistical analysis due to the short monitoring period following construction;
- Monitoring data from the acid mine water discharges indicated that the contaminant concentrations were decreasing;
- The data indicated that the pollutant loading in Tar Creek was decreasing. The OWRB calculated that only 15% of the total metals loading to Tar Creek was from identified major discharges;
- The sediment data were erratic and conclusions on the effectiveness of the remediation could not be drawn; and,
- The data from the monitoring of water levels in the Blue Goose mine showed that overall, the long term average water level in the Boone aquifer had not been reduced. However, the diking and diversion work had reduced short-term rises in water levels in the mines in response to precipitation events (EPA, 1994).

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The EPA's overall conclusion in the first five-year review was that other sources of recharge were contributing more to the acid mine water discharges to Tar Creek than previously estimated. The EPA concluded that the diking and diversion structures were effective at reducing surface water inflows into the mines in relation to specific precipitation events. However, the diking and diversion structures were at best only partially effective at achieving decreases in acid mine water discharges to Tar Creek (EPA, 1994).

The first five-year review report recommended that the post remediation groundwater monitoring program be extended to evaluate the success of the well plugging program at preventing contamination of the Roubidoux aquifer (this program was already in progress). Also, 15 additional abandoned wells were identified after completion of the second well plugging program. The EPA recommended evaluating the need to plug these wells based on the results of the post remediation groundwater monitoring program. Due to changes in the designated uses for Tar Creek, as stated in the OWQS, the EPA recommended no further RA or monitoring of Tar Creek. The other recommendations of the First Five-Year Review, related to OU1, are discussed in Section 2.4 (EPA, 1994).

The Phase I Roubidoux Groundwater Monitoring Program began in 1991 to determine the quality of the water in the Roubidoux aquifer and to assess the effectiveness of the well plugging activities. The goal of the program was to determine if acid mine water had contaminated the public water supply obtained from the Roubidoux aquifer. The program included wellhead sampling of municipal supply wells and discrete sampling of the Roubidoux aquifer. The wellhead sampling program was performed by the USGS for the OWRB between August 1992 and January 1993. Ten wells inside the mining area and one well outside the mining area (used to determine background concentrations) were sampled monthly during this period (EPA, 1994). The OU1 ROD did not set criteria to act as a "trigger" for action or decision regarding the effectiveness of the well plugging program. To provide such a trigger, in January 1993, an additional 10 wells outside the mining area were also sampled. By using wells outside the mining area, more statistically reliable data on background conditions could be gathered and indicator parameters that could be used to indicate the presence of acid mine water influx could be determined. Indicator parameters are compounds that indicate possible mine water impacts - sulfate, iron and zinc. Once background concentrations of contaminants were determined, if background concentrations of key contaminants were exceeded in water drawn from the Roubidoux aquifer, then that was an indication of the need for action or decision. Specifically, zinc, iron, and sulfate were chosen as indicator constituents of acid mine water influx due to large concentration differences for these constituents when comparing acid mine water to the background Roubidoux aquifer concentrations (EPA, 1994). In addition to calculating background concentrations for the indicator parameters, the ODEQ established tolerance limits (statistically derived values representative of the upper limit of background concentrations) for each parameter (ODEQ, 1993). The background concentrations and tolerance limits for these indicator parameters are provided in Table 2.

The results of the wellhead sampling for wells completed in the Roubidoux were documented in a report submitted in July 1993. The data showed that all 21 wells sampled were meeting the MCLs. The five wells failed SCML testing for iron, and one of those wells also failed the SCML for sulfate. Three of the five wells were located in Picher, one well was located in Commerce,

and one well was located in Quapaw. The EPA determined that these five wells were impacted by acid mine water from the Boone aquifer. At least one well (of the five) was clearly impacted by mine water from the Boone, and two (of the five) were probably impacted by mine water from the Boone. It could not be determined, however, whether the impact was related to widespread infiltration of acid mine water into the Roubidoux from the Boone aquifer or due to well integrity problems (ODEQ, 1993 and EPA, 1994). In one of these wells indicator parameters were so high that it is certain that the well is impacted by mine water from the Boone aquifer. In two other wells the indicator parameters are so high that it is probable that the wells are impacted by mine water from the Boone aquifer (ODEQ, 2014). It should be noted that neither the EPA nor ODEQ have identified any public drinking water wells at the site that fail to meet the MCLs established under the SDWA. However, data do indicate that SMCLs (SMCLs are aesthetically based) for the indicator parameters (sulfate, iron, and zinc) were exceeded in five wells completed in the Roubidoux.

Discrete sampling of the Roubidoux aquifer was conducted by the ODEQ from 1996 until 2002. The ODEQ obtained samples from the five impacted drinking water supply wells in Picher, Commerce, and Quapaw that were not meeting the aesthetic SMCLs (These wells meet MCLs and water drawn from these wells is safe to drink). After completion of Phase II, the ODEQ implemented continued monitoring in November 2003 as described in Section 3.4, this phase of sampling under the Roubidoux Groundwater Monitoring Program concluded in April 2008 (ODEQ, 2008a).

In 2009, the ODEQ entered a new cooperative agreement with EPA to continue the Roubidoux Groundwater Monitoring Program, which was named the Tar Creek After-Action Monitoring Part 2 (TCAAM2). The former, Part 1, (consisting of Phase I and Phase II) being completed under the previous cooperative agreement. Five sampling events were collected from the Roubidoux Monitoring Program wells from March 2010 to October 2013 as Part 2 of the TCAAM2. Reports were generated for each of the five sampling events and include tables of analytical results, maps of the well locations (Figure 2), graphs of iron and sulfate concentrations, piper diagrams for the water samples, a list of the wells with completion data, and water level measurements.

Reports from the five sampling events have similar results, conclusions, and recommendations, with some variation. Below is a summary of the conclusions from the fifth and final event:

- Piper diagrams indicate Commerce #5, Miami #3, Miami #11, Quapaw #4, RWD4 #3, and RWD7 #2 show no impacts from mine water.
- Quapaw #5 is considered contaminated by mine water since all three indicator parameters are greater than tolerance limits.
- Picher #6 is probably impacted by mine water with exceedances of two indicator parameters above tolerance limits.
- Picher #7 is probably impacted by mine water with exceedances of two indicator parameters above tolerance limits.
- Picher #5 and Cardin#1 show signs of possible impacts from mine water with one of

three parameters exceeding the tolerance limit.

- The Roubidoux water levels within the mining area have mostly increased, as seen in the slight increasing trend over more than 15 years at Picher #5 (ODEQ, 2014).

Recommendations from the TCAAM2 Reports include:

- Quapaw #5 be tested for casing leaks that may allow mine water to flow into the well and impact the Roubidoux.
- Abandon and plug Quapaw #2.
- Continued monitoring of the Roubidoux is suggested by the increasing trends shown at the Picher wells. Also, as long as the mine pool represents a potential source of contamination to the Roubidoux, continued monitoring is recommended.
- Continue to assess wells that still need to be plugged including those on BIA restricted land (ODEQ, 2014).

As documented in the previous five-year review, a fish consumption study was completed in 2007 by the ODEQ. The ODEQ collected and analyzed fish from the Neosho and Spring Rivers, Grand Lake, and local ponds in Ottawa County receiving mine waste runoff. It concluded that the consumption of some preparations of fish caught in waters affected by contaminated runoff from abandoned lead and zinc mines in the Oklahoma portion of the TSMD have levels of lead that could potentially cause adverse health effects. Separate advisory levels were determined for both residents living within and those living outside of the Tar Creek area using different background exposure assumptions (ODEQ, 2007). Results were compiled into a revised fish consumption advisory, released August 5, 2008. The advisory breaks out fish consumption suggestions on an easy-to-read chart for residents and non-residents of Tar Creek based on type of fish and based on the location from which the fish was caught (ODEQ, 2008b). This study is an indication that consumption of fish does pose a potential risk to human health, which contradicts the finding of the OU1 ROD.

Finally, the Mayer Ranch passive treatment system (MRPTS) has improved surface water quality in Tar Creek downstream of the treatment system by addressing approximately 20% of the contaminant mass loading from the mine water discharges (Nairn, 2012). In addition, sensitive fish species have begun to recolonize the formerly impacted portions of the stream directly downstream from the MRPTS (Nairn, pers. comm.). Given the success, feasibility, and cost effectiveness of treating acid mine water discharge with passive treatment, the process may be an engineered remedy for contaminated surface water at the site. For these reasons, the fund balancing ARARs waiver contained in the OU1 ROD may no longer be appropriate, and should be reevaluated.

There have been 2,940 residential properties and HAAs remediated as part of the removal response actions and OU2 RA (EPA, 2014a). The RA activities for OU2 are nearly complete. It is estimated that approximately 19 properties still require sampling and removal if necessary. In September 2014, EPA celebrated the Milestone Cleanup Event for OU2 recognizing the reduction of blood lead levels in Ottawa County children. Remedial activities that occurred under

OU2 include the remediation of residential yards, residential driveways, public alleyways, churches, City Parks, schools, and other HAAs. ODEQ will, under a cooperative agreement with EPA, perform future OU2 RA (EPA, 2014b and ODEQ, 2014b). ODEQ's role will include assessing new properties as they arise, sampling current properties set for remediation, and carrying out remediation for properties as appropriate, under EPA oversight.

Since the Record of Decision in 1997, cleanup activities carried out as part of OU2 have been a major contributor to creating a healthier environment, and have been instrumental in protecting human health in Ottawa County. With funding from EPA, initially through ASTDR, and more recently through ODEQ, the Ottawa County Health Department (OCHD) has provided ongoing community health education to families and the public on childhood lead poisoning prevention and blood lead screening of children from 6 months to 6 years of age residing in affected areas. Specifically, OCHD has provided childhood lead poisoning prevention education through community and tribal health fairs, Head Start and child care programs, community organizations and events, and the major county health department programs serving children. Monitoring and follow up of children with elevated blood lead levels in Ottawa County is carried out by the OCHD in conjunction with the Oklahoma Childhood Lead Poisoning Prevention Program (OCLPPP) of the Oklahoma State Department of Health. Children with elevated blood lead levels receive follow-up screening, education, and, as indicated, home environmental investigations to determine the source of lead exposure in accordance with the guidelines of the Centers for Disease Control and Prevention (CDC). Since the implementation of the programs and the OU2 RA, significant reductions have occurred in blood lead levels of children in Ottawa County (OSDH, 2015 and Table 10).

In 2004, the U. S. Agency for Toxic Substances and Disease Registry (ATSDR) published a report on blood-lead levels in children at the Tar Creek Superfund Site. The ATSDR concluded that the available evidence indicated that mine tailings in residential soils was the primary exposure pathway and source of lead in children's blood at the Site (ATSDR 2004a). The report stated that the percentage of children between the ages of 1 and 5 at the site with elevated blood lead levels had decreased between 1995 and 2003. The report stated that 2.8 percent of the children tested had elevated blood lead levels (above 10 μg/dL), which was only slightly higher than the percentage of children in the United States as a whole (2.2 percent).

Until 2012, the CDC's blood lead level of concern in children six years old and younger was 10 micrograms per deciliter (10μg/dL), but that has changed and now the CDC is saying that there is no safe blood lead level for young children.[7] EPA has used a blood lead level of 5μg/dL as a benchmark in its recent analyses. In Ottawa County, the percentage of children with blood lead levels that exceed 5μg/dL has decreased from 11.6 percent to 3.7 percent from 2007 to 2014. The 3.7 percent calculated for 2014 is slightly higher than the average for Oklahoma (2.4 percent)

[7] *See* Centers for Disease Control, *Preventing Lead Poisoning in Young Children* (1991) at p. 7 ("Blood lead levels at least as low as 10 μg/dL are associated with adverse effects"). Later the CDC revised its position saying that there was no safe level for lead in young children. *See CDC Response to Advisory Committee on Childhood Lead Poisoning Prevention Recommendations in "Low Level Lead Exposure Harms Children: A Renewed Call of Primary Prevention"* (November 26, 2013) ("CDC will emphasize that the best way to end childhood lead poisoning is to prevent, control or eliminate lead exposures. Since no safe blood lead level in children has been identified, a blood lead "level of concern" cannot be used to define individuals in need of intervention.".)

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(OSDH, 2015). However, the blood lead data collected from children has demonstrated that the OU2 RA has been effective.

The reductions in blood lead level in both Tar Creek Superfund Site and Ottawa County can be directly related to RA under OU2 and education and monitoring efforts by OCHD.

The RI for OU4 was completed in December 2005, and the FS for OU4 was completed in July 2007 (AATA, 2005 and CH2M HILL, 2007c). In lieu of conducting a Baseline Ecological Risk Assessment (BERA) for OU4, the Ecological Remediation Goals developed by EPA for the Cherokee County Superfund Site (located across the state line in Kansas) were considered because of numerous similarities between the two sites including location, ecological sub region and province (Osage Plains section of the Central Lowland Province), and similar concentrations of lead, cadmium, and zinc. Other similarities between the sites including climate, topography, flora and fauna, made the determination to use the Cherokee County site BERA appropriate for OU4 (EPA, 2008). The ROD for OU4 was signed on February 20, 2008.

OU4 addresses the generally undeveloped rural and urban areas of the site where mine and mill residues and smelter wastes have been placed, deposited, stored, disposed, or otherwise come to be located as a result of mining, milling, smelting, or related operations. OU4 RA activities also include the remediation of some rural residential yards that were not included in OU2. OU4 also includes remediation of a former lead smelter, excavation and disposal of chat piles and chat bases in distal areas, the construction of the Central Mill Repository from a former fine tailings pond, and a fine injection pilot study. Additionally, subsidence areas are being used as chat repositories, and chat sales/reuse continues at the site. The LICRAT buyout was completed in 2011, and Treece, Kansas was included as part of the buyout, which was documented in an Explanation of Significant Difference (ESD) of the OU4 ROD. A separate Kansas trust—the TRA Trust—handled the Treece buyout. A soil amendment pilot project is currently underway. The purpose of the pilot project is to find out whether the addition of soil amendments works to address contamination in transition zone soils. If successful, this approach to transition zone soils should reduce the amount of soil that has to be excavated and disposed in the Central Mill Repository. To date, as part of OU4, 56 chat piles and chat bases totaling approximately 1.6 million tons of chat, transition zone soils, and fine tailings have been remediated and 309,787 tons of chat sold. OU4 RA is ongoing.

As part of OU4, a pilot study involving the injection of fine tailings washed from chat at a commercial chat washing plant was performed as part of the remedy. The fine tailings pilot study (FTPS) started on September 2011 and was completed in January 2012. The work included site reconnaissance, surveying, installation of three mine pool borings for use as water extraction wells and tailings injection wells, installation of a Boone aquifer monitoring well, pilot study mobilization, tailings excavation and processing, slurry mixing, tailings injection, and demobilization. The FTPS met the overall objectives set for the project, including exceeding the volume estimated to be injected per well. The FTPS injected approximately 58,063 CY of fine tailings into one boring. However, the cost involved with executing the injections exceeded the costs estimated in the OU4 ROD, and it also exceed the cost of hauling the material to a repository. In addition, the key assumption that all tailings would be injected as one major

project, thereby realizing significant economies of scale, as outlined in the OU4 ROD, was not met (CH2M HILL, 2013).

The Central Mill Repository (CMR) is located within the footprint of Central Mill Tailings Pond (CMTP), and is currently used for disposal of source materials generated during remedial activities performed for OU4. The CMTP was a surface impoundment used during previous milling processes at the former Central Mill. The pond evaporated, leaving behind fine tailings. The remedy for the CMTP was to convert it into the CMR, which will ultimately be covered with soil that meets the remediation goals consistent with the OU4 ROD. Construction and operation of the CMR began in January 2010. The CMR is being constructed in a phased build-out approach and while construction is not complete, the CMR is receiving source material. The CMR is capable of receiving an estimated 7.6 million CY of source material and will be the repository for much of the OU4 RA activities. In 2009, a groundwater monitoring program began at the future site of the CMR to determine the impacts of the CMR to the perched groundwater chemistry. The sampling program was concluded in 2011. Despite exceedances of MCLs for lead and arsenic, exceedances of SMCLs for sulfate, total dissolved solids (TDS), iron, and manganese, and an exceedance of OWQS for zinc, a 2012 report concluded that metal concentrations in the groundwater had not increased since the construction and operation of the repository began in 2010 (CH2M HILL, 2012c and Table 3).

Three rural residential yards were remediated under the OU4 Phase 1 RA in 2010. Approximately 3,556 tons of soils containing lead concentrations that exceed the remediation goal of 500 mg/kg were excavated from these three yards and transported to the CMR (CH2M HILL, 2011a).

The smelter site remediation was completed in November 2011. Approximately, 10,881 tons of source material, 11,402 tons of TZ soils, and 20,606 tons of debris were excavated or removed from the smelter site and transported from the smelter site to the CMR for disposal (CH2M HILL, 2012a).

Marketable chat sales are ongoing and chat piles and bases can be purchased at the following website http://projects.ch2m.com/TCOU4chat/. To date, 309,787 tons of chat and developmental rock have been sold to nearby chat processors (Table 8). All chat purchased must be used in accordance with the Chat Rule, as provided in the OU4 ROD.

Multiple chat piles and chat bases from several distal groups have been excavated and transported to the CMR. Below is a list of all Distal Groups that have had RA construction activities implemented (*see* Figure 3 for the locations of the distal areas).

- Distal 1 North construction activities began in October 2009 and were completed in October 2011. Six chat bases, three chat piles, and six mine shafts make up Distal 1 North. Approximately, 74,014 tons of source material, 1,000 tons of debris, and 95,022 tons of TZ soils were disposed at the CMR or consolidated into mine shafts (CH2M HILL, 2012a).
- Distal 1 South construction activities were began in October 2009 and were completed in December 2010. One chat base, three chat piles, five mine shafts, and eight cased borings

make up Distal 1 South. Approximately, 16,307 tons of source material, 25 tons of debris, and 13,412 tons of TZ soils were excavated from the property and disposed at the CMR or consolidated into mine shafts. Approximately 3,042 tons of source materials were disposed at CB223 (CH2M HILL, 2011a).

- Distal 2 RA construction activities began in December 2009 and were completed in June 2011. Five chat bases, numerous chat piles, 25 mine shafts, and 20 cased borings make up Distal 2. Approximately 292,933 tons of source material, 205,239 tons of TZ soils, and 16,383 tons of debris were excavated from the property and disposed at the CMR or consolidated into mine shafts. Approximately 4,435 tons of TZ soils were disposed at the Hockerville subsidence, and approximately 20,583 tons of source material were disposed at CB223 (CH2M HILL, 2012a).
- Distal 3 RA construction activities began in October 2009 and were completed in August 2011. Four chat bases, two chat piles, 14 mine shafts, and 12 cased borings make up Distal 3. Approximately 259,787 tons of source material, 305 tons of debris, and 5,375 tons of TZ soils were excavated from the property and disposed at the CMR. Approximately 21,283 tons of source materials were disposed at CB223. However, not all chat bases were entirely removed. It was determined that after remediation, the area around CB220 would become a low lying area recharged by mine pool discharge. In addition, remediation was limited at CB214, CB217, and CB215 due to sediment and erosion purposes associated with Beaver Creek (CH2M HILL, 2012a).
- Distal 4 RA construction activities began in August 2011. However, site restoration and final inspection have yet to be completed. One chat base, seven chat piles, one fine tailings pond, 16 mine shafts, and 10 cased borings make up Distal 4. Approximately, 110,836 tons of source material, 921 tons of debris, and 1,260 tons of TZ soils) were taken to the CMR or consolidated in mine shafts. In addition, CP091 was covered and capped in place.
- Distal 5 RA construction activities began in September 2011 and were complete in September 2015. Two chat bases, two chat piles, six mine shafts, and 13 cased borings make up Distal 5. Approximately 89,101 tons of source material, 17,273 tons of debris, and 17,490 tons of TZ soils were excavated and disposed at the CMR or consolidated in on-site mine shafts.
- Distal 6 RA construction activities began in February 2012 and were complete in September 2015. Two chat bases, two chat piles, 17 mine shafts, and 14 cased borings make up Distal 6. Approximately 51,289 tons of source material, 1,718 tons of debris, and 17,504 tons of TZ soils were excavated and disposed at the CMR or consolidated into on-site mine shafts. Subsidence feature CB011N-PIT took on 14,983 tons of material and was covered in place with soils from Distal 5.
- Distal 7 North RA construction activities began in July 2013 and were completed in September 2014. Five chat bases, four chat piles, 30 mine shafts, and 25 cased borings make up Distal 7 North. Approximately 114,189 tons of source material, 15,455 tons of debris, and 49,749 tons of TZ soils were excavated and disposed at the CMR or consolidated into on-site mine shafts. An estimated 55 acres were remediated on Distal 7 North (CH2M HILL, 2015).

- Distal 7 South RA construction activities began in July 2013 and were completed in September 2014. Two chat bases, one chat piles, four mine shafts, two cased borings, and one subsidence feature make up Distal 7 South. Approximately 55,815 tons of source materials, 3,308 tons of debris, and 713 tons of TZ soils were excavated and disposed at the CMR or consolidated into on-site mine shafts and subsidence features. An estimated 14 acres were remediated on Distal 7 South (CH2M HILL, 2015).
- Distal 8 RA construction activities began in December 2013 and are currently ongoing. Distal 8 is also known as the "Catholic 40" and consists of one chat base, four cased borings, and 2 mine shafts. Approximately, 107,000 tons of source material was excavated and disposed at the CMR or consolidated into on-site mine shafts (pers. comm, Craig Kreman). EPA has begun a pilot project whereby, in lieu of extensive excavation of contaminated soils, EPA is adding soil amendments high in phosphates to bind metals in soil, making them less bioavailable. This pilot project will inform EPA as to whether to continue excavation of contaminated TZ soil. It is hoped that more topsoil may be preserved by adding phosphate-containing soil amendments. In addition to preserving topsoil, an objective of the pilot study is to reduce metals bioavailability to acceptable levels while decreasing the volume of TZ soils being excavated and disposed at the Central Mill Repository (EPA, 2014d).
- Distal 6A RA construction activities began in December 2014 and are currently ongoing. Two chat bases, one chat pile, and two cased borings make up Distal 6A. To date, 82,284 tons of source material have been excavated and disposed at the 605 Hole. Soil amendments are being used to remediate TZ soils as part of a pilot project as explained above (ODEQ, 2015b and ODEQ, 2015c).

In addition to the CMR, some chat bases and chat piles have been consolidated in subsidence features. Below is a list of all subsidence features that have received material generated through RA construction activities since the last five-year review period:

- CB143/CB146/CB147 Group RA construction activities began in June 2011 and were complete in September 2015. CB143/CB146/CB147 consisted of three chat bases, nine mine shafts, 10 cased borings and four subsidence features (Subsidence 1, subsidence 2, CB150, and CB143). An estimated 60,936 tons of source material and TZ soils were consolidated into mine shafts or subsidence features. Subsidence features 1 and 2 were completely filled by September 2011, however, CB150 was not completely backfilled. CB143 accepted an estimate 40,977 tons of material and was capped with on-site borrow material. Approximately 11,741 tons of source materials, 4,894 tons of debris, and 5,308 tons of TZ soils were excavated and disposed at the CMR
- The Hockerville subsidence feature began accepting RA construction related waste in in 2011 and was filled by 2012. This subsidence feature was filled with an estimated 60,351 tons construction and demolition debris (CH2M HILL, 2012b).
- CB223 Group RA construction activities began in November 2009 and were completed in November 2011. CB223 Group consisted of a chat base and subsidence feature. At the completion of the construction activities, approximately 112,280 tons of on-site material (chat and TZ soils) and 44,908 tons of off-site material (from Distal 1, 2 and 3) had been

placed into the subsidence feature. Cover installation and final inspection was completed in 2011 (CH2M HILL, 2012).

- 605 Hole subsidence feature is being used to consolidate source material from Distal 6A. Future Distal projects will use the 605 Hole until it is completely backfilled.

Table 10: Childhood Blood Levels

Childhood Blood Levels for Ottawa County, Oklahoma and Oklahoma 2007 – 2013[1-4]					
Year	Ottawa County Total Tested	Tar Creek Total Tested	Ottawa County % ≥ 5 µg/dL	Tar Creek % ≥ 5 µg/dL	State of Oklahoma % ≥ 5 µg/dL
2007	438	107	10.7%	12.1%	9.1%
2008	330	82	10.9%	13.4%	6.5%
2009	500	107	18.4%	19.6%	6.5%
2010	825	191	10.2%	13.6%	4.5%
2011	700	149	9.9%	9.4%	4.4%
2012	755	165	5.7%	7.9%	3.4%
2013	692	141	2.0%	2.8%	2.5%

Notes:

1 Blood lead results were obtained from convenience sampling of children ages six months to six years of age residing in Oklahoma reported to the Oklahoma Childhood Lead Poisoning Prevention Program, Oklahoma State Department of Health. Blood lead test results were rounded to whole numbers for data analysis in accordance with guidance from the Centers for Disease Control and Prevention (CDC).

2 As of July 2012, capillary blood lead test results >5 µg/dL were confirmed with a venous blood lead test in accordance with CDC and state case management guidelines. From January to June, 2012, capillary blood lead test results from 5 – 9 µg/dL were not confirmed by a venous blood lead test. Therefore, the total number of children between the range 5 – 9 µg/dL for CY 2012 could potentially include false positive results which would overstate the number of blood lead levels in this range.

3 Number of Blood Lead Levels: These tests represent the highest venous blood lead test for an individual child. In absence of a venous blood lead test, the highest capillary blood lead test for an individual child is reported during the calendar year. Blood lead test results in the ranges 5-9 µg/dL and >10 µg/dL include children with capillary blood lead tests without a venous confirmation blood lead test. One child, who resided in multiple zip codes in Ottawa County during the year with multiple elevated blood lead levels, was counted as elevated in more than one zip code area but was not duplicated in the annual data for children screened in Ottawa County.

4 Tar Creek Zip Codes include Commerce (74339), Cardin (74355), North Miami (74358), Picher (74360), and Quapaw (74363)

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3.5 Activities Conducted at the Site by Other Governmental Agencies Since the Fourth Five-Year Review

Various other Federal, Tribal, State, and local agencies are also performing work at the Tar Creek Superfund Site to address various environmental, health, and safety risks associated with the site. The following paragraphs describe the activities these various agencies are conducting, outside of the EPA's Superfund work, at the Tar Creek Superfund Site.

The University of Oklahoma (OU) continues to operate a passive treatment system (completed in 2008) to treat acid mine discharges at the Mayer Ranch in Commerce. The Mayer Ranch passive treatment system has improved surface water quality in Tar Creek downstream of the treatment system by addressing approximately 20% of the contaminant mass loading from the mine water discharges (Nairn, 2012). Given the success, feasibility, and cost effectiveness of treating acid mine water discharge with passive treatment, OU and ODEQ have partnered to construct an additional passive treatment system in Commerce. The new passive treatment system is located in southeast Commerce. The area originally contained two distinct mining related ponds. In 2006, the Oklahoma Conservation Commission filled the two ponds with chat and related debris without installing any sort of water control. Shortly after closure of the features, mine drainage started appearing in several areas as seepage surfaces. The proposed Southeast Commerce passive treatment system (SCPTS) project is planned to address the contaminated mine drainage that discharges from upwelling caused by the filling of the subsidence features (Nairn et al. 2014). Construction of the SCPTS is planned for the summer of 2015.

The U.S. Fish and Wildlife Service (USFWS) completed the TSMD Transition Zone Assessment Study in March 2013, intended to provide the information needed to determine the extent of soil degradation from historic mining operations in the TSMD (FWS, 2013). The USFWS also participated with Kansas State University (KSU) on its study into the health effects of mining waste on migrating Canada Geese (*Branta Canadensis*). The USFWS and KSU study documented elevated lead concentrations in liver and brain tissues and elevated pancreatic zinc concentrations in Canada Geese. The authors conclude that Canada Geese at mine waste–contaminated sites at the TSMD consistently suffer adverse health effects associated with lead and zinc exposure (van der Merwe et al. 2011). The USFWS also participated with the Tar Creek Trustee Council on completing the Restoration and Compensation Determination Plan (RCDP) for Grand Lake (TCTC, 2014).

The Quapaw Tribe Environmental Office (QTEO) has been collecting water quality data since 2002 on streams and rivers within the TSMD. The Quapaw Tribe Water Monitoring Program continues to monitor surface water bodies including Tar Creek, Spring River, and Beaver Creek. This program is a designed to assess the ambient water quality conditions of surface waters within the Quapaw lands and sampling is conducted monthly. The QTEO also collects continuous water quality data at the Beaver Creek Gauging Station in the Tribal Pow-Wow Grounds. Additionally, the tribe has initiated a Bio-assessment Monitoring Program that focuses primarily on Beaver Creek and Garret Creek (QTEO, 2013). The QTEO also operate under a management assistance cooperative agreement and a remedial response cooperative agreement both with EPA. Through the remedial response agreement, the QTEO contracted the Quapaw

Services Authority (QSA) to lead the first tribal lead cleanup of a Superfund site in the nation at Distal 8, also known as the "Catholic 40" (*see* Figure 3). In addition, the Quapaw Tribe of Oklahoma (QTO) has also entered into an Interagency Agency agreement with the State of Oklahoma, to undertake the cleanup of Distal 6A (Figure 3). Both cleanup projects are currently ongoing (OK and QTO, 2014).

The Six Treaty Tribes of Oklahoma (Cherokee Nation, Eastern Shawnee Tribe of Oklahoma, Miami Tribe of Oklahoma, Ottawa Tribe of Oklahoma, Seneca-Cayuga Tribe of Oklahoma, and the Wyandotte Nation of Oklahoma) have published two reports focusing on heavy metal contamination in the TSMD. The *Assessment of Heavy Metals in the Clay Fraction of Sediments Downstream of the Tar Creek Superfund Site in Northeast Oklahoma* focuses on the extent to which contamination of fluvial sediment has occurred within the lands of the Six Treaty Tribes of Oklahoma and the level of contamination within the floodplain sediments of the Grand Lake watershed (TEMS, 2012). The *Analysis of Heavy Metals in Culturally Significant Plants within the Grand Lake Watershed of Northeastern Oklahoma* focuses on the lead, zinc, and cadmium concentrations in culturally significant plants and identifies an exposure pathway from contaminated soils to the culturally significant plants (TEMS, 2014). Both studies were conducted because Tribal members who gather wild plants from floodplain habitats in the TSMD are concerned with potential health hazards posed by exposure to heavy metals from mining waste.

Since the Record of Decision in 1997, the Ottawa County Health Department (OCHD) has worked closely with the Oklahoma Department of Environmental Quality (ODEQ) to provide community-wide education on prevention of childhood lead poisoning, and to provide blood lead monitoring of children in residential areas throughout Ottawa County. With funding from EPA, the OCHD provides childhood lead poisoning prevention education through community and tribal health fairs, Head Start and child care programs, community organizations and events, and the major county health department programs serving children. Enhanced efforts are made by staff to identify and offer blood lead screening to children served in the major programs offered in the county health department.

Monitoring and follow-up of children with elevated blood lead levels in Ottawa County is carried out by the OCHD in conjunction with the Oklahoma Childhood Lead Poisoning Prevention Program (OCLPPP) of the Oklahoma State Department of Health. Children with elevated blood lead levels receive follow-up screening, education, and, as indicated, home environmental investigations to determine the source of lead exposure in accordance with the guidelines of the Centers for Disease Control and Prevention (OSDH, 2015).

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Appendix C: Notices to the Public of Five-Year Review

Tar Creek Superfund Site
Public Notice
Oklahoma Department of Environmental Quality Begins 5th Five Year Review of Site Remedy
November 2014

The Oklahoma Department of Environmental Quality (DEQ) and United States Environmental Protection Agency (EPA) Region 6 is beginning the fifth Five-Year Review of the remedy, for the Tar Creek Superfund Site (Site) in Ottawa County, Oklahoma in November 2014. The review will evaluate whether the remedy continues to be protective of human health and the environment, and will document the methods, findings, and conclusions, of the Five-Year Review in a report. The report will be available to the public in September 2015. The approximate 40-square mile Site is a former lead and zinc mining area located in the Tri-State Mining District. The cities' of Cardin, Commerce, North Miami, Picher, and Quapaw, as well as rural areas in northern Ottawa County, are located within the Site boundaries. Elevated levels of lead, zinc, and cadmium exist in the mining waste and affect the soils, ground water, surface water, and sediments of the Site.

The Site is divided into Operable Units (OU). The Record of Decision (ROD) for OU1 was signed in 1984 to address surface water and ground water discharges of acid mine water to Tar Creek and the Roubidoux aquifer. The ROD for OU2 was signed in 1997 to address contaminated soils in residential yards and high access areas. OU3 does not have a ROD, but abandoned mining chemicals were addressed under a removal action in 2000. The ROD for OU4 was signed in 2008 to address mining waste contamination in rural residential yards and ground water wells. Investigations into sediments and surface waters for OU5 are still on going and a ROD has yet to be signed.

Previous Five-Year Review reports are available on the internet and in the information repository located at the Miami Public Library. Information about the Tar Creek Superfund Site including EPA contact information is available at *http://www.epa.gov/Region06/6sf/oklahoma/tar_creek/index.htm*

DEQ will be conducting interviews as part of the Five-Year Review. If you wish to be interviewed, have any questions, or need further information, please contact:

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Proof of Publication

Ottawa County, State of Oklahoma

Tar Creek Superfund

Affidavit of Publication
STATE OF OKLAHOMA, OTTAWA COUNTY OF OKLAHOMA:

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That said newspaper is in the city of Miami, Ottawa County, Oklahoma, a Daily newspaper qualified to publish legal notices, advertisements and publications as provided in Section 106 of Title 25, Oklahoma Statutes 1971, as amended, and complies with all other requirements of the laws of Oklahoma with reference to legal publications.

That the attached notice is a true copy thereof and was published in the regular edition of said newspaper for 1 time(s), the first publication thereof being made as aforesaid on the December 11, 2014.

Cheryl Franklin — Publisher

Subscribed and sworn to before me this December 12, 2014

Kathleen F. Merrill — Notary Public
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Appendix D: Interviews Forms

INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date: 2/4/15**
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Individual Contacted:		
Name: David Cates	**Title:** Professional Engineer	**Organization:** ODEQ
Email: david.cates@deq.ok.gov	**Phone:** (405) 702-5124	**Address:** 707 N. Robinson, Oklahoma City, OK 73101

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   The work since 2010 entailed remedial actions for OU2 and OU4 and after action monitoring for OU1. The work on OU2 residential cleanups has progressed to include many of the outskirt towns in Ottawa County. This work is thought to be successful due to the lack of complaints. The work on OU4 has been frustrating with cost overruns due to inadequate site characterization and increased project scope due to removal of large amounts of transition zone soils, unfinished work, landowner complaints, reluctance to change remedial procedures to address our concerns, and more, all resulting in the state refusing to provide any additional matching funds. This action has resulted positive changes including use of soil amendments for metals sequestration instead of stripping off the top soil. After Action monitoring has been successful in regard to sampling of the Roubidoux wells but lack of adequate funding has resulted in some wells not getting plugged.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   The residential remediation has been successful and more and more of the community have asked for their yards to be sampled. The opposite is true for the OU4 non-residential work where unfinished work and less productive land due to removal of transitional zone soils (when other options existed) has led to property owners refusing to sign access agreements.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

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The down-stream tribes are concerned with continued leaching of metals and contaminated sediments into Tar Creek that flows into areas of their jurisdiction. They are also opposed to injection of fine tailings into the mine workings for fear of contaminating the Roubidoux drinking water aquifer. The Quapaw Tribe and the State would like to have more control (meaningful involvement) in future OU4 work.

4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

   The OU4 stakeholders (the EPA, State, and Quapaw Tribe) meet monthly for conference calls to discuss ongoing work. These meetings were more of a reporting about ongoing work and less about obtaining meaningful Stakeholder input of what should be done. These meetings were more frequent when more work was being conducted. The ODEQ conducts annual O&M for the Douthat diversion dike and annual monitoring of a select group of Roubidoux wells in the area. This activity was also more frequent previously. As a result of EPA closing OU1, the scope will be reduced but periodic monitoring of a few Roubidoux wells will be continued under a modified state O&M plan.

5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   I am not aware of any emergency responses since the last FYR. There was a tornado in Quapaw in 2014 but am not sure of the response. There was a tornado in Picher in 2008 and flooding in Miami in 2007 that involved responses.

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   I feel well informed about the Tar Creek activities but not so much for the Region 7 activities. Progress is slow at Tar Creek mainly due to the immense size of the site but other factors play a role too, like obtaining property access on both fee land and restricted Native American lands. Also the many complications related to performing Superfund remediation on the restricted lands has resulted in slow progress. Also, complaints from land owners about the work defects seem to take a long time to resolve.

7. **Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site related to OU1, and have such changes been adopted?**

   All opportunities to optimize the O&M and After Action Monitoring (sampling) have been adopted and implemented. Non-incremental funding of the well plugging project would have helped to better implement this phase of work.

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8. **Are you aware of any problems or difficulties encountered since the conclusion of the fourth five-year review period (September 2010) which may have impacted progress or resulted in a change in O&M procedures for the Roubidoux Monitoring Program and the Admiralty diversion dike, conducted under OU1? Please describe changes and impacts.**

   EPA intends to close out OU1. As a result ODEQ will amend the O&M plan to include the periodic sampling of several Roubidoux wells at the Tar Creek site. If abandoned Roubidoux wells are discovered in the future as a result of ongoing OU4 remediation, ODEQ will request funding from EPA under a cooperative agreement to evaluate and plug the wells.

9. **Do you have any comments, suggestions, or recommendations regarding the site?**

   With the success of the Mayer Ranch Passive Treatment System (PTS), it is thought that mine water discharges should be addressed with similar systems to curtail the input of metals loading to Tar Creek and other site streams. The ODEQ has entered into an interagency agreement that will provide state funding to the University of Oklahoma to develop a conceptual plan for a passive treatment system at the Southeast Commerce site; to hire a design–build contractor to construct the PTS; and to conduct monitoring of the system. Other mine water discharges that need to be addressed are at Douthat on Tar Creek and at 50 Road on Beaver Creek. The runoff and leachate from chat piles along Tar Creek needs to be addressed as well.

10. **A recommendation from the fourth five-year review report was that EPA should complete an evaluation of current surface water and sediment data for Tar Creek to verify that no unacceptable risks to human health and the environment exist in Tar Creek. To your knowledge, has this been completed? Please Explain.**

    No. A human health risk assessment for surface water and sediment in Tar Creek has not yet been undertaken by EPA.

11. **A recommendation from the fourth five-year review report was for ODEQ to undertake field work to determine whether the 19 wells found in literature actually exist, and evaluate whether plugging any wells found is warranted or feasible. To your knowledge, has this been completed? How many wells did ODEQ plug since the conclusion of the last five-year review period (September 2010)?**

    The ODEQ has begun the deep well evaluation task but this has not been completed. Two wells were found and evaluated for plugging. Many of the wells are on restricted lands for which the ODEQ does not have access. It is thought that many of these have actually been plugged in the 1930s as part of a flood control project in the Tri-State Mining District funded by the Public Works Administration and managed by the USGS. However, information on the identity of the 18 wells plugged in this program has been

exceedingly difficult to obtain. In the last After Action Monitoring report it was recommended that the Quapaw Tribe take over the plugging of wells on restricted lands. The two wells that ODEQ found on unrestricted property are the Tulsa Mine Well and Netta-White well. The ODEQ plugged one of these (the Tulsa Mine Well at the Atlas Chat pile) and the two powerhouse piezometers, but lacked adequate funding to include additional wells in the contract. It is the opinion of ODEQ that the Netta-White well has been plugged previously by Eagle-Picher and further plugging operations are not necessary. The ODEQ has requested additional funding to complete plugging of wells on unrestricted lands (e.g. the Quapaw #5 and Quapaw#2).

12. **Are you aware of any incidents, complaints, or situations, in which citizens are consuming or have consumed contaminated groundwater from either the Boone or Roubidoux aquifers since the conclusion of the fourth five-year review period (September 2010)?**

I am not aware of any such incidences. However, the backup well for the Town of Quapaw (Quapaw #2) has very poor water quality in terms of greater than secondary MCLs for iron, sulfate, and TDS. As soon as the Town of Quapaw gets an alternate source for their backup supply, this well should be plugged since it represents a source of potential contamination of the Roubidoux aquifer. The Town has explored many options to replace their backup well and the latest option is a new well being drilled by the water district a few miles east of Quapaw. As required in the last Five-year review, institutional controls in the form of new restrictions (i.e., testing requirements) were placed into the Appendix H of the Oklahoma Water Resources Board (OWRB) to protect people from exposure to contaminated water from the Boone aquifer at the Tar Creek site. A supplemental / explanatory fact sheet was also placed on the ODEQ website.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date:**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
Individual Contacted:		
Name: Dennis Datin	**Title:** Professional Engineer	**Organization:** ODEQ
Email: dennis.datin@deq.ok.gov	**Phone:** (405) 702-5125	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   The work for OU2 has gone very well with a large number of properties cleaned up with a minimal number of complaints. For OU4, the work has produced some good results at certain locations but has caused some problems with a few individual property owners. There is discussion related to removal of transition zone soils versus only removing the visible chat. This is being addressed at the current time. There was some problems with getting vegetation established which is due to some rocky solid and very dry weather. At least four or five sites needed to be revisited with additional work being done.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   Effects on the surrounding community have been good for the economy and providing work for people who reside in this area. A negative effect has been with a lot of truck driving over the county roads which eventually cause them to be torn up and the county has had to fix them. Also, there has been some trouble in getting access to some sites that need cleanup.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   They are worried about the effect on the roads, with the increase in traffic. Some individuals downstream of the site worry about the effects of the water quality downstream especially from the injection of fines into the Boone aquifer.

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4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

   There have been many meetings with EPA and others. The purpose was check on the status of the remediation and resolves any problems that have or might arrive.

5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   There have been 2 or 3 wrecks between hauling trucks and other vehicle's at the site.

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   I have been informed through meetings, emails, working with the RPM's and visits to the site.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   This has been discussed with EPA, the tribes and others with the Remedial Action Optimization Report being the result. Some of the changes that should be made are not to remove the transition zone soils, redo the remedial action objectives for cadmium and zinc and have more presence at the site of government personnel.

8. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   No

9. **Are you aware of any problems or difficulties encountered since the conclusion of the fourth five-year review period (September 2010) which have impacted progress of the Remedial Action for OU2? Please describe changes and impacts.**

   What hinders the work is when someone whose property needs to be remediated either did not turn it in or refused access during the time that EPA was doing the residential remediation.

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10. Do you know of opportunities to optimize the operation, maintenance, or sampling efforts at the site related to OU2, and have such changes been adopted?

No

11. Do you have any comments, suggestions, or recommendations regarding the site?
As stated above, the optimization report has some of the recommendations. I will relist three of them here. This has been discussed with EPA, the tribes and others with the Remedial Action Optimization Report being the result. Some of the changes that should be made are not to remove the transition zone soils, redo the remedial action objectives for cadmium and zinc and have more presence at the site of government personnel.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date:**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
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QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   A lot of money was spent on OUR 4 during this time. Work was completed on some parcels but there were so many parcels open at once that not all of them were completed. A comparison of the actual costs v the estimated costs in the ROD reveals that the work conducted during this period was much more expensive than anticipated. It is not clear if this was due to changed site conditions, inefficiencies, contract mechanisms or all of the above. I am pleased with the efforts and some of the recommendations of the optimization board to pause and work more cooperatively with all stakeholders on future work. John Meyer with R6 especially has been helpful in articulating and helping to affect some of these changes.

   R6, especially Bob Sullivan, has worked hard to complete OU2 and made a lot of progress. I appreciate the new direction of turning OU2 over to the state to manage in the long term and am hopeful that this will continue to provide avenues to removing risk to residents of Ottawa County.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   Since I do not live there, I do not know. However, I believe that the continued cleanup of the chat and soils are reducing risks to people and the environment and that the continued cleanup of distal areas will have a positive impact on residents and landowners as it will allow them to return land back to productive use.

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3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Property owners where cleanup was started but not finished were unhappy. I believe there is a plan in place to finish those properties. I am hopeful going forward that work will be conducted in a more measured manner, where timely and complete cleanups can occur rather than starting many and not being able to complete them.

4. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   No

5. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   Yes and no. The state has not felt as it if has been treated as a true partner in the OU4 process. Despite routine phone calls, we feel as if our voices are not heard, and more than once have been out of the loop on work in progress. We are hopeful that the new approach to the site will address these concerns and keep us engaged in a meaningful way.

6. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   Contract oversight and cost control were an issue for OU4 during this period. Unless EPA fundamentally changes its approach to contract oversight and cost control, it is not clear that this situation will improve on the projects that it manages. It would be helpful to have an EPA RPM on-site and responsible for cost control and decisions in a similar manner that OSCs are utilized on projects.

7. **Do you have any comments, suggestions, or recommendations regarding the site?**

   I believe that EPA has worked hard to address issues at the site. The concerns expressed here are not insurmountable and do not reflect lack motivation by staff; I think it is just that the normal way of contracting, contract management and coordination is much more complex on this site and needs to be managed differently. Since the buyout has been completed, the immediate risk to residents has been mitigated. This allows time for all stakeholders to slow down and be more thoughtful about how, where and when work is performed and may lend itself to better coordination with natural resource trustees on restoration projects. It is imperative that the state be treated as a partner on these projects and we are looking forward to taking the lead on some of the projects.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date: 1/29/15**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
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Individual Contacted:		
Name: Rafael Casanova	**Title:** Environmental Scientist	**Organization:** EPA Region 6
Email: casanova.rafael@epa.gov	**Phone: 214-665-7437**	**Address:** 1445 Ross Avenue, Suite 1200; Dallas, TX 75202-2733

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   The remedial actions conducted since the fourth FYR have significantly reduced the blood-Pb levels at the Site.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   Site operations have had a positive environmental impact on the surrounding communities.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.** For OU 4, there are community concerns regarding the removal of transition zone soils.

4. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   I am not aware of an events, incidents, or activities at the site which required emergency responses.

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5. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   Yes, we are well informed about site activities.

6. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   The EPA is currently addressing the remedial actions concerning transition zone soils.

7. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   I have not been associated with any complaints or other incidents related to the Site and requiring a response from the office.

8. **The optimization report produced for OU4 included several priorities, one of which was to "Leverage potential synergies with project team structure, roles, and responsibilities". Is there any strategy in place to implement this priority?**

   The EPA is currently considering the recommendations provided in the Optimization Report.

9. **Are you aware of any problems or difficulties encountered since the conclusion of the fourth five-year review period (September 2010) which have impacted progress of the Remedial Action for OU4? Please describe changes and impacts.**

   I have not been involved with any problems or difficulties associated with OU 4 since the conclusion of the fourth FYR Report.

10. **A recommendation from the fourth five-year review report was that EPA should complete an evaluation of current surface water and sediment data for Tar Creek to verify that no unacceptable risks to human health and the environment exist in Tar Creek. To you knowledge, has this been completed? Please Explain.**

    It is my understanding that the remedial investigation for Operable Unit 5 has not been initiated.

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11. Are you aware of any incidents, complaints, or situations, in which citizens are consuming or have consumed contaminated groundwater from either the Boone or Roubidoux aquifers since the conclusion of the fourth five-year review period (September 2010)?

I am not aware of any incidents, complaints, or situations in which citizens are consuming contaminated ground water since the conclusion of the Fourth FYR Report.

12. Do you have any comments, suggestions, or recommendations regarding the site?

The use of soil amendments for addressing the transition zone soils will need to be evaluated over a period of several years to determine if they are functioning as intended.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date:**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
Individual Contacted:		
Name: Rebecca Jim	**Title:** Executive Director	**Organization:** LEAD Agency
Email: rjim@neok.com	**Phone:** 918-542-9399	**Address:** 223 A. St. S.E., Miami, OK 19289 South 4403 Dr., Vinita, OK

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

First of all, we are still disappointed that nothing has been done about Tar Creek itself. Toxic heavy metals continue to wash into the creek and flow downstream through our communities, into the Neosho River and settle into the sediments of Grand and Hudson Lakes as well as contaminate the fish rendering our water bodies unable to meet their primary Beneficial Use of Fishable. We are grateful for the work that has been done and understand the financial limits of funding and the need to sell the chat rather than remediate the piles. We feel human health and the environment would be better protected if funds were spent on preventing site runoff into the communities major water bodies and diversion of mine water flows before clearing of chat bases. The continued cleanup of yards is also very much appreciated by the communities and LEAD Agency. Our main concern is exposure impacts to human health and environment. The issues above carry importance to us and the community.
We are extremely supportive of the EPA for awarding the Quapaw Tribe contracts to provide cleanup of tribal lands and hope their efforts will be rewarded with continued work on the site.

2. **From your perspective, what effects have site operations had on the surrounding community?**

Clearing waste piles and contaminated soil from agriculture lands is important and appreciated by community, but it needs to be left useable for agricultural purposes or for further uses that would be safe for human health. Removing the families from the

Picher/Cardin area for subsidence risk protected people and allows chat loaded truck traffic to run through a much less populated area, and as such is more protective which is much appreciated. Hiring of local workers is also a boon to the area economy and helps put a good view on the Superfund effort. The Superfund Jobs Training Initiative was a powerful experience for those who both tried out, but especially for those who completed the training. It is hopeful that additional residents will have the opportunity to benefit from future trainings.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Our concerns focus on communication with the EPA and State which we feel is very slim up until very recently. OU4 especially, has been a vague process for LEAD and we have been in the dark nearly all the way so far. If we didn't host our annual conference we would not know much at all. Despite our constant pleading, we are not given regular updates nor can we even have our contact information as a citizen organization contact consistently placed on public updates and handouts published by the EPA and state. Citizens are not informed that they can contact us to stay informed or to join our group to work more directly with the site. We are the only Superfund Site where the local community group is left out.

4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

   We conduct regular site visits and guided tours for universities, both local and around the country, area and state-wide schools, teachers, scientists, journalists from around the country and world and many others throughout the year, year after year. We try to communicate with EPA when they are in the area however we rarely know that they are here because we are not contacted before coming or while they are here usually. If we see something unusual or we have questions about what we see we call EPA or state to try and get answers or tell them what we see.

5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   All unusual sightings are called in. None have required emergency response.

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   No, we don't for reasons mentioned above. As a former TAG recipient and the only community group organized to address the site, we feel we should be treated like such. We have stated many times we would like a TAG grant for OU4 but have been met with

disinterest and no official response. We are grateful for the updates that are provided at our annual conference and will continue to provide EPA all the time they require to inform the public during our event.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   See above. We would like to see better off-site management. We are extremely interested in the continuation of OU2, the yard clean-up of lead contaminated yards in Ottawa County, since only one fourth of the properties in the county have been tested thus far, we hope that the hand over from EPA to the Oklahoma Department of Environmental Quality will be smooth and that funding will continue for the cleanup of yards, until it has been determined ALL have been remediated that require it. We would be glad to assist in promoting citizen participation.

8. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   Complaints have to do with Tar Creek itself and the fact that nothing has changed and people wondering if the fish are safe and if swimming is safe in Grand Lake, etc. With orange water pouring through our communities it gives us worry and knowing the chat runoff is un-abated.

9. **Do you have any comments, suggestions, or recommendations regarding the site?**

   Nothing additional.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date:** January 21, 2015
Contact Made By:		
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Individual Contacted:		
Name: Nancy John	**Title:** Environmental Director	**Organization:** Cherokee Nation
Email: nancy-john@cherokee.org	**Phone: 918-453-5102**	**Address:** PO Box 948 Tahlequah, OK 74465

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   The work seems to be progressing. Chat piles are smaller than in the past.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   Most of the OU2 yard waste identification and clean ups have been completed. There is documented evidence of lower blood lead levels in the community.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Yes. There is an untreated mine-water outflow adjacent to US Highway 69, also known as historic Route 66, and the Commerce High School athletic fields. There are no signs or fencing around the mine water. The untreated mine water outflow is scheduled (when funded) to be part of a passive mine water treatment wetland south of US Highway 69, also known as historic Route 66. These children, this community, and Route 66 visitors are concerns for this location.

4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

   Yes. There have been weekly, bi-weekly, then monthly conference calls for OU4 through the period. The purpose of the calls is to keep all 'stakeholders' informed about the

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activities occurring at the site. There have been a few tours of the site with EPA representatives during this period.

5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   No.

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   Yes.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   No.

8. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   No.

9. **Do you have any comments, suggestions, or recommendations regarding the site?**

   See number 3 above.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date:**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
Individual Contacted:		
Name: Kristi Laughlin	**Title:** Environmental Specialist	**Organization:** Eastern Shawnee Tribe of Oklahoma
Email: klaughlin@estoo.net	**Phone:** 918-666-5151x1041	**Address:** 10080 S. Bluejacket Rd. Wyandotte, OK 74370

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   OU4 seemed to be more tedious than was previously planned. State participation in activities has been beneficial, and I'm pleased with the work from the Quapaw Tribe.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   Site operations have provided jobs in the community, but there has been elevated dust and traffic from the trucks hauling to the repository. There have been some traffic accidents too.

   Cleanup of the site is comparable to the land of the surrounding community, which has mostly been farmland. Cleanup so that the landowner can use the land is beneficial realizing that some restrictions must be in place.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Not at this time.

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4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

   No routine site visits are done by this office. We do participate in tours when offered by EPA to look at the work that is being done. More meetings and tours would be beneficial.

5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   We have not responded to any incidences.

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   More information sharing would be beneficial.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   Not at this time.

8. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   Not at this time.

9. **Do you have any comments, suggestions, or recommendations regarding the site?**

   Not at this time.

ED_001863D_00014986-00175

INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date: 12/22/14**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
Individual Contacted:		
Name: Christen Lee	**Title: Environmental Director**	**Organization: Wyandotte Nation**
Email: clee@wyandotte-nation.org	**Phone: 918-678-6341**	**Address: 64790 E Hwy 60 Wyandotte, OK 74370**

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   Overall, it seems much more daunting in its scale than everyone realized (OU4). I am pleased so far with ODEQ's participation and the work the Quapaw Tribe has done.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   Some issues with traffic and dust.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   The idea of multiple repositories, and the main one being in the flood plain.

4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

   Only with EPA personal- set up as stakeholder meetings. More often would be beneficial.

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5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   None

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   More stakeholder site meetings would be helpful.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   More information sharing with other stakeholders, public meetings.

8. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   Not from our office

9. **Do you have any comments, suggestions, or recommendations regarding the site?**

   We would like to see post environmental site monitoring i.e. Water, air…

ED_001863D_00014986-00177

INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date: January 22, 2015**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
Individual Contacted:		
Name: Ursula Lennox	**Title:** Remedial Project Manager	**Organization:** EPA Region (6SF-RL)
Email: lennox.ursula@epa.gov	**Phone: 214-665-6743**	**Address:** 1445 Ross Avenue, Dallas, TX 75202

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

Significant progress continues to be made at the site since the 4th 5-Year Review Report. EPA has concluded the remedial action activities at Operable Unit 1 (OU1 – surface water/ground water) and have transitioned this OU to the State; in tandem with the efforts of ODEQ and the County Health Department, and the remediation of over 2 thousand residential properties (OU2), the blood lead level of children is below the National average; the voluntary buyout of the towns of Picher, Cardin, and Hockerville, have greatly reduced the chances of exposure, and, with the threat of exposure greatly reduced, the remedy for Operable Unit 4, that addresses mine and mill waste, can be performed over a longer period.

Region 6 negotiated a $2.6 million cooperative agreement with the Quapaw Tribe Environmental Office to conduct the remediation of a 40 acre parcel of tribal land known as the 'Catholic 40' within the Tar Creek Superfund Site. This was the first time that a Tribe is carrying out a Superfund Remedial Action in the U.S.

EPA is also working with EPA-HQs' Optimization Team and the stakeholders involved with OU4 to prioritize contaminated areas in flood zones, near waterways, and in riparian areas. Measures are also being evaluated in determining the best approach to address transition zone soils.

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2. **From your perspective, what effects have site operations had on the surrounding community?**

   Land contaminated with mine and mill waste, is now remediated and with proper maintenance, this remediated land provides additional acreage landowners will eventually utilize for agriculture and/or grazing. For land containing marketable chat, EPA facilitated chat sales between the property owner and purchaser, and transported the material to the designated location. Property owners were kept abreast throughout of the entire process and provided the appropriate documentation and fact sheets related to the response action and what to expect. These remedial actions benefited the land owners and surrounding community, because it removes the risk of exposure and protects human health and the environment.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   EPA has not received any community concerns. However, some property owners where work was performed were concerned with the removal of top soil during the remedial action. The top soil needed to be removed because it was contaminated.

4. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   No.

5. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   Absolutely. The project managers participate in weekly and monthly calls with stakeholders to discuss and hear the status on site activities; EPA and ODEQ Management conducts monthly calls to discuss the status/challenges/plan of actions related to Superfund sites in Oklahoma; EPA and other stakeholders present power point presentations at the annual Tar Creek conference that is hosted by the L.E.A.D. agency each year; EPA conducts availability sessions for the public in order to seek answers to questions they may have related to site activities, etc.

6. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   Yes. It is important that all stakeholders stay abreast on site developments, to minimize delays in various response actions.

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7. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   Yes. When work stopped on unrestricted properties in April 2013, EPA received several complaints from property owners and received several inquiries from elected officials. EPA met with the property owners and elected officials and outlined a plan of action and implemented it. The majority of those involved were satisfied with the end result.

8. **The optimization report produced for OU4 included several priorities, one of which was to "Leverage potential synergies with project team structure, roles, and responsibilities". Is there any strategy in place to implement this priority?**

   Yes. The approach has been presented to ODEQ, the Quapaw Tribe of Oklahoma, EPA's Contractor, and the Stakeholders that are involved on this project. The approach is dynamic and will be refined as discussions between the stakeholders and the EPA-HQ's Optimization Team continue.

9. **Are you aware of any problems or difficulties encountered since the conclusion of the fourth five-year review period (September 2010) which have impacted progress of the Remedial Action for OU4? Please describe changes and impacts.**

   Though challenges have continuously evolved throughout the implementation of the remedial action for OU4, progress continues to be achieved. Some of the challenges encountered included securing access agreements on restricted properties, encountered greater volumes of waste material and transition zones soils than what was projected in the OU4 ROD, encountering shallow bedrock during the remedial action, and securing state funds to complete site work.

10. **A recommendation from the fourth five-year review report was that EPA should complete an evaluation of current surface water and sediment data for Tar Creek to verify that no unacceptable risks to human health and the environment exist in Tar Creek. To you knowledge, has this been completed? Please Explain.**

    It is my understanding that Regions 6, 7, and the States are coordinating this effort.

11. **Are you aware of any incidents, complaints, or situations, in which citizens are consuming or have consumed contaminated groundwater from either the Boone or Roubidoux aquifers since the conclusion of the fourth five-year review period (September 2010)?**

    I have not received any complaints from citizens related to this question.

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12. Do you have any comments, suggestions, or recommendations regarding the site?

It is important to keep all stakeholders, property owners, and the public informed on work that is being performed; make sure property owners are aware of their role related to ensuring the implemented remedy maintains its effectiveness; and utilize an access agreement that allows an area to be both assessed and remediated.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date:**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
Individual Contacted:		
Name: Larry Tippit	**Title: Environmental Specialist**	**Organization: Peoria Tribe of Indians of Oklahoma**
Email: ltippit@peoriatribe.com	**Phone: 918-540-2535 ex. 17**	**Address: 118 S. Eight tribes Trail Miami, OK. 74354**

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   Much of the EPA remediation work has been performed in a hap-hazard manner with little thought to future effects to the environment or area residents. As in OU4 with the chat fine injections into water-filled underground mine caverns, and chat filling of open pits, shafts, and subsidence's, most of which are water filled and directly connected with the underlying water table (Boone aquifer), higher levels of contamination and hydraulic pressures from the fill will ultimately increase the area and scope of contamination. Also the distinct probability of cross contamination of the Rubidoux aquifer is increased. At least two Tribal members' drinking water wells have become heavy metal contaminated, and at least two noticeable contaminated seeps have been documented on Spring River at a point just below where mine shafts and open pits were chat filled.

   The EPA Chat Repository for chat removal borders and is uphill from already contaminated Tar Creek, and the leachate drains for that repository are in the Tar Creek flood plain.

   Work contracted by EPA to "qualified" contractors has been at times sub-contracted to unqualified contractors. The results have been that sub-contractors were either under paid, not paid, or did not effectively accomplish contracted jobs. Remediation funding was not judiciously used, and time and money were not used effectively.
   Funding provided for the Picher Buy-Out and the actual buy-out did not seem to correlate.

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2. **From your perspective, what effects have site operations had on the surrounding community?**

   From my perspective, many people/families directly impacted have been unimpressed or dissatisfied with remediation efforts and results. Some others have been made greedy, trying to take advantage of funding provisions for cleanup / buy-out / remediation.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   Probably the biggest concerns that I am aware of is the threat and/or possibility of the cross contamination of the Rubidoux aquifer source of drinking water, and the contamination of Spring River and Grand Lake, as fishing and recreation resources.

4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

   The Peoria Tribe Environmental Department regularly takes water samples from Spring River, Tar Creek and other tributaries in our tribal jurisdiction. We have also taken extensive pore water samples this past year on Spring River. The purpose is to determine levels of contaminants in those water sources, and with the pore water sampling, to track the movement of contaminants from the Kansas / Oklahoma state line to Grand Lake. We have also sampled mussel tissue and mussel shells from Spring River to determine heavy metal contamination. Consistently, we have found high levels of zinc concentrations in the water samples, and zinc toxicity in mussel tissue and zinc concentrations in mussel shells.

5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   No.

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   Not always. EPA Dallas Region 6 not always forthcoming with their plans. They do hold monthly stakeholders conference calls which we try to monitor, but because of our work load and schedule we are not always a party to those calls. Sometimes they make adjustments to their activities without informing all the stakeholders. Sometimes they are not transparent in all their activities.

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7. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

The Peoria Tribe has written numerous letters concerning issues we have had with Region 6 activities. Sometimes we have received a reply, but more times, have not. Our letters/correspondence/opinions, even tribal needs, seem to be of no concern or value to the EPA Regions.

8. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

One specific contact was of a tribal member whose drinking water well became lead contaminated. The individual had a new well drilled and it too was contaminated. He contacted the Peoria Environmental Department, Wyandotte Environmental Department, Quapaw Environmental Department, and Indian Health Services. The Peoria Environmental Department contacted an EPA official and was told to either get the individual's home on a rural water district, or furnish his household bottled water. The Peoria Environmental Department does not know what actions the other Tribal Environmental Departments took. EPA acknowledged no responsibility / liability or further concern, nor did any further investigation. The individual resided within the Peoria Tribal jurisdiction, but was a member of a different tribe. The location of his dwelling is near the northeast Oklahoma / Missouri State line, and south west of the Newton / Jasper Counties, MO. Superfund site and remediation activities. Remediation actions there consisted of filling open, water filled pit mines and subsidences. Those features were in direct connection with the Boone Aquifer which flows toward the southwest, into Oklahoma.

9. **Do you have any comments, suggestions, or recommendations regarding the site?**

The Peoria Environmental Department suggestion:
Instead of hauling chat to repositories or underground dumping, start paving all roads from the OU4 site outward. Chat can safely be encapsulated in pavement and roadbeds. Using the existing chat in pavement would (1) eliminated the aboveground chat in a safe method; (2) provide work for paving crews which would in turn help the economic situation in the poorer Ottawa County; (3) lessen the cost of road building, because nearby building material would be cheaper and wouldn't have to be hauled so far; (4) increase the land values adjacent to paved roads; (5) protect the ground water because no more contaminants are being dumped into it, and there would be no more leachate from chat piles ; (6) improve ground water quality, because the recharge of the aquifer would serve to dilute the existing contamination.

Southwest Missouri is seeking a water supply source for the city of Joplin, MO. and other communities in the area. If a viable and economical means of removing heavy metal contaminants from the existing mine pool in the Picher area, a water treatment facility

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could pump water from that existing mine pool, treat the water, and pipeline it to the Joplin area. This would not only supply water to the Southwest Missouri area, but as water was pumped from the mine pool, natural recharge would serve to dilute the contamination therein, thereby consistently reducing the contaminant load of the extracted water, and the cost associated with the water treatment. Building a pipeline, water treatment plant, and operating and maintaining the infrastructure would also provide employment and boost the economic situation in Northeastern Oklahoma.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date:**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
Individual Contacted:		
Name: Heather Webb	**Title: Environmental Director**	**Organization: Miami Tribe of OK**
Email: hwebb@miamination.com	**Phone: 918-541-1373**	**Address: PO Box 1326 Miami, OK 74355**

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   I have been employed in the Miami Tribe Environmental Department since August 2011. The Tar Creek Superfund Site is directly east of our tribal jurisdictional lands. Since I've started, there has been little or no communication with EPA regarding the site, except for a few meetings with Ursula Lennox. We had to invite ourselves to participate on the OU4 conference calls in December and January. So I have had to play a lot of catch-up. BUT, still glad we are now being included in the informational calls. Hopefully, I will be able to give an impression on the 6th Five-year review.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   The only thing I am extremely concerned with is the water coming from the repository that eventually flows into Tar Creek. Hopefully this will be addressed and fixed soon. We are trying to keep the contamination out of the creeks, not make it worse via route of the solution. Any contamination in the creeks is going to affect the community and the communities that have waterways south that TAR Creek flows into.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   We speak for our tribal communities. They know about the Superfund site but chose to ignore the effects. We are their voice and hopefully our concerns are being addressed as

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the overall communities concerns. They don't have the background and environmental education so they leave those priorities to the department to address.

4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

   We had one meeting with Ursula a while back and she went over some of what they were doing. But that was before the Quapaw tribe was involved in the remediation. The other tribes wanted information so she scheduled a meeting with all of us in a trailer close to the site. Since then, we invited ourselves to be on the OU4 conference calls. We had to invite ourselves because Ursula didn't seem to want us involved.

5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   No.

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   Well no. It's EPA's idea that the contamination doesn't exist outside the superfund site, so the neighboring tribes have not been involved in information sharing about the site. This needs to change. Just being able to be in on the OU4 conference calls would be a great way for us to keep informed.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   None at this time. Besides doing something about the water coming from the repository.

8. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   We have not heard about anything.

9. **Do you have any comments, suggestions, or recommendations regarding the site?**

   Fix the water from the repository. Include downstream tribes in information sharing calls.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date:**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
Individual Contacted:		
Name: Suzanne Dunn	**Title:** Biologist	**Organization:** USFWS
Email: Suzanne_dunn@fws.gov	**Phone: 918.382.4521**	**Address:** 9014 E 21st Street Tulsa, OK 74129

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five-year review period (September 2010)?**

   The first thing that comes to mind is that EPA should do the cleanup in an orderly manner. The cleanup of properties should start near the OK/KS boarder and progress south from there, or some other logical progression. I understand the need to work with landowners to gain access; however, my impression is that if a landowner won't grant EPA access, then that property is "skipped". This leaves an island of contamination that exposes wildlife to risk and can re-contaminate other areas that have been cleaned up.

   In addition, EPA has reduced sampling efforts so they won't detect where the contaminants have come to be located. The transition zones around the chat piles are known to extend out a great distance, up to 600 ft. in some areas and on average 164 ft. in pasture and 175 ft. in wooded areas (FWS 2013). Reduced sampling efforts during the removal phase are irresponsible and allows for potentially high levels of contamination to be left on site.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   I do not live in the community directly impacted by the site, but I work with many who do live in the area. Comments about reduced home values and reduced use of the natural resources have been discussed.

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3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   The majority of the complaints I heard were related to OU2 clean up around the homes. In general, people seem content with the OU4 administration on site with some complaints about the heavy trucks on roads and fugitive dust.

4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

   Yes, the FWS has conducted numerous studies at the site. The final reports are located at http://www.fws.gov/southwest/es/oklahoma/nrdar.htm

5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five-year review period (September 2010)? If so, please give details.**

   No

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five-year review period (September 2010)?**

   Yes, EPA and ODEQ have provided progress reports at meetings and via phone and/or e-mail whenever asked.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   I suggest that EPA Region 6 work closely with EPA Region 7. I have been told that the two regions are working together; however, it is not apparent given the progress at the Treece site and the lack of progress immediately across the state line at the Tar Creek site. This is also true for the current and future work for OU5. Region 7 is on schedule to have a ROD for sediments by 2015. Region 6 will not confirm if they will adopt Region 7s ROD or if they are going to do their own. If Region 6 does their own ROD, this would waste taxpayer funds and possibly result in different clean up levels between the Regions.

8. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   No

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9. Do you have any comments, suggestions, or recommendations regarding the site?

I reiterate my comment from question 7. EPA Regions 6 and 7 should work in tandem with each other to have a uniform cleanup and reduce costs.

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INTERVIEW RECORD		
Site Name: Tar Creek Superfund Site		**EPA ID #** OKD980629844
Location: Ottawa County, OK		**Date:**
Contact Made By:		
Name: Brian Stanila	**Title:** EPS III	**Organization:** ODEQ
Email: brian.stanila@deq.ok.gov	**Phone:** (405) 702-5138	**Address:** 707 N. Robinson, Oklahoma City, OK, 73101
Individual Contacted:		
Name: Ramie Tirres	**Title:** Program Grant consultant	**Organization:** Ottawa County Health Department
Email: remedios@health.ok.gov	**Phone:** 918-540-2481 ext.210	**Address:** 1930 N. Elm Street Miami, OK 74354

QUESTIONS

1. **What is your overall impression of the work conducted on site since the conclusion of the fourth five year review period (September 2010)?**

   The work done has reduced the blood lead levels of children in Ottawa County. Remediation of residential properties, community education and screening has had a great impact in the community. There is still much more work to be done to continue to bring the children's blood lead levels down.

2. **From your perspective, what effects have site operations had on the surrounding community?**

   Positive effect. Children's blood lead levels have dropped. People in the area have increased knowledge of the lead problems through education, health fairs and screening. The community is very much concerned regarding soil contamination (health impact in planting a garden) and also the consumption of fish due the amount of lead levels.

3. **Are you aware of any community concerns regarding the site or its operation and administration? If so, please give details.**

   The community is still very much concerned with soil contamination, lead poisoning and in some cases increased lead levels in young children.

4. **Have there been routine communications or activities (site visits, inspections, reporting, etc.) conducted by your office regarding the site? In general, please describe the purpose and results.**

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Ottawa County Health Department has conducted ongoing community lead poisoning prevention health educational activities, childhood lead poisoning prevention education and blood screening activities and follow-up case management and monitoring of children with elevated blood lead levels.

5. **Are you aware of any events, incidents, or activities at the site that has required emergency responses from your office since the conclusion of the last five year review period (September 2010)? If so, please give details.**

   The town of Quapaw was hit by a tornado in 2014. Ottawa County Health Department sent our Medical Emergency Response team.

6. **Do you feel well informed about the site's activities and progress since the conclusion of the fourth five year review period (September 2010)?**

   The yearly Tar Creek Conference is very informative as well as some newspaper articles.

7. **Do you have any comments, suggestions, or recommendations regarding the site's management and operation?**

   The Last Chance Yard Cleanup offered to the community by EPA has encouraged our local residents to participate. This effort needs to be continued so more of our community can participate in order to bring the children's blood lead levels down as well as to continue educating and bringing awareness to our community of the lead problem.

8. **Have there been any complaints, violations, or other incidents related to the site requiring a response by your office? If so, please give details of the events and results of the responses.**

   A child was tested for lead at the Health Dept. and the result was high. Parents were very much concerned. With the help of LEAD Agency, Inc., a home visit was made to check for lead in the paint. DEQ came out to check the yard and water. The home was an older home and has been repainted so no lead was detected inside.

9. **Do you have any comments, suggestions, or recommendations regarding the site?**

   It would be good to continue blood lead screening and monitoring children with elevated blood lead levels. Continuing community outreach and education is important to keep the blood levels of children down.

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Appendix E: Site Inspection Checklist

I. FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST	
Site Name: Tar Creek Superfund Site	**Date of Inspection:** January 14-16, 2015
Location and Region: Ottawa County, Oklahoma (Region 6)	**EPA ID:** OKD980629844
Agency leading the five-year review: Oklahoma Department of Environmental Quality (ODEQ)	**Weather/temperature:** TBD
Remedy Includes: (Check all that apply) ☒ Landfill cover/containment ☒ Access controls ☒ Institutional controls ☐ Groundwater pump-and-treatment ☒ Surface water collection and treatment ☒ Other- ground water monitoring, surface water diversion, excavation and relocation	
Attachments: ☒ Inspection team roster attached ☒ Site map attached to report	
II. INTERVIEWS (Check all that apply)	
2. O&M Interviewed: ☒ by e-mail ☐ at office ☐ by phone Email. Problems, suggestions: ☒ Reports attached in Attachment 3	
3. Local regulatory authorities and response agencies (i.e.; State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.). Fill in all that apply. **Agency**: Oklahoma Department of Environmental Quality Contact: Dennis Datin and David Cates ☒ Reports attached in Attachment X **Agency**: Environmental Protection Agency Contact: Bob Sullivan, Rafael Casanova, and Katrina Coltrain ☒ Reports attached in Attachment X **Agency**: Members of Oklahoma Trustee Council	

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☒ Reports attached in Attachment X

4. Other interviews (optional):

Rebecca Jim (LEAD Agency)

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. O&M Documents

☐ O&M manual (long term monitoring plan)	☐ Readily available	☐ Up to date	☒ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☒ N/A
☐ Maintenance logs	☐ Readily available	☐ Up to date	☒ N/A

Remarks: There are no on-site facilities and therefore no records are maintained at the Site. Records documents are maintained at EPA and ODEQ.

2. Site-Specific Health and Safety Plan	☐ Readily available	☒ Up to date	☐ N/A
☐ Contingency plan/emergency response plan	☐ Readily available	☒ Up to date	☐ N/A

Remarks: All projects operate under general health and safety plans.

3. O&M and OSHA Training Records	☐ Readily available	☐ Up to date	☒ N/A

Remarks:_____

4. Permits and Service Agreements

☐ Air discharge permit	☐ Readily available	☐ Up to date	☒ N/A
☐ Effluent discharge	☐ Readily available	☐ Up to date	☒ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☒ N/A
☐ Other permits _____	☐ Readily available	☐ Up to date	☒ N/A

Remarks:_____

5. Gas Generation Records ☐ Readily available ☐ Up to date ☒ N/A

6. Settlement Monument Records	☐ Readily available	☐ Up to date	☒ N/A
7. Groundwater Monitoring Records	☒ Readily available	☒ Up to date	☐ N/A

There are five After Action Monitoring Reports that document annual Roubidoux sampling events.

8. Leachate Extraction Records	☐ Readily available	☐ Up to date	☒ N/A

9. Discharge Compliance Records

☐ Air ☐ Readily available ☐ Up to date ☒ N/A

☐ Water (effluent) ☐ Readily available ☐ Up to date ☒ N/A

Remarks:

10. Daily Access/Security Logs ☐ Readily available ☐ Up to date ☒ N/A

IV. O&M COSTS

1. O&M Organization

☐ State in-house ☐ Contractor for State ☐ PRP in-house

☐ Contractor for PRP ☒ Other: Memorandum of Agreement between EPA and ODEQ

2. O&M Cost Records –

☐ Readily available ☐ Up to date ☐ Funding mechanism/agreement in place

☐ Original O&M cost estimate ☒ Breakdown attached

Total annual State cost by year for OU1 O&M

Date	Date	Total Cost	
From 2009	to 2010	$0	- ☐ Breakdown attached
From 2010	to 2011	$0	- ☐ Breakdown attached
From 2011	to 2012	$0	- ☐ Breakdown attached
From 2012	to 2013	$1,157.68	☐ Breakdown attached
From 2013	to 2014	$64.32	☐ Breakdown attached

3. Unanticipated or Unusually High O&M Costs During Review Period

None

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☐ N/A

A. Fencing

1. Fencing damaged ☐ Location shown on site map ☐ Gates secured ☒ N/A

Remarks: CMR gates secured

B. Other Access Restrictions

1. Signs and other security measures ☐ Location shown on site map ☒ N/A

Remarks: CMR signs posted

C. Institutional Controls

1. Implementation and enforcement

Site conditions imply institutional controls not properly implemented	☐ Yes	☐ No	☒ N/A
Site conditions imply institutional controls not being fully enforced	☐ Yes	☐ No	☒ N/A

There are deed notices placed on LICRAT buyout homes and contaminated soil repositories.

Type of monitoring (e.g., self-reporting, drive by): General site visits

Frequency: multiple times per year

Responsible party/agency: EPA/ODEQ

Contact: not applicable

Reporting is up-to-date	☐ Yes	☐ No	☒ N/A
Reports are verified by the lead agency	☐ Yes	☐ No	☒ N/A
Specific requirements in deed or decision documents have been met	☒ Yes	☐ No	☐ N/A
Violations have been reported	☐ Yes	☐ No	☒ N/A

Other problems or suggestions: ☐ Report attached

2. Adequacy ☒ Institutional controls are adequate ☐ Institutional controls are inadequate ☐ N/A

Remarks:

D. General

1. Vandalism/trespassing ☐ Location shown on site map ☐ No vandalism evident

Remarks: While vandalism related to the Site remedy is generally not present, nuisance behavior persists. This behavior includes illegal dumping and trespassing onto chat piles and remediated areas. For example, it is clear that the use of ATV vehicles is present on a filled subsidence in Hockerville.

2. Land use changes on-site ☐ N/A ☒ Land use changes evident

Remarks: Most land use on the Site is rural-residential and agricultural. However, there are mixed areas of residential/commercial. Land use has changed at the Site due to removal and remedial activities. Below is a brief summary of general land use change at the Site.

The LICRAT has voluntarily relocated all of the residents of Picher, OK, and Treece, KS. Homes of former residents have been demolished and disposed. Treece, KS was purchased by the Quapaw Tribe in 2013. Intended land use is agricultural.

Chat piles and contaminated soils were removed from rural-residential properties. Remediated properties were vegetated and have agricultural use. Contaminated soils and chat were placed in repositories constructed from subsidence holes, old mill ponds, and chat bases. Repositories have limited agricultural use and have deed notices filed on them.

3. Land use changes off-site ☒ N/A
Remarks:

VI. GENERAL SITE CONDITIONS

A. Roads ☒ Applicable ☐ N/A

Roads damaged ☐ Location shown on site map ☒ Roads adequate ☐ N/A
Remarks: Roads are publicly owned and maintained.

B. Other Site Conditions ☒ Applicable ☐ N/A

Remarks:
OU2 Repository (Adams) – Fenced and behind locked gate. Good vegetative growth present on site.

OU2 Repository (Stateline) – Fenced and behind locked gate. Good vegetative growth. Owned by Quapaw Tribe.

OU4 Repository- Fenced and behind locked gate. No final cap established and no vegetative growth.

VII. LANDFILL COVERS ☐ Applicable ☒ N/A

A. Landfill Surface

1. Settlement (Low spots) ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____
Remarks:

2. Cracks ☐ Location shown on site map ☐ Cracking not evident
Lengths _____ Widths _____ Depths _____
Remarks:

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks:

4. **Holes** ☐ Holes evident ☐ Holes not evident
Areal extent _____ Depth _____
Remarks:____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks:

6. **Alternative Cover** (armored rock, concrete, etc.) ☐ N/A
Remarks: _____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
Areal extent _____ Depth _____
Remarks: _____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident

☐ Wet areas	☐ Location shown on site map	☐ Areal extent _____
☐ Ponding	☐ Location shown on site map	☐ Areal extent _____
☐ Seeps	☐ Location shown on site map	☐ Areal extent _____
☐ Soft subgrade	☐ Location shown on site map	☐ Areal extent _____

Remarks:_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map
☐ No evidence of slope instability Areal extent _____
Remarks:_____

B. **Benches** ☐ Applicable ☐ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

2. **Bench Breached** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

3. **Bench Overtopped** ☐ Location shown on site map ☐ N/A or okay
Remarks: _____

C. **Letdown Channels** ☐ Applicable ☐ N/A

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Remarks: _____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type _____ Areal extent _____
Remarks:

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent _____ Depth _____
Remarks: _____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent _____ Depth _____
Remarks:

5. **Obstructions** Type _____
☐ No obstructions ☐ Location shown on site map
Areal extent _____ Size _____
Remarks:

6. **Excessive Vegetative Growth** Type _____
☐ No evidence of excessive growth ☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent _____
Remarks: _____

D. **Cover Penetrations** ☐ Applicable ☐ N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☒ N/A
Remarks:

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☒ N/A
Remarks:

3. **Monitoring Wells** (within surface area of landfill)
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A
Remarks: _____

4. Leachate Extraction Wells

☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs O&M ☐ N/A

Remarks: _____

5. Settlement Monuments ☐ Located ☐ Routinely surveyed ☐ N/A

Remarks: _____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. Gas Treatment Facilities

☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
☐ Good condition ☐ Needs O&M

Remarks: _____

2. Gas Collection Wells, Manifolds, and Piping ☐ Good condition ☐ Needs O&M

Remarks: _____

3. Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)

☐ Good condition ☐ Needs O&M ☐ N/A

Remarks: _____

F. Cover Drainage Layer ☐ Applicable ☐ N/A

1. Outlet Pipes Inspected ☐ Functioning ☐ N/A

Remarks: _____

2. Outlet Rock Inspected ☐ Functioning ☐ N/A

Remarks: _____

G. Detention/Sedimentation Ponds ☐ Applicable ☐ N/A

1. Siltation Areal extent _____ Size _____

☐ N/A ☐ Siltation not evident

Remarks: _____

2. Erosion Areal extent _____ Depth _____

☐ Erosion not evident

Remarks: _____

3. Outlet Works ☐ Functioning ☐ N/A

Remarks: _____

4. Dam ☐ Functioning ☐ N/A
Remarks: _____

H. Retaining Walls ☐ Applicable ☐ N/A

1. Deformations ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement _____ Vertical displacement _____
Rotational displacement _____
Remarks:

2. Degradation ☐ Location shown on site map ☐ Degradation not evident
Remarks:

I. Perimeter Ditches/Off-Site Discharge ☐ Applicable ☐ N/A

1. Siltation ☐ Location shown on site map ☐ Siltation not evident
Areal extent _____ Depth _____
Remarks: _____

2. Vegetative Growth ☐ Location shown on site map ☐ N/A
☐ Vegetation does not impede flow
Areal extent _____ Type _____
Remarks: _____

3. Erosion ☐ Location shown on site map ☐ Erosion not evident
Areal extent _____ Depth _____
Remarks:

4. Discharge Structure ☐ Functioning ☐ N/A
Remarks: _____

VIII. VERTICAL BARRIER WALLS ☐ Applicable ☒ N/A

1. Settlement ☐ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____
Remarks:

2. Performance Monitoring Type of monitoring _____
☐ Performance not monitored Frequency _____ ☐ Evidence of breaching
Head differential _____
Remarks: _____

IX. GROUNDWATER/SURFACE WATER REMEDIES ☒ Applicable ☐ N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. Pumps, Wellhead Plumbing, and Electrical

☒ Good condition ☐ All required wells located ☐ Needs O&M ☐ N/A

Remarks: Groundwater/ Surface water remedy at the Site is the Meyer Ranch Passive Treatment System (PTS). The PTS consists of an initial oxidation pond and then a series of wetland/surface flow ponds, vertical flow bio-reactors, re-aeration ponds, horizontal flow limestone beds, and a polishing pond/wetland. The goal of the PTS is to eliminate heavy metal contamination from the groundwater discharges to surface water. The PTS has successfully done this at a low cost.

Flow into the oxidation pond is artesian. Wind and solar power are used in re-aeration ponds.

2. Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☒ Good condition ☐ Needs O&M

Remarks: _____

3. Spare Parts and Equipment

☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: _____

B. Surface Water Collection Structures, Pumps, and Pipelines ☒ Applicable ☐ N/A

1. Collection Structures, Pumps, and Electrical

☒ Good condition ☐ Needs O&M

Remarks: Series of wetland/surface flow ponds, re-aeration ponds, and vertical flow bio-reactors are present as part of the surface water treatment train.

2. Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances

☒ Good condition ☐ Needs O&M

Remarks: Presumed to be in good condition but are not visible.

3. Spare Parts and Equipment

☒ Readily available ☒ Good condition ☐ Requires upgrade ☐ Needs to be provided

Remarks: Operations agreement with City of Commerce. PTS is regularly inspected by Commerce.

C. Treatment System ☒ **Applicable** ☐ **N/A**

1. Treatment Train (Check components that apply)

☒ **Metals removal** ☐ **Oil/water separation** ☒ **Bioremediation**

☐ **Air stripping** ☐ **Carbon absorbers**

☐ **Filters**

☒ **Additive (e.g., chelation agent, flocculent) pH management**

☒ **Others** **Passive aeration system**

☒ **Good condition** ☐ **Needs O&M**

☒ **Sampling ports properly marked and functional**

☐ **Sampling/maintenance log displayed and up to date**

☐ **Equipment properly identified**
☐ **Quantity of groundwater treated annually**
☐ **Quantity of surface water treated annually**

Remarks: Metals removal occurs in oxidation pond, vertical flow bio-reactors, re-aeration ponds, and limestone beds. Additive occurs vertical flow bio-reactors.

2. Electrical Enclosures and Panels (Properly rated and functional)
☐ **N/A** ☒ **Good condition** ☐ **Needs O&M**

Remarks: Most electrical equipment run by solar panels and windmill.

3. Tanks, Vaults, Storage Vessels
☐ **N/A** ☒ **Good condition** ☒ **Proper secondary containment** ☐ **Needs O&M**

Remarks:

4. Discharge Structure and Appurtenances
☐ N/A ☒ Good condition ☐ Needs O&M

Remarks: Outflow pipe from wetland pond. Approximately 8" in diameter.

5. Treatment Building(s)
☒ N/A ☐ Good condition (esp. roof and doorways) ☐ Needs repair
☐ Chemicals and equipment properly stored

Remarks:

6. Monitoring Wells (Pump-and-treatment remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs O&M ☒ N/A

Remarks:

D. Monitored Natural Attenuation ☐ Applicable ☒ N/A

1. Monitoring Wells (Natural attenuation remedy)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ All required wells located ☐ Needs O&M ☐ N/A

Remarks:

X. OTHER REMEDIES

If there are remedies applied at the site that are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

OU1

The OU1 ROD described three remedy elements; (1) Plug abandoned wells completed in the Roubidoux aquifer, (2) construct surface water diversion and diking structures around three major inflow areas to prevent surface water inflow into the abandoned mines, and (3) implement a surface water and groundwater monitoring program to assess the Roubidoux aquifer. The OU1 remedy included construction of three surface water diversion structures and channel improvements to route surface water flow around collapse features. Two such features are located in Treece, Kansas, Cherokee County Superfund Site (EPA Region 7). The other is located in Oklahoma near the Douthat Bridge on E40 Road. At the Douthat Bridge Site, the Remedy included building diversion structures for surface water and plugging abandoned wells completed in the Roubidoux. The diversion dike prevents Lytle Creek from entering nearby subsidences and the channel re-routes Lytle Creek to an upper reach of Tar Creek. The Roubidoux Groundwater Monitoring Program has sampled approximately 13 wells completed in the Roubidoux aquifer and the results of which are documented in After Action Monitoring Reports (2010-2013).

OU2

The OU2 ROD addresses soils in residential yards and high activity areas (HAAs) contaminated with lead. Contaminated soils from residential yards and HAAs were deposited at two repositories

OU4

The OU4 remedy addresses the chat piles, chat bases, tailings ponds, in-stream and near-stream chat, rural residences not addressed under OU2, smelter wastes, and transition zone soils near source materials and smelter wastes. The remedial action is planned to occur over the next 30 years. In addition, LICRAT and TRA have voluntarily bought out impacted residents of Picher, Cardin, and Hockerville, OK, and Treece, KS. The goal of the program is to remove people from the site and thereby reduce the risk from exposure to site-related contaminants.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

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OU1

The OU1 ROD described three remedy elements; (1) Plug abandoned wells completed in the Roubidoux aquifer, (2) construct surface water diversion and diking structures around three major inflow areas to prevent surface water inflow into the abandoned mines, and (3) implement a surface water and groundwater monitoring program to assess the Roubidoux aquifer. The Douthat Bridge Site was visited during the Site Inspection. The stream channel improvements that divert Lytle Creek to an upper reach of Tar Creek appeared to be functioning as designed. There were no signs that the stream was eroding the channel. Rip-rap was present along the cut-banks of the channel. The dike was in good condition and there was no evidence of erosion, slides, burrows, or sloughing. Five wells (Tulsa Mine, Powerhouse well, Quapaw #5, Quapaw #2, and Picher #5) that enter the Roubidoux aquifer were visited during the Site Inspection. Tulsa Mine and Powerhouse well are scheduled to be plugged in January 2015. Plugging these wells is imperative to protect the Roubidoux aquifer from Boone aquifer contamination. The three additional wells are municipal water supply wells. After action monitoring documents that Quapaw #5 exceeds indicator parameter criteria for determining impacted wells. Quapaw #2 is a backup well for Quapaw and while it does not exceed MCLs it has shown historical exceedances of indicator parameters and has a connection to the Roubidoux. ODEQ would like to plug these two wells sometime in the future, but clearly would have to get approval from the City of Quapaw. The Roubidoux Groundwater Monitoring Program has sampled approximately 13 wells completed in the Roubidoux aquifer and the results of which are documented in After Action Monitoring Reports (2010-2013).

OU2

The OU2 ROD addresses soils in residential yards and high activity areas (HAAs) contaminated with lead. Contaminated soils from residential yards and HAAs were deposited at two repositories. Both OU2 repositories were secured by a locked gate and barbed wire fence. Although the Site Inspection occurred during winter, it was apparent that the repositories are well vegetated. Remediation of residential yards for OU2 is completed in the towns of Afton, Cardin, Commerce, Fairland, Miami, Narcissa, North Miami, Peoria, Picher, Quapaw, and Wyandotte. Drive-by inspections of remediated properties were conducted in Quapaw, Commerce, and Miami. Remediated properties included yards, driveways, and alleyways. Yards that were inspected appeared to be in good condition and had vegetation. Driveways and alleyways that were inspected also appeared in good condition and were easily identified from the presence of fresh limestone. Existing data on blood lead levels in children at the site have demonstrated that the OU2 remediation has been effective.

OU4

The OU4 ROD addresses source materials, smelter wastes, rural residential yard contamination, transition zone soil contamination, and contamination in water drawn from rural residential wells. The voluntary buyout being conducted under OU4 was completed in 2011. Residents of Picher, Cardin and Hockerville, OK and Treece, KS were relocated through the LICRAT and TRA programs. The final house demolition from the LICRAT buyout was completed in 2014. Source material from rural residential yard cleanups were placed in the OU4 repository located on E 40 Rd. The OU4 repository was visited during the site inspection. The OU4 repository was behind a locked gate and fence. Chat washing/sale operations (Sooner Pile and Atlas Pile) were visited during the site inspection. Several distal properties were visited during the site inspection. Remedial action was

occurring during the site inspection at distal 8 (Catholic 40) and distal 6A. During the site inspection, source material was still being hauled from distal 6A to a subsidence on 605 Rd. Distal 8 was being seeded during the site inspection. Distal 6 (CP104), Distal 7 North, and Distal 1 North were visited. Distal 6 and Distal 1 North had good vegetative growth present. However, Distal 7 North had sparse vegetation and according to the Quapaw Tribe source material was left near the stream that runs through the property. The 605 subsidence that is acting as the repository for Distal 6A and Distal 8 were visited during the site inspection. At the time of the inspection, 72,000 tons had been placed into the repository. The county owned Hockerville subsidence was visited and has the potential of for accepting source material from other distal properties. A former subsidence filled with construction and demolition waste was visited. This repository had obvious cap settling and it was clear that ATV's had been driving over the repository cap. Additional soil needs to be placed on the settling cap.

B. Adequacy of O&M

OU1

The only O&M procedures involve inspections and maintenance of the diversion dikes at Douthat Bridge. O&M at this location is conducted by the ODEQ and are documented in an O&M Report. Based on the Site Inspection and recent O&M inspection, the O&M at the Admiralty site is adequate.

Groundwater monitoring is being conducted as part of the Long-Term Monitoring program. This monitoring is related to the protection of the drinking water supply at the site. Monitoring of the groundwater used as the primary drinking water supply at the site shows no exceedances of primary drinking water standards (health-based standards). Exceedances of secondary (non-health based) standards do occur in some wells.

OU2

Yards, driveways, alleyways, and HAAs where remedial activities have taken place all appear to be in good condition and are well maintained. Approximately 19 properties may still need to be assessed. EPA has transferred the site lead of this remedial action to ODEQ.

OU4

Remedy is on-going. O&M is not applicable at this point.

C. Early Indicators of Potential Remedy Failure

It is imperative that the Roubidoux aquifer remain protected from the Boone aquifer. To continue these efforts additional wells may need plugging. ODEQ should work to continue to identify well and mine shafts that may allow connection between the Boone and Roubidoux aquifers. Those that are identified need to be plugged.

D. Opportunities for Optimization

Opportunities for optimization have been outlined in the OU4 Optimization Report.

INSPECTION TEAM ROSTER

Name	Organization	Title
Brian Stanila	ODEQ	Environmental Programs Specialist
David Cates	ODEQ	Professional Engineer/Project Manager
Amy Brittain	ODEQ	Environmental Programs Manager
Rafael Casanova	EPA	Remedial Project Manager

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Appendix F: Site Inspection Photographs

Photo 1: Mayer Ranch Passive Treatment System (MRPTS) Oxidation Pond

Photo 2: MRPTS Outflow into Oxidation Pond

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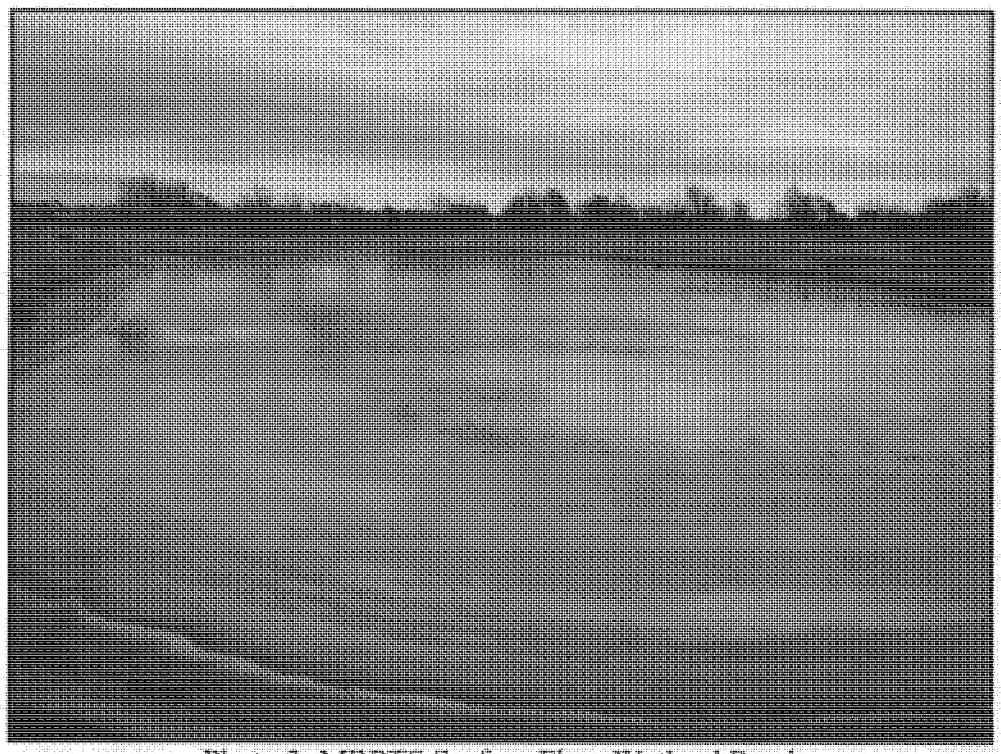

Photo 3: MRPTS Surface Flow Wetland Pond

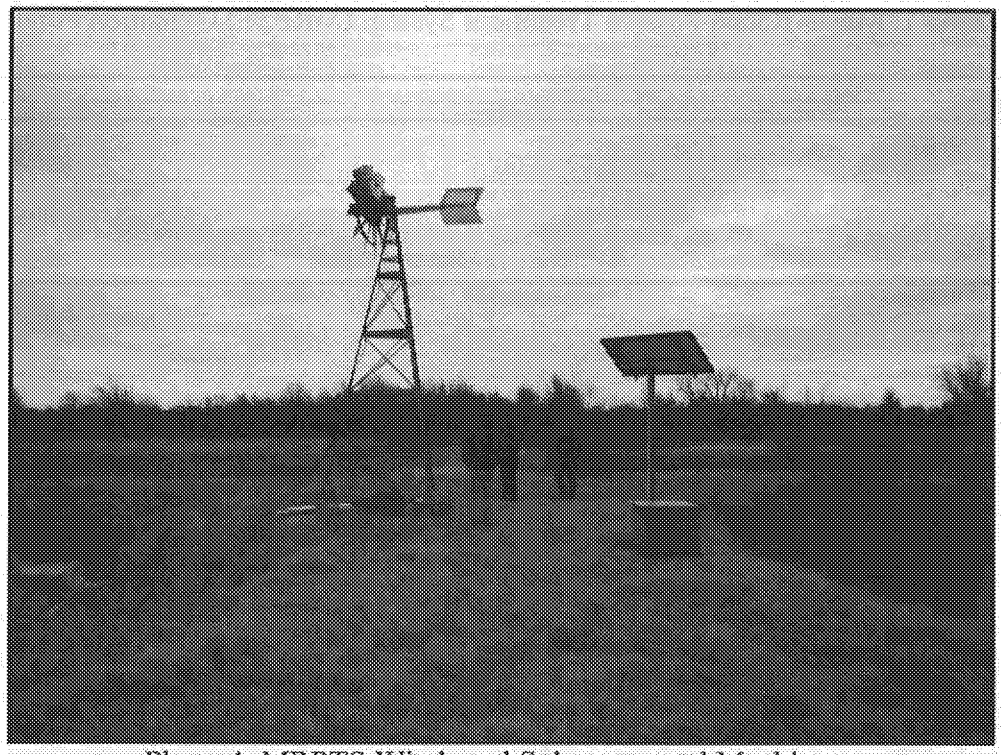

Photo 4: MRPTS Wind- and Solar-powered Machinery

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Photo 5: MRPTS Re-aeration Pond

Photo 6: MRPTS Horizontal-flow Limestone Bed

Photo 7: MRPTS Polishing Basin

Photo 8: Outflow of Polishing Basin from MRPTS

Photo 9: Southeast Commerce Soil Remediation Project

Photo 10: Vegetative Cover on South Repository; Central Mill Repository in Background

Photo 11: Entrance to Central Mill Repository (photo taken from top of repository)

Photo 12: Roads on Central Mill Repository

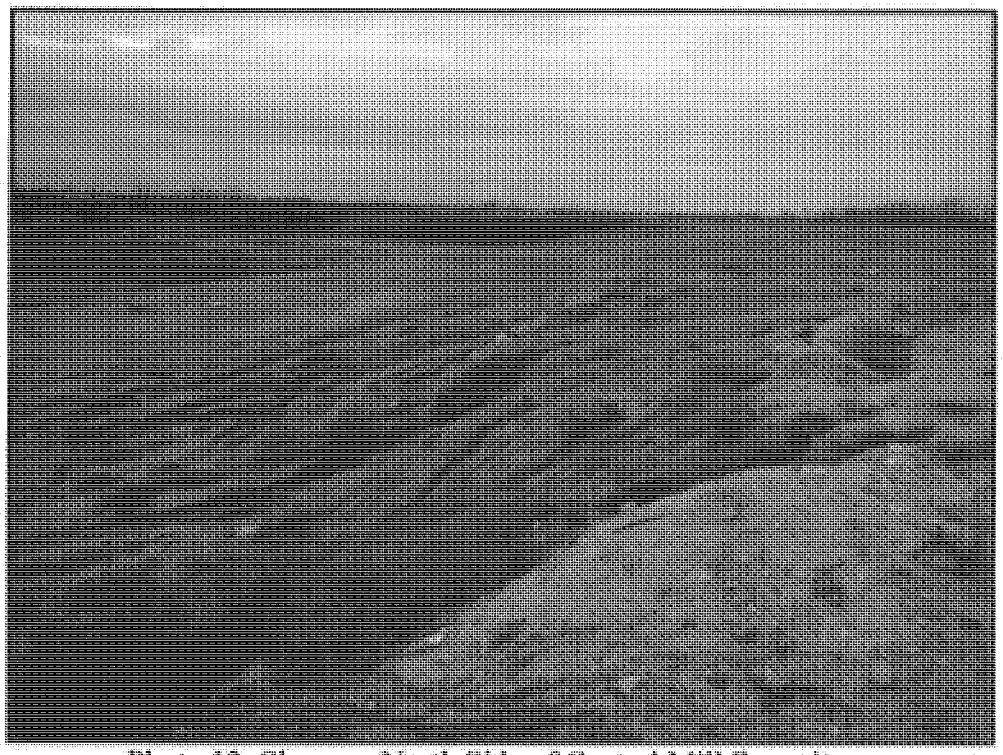

Photo 13: Slope on North Side of Central Mill Repository

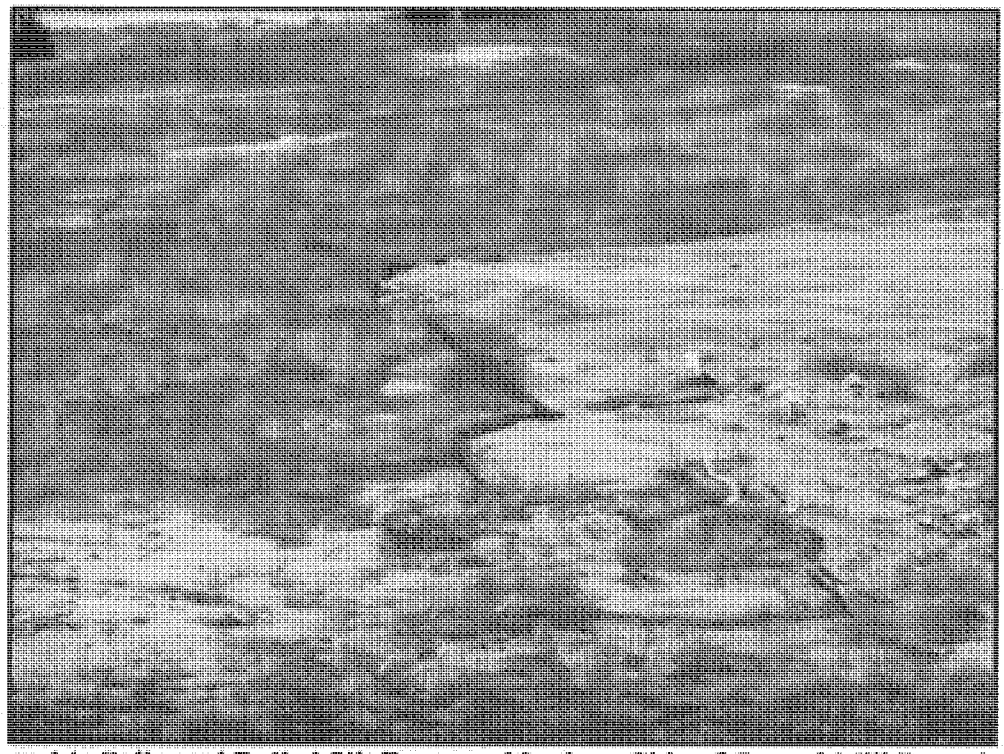

Photo 14: Collapsed Rolled Silt Fence on Northern Side of Central Mill Repository

Photo 15: North Slope of Central Mill Repository (photo taken facing south)

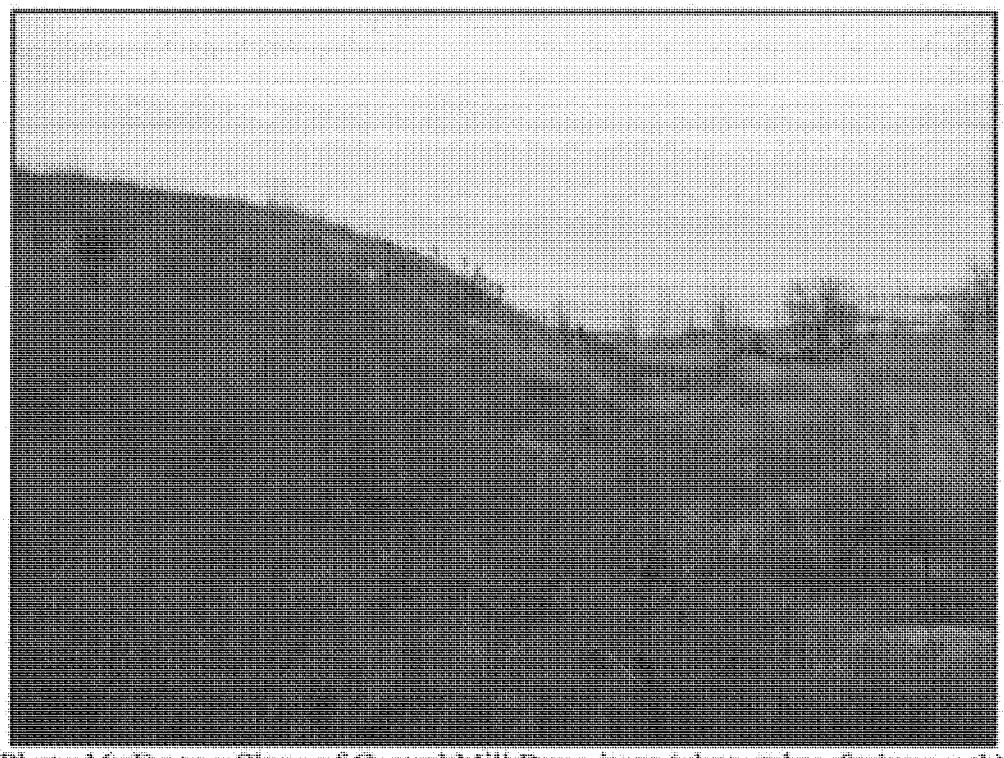

Photo 16: Eastern Slope of Central Mill Repository (photo taken facing south)

Photo 17: Erosion of Northeastern Side of Central Mill Repository

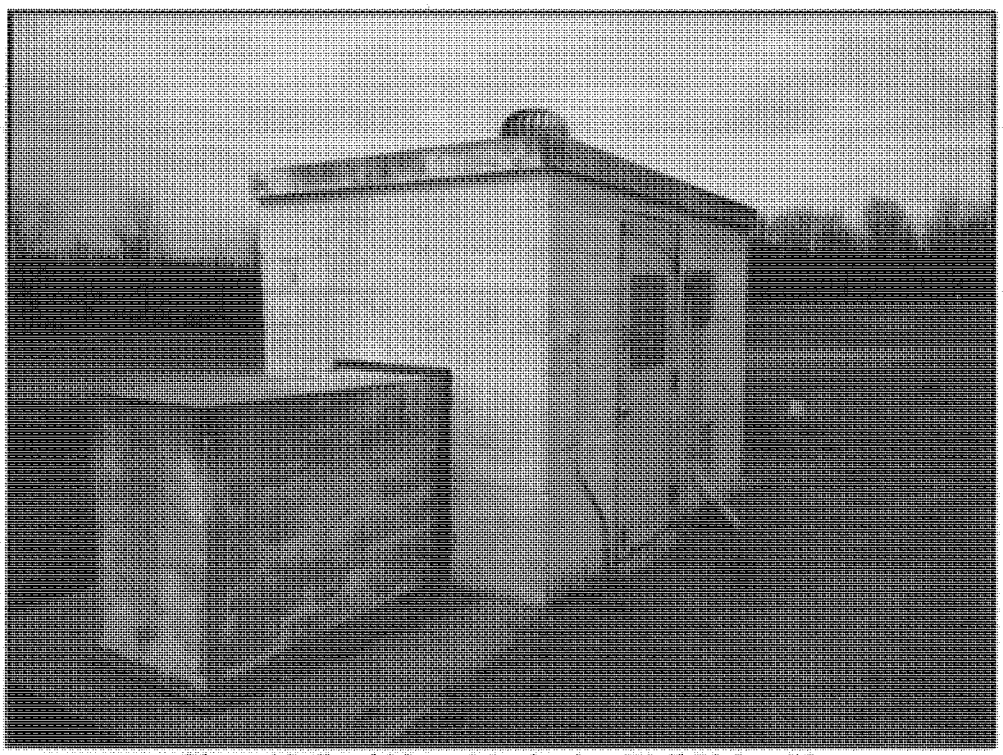

Photo 18: Roubidoux Monitoring Well Picher #5

Photo 19: Location of Filled Mine Shaft at Admiralty Mine Site

Photo 20: Portion of Diversion and Dike Structures at Admiralty Mine Site

ED_001863D_00014986-00217

Photo 21: Rip-rap of Diversion Channel at Admiralty Mine Site

Photo 22: Diversion Channel at Admiralty Mine Site

ED_001863D_00014986-00218

Photo 23: Confluence of Diversion Channel and Tar Creek

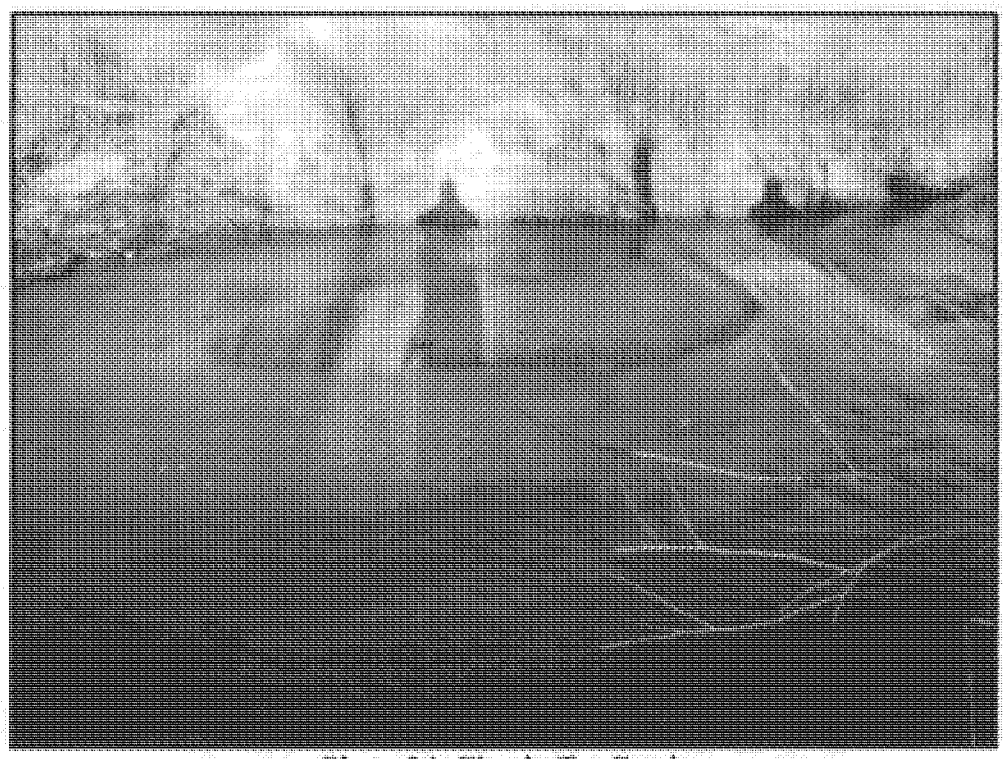

Photo 24: Chat in Tar Creek

ED_001863D_00014986-00219

Photo 25: Flooded Collapsed Mine Feature at Admiralty Mine Site

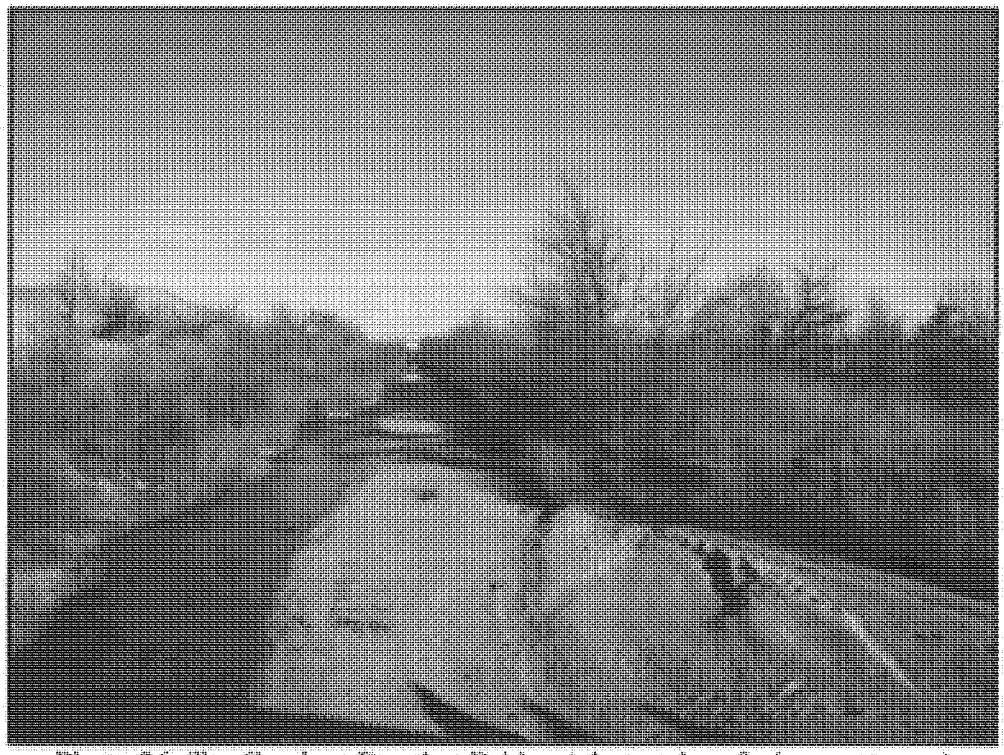

Photo 26: Tar Creek at Douthat Bridge (photo taken facing upstream)

ED_001863D_00014986-00220

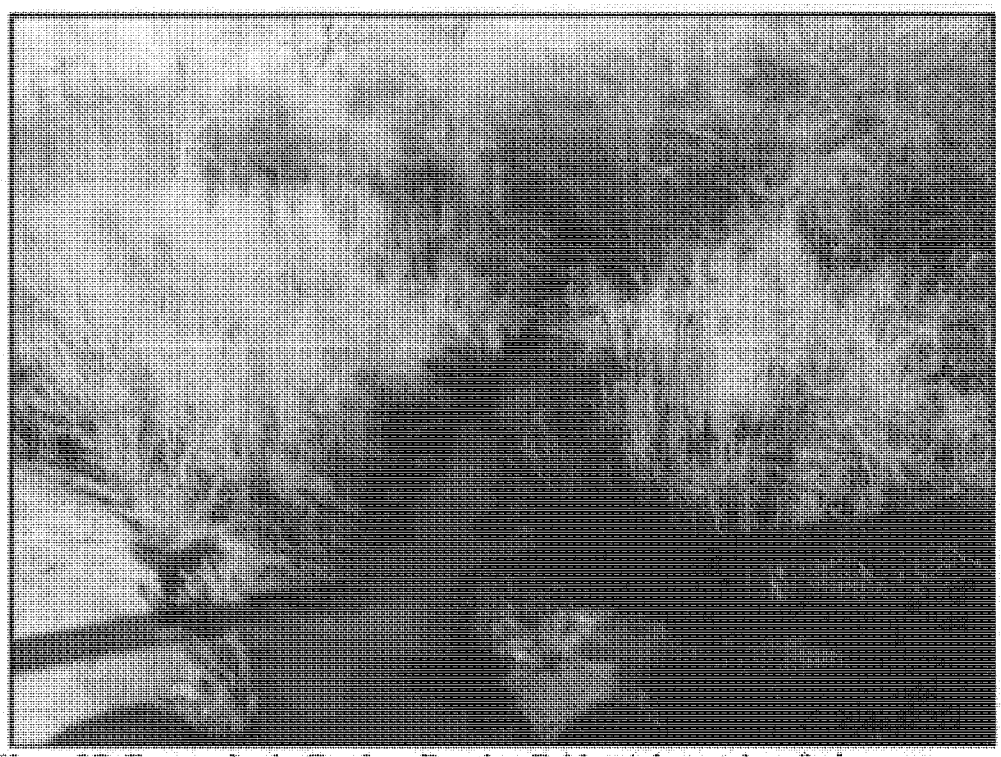

Photo 27: Former Lytle Creek at Douthat Bridge (photo taken facing upstream)

Photo 28: Chat in Tar Creek at Douthat Bridge (photo taken facing upstream)

ED_001863D_00014986-00221

Photo 29: Tar Creek at Douthat Bridge (photo taken facing downstream)

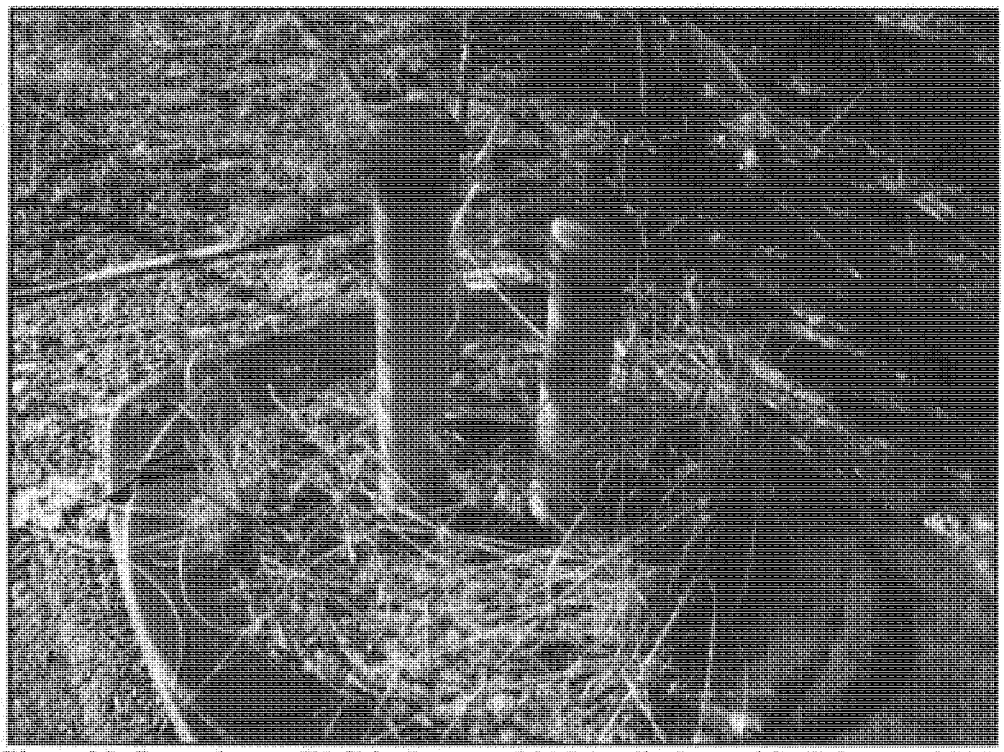

Photo 30: Powerhouse Well in January 2015 (well plugged in February 2015)

Photo 31: Tar Creek at Stateline Road between Oklahoma and Kansas

Photo 32: OU2 Repository Formerly Owned by Picher Development Authority; Property Currently Owned by Quapaw Tribe

ED_001863D_00014986-00223

Photo 33: OU2 Repository Formerly Owned by Picher Development Authority; Property Currently Owned by Quapaw Tribe

Photo 34: MW-1 at Sooner Pile, Location of Chat Injection Pilot Study

Photo 35: Chat Washing Operation at Sooner Pile

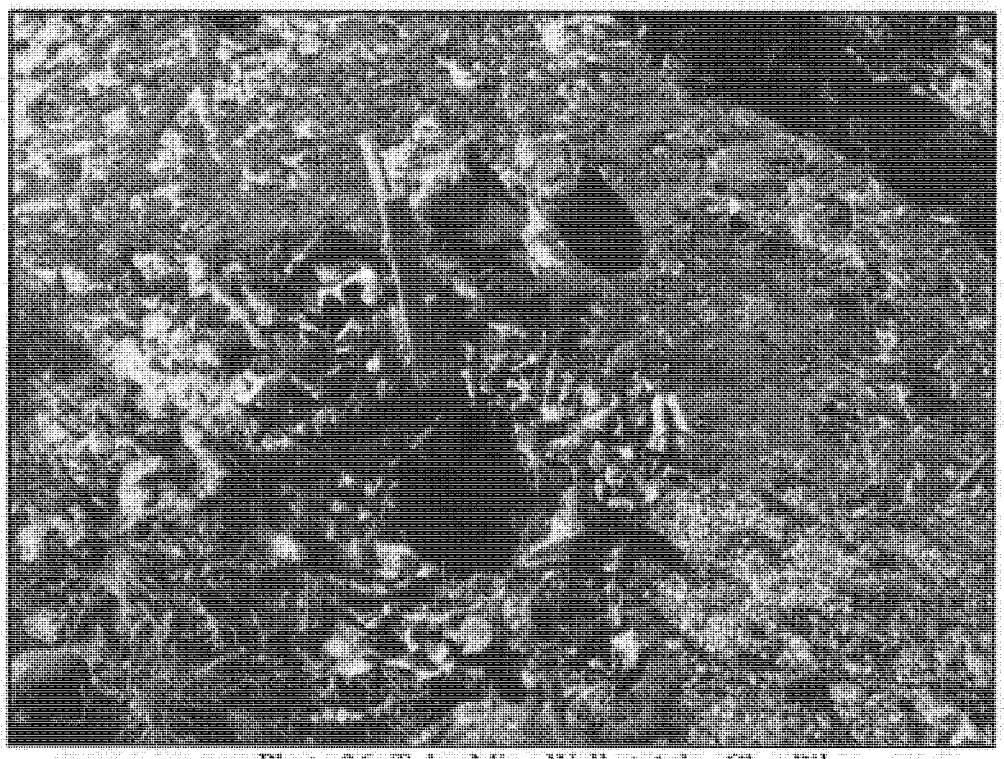

Photo 36: Tulsa Mine Well at Atlas Chat Pile
(well was plugged in February 2015)

Photo 37: Distal 8 Remediation (Catholic 40)

Photo 38: Soil Amendments Placed on Catholic 40 Site

Photo 39: Chat Hauling from Distal 6A

Photo 40: Excavation of Chat from Distal 6A

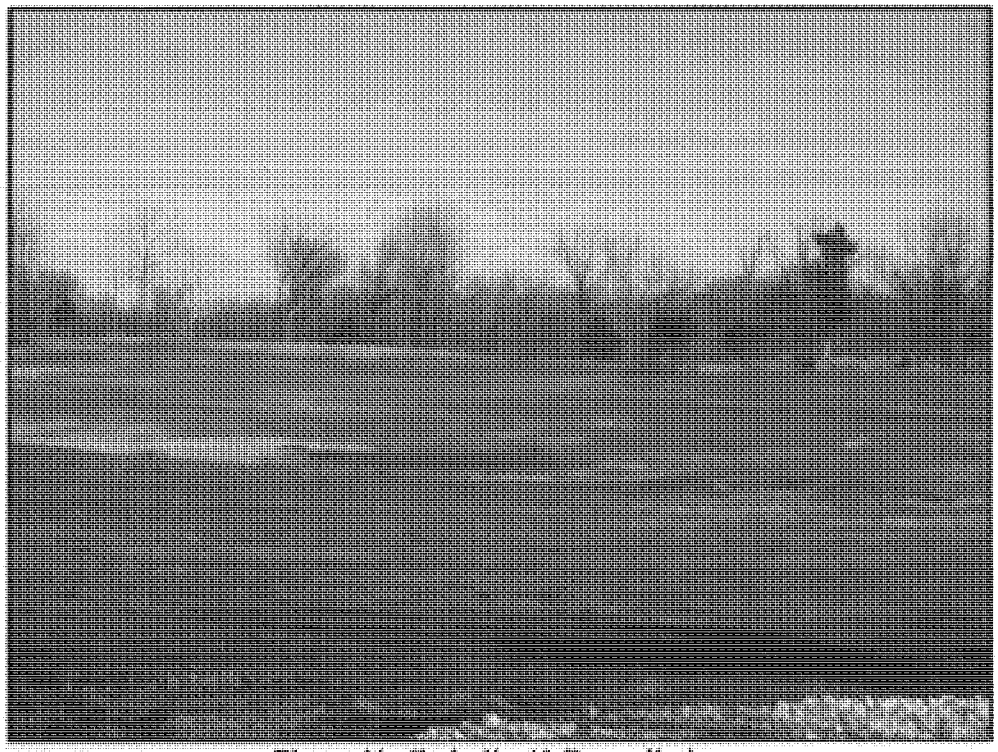

Photo 41: Catholic 40 Remediation

Photo 42: Soil Amendment Placement on Catholic 40

Photo 43: Distal 6 (CP104) Final Remediation

Photo 44: Distal 7 North; Vegetation Has Yet to Become Established

Photo 45: Distal 1 Final Remediation

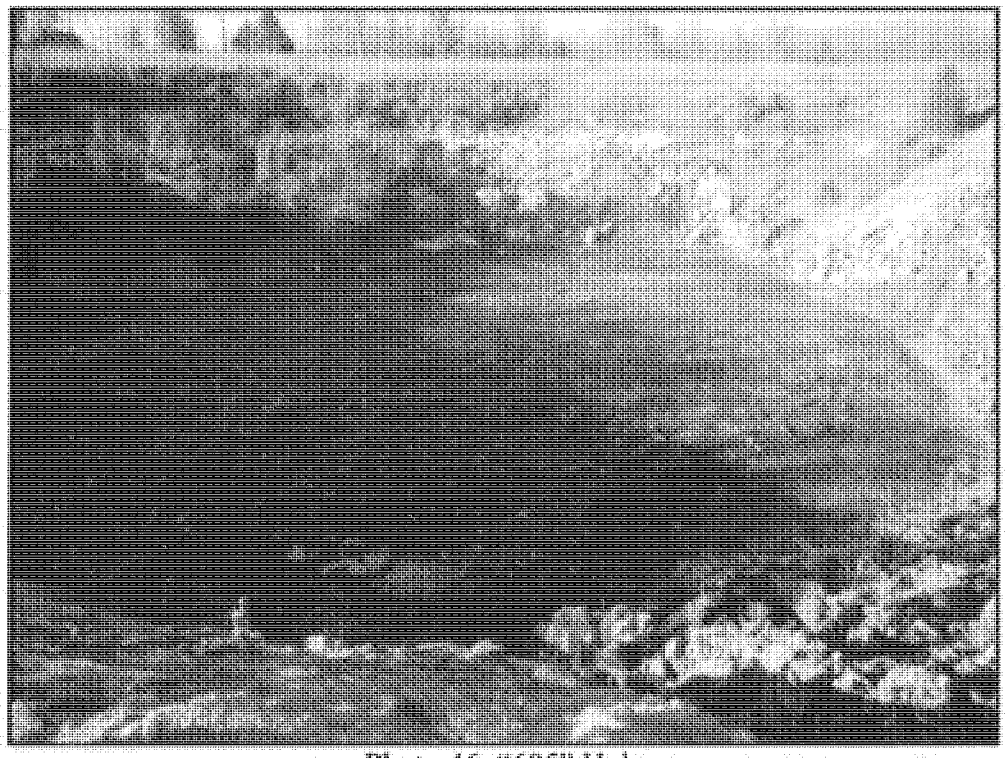

Photo 46: "605" Hole

Photo 47: County Subsidence Near 605 Road

Photo 48: Hockerville Subsidence; Settling and Vandalism Present

ED_001863D_00014986-00231

Photo 49: Hockerville Subsidence; Settling and Vandalism Present

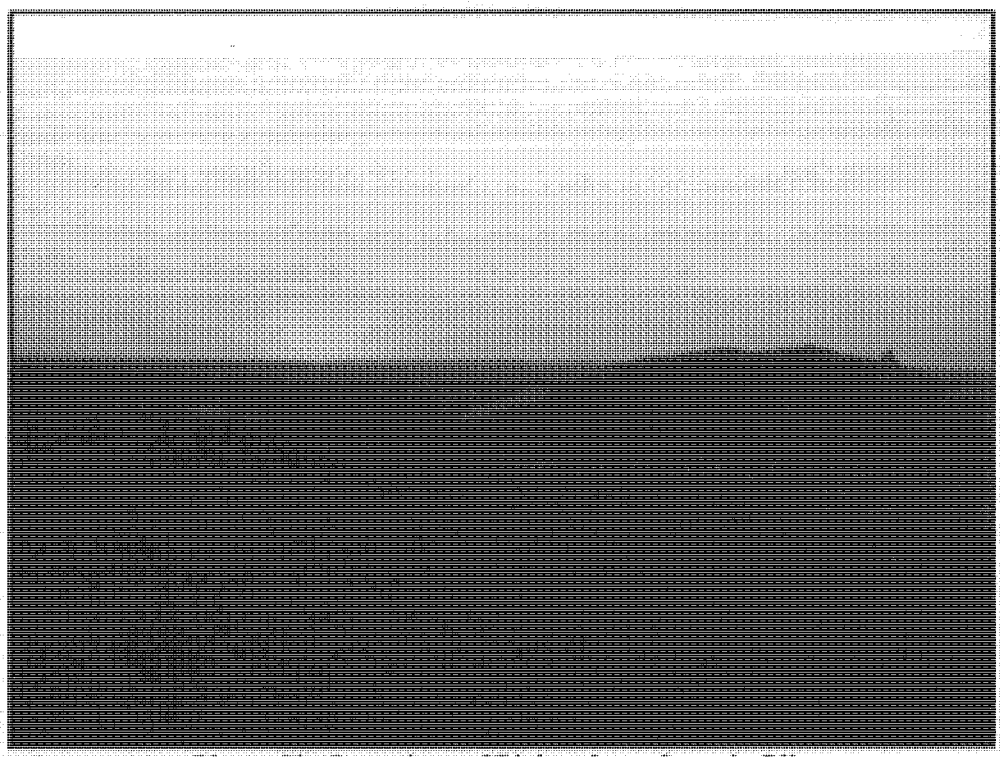

Photo 50: Overview of Picher from Semple Pile

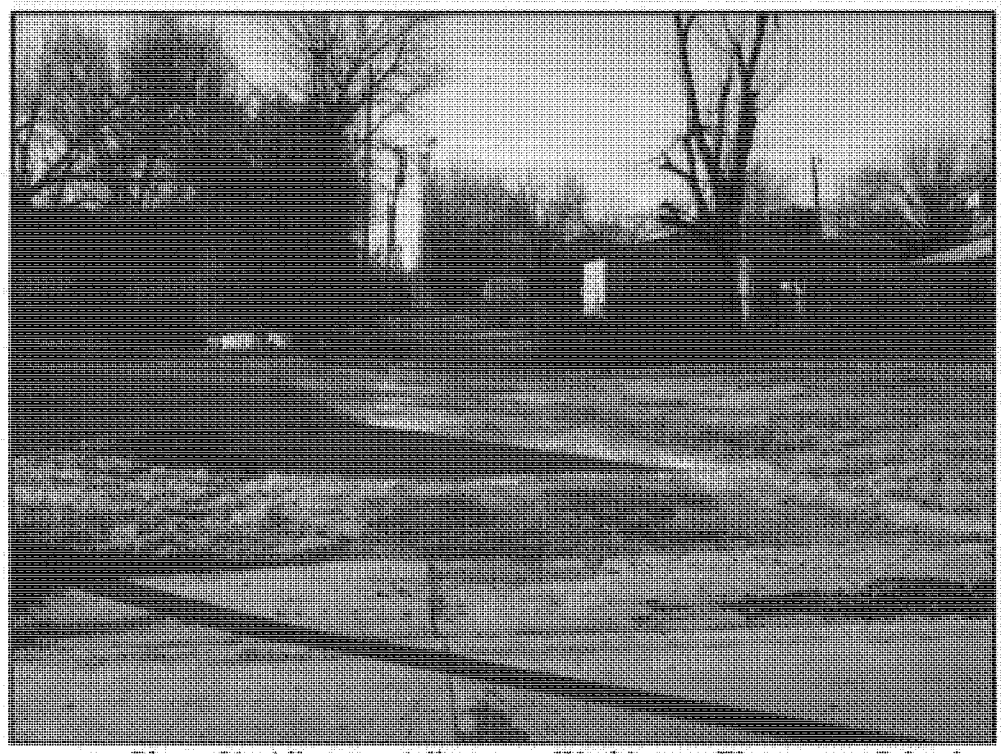

Photo 51: Alleyway Adjacent to Washington Elementary School; No Chat Present

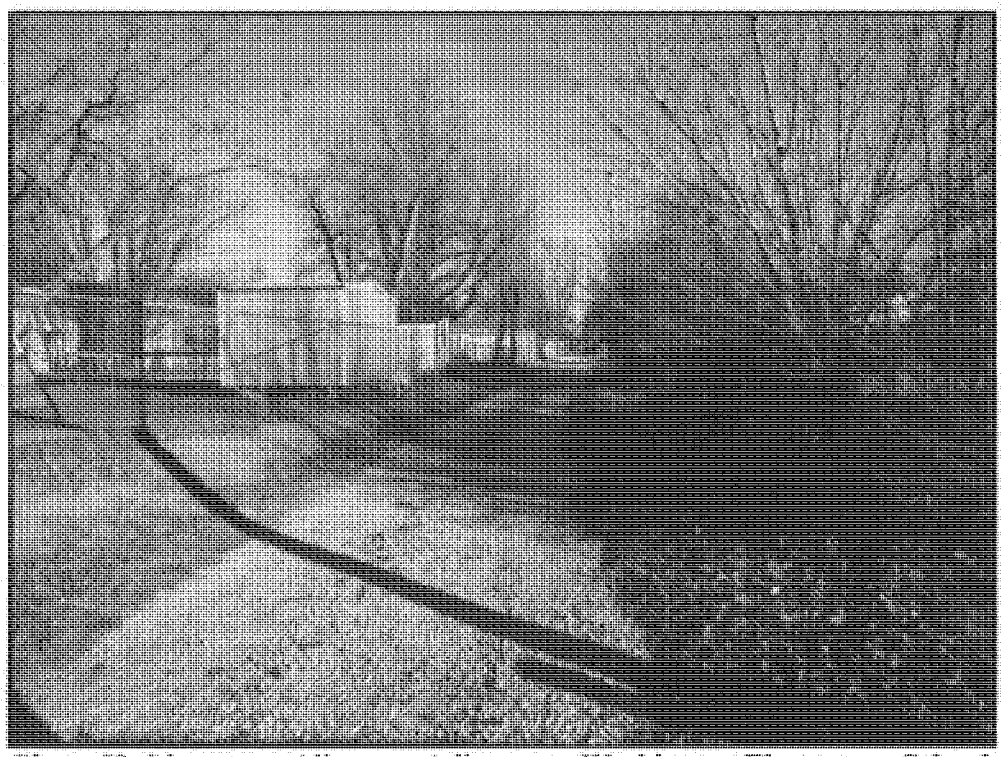

Photo 52: Limestone Alleyway Adjacent to Washington Elementary School

ED_001863D_00014986-00233

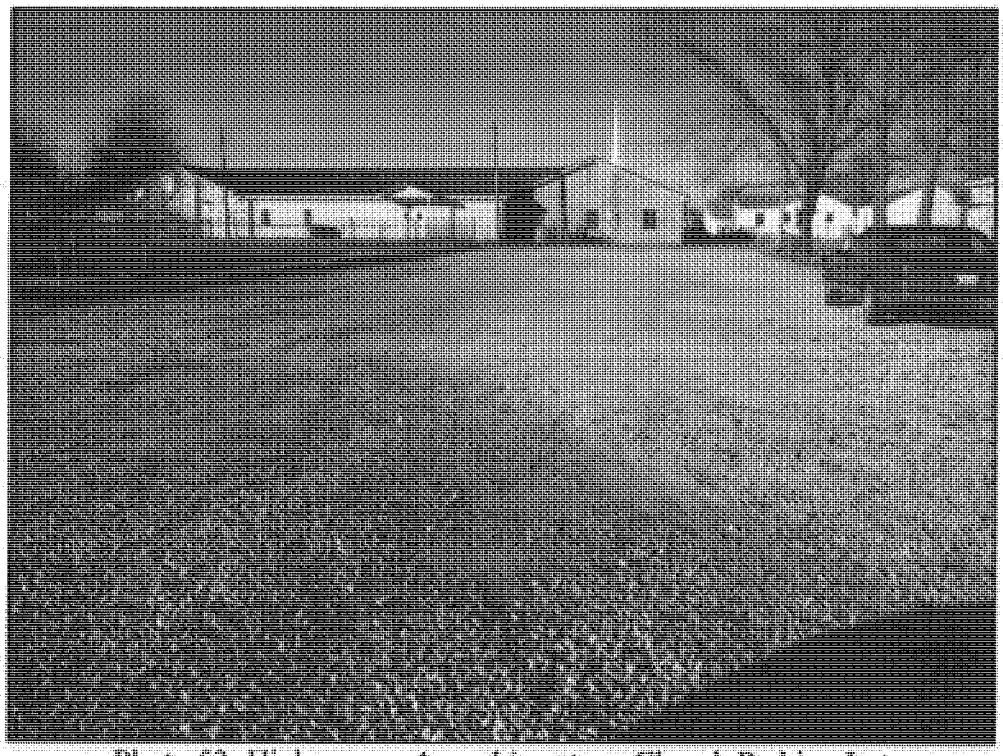

Photo 53: High-access Area, Limestone Church Parking Lot

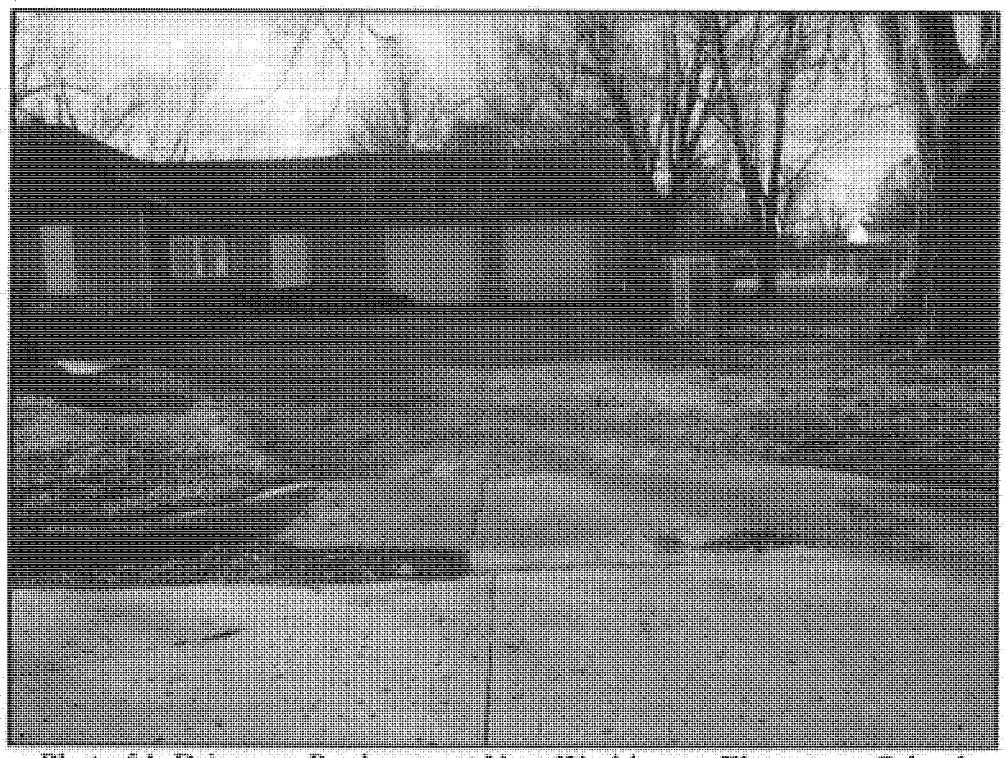

Photo 54: Driveway Replacement Near Washington Elementary School

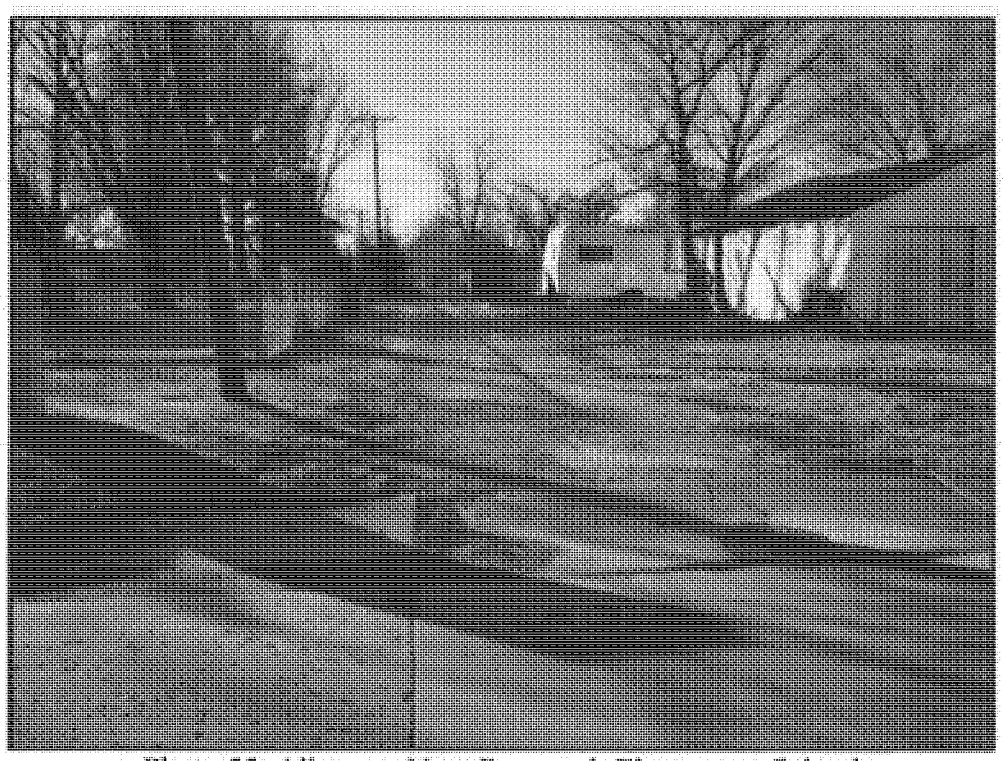

Photo 55: Alleyway Near Roosevelt Elementary School

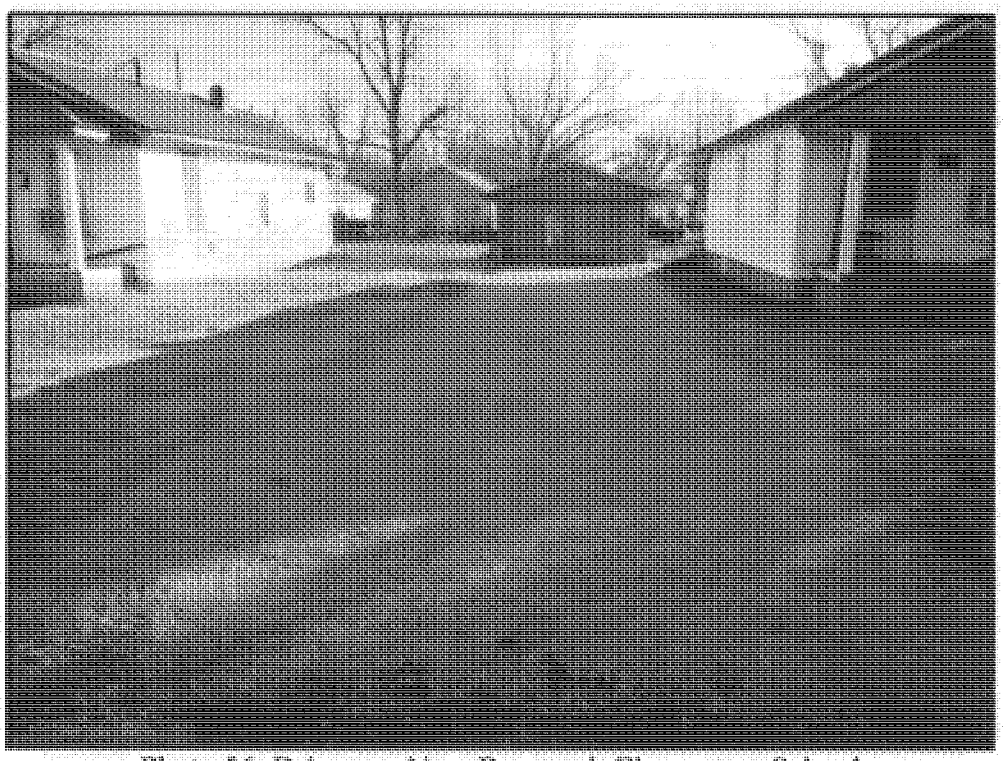

Photo 56: Driveway Near Roosevelt Elementary School

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Photo 57: Alleyway Near Roosevelt Elementary School

Photo 58: Alleyway Near Roosevelt Elementary School

Photo 59: Armory Near Riverview Park; Chat Parking Lot has been Replaced with Limestone

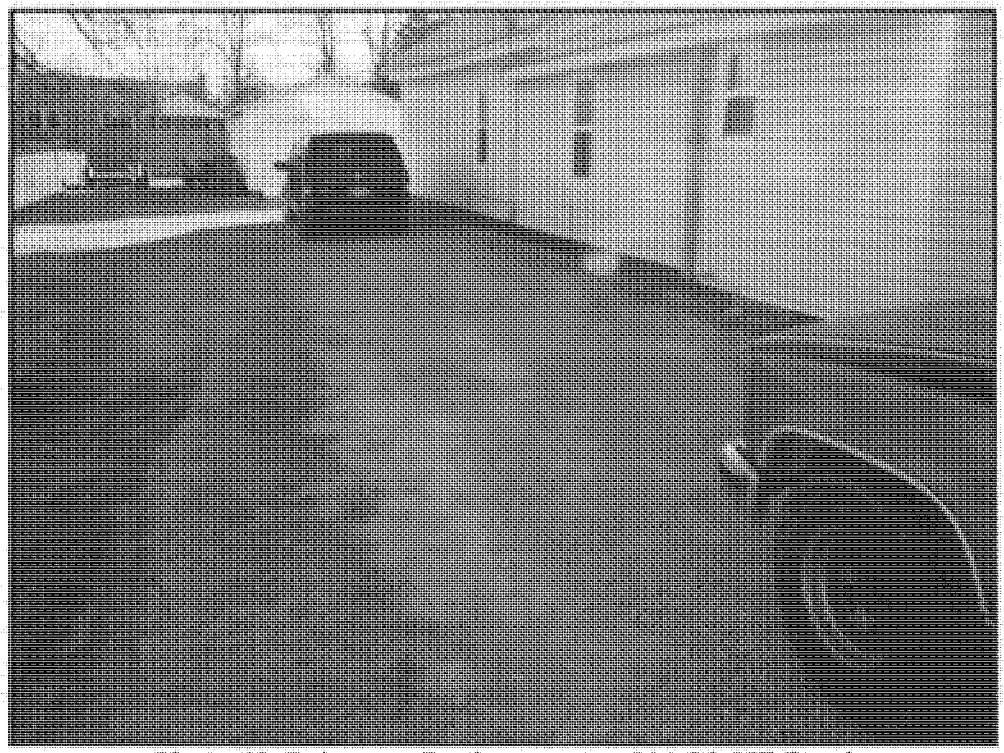

Photo 60: Driveway Replacement at 504 5th NE Road

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Photo 61: Yard Replacement in Commerce Under OU2

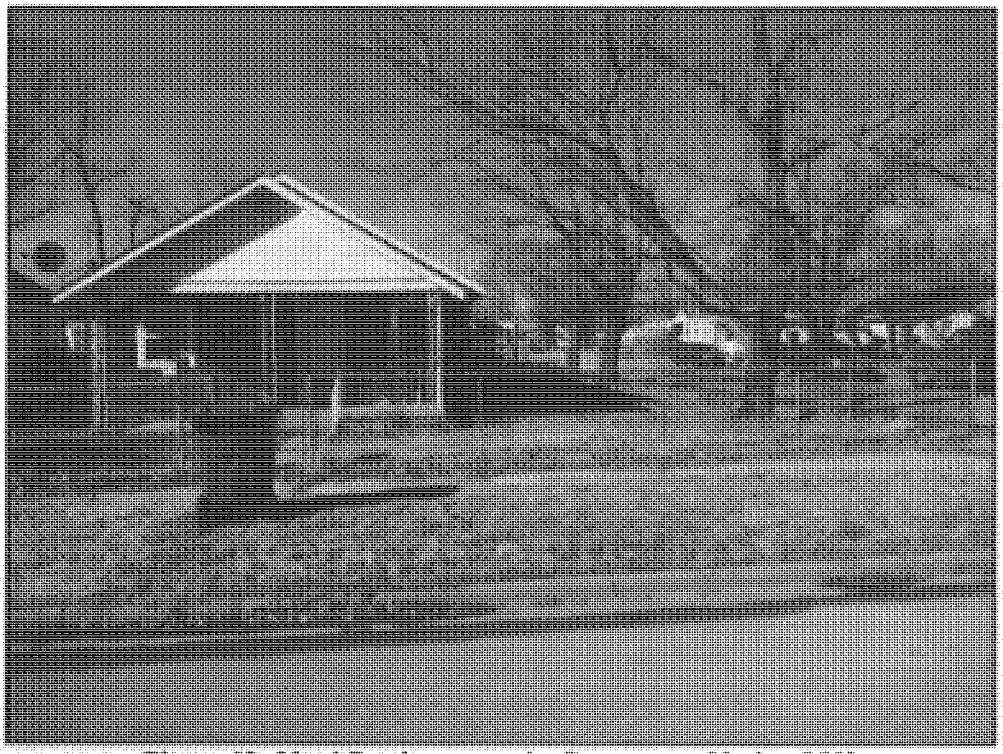

Photo 62: Yard Replacement in Commerce Under OU2

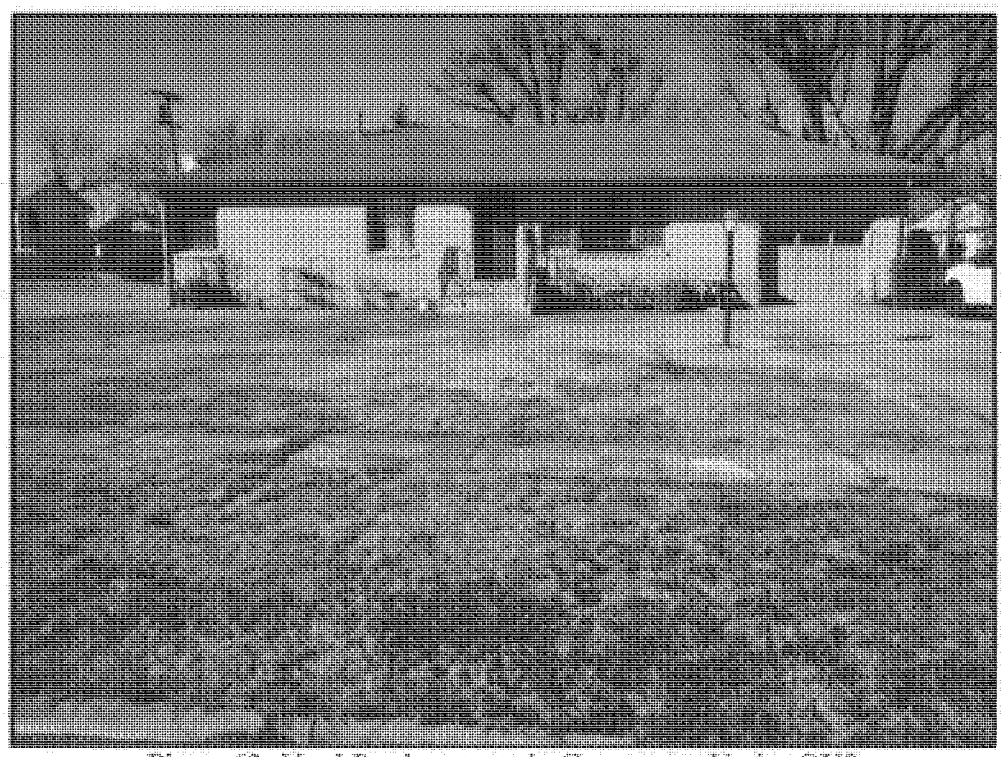

Photo 63: Yard Replacement in Commerce Under OU2

Photo 64: Yard Replacement in Commerce Under OU2

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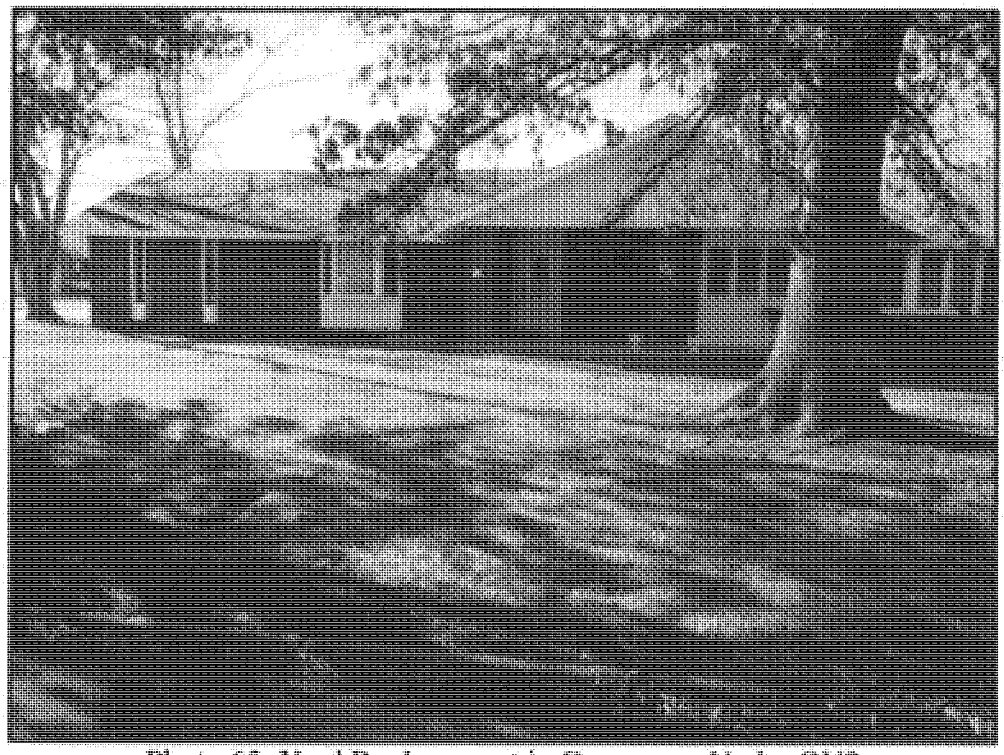

Photo 65: Yard Replacement in Commerce Under OU2

Message

From: Fonseca, Silvina [Fonseca.Silvina@epa.gov]
Sent: 3/5/2018 4:56:24 PM
To: Kelly, Albert [kelly.albert@epa.gov]
Subject: Sites w Funding Increase to OLEM 2 27 18_v3 (002).docx
Attachments: Sites w Funding Increase to OLEM 2 27 18_v3 (002).docx

Kell,

Good morning, this is what was sent over to Paige in OCFO last week regarding the funding of Superfund Sites that were ready to go. Although this provides the list of sites currently awaiting to be funded it does not identify any particular priority as that depends on several factors, including the ability to get 10% cost share from the state. Let me know if you have any questions.

Silvina Fonseca
Special Assistant
Office of the Administrator
U.S. Environmental Protection Agency
Desk: 202.564.1955
Cell: 202.306.6844

Message

From: Fonseca, Silvina [Fonseca.Silvina@epa.gov]
Sent: 12/8/2017 3:17:50 PM
To: Grantham, Nancy [Grantham.Nancy@epa.gov]
CC: Kelly, Albert [kelly.albert@epa.gov]
Subject: XSEL 12.8.17 draft final 10.13 am.xlsx
Attachments: XSEL 12.8.17 draft final 10.13 am.xlsx

Most recent. Includes changes from Region 1 and from Cyndy Mackey on Portland Harbor.

Silvina Fonseca
Special Assistant
Office of the Administrator
U.S. Environmental Protection Agency
Desk: 202.564.1955
Cell: 202.306.6844

Message

From: Chancellor, Erin [chancellor.erin@epa.gov]
Sent: 2/28/2018 2:24:52 PM
To: Kelly, Albert [kelly.albert@epa.gov]; Wagner, Kenneth [wagner.kenneth@epa.gov]
Subject: FW: EPA Quapaw BIA Meeting on Feb 21, 2018
Attachments: EPA Quapaw BIA Mtg Attendees 2.21.18 .pdf; Tim Kent - Quapaw Tribe of Oklahoma; Craig A. Kreman - Quapaw Tribe of Oklahoma; Chris Roper - Quapaw Tribe of Oklahoma; Trenton Stand - Quapaw Tribe of Oklahoma; Ed Rodgers - Quapaw Tribe of Oklahoma; Will Rodgers - Quapaw Tribe of Oklahoma; Misty Scott - Quapaw Tribe of Oklahoma; Rhonda L. Loftin - U.S. DOI Bureau of Indian Affairs; Sammy Beets - U.S. DOI Bureau of Indian Affairs; Laura Knight Palmer - U.S. DOI Bureau of Indian Affairs

List of attendees from the Quapaw meeting attached. I've also attached contact cards for the folks on the list if ya want them.

Erin E. Chancellor

From: Luckett, Casey
Sent: Wednesday, February 28, 2018 8:48 AM
To: tkent@quapawtribe.com; CKreman@quapawtribe.com; Chancellor, Erin <chancellor.erin@epa.gov>; Rhonda Loftin <rhonda.loftin@bia.gov>; Chris Roper <croper@quapawservices.com>
Cc: Atkins, Blake <Atkins.Blake@epa.gov>
Subject: EPA Quapaw BIA Meeting on Feb 21, 2018

Attached is the sign in sheet which was circulated during our meeting last week. Please share with others in your organization.

Thanks,
Casey

Casey Luckett Snyder
EPA R6 Project Manager and
Superfund Reuse Coordinator
214.665.7393
luckett.casey@epa.gov

Contact

Full Name: Chris Roper
Last Name: Roper
First Name: Chris
Company: Quapaw Tribe of Oklahoma

Business Address: Ex. 6 - Personal Privacy

Business Phone:
Mobile Phone: Ex. 6 - Personal Privacy
Fax Number:

Web Page: www.quapawtribe.com

E-mail: Ex. 6 - Personal Privacy

Met at 2/20/18 Tar Creek meeting.

Contact

Full Name: Ed Rodgers
Last Name: Rodgers
First Name: Ed
Company: Quapaw Tribe of Oklahoma

Business Address: Ex. 6 - Personal Privacy

Business Phone:
Mobile Phone: Ex. 6 - Personal Privacy
Fax Number:

Web Page: www.quapawtribe.com

E-mail: Ex. 6 - Personal Privacy

Met at 2/20/18 Tar Creek meeting.

Contact

Full Name: Laura Knight Palmer
Last Name: Palmer
Middle Name: Knight
First Name: Laura
Company: U.S. DOI Bureau of Indian Affairs

Business Address: 34 A Street, NE P.O. Box 391 Miami, OK 74354

Business Phone: (918) 542-3396
Fax Number: (918) 542-7202

Web Page: www.bia.gov

E-mail: laura.knight@bia.gov

Met at 2/20/18 Tar Creek Quapaw Tribe meeting.

Contact

Full Name: Misty Scott
Last Name: Scott
First Name: Misty
Company: Quapaw Tribe of Oklahoma

Business Address: Ex. 6 - Personal Privacy

Business Phone:
Mobile Phone:
Fax Number:
Ex. 6 - Personal Privacy

Web Page: www.quapawtribe.com

E-mail: Ex. 6 - Personal Privacy

Met at 2/20/18 Tar Creek meeting.

Contact

Full Name: Sammy Beets
Last Name: Beets
First Name: Sammy
Company: U.S. DOI Bureau of Indian Affairs

Business Address: 34 A Street, NE P.O. Box 391 Miami, OK 74354

Business Phone: (918) 542-3396
Fax Number: (918) 542-7202

Web Page: www.bia.gov

E-mail: sammy.beets@bia.gov

Met at 2/20/18 Tar Creek Quapaw Tribe meeting.

Contact

Full Name: Trenton Stand
Last Name: Stand
First Name: Trenton
Company: Quapaw Tribe of Oklahoma

Business Address: Ex. 6 - Personal Privacy

Business Phone:
Fax Number: Ex. 6 - Personal Privacy

Web Page: www.quapawtribe.com

E-mail: Ex. 6 - Personal Privacy

Met at 2/20/18 Tar Creek meeting.

Contact

Full Name: Will Rodgers
Last Name: Rodgers
First Name: Will
Company: Quapaw Tribe of Oklahoma

Business Address: Ex. 6 - Personal Privacy

Business Phone:
Fax Number: Ex. 6 - Personal Privacy

Web Page: www.quapawtribe.com

E-mail: Ex. 6 - Personal Privacy

Met at 2/20/18 Tar Creek meeting.

Message

From: Timothy Kent [Ex. 6 - Personal Privacy@quapawtribe.com]
Sent: 4/4/2018 2:35:35 PM
To: Kelly, Albert [kelly.albert@epa.gov]
CC: Ex. 6 - Personal Privacy@quapawtribe.com; John Berrey [Ex. 6 - Personal Privacy@ogahpah.com]; Steve Danforth [Ex. 6 - Personal Privacy@apinnovations.com]; Ex. 6 - Personal Privacy@icloud.com; Chris Roper [Ex. 6 - Personal Privacy@quapawservices.com]
Subject: RE: Quapaw WIFIA project
Attachments: LOI Cover Letter ARK_WIFIA_ 4-4-18.pdf; LOI Form_final_4-4-18.pdf; Narrative for Grand Prairie Farm and Water EPA Letter of Interest Final 4-9-17.pdf

Kel,

Chairman Berrey asked me to get the attached documents to you this morning. They include a WIFIA Program Letter of Interest and cover letter for a water resources infrastructure project in Arkansas that the Tribe is very interested to participate in-and ultimately administer. The appendices were too large to send; but they will be included with the copy we submit to the WIFIA program, unless you have a specific person at the Office Water you would like it to go to.

Please let me know if you have questions, or if you require additional information.

From: Kelly, Albert <kelly.albert@epa.gov>
Sent: Tuesday, April 03, 2018 3:20 PM
To: Timothy Kent <Ex. 6 - Personal Privacy@quapawtribe.com>
Subject: RE: address request

You have email. Mail is 1200 Pennsylvania Ave. NW, Washington DC 20460, Room 3320 WJC North

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Timothy Kent [mailto:Ex. 6 - Personal Privacy@quapawtribe.com]
Sent: Tuesday, April 3, 2018 4:17 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: address request

Kel,

This is Tim Kent with the Quapaw Tribe. I'm addressing a letter to you from John Berrey. Could you give me your address?

Tim Kent, PG
Environmental Director
Quapaw Tribe of OK

Section A: Prospective Borrower Information

10. Organizational Structure of Project

The prospective borrower for this project is the Quapaw Tribe of Oklahoma (Tribe). The Tribe is partnering with the Grand Prairie Farming and Water Company, LLC. to finance and implement the project. The Tribe has extensive experience in financing and managing large construction, infrastructure, and environmental projects. These include: managing and performing $10 to 15 Million per year of remediation projects at the largest Superfund site in the nation (Tar Creek Superfund site); owning and operating 3 Public Water Supply systems, including 7 deep groundwater supply wells; constructing, owning, and operating the first tribal beef processing center, constructing, owning, and operating $300 Million casino resort; commercial agricultural operations on over 6000 acres of land in northeast Oklahoma. Personnel for administering the project from the tribal side of the partnership will come from the Tribe's Environmental Engineering, construction, and finance divisions.

Partnering with the prospective borrower is Grand Prairie Farming & Water Company, LLC (GPFWC). Jerry Lee Bogard and Rebecca Miller are the co-managers of GPFWC. Jerry Lee will oversee the day-to-day operations of the project and Rebecca will be available if needed. The engineering services and construction management will be the responsibility of Steven Danforth, P.E. and Agri Process Innovations, Inc. (APInnovations). Jerry Lee Bogard has known Steven Danforth and Jerry Kelly for decades and they have worked together on various projects in the past. Jerry Lee Bogard has known J. Steven Rice for over ten years and J. Steven Rice is married to Jerry Lee Bogard's daughter).

The legal needs of the project will be overseen by Jerry Kelly, J.D. and Kelly Law Firm, P.A.

The accounting and bookkeeping needs of the project will be overseen by J. Steven Rice, CPA, J.D.

Richard Penn, P.E., the former Utilities Director for the City of Hot Springs, AR and former Director of Community Development and Public Works for the City of Bryant, AR., is a current project engineer for the APInnovations and will oversee project and construction management of the proposed projects *(see attached Appendix A)*.

.

Regarding GPFWC's past experiences with projects of similar size, Jerry Lee Bogard and Steven Danforth have worked together in building infrastructure projects internationally. Richard Penn has managed municipal and other water projects exceeding the cost of $100 million dollars. Steven Danforth is Co-owner of a $10,000,000 per year fabrication and construction company.

11. Public Sponsorship

Tri-Bayou Water District, Arkansas County Conservation District, and Arkansas Natural Resources Commission (ANRC) have reviewed and approved project applications for Tax Credits from the State of Arkansas. This is an ongoing process, committing public funds in the form of credits from the Arkansas Department of Finance and Administration. These reviews and approvals represent local, county, and state levels of governments. Additional public awareness and support is demonstrated by the positive response of individuals who visit the website, "Thewaterdrop.org". Organizational support was

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shown at a recent conference involving USA Rice, Ducks Unlimited, USDA/NRCS, ANRC, and others who applauded the presentation of the proposed projects. Importantly, the Quapaw Tribe's ancestral homeland is in central and eastern Arkansas; therefore, the Tribe is sponsoring this project as part of the Tribe's continuing interests (both culturally and historically) in this region.

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Section B: Project Plan

3. Project Description

As reported by "CBS 60 Minutes", in a special report that aired in May 2015, regardless of the geographic location of any farm, business, or person, we all share a groundwater depletion risk; it is occurring worldwide even today. The science used to track this phenomenon of groundwater depletion clearly shows it has only emerged as a global threat within the last 70 years, as man acquired the financial and technical wherewithal to tap aquifers throughout the world for industrial, agricultural, and personal use.

Grand Prairie Farming and Water Company owns one of a handful of renewable high quality fresh surface water resources available on any continent that can be utilized for groundwater mitigation over a broad area at an economic cost that is sustainable. In fact, this surface water resource can spawn an economic engine that will support infrastructure development, job growth, peace, and food security throughout the world.

Due to an overwhelming need to mitigate groundwater depletion in critical groundwater areas, Grand Prairie Farming and Water Company proposes several projects utilizing the defunct Bayou Meto Canal Company (BMCC) Lift Station. The projects will upgrade the natural water system near Bayou Meto and recycle surface water for agricultural water supply, ground water protection, fish and wildlife restoration and enhancement over the project area.

Phase 1 Development Project will provide for agricultural water supply, ground water protection, and fish and wildlife restoration and enhancement over a general area of 22,250 acres. The project provides substantial improvements, including upgrades to pumping capacity from 42kgpm to 150kgpm, replacement of collapsed pipes under road crossings for increasing public safety and to allow higher flows, and enhancements to canal pools to increase both storage volume and conveyance capacity. Figure 1 *(see attached Appendix B)* demonstrates how an increase in system capacity would be used to create sustainable surface water for irrigation purposes.

Phase 2 Development Project will extend surface water benefits to a general project area of 41,000 acres located in an area from Lodges Corner northward approximately four (4) miles to Highway 130. This territory has been studied by the United States Army Corps of Engineers (USACE) in support of the White River Irrigation District (WRID). Improvements made during GPFWC Phase 1 construction to the original BMCC Lift Station will support increased agricultural water supply, ground water protection, and fish and wildlife restoration and enhancement over the Phase 2 project area in advance of efforts made by WRID. Studies, designs, authorizations, permits, and plans developed by USACE will be utilized by GPFWC to accomplish delivery of the surface water distribution system and dismiss the need for WRID to be present in the project area.

Phase 3 Expansion Project will extend new construction northward, westward, and eastward into the remaining territories already studied by USACE in support of the floundering efforts of WRID and Bayou Meto Water Management District (BMWMD) to provide surface water benefits to these areas. Existing USACE designs will be incorporated into GPFWC plans, along with existing approvals, permits, preliminary studies, etc. that could otherwise slow the progress of GPFWC.

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4. Project Purpose

In a recent SEC Academic Conference, Jay Famiglietti, a senior water scientist at the NASA Jet Propulsion Laboratory at the California Institute of Technology, emphasized the importance of determining a way to address the current global water crisis.

"Of the world's 37 major aquifers, about 20 are past sustainability tipping points and correspond to our major food-producing regions." Excessive ground water withdrawals on a worldwide, daily basis have heavily impacted aquifers that require 50 years to recharge; only 6% of these aquifers remain. Figure 2 illustrates the critical groundwater areas in the United States, including areas such as the Sparta aquifer, where the entire region is a critical groundwater depletion area.

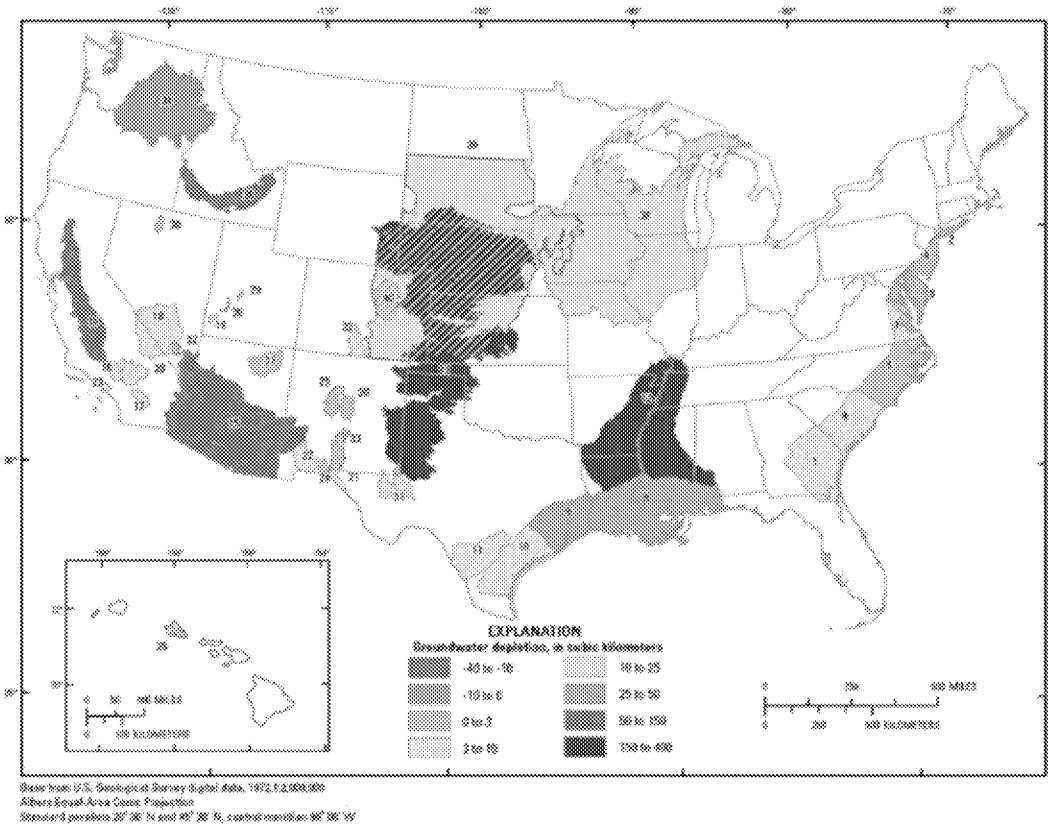

Figure 2. Map of the United States (excluding Alaska) showing cumulative groundwater depletion, 1900 through 2008, in 40 assessed aquifer systems or subareas. Index numbers are defined in table 1. Colors are hatched in the Dakota aquifer (area 39) where the aquifer overlaps with other aquifers having different values of depletion.

Grand Prairie Farming and Water Company is working directly with policy makers and farmers to create a sustainable delivery system for surface water to enable mitigation of groundwater wells. The Grand Prairie Water Credit Program assists in funding these development projects. The amounts of groundwater that can be mitigated in the critical depletion areas served by GPFWC are given below:

Phase 1 Development Project will mitigate 5,083,282,264 gallons/year.
Phase 2 Development Project will mitigate 18,299,816,152 gallons/year.
Phase 3 Expansion Project will mitigate 203,331,290,581 gallons/year.

Total mitigation per year equal to 226,714,388,997 gallons.
Average US household uses 300 gallons/day or 190,500 gallons/year (EPA estimates).

Therefore, the Grand Prairie Water and Farming Project will be mitigating enough water for 1,190,101 US households annually!

The Grand Prairie Water Credit Program was created for the sole purpose of mitigating the groundwater footprint of farmers, industry, and personal consumption worldwide. In response to growing global water scarcity, the Grand Prairie Water Credit Program exists to provide a clear method for participating farmers and landowners to use renewable water sources (surface water) in place of non-renewable water sources (groundwater). Simply put, the Grand Prairie Water Credit Program enables sustainability. It allows participating farmers and landowners to continue their farming operations and food production activities with affordable, high quality surface water for irrigation in place of higher cost water pumped from depleting aquifers.

Funds generated through the purchase of Grand Prairie Water Credit Certificates allow Grand Prairie Marketing and Trading, LLC to provide participating landowners and farmers with large volumes of renewable, high quality surface water. Grand Prairie Marketing and Trading LLC obtains its right to large volumes of surface water by lease from its parent company, Grand Prairie Farming and Water Co., LLC. Grand Prairie Marketing and Trading, LLC, through its Grand Prairie Water Credit Program, creates a contractual relationship between itself and landowners and farmers that enables it to serve as the AGGREGATOR OF THE GRAND PRAIRIE WATER CREDITS.

A Grand Prairie Water Credit helps balance one's groundwater footprint, gallon-for-gallon, and achieve important water security, food security, and environmental benefits. Each Grand Prairie Water Credit represents 162,925 gallons of available surface water to mitigate groundwater, directly contributing to restoring the vitality of national groundwater resources. Grand Prairie Marketing and Trading, LLC exchanges these water credits for the groundwater rights of property owners for the expressed purpose of preventing said property owners, any of their farming tenants, and anyone else with rights of access to such property from using the fresh, clean groundwater from the available aquifers that has otherwise been used to irrigate crops. By exchanging their rights to their groundwater sources, they are agreeing to accept alternative sources of water to meet their needs. The Grand Prairie Water Credit Program aggregates a verified volume of groundwater that is preserved in the aquifer by turning off the associated well pumps and monitoring the discontinued use of those wells for the time period defined within the Credit instrument.

Each Grand Prairie Water Credit is currently priced at $1,059.00 per credit. Each credit is renewable from year to year within the irrigation cycle of major agricultural crops grown on farms associated with the ground water wells to which the pumping rights have been restricted under the Grand Prairie Water Credit Program (this restriction serves as the mitigating source). Once the aggregate gallons of groundwater preserved are verified, serialized and transferable certificates are created and registered with an environmental registry. This registration of the certificate includes the ownership of these environmental benefits, the year in which the benefits are generated, and other necessary background information. These certificates have a unique serial number associated with each unit of benefit to prevent double counting and enable the certificates to be tracked. Such tracking by the registry ensures the integrity and transparency of the environmental benefit.

The same process as the Water Credit Program is replicated (credit renewed annually) for Winter Water Fowl Habitats whereby groundwater is replaced with surface water as the habitat creation source.

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5. Project Location

The Phase 1 and Phase 2 Development Projects are in an area shown on the attached project map *(see attached Appendix C)*. Lodges Corner, AR is a reference point near the center of Phases 1 and 2, with latitude/longitude of 34.3, -91.525. The existing BMCC Lift Station (south of Lodges Corner) on Bayou Meto is the source point of surface water pumped into the distribution canal system that extends from the lift station northward through existing Phase 1 coverage area and into the proposed Phase 2 coverage area (extending 4 miles north of Lodges Corner).

10. Project Schedule

The project schedule for the various project tentative start and end dates of the planning, design, permitting, and construction phases are on the Grand Prairie Farming, and Water Co, LLC Phase 1 and Phase 2 Development Timeline *(see attached Appendix D)*.

11. Project Analysis

The preliminary engineering analysis of Phase 1 can be found on the attached Appendices E and F which include detailed summaries for the various subprojects as well as an independent impact statement of the Bayou Meto region. Phase 2 preliminary engineering analysis is wholly contained in the USACE documents provided *(see attached Appendix G)*. Phase 3 preliminary engineering analyses are also contained in the USACE documents provided *(see attached Appendix G)*.

12. Project Alternatives

The Water Credit Program with Water Credit Certificates supporting the construction and operation of GPFWC Phases 1, 2, and 3 are the preferred alternative to mitigate groundwater use in favor of surface water supplies. Other alternatives include "Do Nothing", which will quickly lead to the destruction of the Sparta Aquifer and other critical groundwater areas. The "Wait and See" option for WRID and/or BMWMD to proceed with the proposed projects and eventually expand into the underserved areas of the Bayou Meto Basin Project is characterized by a lack of development currently in the region; this alternative would involve doing nothing and hoping future funding reaches the Bayou Meto Project to continue their delayed development. The preferred alternative given above for GPFWC Phase 1,2, and 3 presents a better option for funding in the form of water credits as described in Section B, item 4. These credits offset the pumping cost to irrigation water consumers by 50% compared to current groundwater pumping. *(see attached Appendix E)*

13. System Master Plan

The master plan *(see attached Appendix C)* includes a detailed drawing of overall projects along the water distribution system. Phases 1 and 2 will serve areas of Arkansas County; Phase 3 has the potential of serving portions of Prairie, Arkansas, Lonoke, and Monroe Counties over a project area of 362,662 acres.

Phase 1 Development Project provides a substantial improvement including upgrades to system capacity from 42kgpm to 150kgpm and replaces road crossings and collapsed pipes with higher capacity conduits. By doing so, Figure 1 *(see attached Appendix B)* demonstrates how the increase to system capacity would be used to create sustainable surface water for irrigational purposes.

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Phase 2 Development Project includes new construction of a water distribution system. Source water for this phase is provided through the upgrades to BMCCLS and Phase 1 improvements. This phase provides water supply, ground water protection, and fish and wildlife restoration and enhancement over a project general area of 41,000 acres, extending from Lodges Corner a span of 4 miles northward to Highway 130.

Phase 3 Expansion Project will benefit from coordination with BMWMD and WRID as the land area considered has already been included in coverage areas studied by USACE. Expansion by GPFWC will involve new construction to expand the Phase 1 and Phase 2 Development Projects into the WRID and Bayou Meto areas that are currently underserved.

15. Authorization Actions Necessary

Grand Prairie Farming & Water Company, LLC (GPFWC) is a manager-managed limited liability company. As such, GPFWC would obtain its approval to enter into a loan agreement with the WIFIA program from its managers and ratification by its owners.

16. Environmental Review Process

An environmental review process for Phase 1 is not applicable to most sections of the project(s) due to the nature of the work to be accomplished. The existing canal and associated rights-of-way are owned by GPFWC. The canal has been used in one way or another for more than fifty years. Individual projects plan to improve, replace, or renovate components of the canal system have and little to no impact on the environment. Any new sections of canals in Phase 1 are located adjacent to existing canal sections and represent little to no change of current land use, which is largely agricultural. The human population in Phase 1 coverage area is sparse, suggesting there are virtually no opportunities for adverse impacts (such as relocations), known or anticipated.

The environmental review process for Phases 2 and 3 is included in work already accomplished by USACE on behalf of WRID and BMWMD. Requirements for further studies, if any, will be met using existing methods and processes presented in the USACE documents *(see attached Appendix G)*.

Section C: Project Operations and Maintenance Plan

1. Estimated Useful life of Project

The projected useful life of the projects is based on a 50-year life span assuming the operations and maintenance plan associated with the projects are followed. The economic benefits are expected to be continued throughout the 50-year operational lifespan.

2. Operations and Maintenance Plan

The entire canal system (Phases 1, 2, and 3) of pump stations, gates, and system pumps will be controlled by a Supervisory Control and Data Acquisition (SCADA) system operated by the Watermaster in the latter stages of development. For Phase 1, during the redevelopment of Bayou Meto Canal Company Lift Station (BMCCLS) and operation of the Phase 1 distribution canal system, the system will be operated manually as it is today and has been done successfully for many years. This will allow for

continuation of canal utilization during the present growing season and accommodate incremental construction and development where water flow can be maintained by diversion while a portion of the system is being renovated, expanded, or newly constructed. The SCADA system will ultimately allow fully programmable (automatic) or operator assisted (manual) operation.
The controls systems for the BMCCLS will be located at the presently used site on Bayou Meto, which is located approximately ¾-mile south-southwest of the Bayou Meto community off of Highway 276 Spur. BMCCLS will operate as a supply type station with initial upstream control provided by manual observation and monitoring. As Phase 2 is brought online, a SCADA system will be utilized for system programmable automatic control and human manual overrides.
BMCCLS is a supply/demand-oriented system. During times when the amount of water available from the Arkansas River determines withdrawal levels, the system is supply driven, and during times when water availability is not the governing factor, demand will determine the operation schedule of the pump station and the canal flow schedule. The control structures and turnouts having gravity flow or pumps located in the canal system will be operated as a supply-type system. The existing ditches within the distribution system will operate under the upstream control philosophy of delivering water to the upstream end of the delivery system and letting it route down to the user before it can be pumped out. This type of operation calls for more scheduling to occur to anticipate the need for irrigation water. The system will be controlled by the Watermaster based on real time information of water levels upstream of the structures and a flow depth over weirs to determine flow rates. This ensures that enough water is passing downstream to satisfy the demands of those users and helps in monitoring the efficiency of the system. The control systems for the pump stations and the canal system will be designed with components requiring low maintenance ease of operation.

The United States Army Corps of Engineers (USACE) has published volumes of information relevant to the Grand Prairie Demonstration Project (White River Irrigation District – WRID, and Bayou Meto Water Management District – BMWMD). Both districts have construction underway, having passed the milestones of system evaluation, system design, environmental review, right-of-way acquisition, permitting, etc. GPFWC is relying on methods and procedures used by USACE on these other projects as templates for the development of BMCCLS and GPFWC Phases 1 and 2. Several of the available USACE documents are attached in Appendix G. Those which are attached are obtained from the USACE website for BMWMD: Volume 5, Section IV, Part B, Electrical, Power, Control Systems, and Operations Conditions; Volume 6, Appendix, Section V, Part C and Part D, Mechanical Design Development, and Electrical Design Development. Unfortunately, the USACE Memphis District website page for Grand Prairie Demonstration Project was empty as of the time of publication of this Letter of Intent and are, therefore, not included. Nevertheless, the methods and procedures used by USACE are similar between the two USACE projects and provide ample guidance for the development of GPFWC Phases 1 and 2.

The control and monitoring system for the delivery system operation will be further developed during the preparation of plans and specifications. Individual farmers will do operation and maintenance of the on-farm components of the project. They will enter into water contracts that will clearly define their obligation to operate and maintain the on-farm project features necessary to deliver water to their farm. The delivery system includes features that require various levels of maintenance. Pumping units, gates, and other mechanical and/or electrical devices require maintenance at prescribed intervals for the proper operation and life of the component. Maintenance will include structure upkeep and replacement, pumping unit upkeep and replacement, canal and stream cleanout, and bank stabilization for any slides or erosion that may occur as well as maintenance and repair of the levee embankments. Canal maintenance includes excavation of sediment, removal of aquatic growth, selective vegetative clearing, and slide repairs. Stream maintenance consists of repairs to the low water weirs and selective vegetative clearing.

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Canal and stream maintenance is estimated on a 20-year frequency at a cost of $5,000 per mile of canal and stream maintenance. An annual mowing cost is based on mowing 70 percent of the canal rights-of-way three times a year at a cost of $300/mile of canal mowed. The remaining 30 percent of canal rights-of-way will be utilized for prairie restoration, and burning is the preferred method of control.

Section D: Financing Plan

1. Financial Narrative

The project will be structured financially so that the 12,500 acres of real estate serves as the security pledged for repayment of the WIFIA loan. The five year pro forma cash flow projects that cash flow from operations will be $2,909,000 in year 1; $12,243,000 in year 2; $16,128,000 in year 3; $33,554,000 in year 4; and $46,455,000 in year 5. In each of these years the debt service required for the senior debt obligations will be much less than the projected cash flow from operations, and as such, the debt service coverage ratio will be significantly greater than 1.

In regards to the debt to equity ratio, management projects that in year one total debt will be approximately $125M and that equity exists of approximately $30M. Taking these debt and equity projections into account the projected debt to equity ratio would be 80% debt to 20% equity.

(see attached Appendix H): Phase 1 and 2 Financial Model 80% Finance

2. Capital Costs

The projects are broken down into Phase 1 and Phase 2. Phase 1 is the purchase of the 12,500 acre farm and Bayou Meta Canal Company as well as the costs related to refurbishment and enlargement of the capacity of the surface water distribution system now operated by GPFWC. Phase 2 consists of the expansion of the surface water distribution network to an additional 41,000 acres of farm land north of the existing irrigation district.

(see attached Appendix H): Phase 1 and 2 Financial Model 80% Finance

3. Sources of Financing

The total project cost is projected at $153,000,000 capital expenditures and $3,000,000 for woring capital. The sources of financing for the project include obtaining WIFIA assistance at 49% of project cost or approximately $75M. The remaining 51% of project finance will be provided by private capital placement, debt placement with MetLife, private equity placement and operating income in excess of debt service. See Item D9. Total debt to be limited to 80% of project cost. The pledge of security of the 12,500 acres of real estate and the water district with a valuation of $151,000,000 is offered. Repayment sources include the income from water sales, land leases and water credits.

4. Existing Debt

The terms of the GPFWC existing debt was such that the origination date was the spring of 2015, the amount was approximately $80M, the final maturity date is 15 years, the estimated interest rate is 5%, the timing of the disbursements were at the origination date, the pledged security was the 12,500 plus acres of real estate, the repayment sources are the income, the lien position is first.

5. Borrower's Financial Condition

GPFWC is not in default and is current on all debt service. There are no year end audited financial statements available.

6. Revenue Sources

GPFWC will pledge all revenue sources as well as the hard assets to the extent permissible.

7. Financing Terms

The terms expected for each source of financing including the WIFIA assistance are described in D3.

8. Sources and Uses of Funds

A Sources and Uses of Funds tab as well as the timing for disbursement of these funds is included in the Financial model included in Appendix H.

9. Financial Model

Financial Model in Appendix H contains the requested information on:

a. The Projects Funding Sources
b. The project obligations dedicated sources of repayment
c. The projects revenue sources
d. Operation and Maintenance costs
e. Capital expenditures
f. Debt service payments and reserve transfers
g. Equity distributions

No sensitivity analyses are available at this time.

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A **Financial Summary** is given as follows:

Capital Expenditures

Land Purchase	- $ 80,000,000
Phase 1 Improvements to Existing Infrastructure	- $ 10,735,000
Phase 2 Infrastructure to Increase Area Serviced	- $ 62,750,000
Total Capital Expenditures	- $153,485,000

Financing

WIFIA Loan at 49%	- $75,000,000	
Additional Debt	-$65,000,000	Currently Provided by MetLife
Owners Equity	-$30,000,000	Private Equity Placement by Investment House. Currently in Negotiation.
Working Capital Loan	-$ 3,000.000	Provided by Private Equity Sources

Equity Placement and retained earnings will be utilized to retire MetLife debt as funds are available.

Asset Value

Farmland	-	$ 51,000,000
Timberland	-	$ 43,485,000
Buildings	-	$ 270,000
Bayou Meto Canal Company	-	$ 75,000,000
Phase 1 Improvements	-	$ 10,735,000
Phase 2 Infrastructure	-	$ 62,750,000
Total Asset Value After Investment	-	$243,240,000

See Appendix K

Income Assumptions

Irrigation water	- $50 per acre per year
Acre-foot water per acre	- 1.6 per year
Water Value	- $1,059 per 0.5 acre-foot
Acres served in Phase 1	- 10,000
Acres served in Phase 2	- 36,000
Operating cost Phase 1	- $2,690,000 per year
Operating cost Phase 2	- $6,017,000 per year
Recreation Leases	- $236,388 per year
Cash Rent for Farm Land	- $434,966 per year

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Income Statement

	2017	2018	2019	2020	2021	2022	2023
Acres	2,500	8,600	11,100	20,800	28,000	37,000	46,000
Acre-Feet Water	3,900	13,416	17,316	32,448	43,680	57,720	71,760
Water Credits	7,800	26,832	34,632	64,896	87,360	115,440	143,520
Income (,000)	$9,056	$29,516	$37,901	$70,436	$94,585	$124,772	$154,959
Expenses (,000)	$4,281	$9,301	$11,257	$14,861	$17,612	$20,111	$22,219
EBITDA (,000)	$8,294	$27,246	$34,761	$64,898	$87,377	$115,423	$143,370

Debt Service

Assumptions
4% Interest
35 Year Amortization
25 Year Depreciation Life
Debt Draws as required for Infrastructure Spending

	2017	2018	2019	2020	2021	2022	2023
Principal (,000)		$2,096	$2,366	$2,703	$3,046	$3,302	$3,207
Interest (,000)		$2,935	$3,313	$3,784	$4,264	$4,623	$4,490
Total Debt Service (,000)		$5,032	$5,680	$6,487	$7,311	$7,935	$7,698

	2017	2018	2019	2020	2021	2022	2023
Net Income (,000)	**$2,817**	**$11,926**	**$15,720**	**$32,789**	**$45,414**	**$61,750**	**$78,316**

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10. Revenue Feasibility Studies

Off take agreements include:

- Water sales
- Farm rent

Agreements are inacted for the conveyance of the rights to Water Credits for replacement of ground water with surface water (see Coker Farm Company contract as a Pro Forma; other contracts listed). The water credits can then be sold for fulfillment of sustainability goals to individuals as well as corporations.

Appendix I: Water contracts Coker Farm Company, other contracts listed.

Appendix J: Farm lease agreements Coker Farm Company, other contracts listed.

Section E: Selection Criteria

1. National or Regional Significance

Irrigation is very important to crop production in Arkansas. Arkansas ranks fourth in the United States in irrigated acreage with approximately four million acres. Water has always been essential in growing rice - which is a billion-dollar industry in eastern Arkansas. Arkansas accounts for almost 50 percent of the rice that is produced in the United States. Now, irrigation of other crops has become essential in sustaining production at profitable levels. When growth and yield factors are rated according to importance, the availability of water ranks at the top. Arkansas Soybean Performance Tests showed consistent yields in the 50 bushels per acre range when irrigated, compared to an average of 10 to 20 bushels per acre without irrigation.

Grand Prairie Farm and Water Company has embraced the challenge to help alleviate the devastating effects of groundwater depletion occurring in the Bayou Meto Basin and Grand Prairie areas of Arkansas County by providing a source and distribution system for import water from the Arkansas River through natural channels of the lower Bayou Meto. Features of this endeavor include the following (taken from USACE documents provided in Appendix G):

Benefits
- protect the sparta aquifer
- protect the regions drinking water supply
- opportunities for future industrial development
- avoid regulations that could hurt future development
- eliminate threat of salt-water intrusion

Protect the alluvial aquifer
- eliminate threat of salt-water intrusion
- sustain irrigated agriculture critical to the nation's food

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Independence

- ensure economic viability of the region
- municipalities (schools, churches, businesses)
- farms (agricultural and hunting operations)
- provide for environmental enhancement for waterfowl
- provide for environmental enhancemant opportunities on new on-farm reservoir sites
- enhance aquatic habitat in streams and ditches
- increase irrigation efficiency
- decreased energy consumption in region
- reduced emissions (air quality)

The projects proposed by GPFWC for surface water supply directly supports groundwater mitigation efforts, which impact all phases of life in the Grand Prairie of the state of Arkansas. Regional and national significance with respect to the generation of economic and public health benefits is without question regarding the impact of GPFWC efforts. In addition to the items listed above that are identified by USACE, Appendix E further supports the claims that these projects have a positive impact on the region that will greatly increase wildlife watching, duck hunting, and developing sustainable means of agriculture in the region (see Tables 12 and 13 in Appendix E).

2. Enables Project to Proceed Earlier

The traditional method of funding for this type of surface water irrigation infrastructure is using public monies in the form of grants or other governmental entitlements. The WRID and BMWMD projects have been delayed for years waiting on this type of government funding. The USACE Fact Sheet "Grand Prairie Region, AR" was last updated on February 24, 2017, and clearly identifies the huge investment already made, the shortfall that must be satisfied before construction can resume, with the final statement highlighted in yellow on their published version:

"Total investment to date is approximately $190,000,000 ($139,000,000 Federal; $51,000,000 non-Federal). Initial delivery of water requires an additional investment of approximately $35,000,000 ($19,700,000 Federal, $15,300,000Non-Federal).".

"Initial delivery of water requires an additional investment… " clearly demonstrates the precarious position these projects find themselves, having consumed huge amounts of tax dollars and, to date, delivering not even one gallon of surface water to critical groundwater designated areas of the Grand Prairie. This reality suggests that another way of achieving benefits for the Grand Prairie is necessary.

WIFIA funding will allow the GPFWC project construction to proceed immediately, expanding rapidly into the critical groundwater designation areas, and generating income through the operation of the system to support the financial plan included with this request for funding. The alternative to pursue private funding for this type of infrastructure program will take much longer to develop, which prolongs the current emergency conjoined with groundwater depletion.

3. New or Innovative Approaches

The GPFWC projects utilize an innovative approach of Renewable Water Credits to aid in funding the infrastructure development. These Renewable Water Credits are produced through a tightly controlled process of measuring and validating the discontinuation of groundwater extractions in critical groundwater depletion areas, and providing equal volumes of water from renewable surface water

supplies. These Water Credits can then be sold to individuals and corporations to meet sustainability goals for groundwater preservation. Thewaterdrop.org provides additional information on this concept.

Another innovative approach of GPFWC's Phase 1 and Phase 2 is demonstrated as the delivery systems allow for additional water use efficiencies, as well as significant environmental benefits, by recapturing field runoff and returning it to the canal delivery system, with an innovative "counter-circulation" feature. This counter-circulation feature is applied at the farm level, at the canal pool level, and eventually at the natural stream level where any runoff (containing sediment, used herbicides and pesticides, other pollutants) is captured and returned to the system, which is ultimately contained within the Bayou Meto area that is bounded by Arkansas River Lock and Dams #2 and #3.

4. Protection Against Extreme Weather Events

The GPFWC projects will be designed to minimize impacts to regulatory floodplains and wetlands. All mechanical and electrical equipment used in the projects will be elevated above the levels necessary to provide resiliency against natural disasters to the function and operation of the surface water distribution system. Within the operation of a local portion of the canals, it will be possible to pump water off of flooded fields in some instances to protect crops from excessive or untimely rainfall events, even to the extent of mitigating some flooding of certain areas to the benefit of the farmers, residents, and public in general.

5. Maintain or Protect the Environment or Public Health

The GPFWC projects provide a surface water delivery system to allow groundwater mitigation to be effective in critical groundwater depletion areas of Bayou Meto and the Grand Prairie. Phases 1 and 2 will mitigate 23,383,098,416 gallons per year of groundwater withdrawal, enough water to supply 122,746 homes for a year. In addition, the storage functions and reuse capabilities designed into the system allow for additional water use efficiencies, as well as significant environmental benefits, by recapturing field runoff, returning it to the canal delivery system, and allowing for sediment, excessive chemical runoff, and other pollutants to settle out before returning to the environment. The process of re-applying surface runoff from the fields allows the crops, soils, and storage impoundments to clean the water to a level equal or better than when the water was first imported from the Arkansas River/Bayou Meto complex.

6. Serves Energy Exploration or Production Areas

The projects largely serve rural, agricultural areas without significant energy exploration existing in the region. The project does not interfere with any future explorations or developments of energy fields within the Grand Prairie.

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7. Serves Regions with Water Resource Challenges

The projects serve large areas that are classified as critical groundwater depletion areas. Figure 2 is a map of the United State showing cumulative groundwater depletion, and points to a 100-400 cubic kilometers depletion in the Sparta and Alluvial aquifers that the GPFWC projects directly assist in restoring recharge rates by the mitigation of groundwater pumping. The water credit program established by the Grand Prairie Farming and Water Company, LLC is instrumental in providing funding for surface water projects as well as documentation of groundwater mitigation activities. The projects serve to address significant water resource challenges by reducing ground water usage in a Critical Groundwater Usage Area by replacing that groundwater usage, primarily crop irrigation, with Renewable Surface Water.

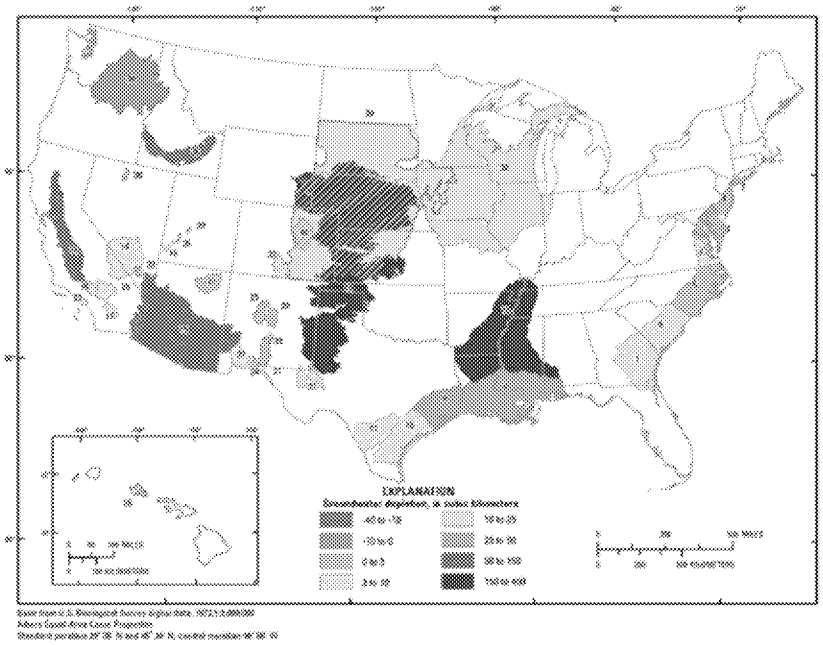

Figure 2. Map of the United States (excluding Alaska) showing cumulative groundwater depletion, 1900 through 2008, in 40 assessed aquifer systems or subareas. Index numbers are defined in table 1. Colors are hatched in the Dakota aquifer (area 39) where the aquifer overlaps with other aquifers having different values of depletion.

8. Addresses Identified Priorities

Agriculture is listed as a major use of water in the Arkansas State Water Plan. The Plan identifies supplies and demands on water, both surface water and groundwater. Impact of GPFWC projects to regional priorities are identified in type in Appendix E, wherein these projects are shown to have a positive impact on the creation of jobs required to construct the infrastructure required to provide surface water to the area that will, in turn, greatly increase wildlife watching, duck hunting, and development of sustainable means of agriculture in the region per Tables 12 and 13 in Appendix E. Organizational support for the activities proposed by GPFWC was demonstrated visually at a recent conference involving USA Rice, Ducks Unlimited, USDA/NRCS, ANRC, and others who applauded the presentation of the proposed projects with great enthusiasm.

9. Financing Plan

The sources of financing for the project include obtaining WIFIA assistance at 49% of project cost. The prospective borrower looks to the WIFIA assistance to provide approximately $75M for Phases 1 and Phase 2. The remaining 51% of project finance will be provided by private capital placement, debt placement with MetLife, private equity placement and operating income in excess of debt service.

10. Reduction of Federal Assistance

Current efforts to replace groundwater usage in this area utilize government grants to develop infrastructure which are managed by government agencies. By supporting the GPFWC projects, the long-term effect will be elimination of the grants required to support WRID and Bayou Meta Irrigation Project and reduction in spending by the affected government agencies currently managing the projects.

11. Readiness to Proceed

These proposed projects are ready to proceed. Preliminary planning and design work for Phase 1 has begun. See Appendix F for project details.

12. Repair, Rehabilitation, Replacement

This section is Not Applicable to surface water irrigation distribution. The GPFWC projects do not anticipate supporting any public drinking water or sanitary sewer projects.

13. Economically Stressed Communities

The projects serve agricultural areas that rely on irrigation water to raise crops. The projects provide irrigation water at 50% of the cost of groundwater, improving the profitability of crop production in the affected region. Lower income families struggling to survive economically will benefit from these lower crop production costs and realize greater profits from their harvests. This will help sustain local economies.

Appendices:

Appendix A – Organizational Structure of Projects

Appendix B – Surface Water Flow Chart

Appendix C – Project Map Master Plan

Appendix D – Project Timeline

Appendix E – Impact of Bayou Meto Study 2016

Appendix F – Phase 1 Project Details

Appendix G – USACE Documents

Appendix H – Phase 1 and 2 Financial Models 80% Finance

Appendix I – Water Contracts

Appendix J – Land Contracts

Appendix K – GPFWC Statement of Assets

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Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 8/10/2017 4:24:41 PM
To: Woolford, James [Woolford.James@epa.gov]
CC: Breen, Barry [Breen.Barry@epa.gov]; Fonseca, Silvina [Fonseca.Silvina@epa.gov]
Subject: RE: San Jacinto Background Materials

Thanks Jim. I appreciate your thoughtfulness. I didn't think my tour was too important. I was really just getting some familiarity with the site and to try to be responsive. Just to be sure that you don't have to hear from the Regions where I might be wandering, I will give you any scheduled locations that I might be invited to or planning to visit. After Houston, I am going to the Tribal event in Tulsa and am going to tour the Tar Creek site. I am trying to travel to Des Moines after that to see the Dico site and then on Thursday to go with Region 10 to the Coeur D'Lane site. Then I am going back to East Chicago on the 19th for their monthly meeting.

If there is anything I need to know in advance of these visits, please let me know. Also, voice any concerns that you have that I need to know as well. I value your advice. Thank you.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Woolford, James
Sent: Thursday, August 10, 2017 11:42 AM
To: Kelly, Albert <kelly.albert@epa.gov>; Darwin, Veronica <darwin.veronica@epa.gov>; Fonseca, Silvina <Fonseca.Silvina@epa.gov>; Falvo, Nicholas <falvo.nicholas@epa.gov>
Cc: Edlund, Carl <Edlund.Carl@epa.gov>; Breen, Barry <Breen.Barry@epa.gov>; Hilosky, Nick <Hilosky.Nick@epa.gov>; Davis, Patrick <davis.patrick@epa.gov>; Brooks, Becky <Brooks.Becky@epa.gov>; Stalcup, Dana <Stalcup.Dana@epa.gov>; Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Poore, Christine <Poore.Christine@epa.gov>; Phillips, Pam <phillips.pam@epa.gov>
Subject: FW: San Jacinto Background Materials

Kell, we heard from Region 6 that you will be visiting the San Jacinto site near Houston Friday. Following the NRRB review, OSRTI has been working closely with Region 6 on this remedy. The PRPs came and did a presentation to me and my staff last December. We've been working collectively through issues raised by the PRPs and others over the past 8 months.

I asked my staff to prepare some materials for your visit. They are attached:

1. Power point with schedule as of July 24 (also part of the 6 page summary)
2. S/WP Proposed plan pdf – diagrams, pictures of site over time
3. State comment – pdf – we found comments from Texas to be an objective view of the site/challenges
4. A 6-7 page summary with a bit of the history & background on the site, main issues, NRRB comments, OSRTI/regional interactions, etc.
5. An attachment that lays out in some detail the issues at hand from the 2 main alternatives.

Jim Woolford, Director
Office of Superfund Remediation and Technology Innovation
Office of Land and Emergency Management

US Environmental Protection Agency
1200 Penn. Ave., NW
Washington, DC 20460
(Mail Code 5201-P)

Our mission is to return the most contaminated areas of country to communities for safe reuse in a healthy environment.

Phone: (703) 603 8960– Main Office Line

Physically located at:

Room 5622
One Potomac Yard (South)
2777 S. Crystal Dr.
Arlington, VA 22202

From: Gartner, Lois
Sent: Thursday, August 10, 2017 9:47 AM
To: Woolford, James <Woolford.James@epa.gov>
Cc: Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Fitz-James, Schatzi <Fitz-James.Schatzi@epa.gov>; Ammon, Doug <Ammon.Doug@epa.gov>; Poore, Christine <Poore.Christine@epa.gov>; Legare, Amy <Legare.Amy@epa.gov>
Subject: SJC Material -- All Items Attached

Jim- Attached are the updated fact sheet and alternatives summary along with the State's letter, Gary Miller's (RPM) 2-page PPT update from the 7/24 and 7 figures from the proposed plan.

Lois Haas Gartner
Special Assistant
Office of Superfund Remediation
and Technology Innovation
U.S. Environmental Protection Agency
703.603.8711

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 4/16/2018 7:36:56 PM
To: Wilcox, Jahan [wilcox.jahan@epa.gov]
Subject: Re: You can attribute this to me - EPA spokesman

Looks good to me

Sent from my iPhone

On Apr 16, 2018, at 2:35 PM, Wilcox, Jahan <wilcox.jahan@epa.gov> wrote:

From: Wilcox, Jahan
Sent: Monday, April 16, 2018 3:36 PM
To: 'Malcolm Burnley' <malcolm.burnley@gmail.com>
Cc: Ferguson, Lincoln <ferguson.lincoln@epa.gov>
Subject: You can attribute this to me - EPA spokesman

1) How does administrator Pruitt respond to the assertion of state auditors, writing in the Tar Creek audit that was released on Monday, that the audit yielded "sufficient circumstantial evidence for additional investigation into a potential conspiracy against the state"?
2) If EPA Administrator Pruitt disagreed/disagrees with the supporting circumstantial evidence of a conspiracy that Jones enclosed, related to the assertion above, why did he? Was it the 2013 EPA OIG report that made him decide against Jones's findings that there was indeed evidence of conspiracy worthy of further investigation? And/or was it the arguments of attorney Andy Lester?

- <!--[if !supportLists]--><!--[endif]-->**"Two years after then-Attorney General Pruitt requested the audit, the State Auditor returned his findings. The attorneys in the Attorney General's office who oversee the grand jury determined the audit did not present enough evidence to present the grand jury. After another full year of investigations, the audit at best offered by its own admission circumstantial evidence. If after three years of investigation the State Auditor still cannot produce enough evidence, moving forward was hardly the best use of state resources. During the same time the EPA Inspector General released an audit reviewing similar information finding 'this investigation revealed no evidence to support an allegation by the complaints.'"**

3) Does administrator Pruitt support AG Mike Hunter's decision to disclose the audit now after all these years?

- <!--[if !supportLists]--><!--[endif]-->**"It is entirely the decision of Attorney General Hunter."**

4) Prior to Monday, did AG Mike Hunter notify administrator Pruitt that his office was going to the release the audit? If so, when?

- <!--[if !supportLists]--><!--[endif]--> **"No."**

Jahan Wilcox
EPA
Strategic Communications Advisor
Work Cell: 202.309.0934
Work Email: wilcox.jahan@epa.gov

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 8/8/2017 2:30:21 PM
To: Fonseca, Silvina [Fonseca.Silvina@epa.gov]
Subject: RE: FYI--EPA/HUD collaboration PLUS top 10

Seems like it would have been good to know of this when we were doing the task force report. I also see you are copied on the OMB request. This is ridicules in my opinion. Complete waste of time.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Fonseca, Silvina
Sent: Tuesday, August 8, 2017 10:26 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: RE: FYI--EPA/HUD collaboration PLUS top 10

Yes, I was involved with some of the initial planning. There was a letter that resulted out of this exercise.

Silvina Fonseca
Special Assistant (OLEM, OARM, OHS, OSBP and OCR)
Office of the Administrator
U.S. Environmental Protection Agency
Desk: 202.564.1955
Cell: 202.306.6844

From: Kelly, Albert
Sent: Tuesday, August 08, 2017 10:20 AM
To: Fonseca, Silvina <Fonseca.Silvina@epa.gov>
Subject: FW: FYI--EPA/HUD collaboration PLUS top 10

Do you know anything about this?

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Deborah Gail Musiker [mailto: Ex. 6 - Personal Privacy]
Sent: Tuesday, August 8, 2017 10:11 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Garypie, Catherine <garypie.catherine@epa.gov>
Subject: Fw: FYI--EPA/HUD collaboration PLUS top 10

fyi

Debbie (Musiker) Chizewer
Environmental Advocacy Clinic
Bluhm Legal Clinic
Northwestern University School of Law
375 East Chicago Avenue, Chicago, IL 60611-3069
Ex. 6 - Personal Privacy

From: Deborah Gail Musiker
Sent: Thursday, August 3, 2017 4:08 PM
To: garypie.catherine@epa.gov
Subject: FYI--EPA/HUD collaboration PLUS top 10

What and where were the 10 prioritized NPL sites near HUD housing?

The 10 sites were:

- Omaha Lead (Omaha, NE)
- Brown's Dump and Jacksonville Ash (Jacksonville, FL)
- Oronogo-Duenweg Mining Belt (Joplin, MO)
- Jacobsville Neighborhood Soil Contamination (Evansville, IN)
- Anniston PCB Site (Anniston, AL)
- Southwest Jefferson County Mining District (Jefferson County, MO)
- Welsbach & General Gas Mantle [Camden radiation] (Camden, NJ)
- Tar Creek (Ottawa County, OK)
- Raymark Industries (Stratford, CT)
- Colorado Smelter (Pueblo, CO)

The review also identified 3 Superfund removal actions:

- Pilsen Neighborhood Contamination (Chicago, IL)
- American Lead (Indianapolis, IN)
- Former Chattanooga Foundries (Chattanooga, TN)

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 3/31/2018 4:29:27 PM
To: John Berrey Ex. 6 - Personal Privacy
CC: Ex. 6 - Personal Privacy
Subject: RE: priority list i left with Ryan

Hello Chairman Berrey, I am just circling back on our previous discussion. I think you were going to provide me with some additional documents.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: John Berrey [mailto Ex. 6 - Personal Privacy
Sent: Friday, March 23, 2018 3:35 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Ex. 6 - Personal Privacy
Subject: priority list i left with Ryan

Kel,
Here is the list and I will send you some data from our discussion. Thank you for all you do.

- Chat Piles
- Railroad Spur
- Speed up Tar Creek work.

John L Berrey
Chairman Quapaw Tribe Business Committee
Downstream Development Authority

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/25/2018 11:53:41 PM
To: Ex. 6 - Personal Privacy
Subject: Re: A visit to Tar Creek

Perhaps we could visit tomorrow

Sent from my iPad

On Feb 25, 2018, at 6:37 PM, Neok(rjim) <Ex. 6 - Personal Privacy> wrote:

Mr. Kelly,
Sure, I would be glad to let you know what I know. But stopping the flow of metals down Tar Creek is important, too. They all flow towards and then are ending up in Grand Lake, in our water and measurably in some of our fish. As one of the early EPA officials who came to work at this site said, "It's in the air, it's in the water, it's everywhere."
It is the chat, it is the metals in the water and it is in the yards where children are being exposed and being lead poisoned. Nothing is quick, but it is all 3. Each one. The best of all worlds would be do them all and with all speed. I assure you, with all speed has never been tried here.
Glad to visit when you have the time.
Happy you must be feeling better.
~ Rebecca Jim

From: Kelly, Albert
Sent: Sunday, February 25, 2018 4:50 PM
To: Ex. 6 - Personal Privacy
Cc: Chancellor, Erin
Subject: Re: A visit to Tar Creek

Hello Ms. Jim. Thank you for your summary of the day's discussions. From reading, it would seem the first order of business is to get rid of the chat piles. How? Who is involved? Who is against that? Can we have an initial meeting by phone?

Sent from my iPad

On Feb 22, 2018, at 11:11 AM, Neok(rjim) <Ex. 6 - Personal Privacy> wrote:

What a powerful experience we had at LEAD Agency this week with the visit from the EPA officials.
I wanted to share some of what happened.

Felt Respected by our listeners ~ Rebecca Jim

Rebecca Jim
Executive Director

LEAD Agency, Inc. &
Tar Creekkeeper
www.leadagency.org
leadagency@att.net

Ex. 6 - Personal Privacy

"When we heal the earth, we heal ourselves." - David Orr

Virus-free. www.avast.com

<Elevator speech.docx>

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 8/8/2017 2:19:42 PM
To: Fonseca, Silvina [Fonseca.Silvina@epa.gov]
Subject: FW: FYI--EPA/HUD collaboration PLUS top 10
Attachments: HUD MOU Slides - final.pdf; ATT00001.htm

Do you know anything about this?

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Deborah Gail Musiker [mailto: Ex. 6 - Personal Privacy
Sent: Tuesday, August 8, 2017 10:11 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Garypie, Catherine <garypie.catherine@epa.gov>
Subject: Fw: FYI--EPA/HUD collaboration PLUS top 10

fyi

Debbie (Musiker) Chizewer
Environmental Advocacy Clinic
Bluhm Legal Clinic
Northwestern University School of Law
375 East Chicago Avenue, Chicago, IL 60611-3069
Ex. 6 - Personal Privacy

From: Deborah Gail Musiker
Sent: Thursday, August 3, 2017 4:08 PM
To: garypie.catherine@epa.gov
Subject: FYI--EPA/HUD collaboration PLUS top 10

What and where were the 10 prioritized NPL sites near HUD housing?

The 10 sites were:

- Omaha Lead (Omaha, NE)
- Brown's Dump and Jacksonville Ash (Jacksonville, FL)
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- Jacobsville Neighborhood Soil Contamination (Evansville, IN)
- Anniston PCB Site (Anniston, AL)
- Southwest Jefferson County Mining District (Jefferson County, MO)
- Welsbach & General Gas Mantle [Camden radiation] (Camden, NJ)
- Tar Creek (Ottawa County, OK)
- Raymark Industries (Stratford, CT)
- Colorado Smelter (Pueblo, CO)

The review also identified 3 Superfund removal actions:

- Pilsen Neighborhood Contamination (Chicago, IL)
- American Lead (Indianapolis, IN)
- Former Chattanooga Foundries (Chattanooga, TN)

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/25/2018 10:51:19 PM
To: Chancellor, Erin [chancellor.erin@epa.gov]
Subject: Tar Creek

Do you have names, numbers and summary yet?

Sent from my iPad

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/25/2018 10:50:47 PM
To: Ex. 6 - Personal Privacy
CC: Chancellor, Erin [chancellor.erin@epa.gov]
Subject: Re: A visit to Tar Creek

Hello Ms. Jim. Thank you for your summary of the day's discussions. From reading, it would seem the first order of business is to get rid of the chat piles. How? Who is involved? Who is against that? Can we have an initial meeting by phone?

Sent from my iPad

On Feb 22, 2018, at 11:11 AM, Neok(rjim) <Ex. 6 - Personal Privacy> wrote:

> *What a powerful experience we had at LEAD Agency this week with the visit from the EPA officials.*
> *I wanted to share some of what happened.*
>
> *Felt Respected by our listeners ~ Rebecca Jim*

Rebecca Jim
Executive Director
LEAD Agency, Inc. &
Tar Creekkeeper
www.leadagency.org
leadagency@att.net

rjim@neok.com
918-542-9399

"When we heal the earth, we heal ourselves." - David Orr

Virus-free. www.avast.com

<Elevator speech.docx>

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/21/2018 8:28:01 PM
To: Ex. 6 - Personal Privacy
Subject: Re: Hope you feel better soon

Thank you Mrs Jim. I would like to reschedule to come to Miami and Tar Creek

Sent from my iPhone

On Feb 21, 2018, at 1:36 PM, Neok(rjim) <Ex. 6 - Personal Privacy> wrote:

> Hello Mr. Kelly,
> We missed seeing you yesterday at Tar Creek, but hope you will feel better soon. It is very important to pay attention to the flu to take better care of yourself, but also to keep from passing it along. We enjoyed meeting Ken and Erin and appreciated their openness to listen to our residents.
> My best,
> Rebecca
>
> Rebecca Jim
> Executive Director
> LEAD Agency, Inc. &
> Tar Creekkeeper
> www.leadagency.org
> leadagency@att.net
>
> Ex. 6 - Personal Privacy
>
> "When we heal the earth, we heal ourselves." - David Orr

Virus-free. www.avast.com

To: Grantham, Nancy[Grantham.Nancy@epa.gov]
Cc: Gray, David[gray.david@epa.gov]
From: Kelly, Albert
Sent: Wed 2/21/2018 4:58:26 AM
Subject: Re: Wilcox site in Bristow, Okla.

Ex. 5 - Deliberative Process

Sent from my iPhone

On Feb 20, 2018, at 7:22 AM, Grantham, Nancy <Grantham.Nancy@epa.gov> wrote:

Thanks .. looping kell as I believe he has some knowledge of this site .. thanks ng

Nancy Grantham

Office of Public Affairs

US Environmental Protection Agency

202-564-6879 (desk)

Ex. 6 - Personal Privacy (mobile)

From: Gray, David
Sent: Tuesday, February 20, 2018 8:21 AM
To: Grantham, Nancy <Grantham.Nancy@epa.gov>
Subject: Fwd: Wilcox site in Bristow, Okla.

We are working on answers.

Sent from my iPhone

Begin forwarded message:

From: Mike Soraghan < Ex. 6 - Personal Privacy >
Date: February 20, 2018 at 7:17:18 AM CST
To: "David Gray (gray.david@epa.gov)" <gray.david@epa.gov>, Jennah Durant

<Durant.Jennah@epamail.epa.gov>
Subject: Wilcox site in Bristow, Okla.

Jennah, David,

Hi. Mike Soraghan here at E&E News. I'm finishing a story that involves the Wilcox Oil refinery Superfund site in Bristow, Okla., and I had some questions. Would it be possible to talk to the point person for the sites there? I'm trying to finish my reporting this week and these are some of the questions I'm trying to get answers to.

What is the current status the Wilcox site?

I understand EPA folks have been talking with stakeholders about eventual uses for the Wilcox site. Is EPA recommending that the site be capped rather than having the waste removed?

The site has been on the agency's radar since at least 1994. Does EPA do anything that would alert purchasers or residents to the risks of living on the site before a cleanup is completed?

I would expect to have some questions in the future on Tar Creek, but I'm further behind on that story.

Thank you,

Mike Soraghan

E&E News reporter

Ex. 6 - Personal Privacy

Ex. 6 - Personal Privacy (office and mobile)

Ex. 6 - Personal Privacy

E&E NEWS

122 C Street NW 7th Floor Washington, DC 20001

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Energywire, Climatewire, Greenwire, E&E Daily, E&E News PM

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 9/19/2017 4:03:07 PM
To: Grantham, Nancy [Grantham.Nancy@epa.gov]
Subject: Re: NPR/StateImpact interview on Superfund program

We break at 2 your time

Sent from my iPhone

On Sep 19, 2017, at 9:52 AM, Grantham, Nancy <Grantham.Nancy@epa.gov> wrote:

> Hi Kell – see below – what is your availability? Thanks ng
>
> **Nancy Grantham**
> **Office of Public Affairs**
> **US Environmental Protection Agency**
> **202-564-6879 (desk)**
> **202-253-7056 (mobile)**
>
> ---
>
> **From:** Jones, Enesta
> **Sent:** Tuesday, September 19, 2017 11:51 AM
> **To:** Grantham, Nancy <Grantham.Nancy@epa.gov>
> **Cc:** AO OPA Media Relations <AO_OPA_Media_Relations@epa.gov>
> **Subject:** Re: NPR/StateImpact interview on Superfund program
>
> Nancy, he responded:
>
> I'm interested in Superfund generally, funding, the task force's recommendations and the top-10 list.
>
> On Sep 19, 2017, at 11:36 AM, Grantham, Nancy <Grantham.Nancy@epa.gov> wrote:
>
> Enesta,
>
> Can you contact the reporter for specific questions? Thanks ng
>
> **Nancy Grantham**
> **Office of Public Affairs**
> **US Environmental Protection Agency**
> **202-564-6879 (desk)**
> **202-253-7056 (mobile)**
>
> > Hi Kell,
> >
> > Would you be able to do this interview from CO? I would be on the phone with you? Ken thinks you should do. Thanks ng
> >
> > **Nancy Grantham**

Office of Public Affairs
US Environmental Protection Agency
202-564-6879 (desk)
202-253-7056 (mobile)

From: Sorokin, Nicholas
Sent: Monday, September 18, 2017 10:11 AM
To: Grantham, Nancy <Grantham.Nancy@epa.gov>
Subject: FW: NPR/StateImpact interview on Superfund program

Hi Nancy,

Here is the Wertz inquiry.

From: Joe Wertz [mailto: **Ex. 6 - Personal Privacy**
Sent: Thursday, September 7, 2017 10:31 AM
To: Press <Press@epa.gov>
Subject: re: NPR/StateImpact interview on Superfund program

Hello,

I'm working on a story about the national Superfund program and wanted to schedule an interview with someone at EPA. I'm centering at least some of my story around Tar Creek, and I know agency officials were recently on-site.

Think we could set something up? Possibly with Albert Kelly or Ken Wagner?

Best,

Joe

—
Joe Wertz
Senior Reporter & Managing Editor
StateImpact Oklahoma

Ex. 6 - Personal Privacy

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 9/19/2017 3:34:05 PM
To: Grantham, Nancy [Grantham.Nancy@epa.gov]
Subject: Re: NPR/StateImpact interview on Superfund program

Ok. What is he going to be asking

Sent from my iPhone

On Sep 19, 2017, at 9:22 AM, Grantham, Nancy <Grantham.Nancy@epa.gov> wrote:

Hi Kell,

Would you be able to do this interview from CO? I would be on the phone with you? Ken thinks you should do. Thanks ng

Nancy Grantham
Office of Public Affairs
US Environmental Protection Agency
202-564-6879 (desk)
202-253-7056 (mobile)

From: Sorokin, Nicholas
Sent: Monday, September 18, 2017 10:11 AM
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Subject: FW: NPR/StateImpact interview on Superfund program

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Subject: re: NPR/StateImpact interview on Superfund program

Hello,

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Think we could set something up? Possibly with Albert Kelly or Ken Wagner?

Best,

Joe

—

Joe Wertz
Senior Reporter & Managing Editor
StateImpact Oklahoma

Ex. 6 - Personal Privacy

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 8/8/2017 1:13:20 PM
To: Willis, Sharnett [Willis.Sharnett@epa.gov]

My travel is as follows:

Houston-San Jacinto Superfund site with Region 6
Tulsa-EPA Tribal Conference and visit to Tar Creek Superfund Site
Idaho-Visit to Courd'lane Superfund Site
Chicago-meeting in East Chicago Superfund Site

In a change of plans, it is more efficient to go to East Chicago on the 18th from Idaho than to go back through Tulsa. I have the East Chicago meeting on the 19th so I would like that 6 pm flight out of Chicago back here on the 19th please

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/12/2018 4:10:58 PM
To: Wagner, Kenneth [wagner.kenneth@epa.gov]
Subject: RE: No meeting next week

Erin and I are going to Tar Creek on the 20th if you want to join

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Wagner, Kenneth
Sent: Monday, February 12, 2018 11:10 AM
To: Dunn, Alexandra <dunn.alexandra@epa.gov>; Lopez, Peter <lopez.peter@epa.gov>; Servidio, Cosmo <Servidio.Cosmo@epa.gov>; Glenn, Trey <Glenn.Trey@epa.gov>; Stepp, Cathy <stepp.cathy@epa.gov>; Idsal, Anne <idsal.anne@epa.gov>; Gulliford, Jim <gulliford.jim@epa.gov>; Benevento, Douglas <benevento.douglas@epa.gov>; Hladick, Christopher <hladick.christopher@epa.gov>; Kelly, Albert <kelly.albert@epa.gov>
Cc: Cheatham-Strickland, Latonia <Cheatham-Strickland.Latonia@epa.gov>
Subject: No meeting next week

All: OPA could not do the Media Workshop on the 19-20 so we are going to look for alternative dates.

Thanks for being flexible and keep up the great work!

Ken

Kenneth E. Wagner
Senior Advisor to the Administrator
For Regional & State Affairs
U S Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC. 20460
office: (202) 564-1988
cell: (202) 309-2418
email: wagner.kenneth@epa.gov

This email is for official EPA business only and is subject to disclosure under the Freedom of information Act

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/12/2018 2:45:15 PM
To: Edlund, Carl [edlund.carl@epa.gov]
CC: Chancellor, Erin [chancellor.erin@epa.gov]
Subject: RE: Tar Creek Trip on 02/20 [and 02.21]

Thanks for this Carl. Erin Chancellor is joining us as well. I have to be in Houston on Wednesday morning so I will be there for all of Tuesday. I was wondering if she and I could schedule a morning there on Tuesday, maybe meet with Mrs. Jim and perhaps others. Wanted to get your thought on that.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Edlund, Carl
Sent: Thursday, February 8, 2018 3:23 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Atkins, Blake <Atkins.Blake@epa.gov>; Luckett, Casey <Luckett.Casey@epa.gov>; Casanova, Rafael <Casanova.Rafael@epa.gov>; Coltrain, Katrina <coltrain.katrina@epa.gov>; Falvo, Nicholas <falvo.nicholas@epa.gov>
Subject: Tar Creek Trip on 02/20 [and 02.21]

Kell- Attached is an itinerary that Region 6 will follow for Tar Creek visits on both the 20th and 21st of February. You are welcome to join us on the 20th [and 21st, if you have time]. Casey Luckett, our Reuse Coordinator, prepared the outline. Chairman Berrey has requested to meet with on the 20th. The afternoon is pretty booked, unless would be available to meet after 5:00 pm. Alternatively, if you are already in the area we could set up a meeting with the Chairman in the morning. Let us know and Casey will schedule a separate meeting time with Chairman Berrey's executive assistant.

February 20, 2018

9:35am - Arrive Tulsa from Dallas

12:00pm – Arrive Miami, OK

12:00pm-1:00pm – Lunch

1:00pm-3:00pm – Meeting with representatives from Miami and Commerce to discuss economic development project and potential acquisition of property and inactive BNSF rail spur that are both part of the Tar Creek Superfund site.

Meeting Location:
Miami Civic Center; 129 5th Ave NW, Miami, OK; the second floor to the left.
Meeting Attendees:
EPA Region 6
Casey Luckett Snyder, Superfund Redevelopment Coordinator and Tar Creek RPM
Blake Atkins, Acting Associate Director, Superfund Division

Local Representatives
Dean Kruithof, Miami City Manager
Kristi McClain, Miami Economic Development Coordinator
Steve Gilbert, Miami Regional Chamber of Commerce, and
Tommy Long, City of Commerce
ODEQ
Brian Stanilla, Tar Creek Project Manager for OU2
Amy Brittain, Superfund Site Remediation Manager

3:30pm-5:00pm – Site Tour with BIA and Quapaw: Site tour will focus on restricted properties where EPA is requesting the BIA implement institutional controls to ensure long term protectiveness.

Site Tour Location:
Quapaw Environmental Office, 334 Main Street, Quapaw, OK 74363
Site Tour Attendees:
EPA Region 6
Casey Luckett Snyder, Superfund Redevelopment Coordinator and Tar Creek RPM
Blake Atkins, Acting Associate Director, Superfund Division
BIA Miami Agency
Rhonda Loftin, Deputy Superintendent
Quapaw Tribe
Tim Kent, Environmental Director
Trenton Stand, Realty Director

February 21, 2018

9:00am – 2:00pm – Tar Creek Monthly Meeting

Meeting Location: Quapaw Environmental Office, 334 Main Street, Quapaw, OK 74363

Meeting Attendees: Representatives EPA Region 6, BIA, ODEQ, Quapaw and Jacobs (formerly CH2M Hill). Meeting agenda under development. Focus of monthly meeting is site updates and remedial activities for all operable units.

**11:30am – Some R6ers will travel back to Tulsa for a 2:10pm flight.*

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/8/2018 6:46:53 PM
To: Chancellor, Erin [chancellor.erin@epa.gov]
Subject: Fwd: Tar creek

This is all I have so far

Sent from my iPad

Begin forwarded message:

> **From:** "Edlund, Carl" <Edlund.Carl@epa.gov>
> **Date:** February 5, 2018 at 10:58:20 AM MST
> **To:** "Kelly, Albert" <kelly.albert@epa.gov>
> **Cc:** "Atkins, Blake" <Atkins.Blake@epa.gov>, "Luckett, Casey" <Luckett.Casey@epa.gov>, "Casanova, Rafael" <Casanova.Rafael@epa.gov>, "Coltrain, Katrina" <coltrain.katrina@epa.gov>
> **Subject: Re: Tar creek**
>
> Great...I'll ask my folks to send you schedules and agendas for the 20th. No inconvenience at all.
>
> Sent from my iPad
>
> On Feb 5, 2018, at 9:30 AM, Kelly, Albert <kelly.albert@epa.gov> wrote:
>
>> Thanks. Would it be acceptable to plan for the 20th? I don't want to inconvenience anyone.
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>> Sent from my iPhone
>>
>> On Feb 5, 2018, at 7:20 AM, Edlund, Carl <Edlund.Carl@epa.gov> wrote:
>>
>>> Thanks Blake....a good list.
>>>
>>> Kell- interested in any of these events?
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>>> Sent from my iPad
>>>
>>> On Feb 5, 2018, at 8:41 AM, Atkins, Blake <Atkins.Blake@epa.gov> wrote:
>>>
>>>> Carl, here are some upcoming Tar Creek trips that might be of interest. The reuse/redevelopment opportunity in Miami, and discussion regarding institutional controls with BIA may be of particular interest.

2/20/18: Meeting with the City of Miami and ODEQ to discuss Miami's interest in acquiring a commercial property and inactive rail spur located within the Tar Creek Superfund site. The acquisition is an economic development project for the City which will provide rail access to several companies located near the rail spur. A local chat processors has expressed interest in using the commercial property to ship chat.

2/20/18: Host a Tar Creek site tour for the BIA Miami Agency. The tour will include visits to restricted properties which need institutional controls (ICs) to protect the cleanup and ensure long term stewardship. EPA is working with BIA to reach an agreement on the ICs issue since the BIA is the federal agency with the regulatory authority to place deed notices on restricted properties.

2/21/18: Monthly Tar Creek meeting. Meeting attendees include representatives from EPA, ODEQ, the Quapaw Tribe and the BIA. All entities are involved with on-going remedial activities at the site.

3/28/18: Region 6 and Region 7 Managers meeting to discuss coordinated efforts for all operable units of the Tar Creek Superfund site.

3/28/18: Tar Creek Stakeholder meeting: EPA Regions 6 and 7 will participate in a meeting with the Tar Creek stakeholders to provide site updates and action status.

Blake Atkins, Chief
LA/NM/OK Remediation Section
EPA Region 6 Superfund Division
1445 Ross Ave (6SF-RL)
Dallas, TX 75202
214-665-2297 w
214-406-5907 c

From: Edlund, Carl
Sent: Sunday, February 04, 2018 7:40 PM
To: Phillips, Pam <phillips.pam@epa.gov>; Sanchez,

Carlos <sanchez.carlos@epa.gov>; Casanova, Rafael <Casanova.Rafael@epa.gov>; Atkins, Blake <Atkins.Blake@epa.gov>
Subject: Fwd: Tar creek

Any thoughts? Events that he could hook into?

Sent from my iPad

Begin forwarded message:

> **From:** "Kelly, Albert" <kelly.albert@epa.gov>
> **Date:** February 4, 2018 at 2:01:17 PM CST
> **To:** "Edlund, Carl" <Edlund.Carl@epa.gov>
> **Subject: Tar creek**
>
> I would like to schedule a visit to Tar Creek. What would you suggest?
>
> Sent from my iPhone

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/8/2018 6:46:08 PM
To: Edlund, Carl [Edlund.Carl@epa.gov]
Subject: Re: Tar creek

Hello Carl. Erin Chancellor is going to join us at Tar Creek. When should we have agenda? I would like to see Mrs. Jim while there. Also, should we visit Chairman Berry?

Sent from my iPad

On Feb 5, 2018, at 10:58 AM, Edlund, Carl <Edlund.Carl@epa.gov> wrote:

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Blake Atkins, Chief
LA/NM/OK Remediation Section
EPA Region 6 Superfund Division
1445 Ross Ave (6SF-RL)
Dallas, TX 75202
214-665-2297 w
214-406-5907 c

From: Edlund, Carl
Sent: Sunday, February 04, 2018 7:40 PM
To: Phillips, Pam <phillips.pam@epa.gov>; Sanchez, Carlos <sanchez.carlos@epa.gov>; Casanova, Rafael <Casanova.Rafael@epa.gov>; Atkins, Blake <Atkins.Blake@epa.gov>
Subject: Fwd: Tar creek

Any thoughts? Events that he could hook into?

Sent from my iPad

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From: "Kelly, Albert" <kelly.albert@epa.gov>
Date: February 4, 2018 at 2:01:17 PM CST
To: "Edlund, Carl" <Edlund.Carl@epa.gov>
Subject: Tar creek

I would like to schedule a visit to Tar Creek. What would you suggest?

Sent from my iPhone

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/8/2018 6:42:49 PM
To: Chancellor, Erin [chancellor.erin@epa.gov]
Subject: Re: Travel to Houston

I will find the agenda

Sent from my iPad

On Feb 8, 2018, at 11:42 AM, Chancellor, Erin <chancellor.erin@epa.gov> wrote:

> I can make it work! What time do I need to be in Tulsa on the 20th?
>
> Erin E. Chancellor
>
> ---
>
> **From:** Kelly, Albert
> **Sent:** Thursday, February 8, 2018 1:38 PM
> **To:** Chancellor, Erin <chancellor.erin@epa.gov>
> **Subject:** Re: Travel to Houston
>
> If that is convenient, I think it would be good. We can fly out of Tulsa Tuesday night as late as possible and be in Houston ready to go that next morning. If that doesn't work for you, no problem.
>
> Sent from my iPad
>
> On Feb 8, 2018, at 10:09 AM, Chancellor, Erin <chancellor.erin@epa.gov> wrote:
>
>> Hey Kell,
>>
>> Should I plan on joining you in OK for Tar Creek? Sharnett is working on travel.
>>
>> Thanks!
>>
>> Erin E. Chancellor
>>
>> ---
>>
>> **From:** Falvo, Nicholas
>> **Sent:** Thursday, February 8, 2018 11:52 AM
>> **To:** Willis, Sharnett <Willis.Sharnett@epa.gov>
>> **Cc:** Chancellor, Erin <chancellor.erin@epa.gov>
>> **Subject:** Travel to Houston
>>
>> Travel for Kell and Erin to address the Surplus Properties Roundtable in Houston. I'm not sure if Erin will be joining Kell at Tar Creek on the 20th.
>>
>> Tuesday February 20th
>> United flight 1247, departs DCA at 4:25, arriving Houston at 7:00pm. (We'll have to change Kell's using his personal CC out of Tulsa).
>> HOTEL:

Hotel ZaZa Memorial City. 713-526-1991. Room block under BP. There are other hotels nearby including the Wyndham Houston West Energy Corridor.

Wednesday February 21st.
United flight 3618, departing Houston at 6:05pm, arriving DCA at 10:03pm.

Nicholas Falvo
Special Assistant to the Senior Advisor
Environmental Protection Agency
Office of the Administrator
Falvo.Nicholas@epa.gov
Office: (202) 564-5075
Cell: (202) 760-0581

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/8/2018 6:38:15 PM
To: Chancellor, Erin [chancellor.erin@epa.gov]
Subject: Re: Travel to Houston

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> **Sent:** Thursday, February 8, 2018 11:52 AM
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> **Cc:** Chancellor, Erin <chancellor.erin@epa.gov>
> **Subject:** Travel to Houston
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> United flight 3618, departing Houston at 6:05pm, arriving DCA at 10:03pm.
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> Nicholas Falvo
> Special Assistant to the Senior Advisor
> Environmental Protection Agency
> Office of the Administrator
> Falvo.Nicholas@epa.gov
> Office: (202) 564-5075
> Cell: (202) 760-0581

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 8/6/2017 8:27:48 PM
To: Nishida, Jane [Nishida.Jane@epa.gov]
Subject: FW: A Few Important TLEF Announcements: UPDATE
Attachments: RaffleDescription_2017 TLEF.docx; tlef17-StmpDance.jpg

My plans right now are to be there on Monday and Tuesday if that works for you. I would like to attend the Tar Creek trip if possible. Do we need to donate something to the raffle? Give me any other direction necessary

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Todd A Barnell [mailto: Ex. 6 - Personal Privacy
Sent: Friday, August 4, 2017 3:10 PM
To: todd.barnell@nau.edu
Subject: A Few Important TLEF Announcements: UPDATE

Hello everyone. Sorry for the second email but I wanted to pass along a few more updates.

First, the attachments I meant to include the original email didn't quite make it through the system. So please now find attached the form you can fill out and bring with you if you would like to donate an item to the raffle. Also, please find a flyer about the special Stomp Dance that will be offered on Wednesday night.

Many of you have asked how you could go about shipping an item you would like to donate to the raffle. You can follow the same procedure the TLEF vendors are following. You can ship to the COX Center by making sure your mailing address is filled out with the following information:

Tribal Lands and Environment Forum
Your Name C/O Darian Woods
100 Civic Center
Tulsa, OK 74103

See you all soon!

___
Your TLEF team
Todd
Julie Ex. 6 - Personal Privacy
John

From: Todd A Barnell
Sent: Friday, August 04, 2017 6:59 AM
To: Todd A Barnell
Subject: A Few Important Tribal Lands and Environment Forum Announcements

Hello everyone,

We look forward to seeing you all at the 2017 TLEF in just a week and a half. There are several issues of note I want to draw your attention to:

- Those of you who have been to a previous TLEF will know that the **raffle is a very popular part of the TLEF**. Each year Tribes, non-profits, businesses and individuals donate a variety of fun, fascinating, and beautiful items which lucky attendees win during the raffle drawings. If you are interested in donating something for this raffle please fill out the attached form and bring it with you. You can give this form, along with your item, to one of our staff at the registration table. Each attendee will receive a free raffle ticket when they pick up their nametag and booklet; there will be drawings at noon on Tuesday and Wednesday, and the final raffle drawings will take place during the closing plenary on Thursday. (Please note, so as not to cause any concerns with ethics requirements our attendees from federal agencies will not be receiving raffle tickets.)
- While there are many different eating establishments around the COX Center (and a list of them will be at the registration desk), we also recognize that August in Tulsa is, well, rather hot and humid. For your convenience we have arranged for a **café and two "pop-up" stands** to be open during the lunch hour. Each of these will be serving a variety of quick and inexpensive lunch options for you in case you don't feel like heading out into the heat and humidity!
- Our **registration table** will be open for you to stop by and get your name tag and booklet Sunday from 4:00 to 6:00 pm; Monday from 6:30 am to 6:00 pm; and Tuesday from 7:00 am to 1:30 pm.
- We always ask attendees who are planning to attend some of the **special trainings** all-day Monday and Tuesday morning to sign up in advance. That way we can let the instructors know how many are attending. Due to reduced travel funds for many of our instructors this has become <u>even more important</u> this year. Some of the trainings being offered this year may need to be canceled if they do not meet a minimum number of attendees. For example, the special training on munitions will have to be canceled if we do not have at least ten individuals signed up by tomorrow afternoon. So, if you are planning on attending one of the fifteen trainings available this year **email Julie or Todd** at Ex. 6 - Personal Privacy or Ex. 6 - Personal Privacy right away!
- On Wednesday evening there will be a special **Stomp Dance, courtesy of members from several Oklahoma Tribes.** This special opportunity will allow our attendees to come together and share a very special ceremony. The Stomp Dance will be taking place Wednesday, from 7:30 to 10:30 pm, in the COX Center's North Ballroom Gallery. More information about this event will be available at the registration table.
- And finally, the **Tribal Superfund Working Group** will be having a dinner at 6:00 pm on Wednesday. If you are interested in attending please RSVP to Julie at Ex. 6 - Personal Privacy by August 7.

Pleasant travels everyone!

___
Your TLEF team
Todd
Julie Ex. 6 - Personal Privacy
John

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 8/6/2017 6:44:54 PM
To: Wright, Felicia [Wright.Felicia@epa.gov]
CC: Dieu, Martin [Dieu.Martin@epa.gov]; Nishida, Jane [Nishida.Jane@epa.gov]; Snyder, Jessica [Snyder.Jessica@epa.gov]
Subject: RE: Tulsa conference

I intend to be there Monday and Tuesday so let me know when and where you need me.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Wright, Felicia
Sent: Thursday, August 3, 2017 12:17 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Dieu, Martin <Dieu.Martin@epa.gov>; Nishida, Jane <Nishida.Jane@epa.gov>; Snyder, Jessica <Snyder.Jessica@epa.gov>
Subject: FW: Tulsa conference

Hi Kell,
We are so pleased that you will be joining us in Tulsa! In response to your request to Jane for the Tribal Lands Environmental Forum agenda, please find the following attached information:

1) Overview of trip activities planned for Monday, August 14

2) TLEF Conference Booklet (contains agenda and additional information on the TLEF)

3) Agenda Summary (chart)

Head's up that the Executive Director of the Institute for Tribal Environmental Professionals (ITEP) (who is host of the TLEF), Ann Marie Chischilly, would like to meet with you and Jane on Tuesday before the Plenary. From my understanding, she usually likes to meet the folks on the Plenary Panel before introducing them at the conference. Let me know if you would be interested in having a cup of coffee with Ann Marie on Tuesday at 10AM.

While it may be too late to update the conference booklet of your participation, we would like to provide ITEP with your bio for an addendum that can be provided to conference participants and added to the website, if you have that readily available.

Thank you,
Felicia

Felicia Wright, Acting Director
American Indian Environmental Office
Environmental Protection Agency
Phone: 202-566-1886

1200 Pennsylvania Avenue, NW
Mailcode 2690R
Washington, DC 20460

From: Nishida, Jane
Sent: Wednesday, August 02, 2017 9:52 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Wright, Felicia <Wright.Felicia@epa.gov>; Breen, Barry <Breen.Barry@epa.gov>
Subject: Re: Tulsa conference

We are excited that you can join us in Tulsa. I have copied Felicia Wright in my office who can send you the draft agenda for August 14, and Barry Breen in OLEM who was preparing draft remarks for Patrick.

Sent from my iPhone

On Aug 2, 2017, at 4:44 PM, Kelly, Albert <kelly.albert@epa.gov> wrote:

> Hello Jane, I am pleased I can join you in Tulsa. I look forward to the program and the trip to Tar Creek. Would you have someone send me the agenda for the Tulsa event please. Also, what would you suggest that I say in my remarks?
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> Albert Kelly
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> Washington, DC 20460
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From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 8/2/2017 7:42:44 PM
To: Nishida, Jane [Nishida.Jane@epa.gov]
Subject: RE: Tulsa conference

It would be helpful to have the agenda for the entire conference. I intend to be there a couple days if productive

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Nishida, Jane
Sent: Wednesday, August 2, 2017 9:52 AM
To: Kelly, Albert <kelly.albert@epa.gov>
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Sent: 8/2/2017 2:00:14 PM
To: Nishida, Jane [Nishida.Jane@epa.gov]
Subject: RE: Tulsa conference

Tell Barry, I just need some brief bullet points

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

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Sent: 8/2/2017 1:44:55 PM
To: Nishida, Jane [Nishida.Jane@epa.gov]
Subject: Tulsa conference

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Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

To: John Berrey Ex. 6 - Personal Privacy
Cc: Ex. 6 - Personal Privacy
From: Kelly, Albert
Sent: Fri 3/23/2018 8:43:41 PM
Subject: RE: priority list i left with Ryan

Thank you Chairman Berrey. I look forward to further discussion next week

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

From: John Berrey [mailto: Ex. 6 - Personal Privacy
Sent: Friday, March 23, 2018 3:35 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Ex. 6 - Personal Privacy
Subject: priority list i left with Ryan

Kel,

Here is the list and I will send you some data from our discussion. Thank you for all you do.

- Chat Piles
- Railroad Spur
- Speed up Tar Creek work.

John L Berrey

Chairman Quapaw Tribe Business Committee

Downstream Development Authority

To: Chancellor, Erin[chancellor.erin@epa.gov]
From: Kelly, Albert
Sent: Fri 3/23/2018 4:19:58 PM
Subject: Tar Creek call

I have a call on the above at 2. Can you attend?

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 3/22/2018 8:59:47 PM
To: John Berrey [Ex. 6 - Personal Privacy]
Subject: RE: Tar Creek

How about 1 your time?

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: John Berrey [mailto: Ex. 6 - Personal Privacy]
Sent: Thursday, March 22, 2018 4:59 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: Re: Tar Creek

Yes sir, let me know when?

On Thu, Mar 22, 2018 at 3:42 PM Kelly, Albert <kelly.albert@epa.gov> wrote:

> Afternoon is better if that works for you
>
> Albert Kelly
>
> Senior Advisor to the Administrator
>
> 1200 Pennsylvania Avenue, NW
>
> Washington, DC 20460
>
> 202 306 8830
>
> **From:** John Berrey [mailto: Ex. 6 - Personal Privacy]
> **Sent:** Thursday, March 22, 2018 3:52 PM
> **To:** Kelly, Albert <kelly.albert@epa.gov>
> **Subject:** Re: Tar Creek
>
> Let's talk tomorrow

On Thu, Mar 22, 2018 at 12:33 PM Kelly, Albert <kelly.albert@epa.gov> wrote:

Hello Chairman Berrey, I would like to have a call with you at your convenience.

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

202 306 8830

--

John L Berrey
Chairman
Quapaw Tribe BC, DDA

--

John L Berrey
Chairman
Quapaw Tribe BC, DDA

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 3/22/2018 8:42:02 PM
To: John Berrey [Ex. 6 - Personal Privacy
Subject: RE: Tar Creek

Afternoon is better if that works for you

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: John Berrey [mailto: Ex. 6 - Personal Privacy
Sent: Thursday, March 22, 2018 3:52 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: Re: Tar Creek

Let's talk tomorrow

On Thu, Mar 22, 2018 at 12:33 PM Kelly, Albert <kelly.albert@epa.gov> wrote:

> Hello Chairman Berrey, I would like to have a call with you at your convenience.
>
> Albert Kelly
>
> Senior Advisor to the Administrator
>
> 1200 Pennsylvania Avenue, NW
>
> Washington, DC 20460
>
> 202 306 8830

--
John L Berrey
Chairman
Quapaw Tribe BC, DDA

To: Grantham, Nancy[Grantham.Nancy@epa.gov]
From: Kelly, Albert
Sent: Fri 10/13/2017 2:41:19 PM
Subject: FW: Google Alert - Superfund

See the article on Trump Track and Minden. Do we know anything more on Minden?

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

From: Google Alerts [mailto:googlealerts-noreply@google.com]
Sent: Friday, October 13, 2017 9:08 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: Google Alert - Superfund

Superfund

Daily update October 13, 2017

NEWS

EPA Vows To Speed Cleanup Of Toxic **Superfund** Sites Despite Funding Drop

KRCC

An aerial photo shows hills of mining waste known as "chat" scattered throughout the abandoned lead and zinc mine at the Tar Creek **Superfund** site.

Flag as irrelevant

Puerto Ricans desperate for water are drinking from **Superfund** sites

Quartz

More than three weeks since Hurricane Maria, more than a third of Puerto Ricans still don't have access to drinking water. So some are turning to wells ...

Desperate Puerto Ricans warned not to drink from toxic wells - New York Post

Full Coverage
Flag as irrelevant

EPA approves $115M cleanup plan for hurricane-stricken Texas **Superfund** site

Waste Dive

Since then, Pruitt has announced plans for a "top 10" list of **Superfund** sites to aggressively target and also talked about how the Obama-era EPA ...

EPA approves $115M plan to clean up Houston-area **Superfund** site - Houston Business Journal

EPA orders cleanup at Texas toxic site flooded by Harvey - Houston Chronicle

EPA orders cleanup at Texas toxic site flooded by Harvey - News & Observer

Full Coverage
Flag as irrelevant

EPA warns desperate Puerto Ricans not to drink water from **Superfund** sites

Mashable

There are reports of residents obtaining, or trying to obtain, drinking water from wells at hazardous waste "**Superfund**" sites in Puerto Rico.
Flag as irrelevant

EPA 'remains committed' to working with DEQ, tribes on Portland **Superfund** cleanup

OregonLive.com

The Portland Harbor **Superfund** drama comes as EPA Administrator Scott Pruitt has vowed to speed up cleanups nationwide, pledging to create a top ...

DEQ says EPA 'opening up process' in **Superfund** row - Portland Business Journal

Full Coverage
Flag as irrelevant

EPA: Don't use water from Puerto Rico **Superfund** sites

Fox5NY

NEW YORK (FOX 5 NEWS) - Federal authorities are concerned that residents of hurricane-ravaged Puerto Rico are risking exposure to toxic ...

Trump hints at ending aid as Puerto Ricans forced to drink polluted water - The Guardian

Puerto Rico Struggling to Find Drinkable Water; People Drinking from Contaminated Wells ... - NewsLI

Full Coverage
Flag as irrelevant

10/13 Letters: Make athletics programs businesses to end 'student-athlete delusion'

News & Observer

I was the deputy director and previously a division director for the National **Superfund** program in Washington, D.C., from 1989 to 2002. I witnessed the ...
Flag as irrelevant

EPA says more testing needed at Minden **Superfund** site

Charleston Gazette-Mail

Federal regulators confirmed Thursday that they had again found potentially troubling levels of toxic contamination at a former mining equipment ...
Flag as irrelevant

Trump Track: EPA Beginning Anew at Portland Harbor **Superfund** Site?

Lexology

EPA had already signaled that it would be reviewing significant, long-unresolved **Superfund** sites with an eye toward streamlining the process.
Flag as irrelevant

Why our **Super Fund** just got compared to the All Blacks

The Spinoff

New Zealand's **Super Fund** is one of the best performing sovereign wealth funds in the world – and yet isn't quite what it could have been. Rebecca ...
Flag as irrelevant

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Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 3/22/2018 5:33:14 PM
To: John Berrey Ex. 6 - Personal Privacy
Subject: Tar Creek

Hello Chairman Berrey, I would like to have a call with you at your convenience.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/5/2018 3:43:36 PM
To: Ex. 6 - Personal Privacy
Subject: Re: call

Thanks I will call. I am in Nevada today. I am trying to come to the area on Feb 20 if possible

Sent from my iPhone

On Feb 5, 2018, at 7:41 AM, Neok(rjim) <Ex. 6 - Personal Privacy> wrote:

> Hello Mr. Kelly,
> We have had a little snow and Ottawa County stops moving when accident numbers mount. I would like to talk to you about Tar Creek, my time is certainly more flexible than yours so please call when you can wedge in a moment. My cell is probably the easiest number and it is 918 520 6720. For your records, my home number is Ex. 6 - Personal Privacy and our office number is Ex. 6 - Personal Privacy Ex. 6 - Personal Privacy
> Thank you for your interest in Tar Creek. ~ Rebecca Jim
>
> **From:** Kelly, Albert
> **Sent:** Friday, February 2, 2018 4:13 PM
> **To:** rjim@neok.com
> **Subject:** call
>
> Hello Ms. Jim, I hope you are well. I wanted to inquire and see if you would have time for a call so I can get your suggestions and ideas on the way forward at Tar Creek. If you would be so inclined, please give me a couple convenient times and the best number for you. Thank you.
>
> Albert Kelly
> Senior Advisor to the Administrator
> 1200 Pennsylvania Avenue, NW
> Washington, DC 20460
> 202 306 8830

Virus-free. www.avast.com

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 7/28/2017 12:25:26 PM
To: Stalcup, Dana [Stalcup.Dana@epa.gov]
CC: Woolford, James [Woolford.James@epa.gov]
Subject: RE: July 15, 2017 Indiana Harbor CDF & USS Lead Superfund Meetings

I don't want to waste people's time. This gentleman lambasts us in public with this information. He has convinced the public that we are not characterizing the site correctly. Primarily that we have not tested deeply enough and that there are as he asserts 'millions of pounds of lead slag' in the former swales and that this is undocumented and as he says a bigger disaster than Flint,. So, I am just looking for some points to refute him. Did we test deeply. Knowing that lead in colder climates may move upward-don't know how fast- do we know or does it matter what may be down there. I just need some talking points. Sec Carson is going to East Chicago on the 7th along with the Governor.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Stalcup, Dana
Sent: Thursday, July 27, 2017 4:00 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Woolford, James <Woolford.James@epa.gov>
Subject: RE: July 15, 2017 Indiana Harbor CDF & USS Lead Superfund Meetings

Wow, there are a wide variety of issues addressed in the paper, including historical and more recent perspectives on the toxicity of lead and arsenic, the legal and industrial history at this site, activities at other Superfund sites, and a variety of statutory authorities that might have some impact. We would have to pull in a number of people/perspectives to provide you a thorough analysis. We would likely involve the Region, as well as other Regions that have sites identified, and several folks within HQ, mostly in OLEM but also possibly in other offices. I have copied Jim to see if he has any other thoughts.

OSRTI would be happy to reach out to the right people and pull info together, if that would help. What is your timeframe?

Let us know; thanks - Dana

Dana Stalcup
Deputy Director
OLEM/Office of Superfund Remediation and Technology Innovation (OSRTI)
Desk – 703-603-8702
Cell – 202-309-5473
Follow us on Twitter @EPALand

From: Kelly, Albert
Sent: Thursday, July 27, 2017 3:32 PM
To: Stalcup, Dana <Stalcup.Dana@epa.gov>
Subject: FW: July 15, 2017 Indiana Harbor CDF & USS Lead Superfund Meetings
Importance: High

This is on East Chicago. Would you identify someone to give me a bullet point analysis of this

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Larry Davis [mailto: Ex. 6 - Personal Privacy
Sent: Wednesday, July 26, 2017 7:15 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: 'Larry Davis' < Ex. 6 - Personal Privacy 'Maritza Lopez' < Ex. 6 - Personal Privacy 'Rev. Cheryl Rivera' Ex. 6 - Personal Privacy 'Thomas Frank' Ex. 6 - Personal Privacy 'Akeeshea Daniels' < Ex. 6 - Personal Privacy 'Sara Lynn' 'Tara Adams' Ex. 6 - Personal Privacy Mary Poe' Ex. 6 - Personal Privacy 'Lori' 'Elbert Williams' Ex. 6 - Personal Privacy 'raymond mosley' < Ex. 6 - Personal Privacy 'Sarah Willis' Ex. 6 - Personal Privacy ; Ex. 6 - Personal Privacy 'Byron Duke Florence' < Ex. 6 - Personal Privacy ; 'Byron Florence' Ex. 6 - Personal Privacy Ex. 6 - Personal Privacy 'Pamela Berry' Ex. 6 - Personal Privacy ; 'Michael Jacobi' < Ex. 6 - Personal Privacy ; 'Deborah Gail Musiker' < Ex. 6 - Personal Privacy >; 'Waikar, Anjali' < Ex. 6 - Personal Privacy 'Geertsma, Meleah' < Ex. 6 - Personal Privacy >; 'Templeton, Mark' <templeton@uchicago.edu>; 'Emily Coffey' Ex. 6 - Personal Privacy Kate Walz' < Ex. 6 - Personal Privacy 'Gilman, Emily D.' < Ex. 6 - Personal Privacy ; 'Chizewer, David' < Ex. 6 - Personal Privacy >; 'Samuel Henderson' < Ex. 6 - Personal Privacy
Subject: RE: July 15, 2017 Indiana Harbor CDF & USS Lead Superfund Meetings
Importance: High

July 27, 2017

To: Mr. Albert Kelly
Senior Advisor to the Administrator
Office of the Administrator
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460
(202) 564-5086
(202) 306-8830
< kelly.albert@epa.gov >

From: Larry Davis
268 S 600 W
Hebron, Indiana 46341
(219) 988-4843 H.
(219) 488-6052 M.
<Ex. 6 - Personal Privacy>

RE: July 15, 2017 Indiana Harbor CDF & USS Lead Superfund Meetings

Dear Mr. Kelly,

I want to personally thank you for enduring the five hours of toxic tribulations you witnessed Saturday July 15, 2017 in East Chicago, Indiana. This correspondence is entirely my own as a concerned taxpaying citizen I am not representing an organization.

I hope that you realize as I do that Superfund is broken and is failing to protect people of the United States from toxic wastes and their adverse health impacts.

In East Chicago we see the generational damage that chronic toxic waste exposure has produced. A community of color where children evacuated from one school built on the USS Lead Superfund site are relocated to a school that is one-third of a mile from where the United States Environmental Protection Agency (US EPA) and the United States Army Corps of Engineers (USACE) are creating the largest Dioxin & Polychlorinated biphenyl (PCBs) land disposal facility in the Great Lakes – most likely a future toxic waste Superfund site for Northwest Indiana...

I would like to provide you with some background on topic starting with the USS Lead Superfund site.

The ancient Greeks recognized Lead and Arsenic as poison over 2,200 years ago – anyone involved in this industry in East Chicago, Indiana saying that they did not know the hazards and risks of Lead and Arsenic are being deceitful...

The State of Indiana first discovered Lead contamination in 1985 with sample results with Lead levels "as high as 594,420 mg Pb/g (ppm)" parts per million (ppm) – in other words, over half Lead content in the soil off-site of the USS Lead Refinery's property.

This was followed up with sampling by US EPA which confirmed extremely high levels of Lead in the soil of the West Calumet area of East Chicago, Indiana.

In 1989 representatives for USS Lead Refinery signed a Partial Interim Agreed Order in Cause No. N-296 Indiana Department of Environmental Management (IDEM) versus USS Lead Refinery.

The Agreed Order required the company to conduct sampling and analysis for: "…all contaminated areas to determine the extent, area, and depth of contamination" and implement a cleanup plan that: "addresses what remedial action will be performed to ensure the removal of all contamination."

Today the US EPA, HUD, and the responsible parties are not providing anything close to what the company originally agreed to do in 1989.

All the decision making surrounding the USS Lead Superfund site has only been based upon what was considered a toxic particulate aerial deposition contamination event as a result of Lead smelting and alloying process smoke stacks and toxic dust from waste piles blowing with the wind…

We know that the West Calumet Housing Complex has extremely high levels of Lead in soil and inside homes with test results at 92,000 ppm Lead and 32,000 ppm Lead respectively. And we know the ground water there tests at 16,000 ppm Lead.

We know that millions of tons of Lead products were produced over the decades by the Lead industry operating in East Chicago, Indiana and that subsequently production of toxic wastes in the forms of dusts, slag, and dross were also generated by the millions of tons over time.

This toxic waste was dumped in nearby swamp – dune and swale topography consisting of twenty to thirty foot tall heavily vegetated sand dunes separated by low areas (swale) of wetlands similar to what can still be observed in nearby natural areas.

US EPA and the United States Department of Housing and Urban Development (HUD) have not identified where the millions of tons of these toxic wastes are located even though historical photographs clearly illustrate the land filling of the area over time.

Groundwater sampling is planned by US EPA without yet having identified any source(s) of contamination which is required to properly design a valid groundwater model and sampling plan. This is a waste of resources since we already know the groundwater at West Calumet tested at 16,000 ppm Lead. Sources of contamination must be identified first and a properly designed groundwater sampling and analysis plan needs to be implemented.

Currently US EPA and HUD plan to pay contractors to dig up the USS Lead Superfund site in the West Calumet Housing Complex three times:

1) Contractors paid to remove and stockpile contaminated soil during utility removal,
2) Contractors paid to replace the contaminated soil back into the utility excavations, and
3) Contractors paid to remove up to two feet of contaminated soil or implement some other interim or final remedy as selected by US EPA.

All these U.S. taxpayer dollars spent and contractor activity taking place on a toxic waste Superfund site and we still will not achieve any permanent remedy or complete cleanup of West Calumet. This is an outrageous squandering of tax dollars!

How many times does the federal government have to pay contractors to dig in the toxic soils found in the USS Lead Superfund site before we actually get a complete cleanup?

In fact, the money spent so far in not achieving a permanent remedy could have provided an equitable and just means for churches, businesses, property owners, and renters to move as a community to a clean & healthy area away from the USS Lead Superfund site.

Parallels between the infamous Love Canal toxic waste catastrophe In New York and the USS Lead Superfund site in Indiana include:

1) Residents are unaware of living on top of or adjacent to toxic wastes;
2) Children chronically exposed to contaminated dusts, soils, and waters;
3) Toxic waste contamination in schools, parks, and playgrounds;
4) Severely contaminated groundwater is documented and toxic contaminates are seeping into basements and drainage systems;
5) A portion of the Superfund site was forced to evacuate while other people are forced to remain behind in a known toxic waste contaminated environment;
6) Residents are told that it is safe to remain during demolition and emergency removal actions and are given false impressions of a permanent cleanup and restoration of their properties.

US EPA contractors are involved in an Emergency Removal Action only removing soil down to two feet deep at residences and parks. However US EPA in local public meetings speak of "Cleanups" and "Restoration" when in reality the Emergency Removal Action entails leaving areas under: sidewalks, patios, shrubs & trees, etc. unaddressed and ignores areas of visible contamination e.g. large chunks of slag found in parks and yards that are subsequently reburied by topsoil and sod even though visible contamination removal is required in USS Lead Superfund site's consent decree.

The lessons learned at the Love Canal and Tar Creek Superfund sites seem to have been lost and forgotten when it comes to East Chicago, Indiana.

No one in the United States of America should have to live on a toxic waste Superfund site.

The Superfund Amendments and Reauthorization Act (SARA): SARA requires U.S. EPA to give preference to and use permanent solutions and alternative treatment technologies "to the maximum extent practicable" with "reductions in volumes, mobility, and toxicity" of the wastes.

The only sure way to ensure toxic waste risk reduction is to eliminate the hazard.

And the only sure way to eliminate toxic waste liabilities for both the responsible parties and the community is to achieve a permanent cleanup. You might ask how clean?

"Moving hazardous waste from one hole in the ground to another is the non-solution that was behind SARA's preference for permanent cleanup." – U.S. Congress, Office of Technology Assessment (OTA)

"OTA considers that a site has been permanently cleaned up when the contamination that was the cause of high enough risk to warrant cleanup (either current or future risk) is rendered irreversibly harmless through destruction (e.g., incineration or biological treatment) or recovery and reuse of the hazardous substances (e.g., recovery of lead from contaminated soil and buried battery casings)" – U.S. Congress, Office of Technology Assessment

"Cost-benefit thinking allows nearly any kind of cleanup decision to be rationalized and undermines the environmental goals of Superfund. Cost-benefit reasoning backs up the selection of impermanent remedies because of excessive flexibility in cleanup goals." – U.S. Congress, Office of Technology Assessment

"Impermanent remedies results in: "Spending on cleanup remedies which are unlikely to be permanent, leading to more spending in the long term for re-cleanups and perhaps posing exposures, risks, and damage to health and environment." – U.S. Congress, Office of Technology Assessment

"…certain kinds of action are inconsistent with permanence, including any form of land disposal or containment, and any use of engineering or institutional controls, including long term monitoring for releases. All of these mean:

1) Site hazardous material remains hazardous;

2) There is uncertainty about releases of hazardous material and, therefore, risks to health and environment; and

3) There are a host of uncontrollable possible future events which might compromise the effectiveness of the protection.

"…OTA disagrees with the notion that land disposal or engineering or institutional controls provide a "degree of permanence." What varies is the level of protection provided by different cleanup technologies and methods, not the degree of permanence. To tell the public that a remedy is permanent for perhaps a decade does not build public confidence." – U.S. Congress, Office of Technology Assessment

Our government must provided an equitable and just means for churches, businesses, property owners, and renters to move as a community to a clean & healthy area away from the USS Lead Superfund site based upon the needs of the community.

Select a permanent remedy that ensures unrestricted and safe use of the land in the future – that will actually be a complete cleanup and restoration of the land and groundwater.

By comparison look what US EPA did in Pitcher, Oklahoma, at the Tar Creek Superfund site where "…EPA and the state of Oklahoma agreed to a mandatory evacuation and buyout of the entire township. The similarly contaminated satellite towns of Treece, Kansas and Cardin, Oklahoma were included in the Tar Creek Superfund site."

"EPA/HUD Joint Statement on the Picher, Oklahoma, Housing Authority
Release Date: 01/26/2009
Contact Information: Dave Bary or Anthony Suttice at 214-665-2200 or < r6press@epa.gov >

(Dallas, Texas – January 26, 2009) Officials of the Regional offices of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Housing and Urban Development (HUD) are working together to ensure that families living in the Picher area are not adversely affected by the Tar Creek Superfund site. EPA and HUD support the voluntary relocation of residents currently under way."

Metal Smelters are always a concern due the nature of the toxic wastes produced by smelting and alloying processes. The people within the Tar Creek Superfund site were bought out but where toxic metal was smelted and alloyed in East Chicago, Indiana people have been left behind to suffer more chronic exposures to toxic wastes…

When a person can safely grow a garden without worry about being poisoned and feed themselves and their family then it's clean enough.

When a person can safely drill a well without worry about being poisoned and use that source of fresh water safely then it's clean enough. This level of clean also would ensure that any basements with water seepage would be free from toxic contamination.

With respect to the Indiana Harbor and Canal (IHC) dredging operations and Indiana Harbor Confined Disposal Facility (CDF) operations the phrase: "making matters worse" comes to mind…

Once again we see federal contractors involved in an impermanent removal action and failing containment strategy involving toxic wastes which are untreated and open dumped into a land disposal facility that does not meet current federal and state laws and regulations for: Siting, Design, Construction, or Operation of a Toxic Substances Control Act (TSCA) chemical landfill.

We are witnessing the next toxic waste Superfund site being created before our own eyes and it does not begin to eliminate toxic threats to public health here in Northwest Indiana in fact it adds more Risk to adults and children who's health is already in jeopardy with a 310 in one million cancer risk due to current levels of pollution…

US EPA's normal acceptable risk level is 1 in one million cancer Risk.

Commonsense would tell you that a single toxic volatile chemical could not possibly represent the vast number of hazards and risks known to be present in the heavily contaminated toxic Dioxin & PCB laced IHC sediments that are being dredged up by the United States Army Corps of Engineers (USACE) and then open dumped one third of a mile from schools, parks and residences in East Chicago, Indiana.

These toxic sediments have been describe as; "among the most contaminated and toxic that have ever been reported."

And as ridiculous as it may sound, that single chemical is: Naphthalene, commonly known as traditional mothballs – a solid white crystalline chemical that has vapors heavier than air and evaporates very slowly making it less likely to be detected given the way USACE is conducting their single chemical air pollution monitoring.

One definition of "mothball" is: "a state of having been rejected for further use or dismissed from further consideration."

That definition precisely describes how people's concerns over further poisoning of their community are being dismissed from consideration by USACE, US EPA, and the Indiana Department of Environmental Management (IDEM).

The USACE has failed for over four decades to come up with anything better than dredging up heavily contaminated toxic waste laced with Dioxin & PCBs and open dumping it next to schools, parks and residences – something that if anyone else did would make themselves subject to criminal prosecution under the law.

The fraudulent scheme USACE and US EPA are using considers the hazard and risk posed by mothballs alone in calculating an "Acceptable Risk" to people's health – this is not representative of all the Risks in the highly contaminated toxic IHC sediments.

And Real Time Monitoring only for mothballs ensures that the true extent of the releases of toxic volatile chemicals, including Dioxin & PCBs, during dredging, debris separation, and disposal operations will never be adequately monitored or reported to the public.

Commonsense tells you that the real hazards and risks are far greater than just mothballs and that current operational practices are far from being acceptable for the heavily contaminated toxic Dioxin & PCB sediments being disturbed and dumped.

Real Time Monitoring must use state-of-the-art technology which is capable of monitoring for all toxic volatile chemical air pollution during dredging and disposal operations to ensure protection of public health and safety in Northwest Indiana.

As opposed current uncontrolled open air practices, heavily contaminated debris separation and toxic sediment handing must take place in an enclosed process that ensures zero discharge of toxic volatile chemicals into Northwest Indiana's air.

Current USACE plans include leaving 45% to 55% of the most heavily contaminated Dioxin & PCB sediments exposed in place in the IHC after dredging and covering with a gravel cap. The PCBs will still be in the water column as they volatize from the highly contaminated exposed sediments which are now destabilized by incomplete dredging.

To stop the release of these toxins into Lake Michigan all of heavily contaminated toxic Dioxin & PCB IHC sediment must be dredged to a clean bottom for the entire IHC regardless of the extent of

USACE's navigational boundaries. The USACE started this process and now must own the situation they have created in making matters worse by destabilizing toxic sediments in the IHC and increasing the spread of toxins into our air, water and land.

All debris and toxic sediments must be detoxified before land disposal to eliminate future toxic liability for both the polluting companies and the community's health – combinations of technologies to effectively do this have been around for decades (but due to length of this correspondence that is a subject for another discussion…).

Sincerely;

Larry Davis
268 S 600 W
Hebron, Indiana 46341
(219) 488-6052
(219) 988-4843
< lad@netnitco.net >

P.S. More details or references for any above information are available upon request.

To: Grantham, Nancy[Grantham.Nancy@epa.gov]
From: Kelly, Albert
Sent: Thur 3/22/2018 1:43:57 PM
Subject: FW: Google Alert - Superfund

Are we surprised at the push back here?

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

From: Google Alerts [mailto:googlealerts-noreply@google.com]
Sent: Thursday, March 22, 2018 9:09 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: Google Alert - Superfund

Superfund

Daily update March 22, 2018

NEWS

Mining Company Challenges EPA Order For **Superfund** Site Study

CBS Denver

DENVER (AP) — A mining company is formally challenging an Environmental Protection Agency order to pay for an investigation of underground water flows at a Colorado **Superfund** site. Sunnyside Gold Corp. said Wednesday it asked for a conference at which the company can ask EPA to modify or ...

Flag as irrelevant

Mining Company Challenges EPA Order for **Superfund** Site Study

U.S. News & World Report

Mining Company Challenges EPA Order for **Superfund** Site Study ... company is challenging an Environmental Protection Agency order to pay for an investigation of underground water flows at a Colorado **Superfund** ...

Sunnyside doesn't own the Gold King but has other property in the **Superfund** site.

Tar Creek Open House Event March 27 - Pawhuska Journal Capital

Full Coverage
Flag as irrelevant

Mining company challenges EPA order for **Superfund** site study near Gold King

The Denver Post

EPA-led contractors inadvertently triggered a spill of potentially toxic wastewater there in 2015, polluting rivers in Colorado, New Mexico and Utah. Sunnyside doesn't own the Gold King but has other property in the **Superfund** site. The EPA says previous work at a Sunnyside's mine may have redirected ...
Flag as irrelevant

Superfund, Water Infrastructure See Funding Bump in Omnibus

Bloomberg BNA

... which have traditionally been popular with both parties, given that they help state and local government fund water treatment and other infrastructure. Other funding highlights include a $66 million increase to speed cleanup of **Superfund** sites and EPA response to releases of hazardous substances, ...
Flag as irrelevant

Superfund site heads into final year of cleanup

Ashland Daily Press

Work at the Ashland **Superfund** site is to be largely completed this year, including the removal of the floating boom barrier systems and the disassembly of the white tent-like structures involved in the cleanup. Demobilization of the project is set to be completed by some time in September. In the next year, ...
Flag as irrelevant

The Pension **SuperFund**: Benevolent disruptor or danger to members?

Pensions Expert

The Disruptive Capital founder has announced his plans to back a consolidation vehicle, The Pension **SuperFund**, to be chaired by former Pension Protection Fund chief Alan Rubenstein and reportedly targeting £500bn in assets. The venture, which has also poached former PwC head of pensions ...
Flag as irrelevant

Alan Rubenstein launches 'Pension **SuperFund**' DB consolidator

www.professionalpensions.com

"The Pension **SuperFund** will consolidate DB schemes into a single pension scheme and, by doing that, we aim to achieve higher investment returns, stronger risk management, and lower costs and, thanks to the capital provided by investors, it should also enable us to improve the security or covenant ...
Flag as irrelevant

Ex-PPF chief Rubenstein to lead DB consolidator '**superfund**'

IPE.com

Rubenstein is joined at the **superfund** by Marc Hommel, the former global head of pensions advisory at PwC, and Luke Webster, chief investment officer at the Greater London Authority and former chief financial risk officer at the London Pension Fund Authority. Webster is also partner and chief financial ...

Polluters attempt to dismiss property damage lawsuit brought by homeowners of EPA **Superfund** site

nwitimes.com

EAST CHICAGO — Polluters taken to court over property damage claims in the lead- and arsenic-contaminated USS Lead **Superfund** site have asked a federal judge to dismiss the case, contending the plaintiffs — 38 households — have no grounds to sue them. Homeowners first filed the lawsuit on ...

Flag as irrelevant

Hurricane Harvey's toxic impact deeper than public told

WTOP

Testing by state and federal regulators of soil and water for contaminants was largely limited to **Superfund** toxic waste sites. Based on widespread air monitoring, including flyovers, officials repeatedly assured the public that post-Harvey air pollution posed no health threat. But the U.S. Environmental ...

Flag as irrelevant

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To: Epp, Timothy[Epp.Timothy@epa.gov]
From: Kelly, Albert
Sent: Thur 3/22/2018 1:41:23 PM
Subject: RE: EPA Morning News Highlights 03.21.18

Ex. 5 - Deliberative Process

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

From: Epp, Timothy
Sent: Thursday, March 22, 2018 9:41 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: RE: EPA Morning News Highlights 03.21.18

Ex. 5 - Deliberative Process

Timothy R. Epp

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U.S. Environmental Protection Agency
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From: Kelly, Albert
Sent: Thursday, March 22, 2018 9:38 AM
To: Epp, Timothy <Epp.Timothy@epa.gov>

Subject: RE: EPA Morning News Highlights 03.21.18

Ex. 5 - Deliberative Process

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

From: Epp, Timothy
Sent: Thursday, March 22, 2018 9:35 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: RE: EPA Morning News Highlights 03.21.18

I am talking with the Region 2 POC at 10 and this is on my topic list.

Ex. 5 - Deliberative Process

Tim

Timothy R. Epp

Assistant General Counsel
International Environmental Law
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U.S. Environmental Protection Agency
Tel. 202-564-2830

From: Kelly, Albert
Sent: Thursday, March 22, 2018 9:21 AM
To: Epp, Timothy <Epp.Timothy@epa.gov>
Subject: FW: EPA Morning News Highlights 03.21.18

Ex. 5 - Deliberative Process

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

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Ex. 6 - Personal Privacy

From: Hewitt, James
Sent: Wednesday, March 21, 2018 9:07 AM
To: Shimmin, Kaitlyn <shimmin.kaitlyn@epa.gov>; Beach, Christopher <beach.christopher@epa.gov>; Block, Molly <block.molly@epa.gov>; Jackson, Ryan <jackson.ryan@epa.gov>; Bowman, Liz <Bowman.Liz@epa.gov>; Dravis, Samantha <dravis.samantha@epa.gov>; Wilcox, Jahan <wilcox.jahan@epa.gov>; Konkus, John <konkus.john@epa.gov>; Ferguson, Lincoln <ferguson.lincoln@epa.gov>; McMurray, Forrest <mcmurray.forrest@epa.gov>; Ford, Hayley <ford.hayley@epa.gov>; Bennett, Tate <Bennett.Tate@epa.gov>; Abboud, Michael <abboud.michael@epa.gov>; Daniell, Kelsi <daniell.kelsi@epa.gov>; Hanson, Paige (Catherine) <hanson.catherine@epa.gov>; Letendre, Daisy <letendre.daisy@epa.gov>; Grantham, Nancy <Grantham.Nancy@epa.gov>; Beck, Nancy <Beck.Nancy@epa.gov>; Wehrum, Bill <Wehrum.Bill@epa.gov>; Gunasekara, Mandy <Gunasekara.Mandy@epa.gov>; Bodine, Susan <bodine.susan@epa.gov>; Ross, David P <ross.davidp@epa.gov>; Leopold, Matt <Leopold.Matt@epa.gov>; Yamada, Richard (Yujiro) <yamada.richard@epa.gov>; Kelly, Albert <kelly.albert@epa.gov>; Lyons, Troy <lyons.troy@epa.gov>
Subject: EPA Morning News Highlights 03.21.18

EPA Morning News Highlights 03.21.18

Tulsa World: EPA Administrator Scott Pruitt says lack of clean up of Tar Creek Superfund site is 'unacceptable'

Administrator Scott Pruitt of the U.S. Environmental Protection Agency said his new push on the nation's Superfund program finally can provide clarity and accountability to the Tar Creek area, for decades one of the oldest, largest and most complex toxic sites in the nation. "It is really unacceptable," Pruitt said as he recalled the history of the Tar Creek area in far northeastern Oklahoma, whose Superfund legacy dates back to 1983, as well as the amount of money and time deployed there. "You don't list a site in the mid-1980s and you don't take the kind of steps we have taken historically and still have issues today in 2018."The area in Ottawa County is contaminated by lead and other heavy metals from long-closed mining operations and is undermined with caverns that are prone to cave-ins. The Picher and Cardin communities were bought out by a federal program and are now ghost towns, but the mine wastes remain.

Hot Air: EPA Ends The Use Of "Secret Science" In Crafting Regulations

Just in case liberals didn't already have enough reasons to pin EPA Administrator Scott Pruitt's picture to their dart boards, he's just rolled out another policy change which will force the "party of science" to rely on actual science when pushing for regulatory changes. Promising to eliminate "secret science" in EPA deliberations, Pruitt is ordering all scientific studies used when considering new regulations to include publicly available data and methodologies. This was announced in an exclusive interview with The Daily Caller News Foundation.

Detroit News: EPA chief wants to eradicate lead from drinking water

The head of the Environmental Protection Agency says eradicating lead from drinking water is one of his top priorities three years after the Flint water crisis, and he's worried Americans aren't "sufficiently aware" of the threat. "I really believe that we ought to set a goal as a country that, over the next 10 years, that we ought to work with respect to investments in our infrastructure to eradicate lead in our drinking water," EPA Administrator Scott Pruitt told reporters this week at the agency's headquarters. "It can be achieved. Some of the mental-acuity levels of our children are being impacted adversely as a result of this." Pruitt is concerned that parents and citizens don't understand the threat of lead in drinking water or toys, and "we're looking at ways we can contribute to that dialogue," he said, according to an audio recording provided by the New York Post.

New York Post: EPA head calls for 'coordinated' response to NYC lead crisis

EPA Administrator Scott Pruitt called for a "coordinated" response between New York State and City officials to address the ongoing lead crisis. Asked whether federal intervention is needed to protect New York children and tenants from lead poisoning, the Environmental Protection Agency chief urged action on all fronts. "I think a local, state and federal response that is very coordinated and collaborative is terribly important," Pruitt said in an interview. "We each play a role. I'd love to see steps taken at the local level to invest." Gov. Cuomo already announced an emergency declaration for New York Housing Authority buildings and pledged an additional $250 million for upgrades. But heated public squabbles over resources and responsibility with rival Mayor de Blasio have complicated progress.

The Philadelphia Inquirer: Philly has a smog problem. Will Scott Pruitt's EPA say so?

Whether Philadelphia is violating the federal Clean Air Act remains in bureaucratic limbo. Despite deadlines, the EPA has refused to say whether Philadelphia and some other cities, including Pittsburgh, have met a 2015 benchmark of 70 parts per billion or less of ground-level ozone in the ambient atmosphere. Being out of compliance, or in "nonattainment," has a real-world impact on the state, city, businesses and industry, and even motorists through increased regulation and funding. The EPA was supposed to state whether Philadelphia was in compliance by last Oct. 1. Last week, a federal court ruled that the EPA, under its administrator, Scott Pruitt, broke the law by missing the deadline, and gave the EPA until April. On Monday, Pruitt's office said it would meet the deadline.

National Morning News Highlights 03.21.18

Politico: Congress struggles to clinch spending deal

Congressional leaders are racing to finalize a spending bill by the end of Tuesday but find themselves still at odds over a host of controversial issues — delaying plans to unveil the proposal and raising the prospect of weekend votes to avoid a shutdown. Democrats, Republicans and the White House battled late into the night Monday and into Tuesday afternoon over whether to include provisions on President Donald Trump's border wall, a massive New York infrastructure project and the special counsel's Russia investigation, according to lawmakers and aides in both parties. There were still a number of unresolved issues as of Tuesday evening, and multiple sources were pessimistic that negotiators would reach a deal in time to release the bill before Wednesday.

Wall Street Journal: Trump to Ramp Up Trade Restraints on China

The White House is preparing to crack down on what it says are improper Chinese trade practices by making it significantly more difficult for Chinese firms to acquire advanced U.S. technology or invest in American companies, individuals involved in the planning said. The administration plans to release on Thursday a package of proposed punitive measures aimed at China that include tariffs on imports worth at least $30 billion. But the tariffs won't be imposed immediately. Rather, U.S. industry will be given an opportunity to comment on which products should be subject to the duties. As part of the package, the White House will announce possible investment restrictions by Chinese firms in the U.S. and will direct the Treasury Department to outline rules governing investment from China.

TRUMP TWEETS

Tulsa World

http://www.tulsaworld.com/homepagelatest/epa-administrator-scott-pruitt-says-lack-of-clean-up-of/article_4a3e4982-569e-5023-8141-392ebe629a65.html

EPA Administrator Scott Pruitt says lack of clean up of Tar Creek Superfund site is 'unacceptable'

By: Jim Myers, 3/21/18

Administrator Scott Pruitt of the U.S. Environmental Protection Agency said his new push on the nation's Superfund program finally can provide clarity and accountability to the Tar Creek area, for decades one of the oldest, largest and most complex toxic sites in the nation.

"It is really unacceptable," Pruitt said as he recalled the history of the Tar Creek area in far northeastern Oklahoma, whose Superfund legacy dates back to 1983, as well as the amount of money and time deployed there.

"You don't list a site in the mid-1980s and you don't take the kind of steps we have taken historically and still have issues today in 2018."

The area in Ottawa County is contaminated by lead and other heavy metals from long-closed mining operations and is undermined with caverns that are prone to cave-ins. The Picher and Cardin communities were bought out by a federal program and are now ghost towns, but the mine wastes remain.

Pruitt blamed inconsistency, even within the EPA's 10 regions, as well as a lack of attention and focus, for slowing remediation outcomes.

"It is one of the things that seemed to be languishing as we arrived," Pruitt said, making it clear that the lack of urgency was something he found "palpable" at Superfund sites across the country.

"When it takes you 27, 28 years to make a decision — make a decision, not clean it up, not remediate, but make a decision on how you are going to remediate — that is unacceptable."

His comments came during one of several reporter roundtables he has been holding at the EPA's headquarters to mark his first year as administrator, during which he also became a leading voice in the Trump administration's major push on regulation reform.

Those efforts have prompted applause from his supporters and alarm from his critics.

Recently Pruitt is rarely out of the headlines, with stories ranging from travel expenses to speculation over whether his political future might include bids for a U.S. Senate seat or even the White House.

When given the chance to comment on yet another story this week about his political options, he took a pass.

Pruitt also declined to comment when asked about a recent decision by an Oklahoma judge to allow a lawsuit filed by Campaign for Accountability to continue. The lawsuit seeks to force the release of a 2014 audit of the Lead-Impacted Communities Relocation Trust, which was created in an effort to help move residents out of communities affected by the Tar Creek contamination.

"That is during my time as attorney general," he said. "I think it is better that I just keep it focused on the EPA matters."

Pruitt, who was Oklahoma's attorney general before being tapped by President Donald Trump to lead the EPA, had declined to file charges based on the audit by state Auditor Gary Jones and also had taken steps to bar its release to the public.

According to reporting by The Oklahoman, legal action in the case continues and eventually could include an appeal to the Oklahoma Supreme Court.

Pruitt's emphasis on Tar Creek and the other Superfund sites across the country grew out of a task force he created in 2017, just months after being sworn in as administrator.

Members of the Superfund Task Force came back with a list of specific recommendations under major goals ranging from expediting cleanup and remediation to promoting redevelopment and community revitalization.

As part of that process, Tar Creek landed on a list Pruitt says he will use to keep the emphasis on the program.

Hot Air

https://hotair.com/archives/2018/03/20/epa-ends-use-secret-science-crafting-regulations/

EPA Ends The Use Of "Secret Science" In Crafting Regulations

By: Jazz Shaw 3/20/18

Just in case liberals didn't already have enough reasons to pin EPA Administrator Scott Pruitt's picture to their dart boards, he's just rolled out another policy change which will force the "party of science" to rely on actual science when pushing for regulatory changes. Promising to eliminate "secret science" in EPA deliberations, Pruitt is ordering all scientific studies used when considering new regulations to include publicly available data and methodologies. This was announced in an exclusive interview with The Daily Caller News Foundation.

"We need to make sure their data and methodology are published as part of the record," Pruitt said in an exclusive interview with The Daily Caller News Foundation. "Otherwise, it's not transparent. It's not objectively measured, and that's important."

Pruitt will reverse long-standing EPA policy allowing regulators to rely on non-public scientific data in crafting rules. Such studies have been used to justify tens of billions of dollars worth of regulations.

EPA regulators would only be allowed to consider scientific studies that make their data available for public scrutiny under Pruitt's new policy. Also, EPA-funded studies would need to make all their data public.

"When we do contract that science out, sometimes the findings are published; we make that part of our rule-making processes, but then we don't publish the methodology and data that went into those findings because the third party who did the study won't give it to us," Pruitt added.

In other words, science is not being excluded from any EPA studies. The agency is simply ensuring that groups conducting studies publish the data used to reach the conclusions they forward to the EPA so it can be examined and potentially challenged if it's found to be faulty. Surely nobody who's really interested in following the science could object to that, right?

Wrong. Democrats were immediately arguing against such a move, saying that forcing research organizations to publish their figures "would reveal confidential patient data." That's a rather odd argument in a couple of different ways. First of all, there's a lot of data collected for various studies used by the EPA which have nothing to do with medical records. Examples include all of the groundwater studies done when the Obama administration was considering banning fracking.

But even in cases where medical information is required, the groups conducting the study were able to obtain the patient data. As Steve Milloy, the publisher of JunkScience.com was quoted as saying, California regularly makes such data available under the name, 'Public Use Death Files.' Other medical information can be compiled and have the patients' names and other identifying personal information scrubbed. This is already done on a regular basis.

In fact, barring some subject which might compromise national security – such as the handling of tactical weapons materials – it's difficult to imagine many true, scientific studies which couldn't publish their underlying data, making it available for peer review. So if you're still opposed to federal agencies wanting to see such data, the next logical question to ask is precisely what it is that you're hiding.

The Detroit News

https://www.detroitnews.com/story/news/politics/2018/03/20/epa-pruitt-lead-water-flint/33125283/

EPA chief wants to eradicate lead from drinking water

By: Melissa Nann Burke, 3/20/18

The head of the Environmental Protection Agency says eradicating lead from drinking water is one of his top priorities three years after the Flint water crisis, and he's worried Americans aren't "sufficiently aware" of the threat.

"I really believe that we ought to set a goal as a country that, over the next 10 years, that we ought to work with respect to investments in our infrastructure to eradicate lead in our drinking water," EPA Administrator Scott Pruitt told reporters this week at the agency's headquarters.

"It can be achieved. Some of the mental-acuity levels of our children are being impacted adversely as a result of this."

Pruitt is concerned that parents and citizens don't understand the threat of lead in drinking water or toys, and "we're looking at ways we can contribute to that dialogue," he said, according to an audio recording provided by the New York Post.

"I do think that what happened in Flint is something that could happen elsewhere. We just simply need to take steps to do all that we can to address it prospectively and proactively," Pruitt said.

Pruitt said President Donald Trump's $1.5 trillion plan to bolster the nation's infrastructure over the next decade would include investments in aging water infrastructure.

Pruitt didn't describe a plan for replacing the thousands of lead service lines throughout the country – a cost estimated around $40 billion to $45 billion – but stressed the need for state and local governments to invest in such upgrades, perhaps with federal grant aid.

Pruitt added he would "love" to see local governments investing more in water infrastructure.

"These water treatment facilities – they have authority to bond out, to raise fees, to invest in corrosion control, the replacement of service lines and the rest," Pruitt said. "And some of them just aren't doing it."

Gov. Rick Snyder has proposed having water customers across Michigan pay a $5 annual fee to help upgrade aging infrastructure and replace lead pipes in their local communities, but the plan hasn't gained steam in the Republican-controlled Legislature.

U.S. Rep. Dan Kildee, D-Flint Township, said what Pruitt has described isn't really a plan.

"When it comes to Mr. Pruitt, nice words don't replace pipes. It takes money. What they have proposed is really nothing when it comes to infrastructure," Kildee said of the Trump administration.

Kildee said what would help is Pruitt putting his support behind Kildee's legislation that would reduce the acceptable amount of lead in drinking water to 5 parts per billion. The current federal action limit is 15 parts per billion.

"Force federal and state governments to stare this in the face by adopting a level that is science-based that says there is no acceptable level of lead," he said.

EPA has spent a decade trying to update the rule.

Snyder called the rule "dumb and dangerous" after the Flint disaster. The state has proposed draft rules to drop the acceptable amount of lead in drinking water to 10 parts per billion by 2024.

The New York Post

https://nypost.com/2018/03/21/epa-head-calls-for-coordinated-response-to-nyc-lead-crisis/

EPA head calls for 'coordinated' response to NYC lead crisis

By: Marisa Schultz, 3/21/18

EPA Administrator Scott Pruitt called for a "coordinated" response between New York State and City officials to address the ongoing lead crisis.

Asked whether federal intervention is needed to protect New York children and tenants from lead poisoning, the Environmental Protection Agency chief urged action on all fronts.

"I think a local, state and federal response that is very coordinated and collaborative is terribly important," Pruitt said in an interview. "We each play a role. I'd love to see steps taken at the local level to invest."

Gov. Cuomo already announced an emergency declaration for New York Housing Authority buildings and pledged an additional $250 million for upgrades. But heated public squabbles over resources and responsibility with rival Mayor de Blasio have complicated progress.

Pruitt declined to weigh in on the Cuomo/de Blasio feud but encouraged broad infrastructure investment from all levels to prevent children from getting sick.

"I think the governor's call for that is important and it's something we think is important as well and we need to contribute to it along with the states, local cities and towns," Pruitt said.

While the problems in NYCHA are centered on lead paint, Pruitt has primarily tackled the issue of eliminating lead poisoning from water. He raised concerns over high lead levels found at certain New York City school water fountains.

"I do think that what happened in Flint is something that could happen elsewhere," Pruitt said. "We just simply need to take steps to do all that we can to address it prospectively and proactively."

Pruitt estimated it would take $40 billion – $45 billion to replace lead service lines nationwide and suggested President Trump's $1.5 trillion infrastructure plan can assist states and cities with the costs.

"I really believe that we ought to set a goal as a country that, over the next 10 years, that we ought to work with respect to investments in our infrastructure to eradicate lead in our drinking water," Pruitt said.

He added: "It can be achieved. Some of the mental-acuity levels of our children are being impacted adversely as a result of this."

The Philadelphia Inquirer

http://www.philly.com/philly/health/pruitt-epa-smog-philadelphia-ozone-20180320.html

Philly has a smog problem. Will Scott Pruitt's EPA say so?

By: Frank Kummer, 3/20/18

Mollie Michel of South Philadelphia keeps her children inside some days because of air pollution, so she's particularly irked by a long delay by the U.S. Environmental Protection Agency to say officially whether Philadelphia has a smog problem. That designation could mean more regulation to help clean up the dirty air, she said.

"You have a city with a childhood asthma rate twice as high as the national average," Michel said to bolster her argument. A member of Moms Clean Air Force, she gathered Tuesday with a few dozen other activists and local officials at City Hall to mark the first day of spring by protesting Trump administration policies.

Whether Philadelphia is violating the federal Clean Air Act remains in bureaucratic limbo. Despite deadlines, the EPA has refused to say whether Philadelphia and some other cities, including Pittsburgh, have met a 2015 benchmark of 70 parts per billion or less of ground-level ozone in the ambient atmosphere. Being out of compliance, or in "nonattainment," has a real-world impact on the state, city, businesses and industry, and even motorists through increased regulation and funding.

The EPA was supposed to state whether Philadelphia was in compliance by last Oct. 1. Last week, a federal court ruled that the EPA, under its administrator, Scott Pruitt, broke the law by missing the deadline, and gave the EPA until April.

On Monday, Pruitt's office said it would meet the deadline.

Pruitt said during a meeting with reporters at EPA headquarters in Washington that the scope of monitoring required to answer the smog question had caused the delay.

"The agency has been running behind for a number of years," said Pruitt, who took office a year ago.

Pruitt, who said he didn't have data specific to Philadelphia in front of him, also took issue with how the monitoring program has been carried out in the past, saving money by "modeling" — using data from one area and applying it to another.

"Real data is terribly important," Pruitt said. "When we go forward, we need to focus more on monitoring as opposed to modeling … You shouldn't get data from one monitor and extrapolate it over a whole area because you're not dealing with real data at that point."

He said his office is "exploring ways" to pay for monitoring.

If Philadelphia is declared to have a smog problem, the Pennsylvania Department of Environmental Protection would be responsible for crafting a plan to reduce ground-level ozone. Ozone is formed when volatile organic compounds and nitrogen oxides — created by burning fossil fuels, and power plants and other industries — combine in sunlight. Long, hot, humid days act as smog factories, so smog is expected to increase as the climate warms up.

James Garrow, a spokesman for the city's Department of Public Health, said, "Philadelphia is indeed out of compliance" as of March 1. He said the trend for ground-level ozone has been going down for years and Philadelphia expects to meet requirements within a few years.

At the protest, Flora Cardoni, an organizer with PennEnvironment, joined Democratic State Reps. James R. Roebuck Jr. and Brian K. Sims, as well as members of Deep Green Philly and the Clean Air Council, in speaking out. Cardoni said it's already been too long a wait for action.

"Philadelphians want to walk along the Schuylkill, play in Fairmount Park, and wander the historic city without worrying about choking on smog and soot," she said.

Politico

https://www.politico.com/story/2018/03/20/omnibus-vote-house-thursday-473010?lo=ap_e1

Congress struggles to clinch spending deal

By: Burgess Everett, Rachel Bade, Sarah Ferris and Heather Caygle, 3/20/18

Congressional leaders are racing to finalize a spending bill by the end of Tuesday but find themselves still at odds over a host of controversial issues — delaying plans to unveil the proposal and raising the prospect of weekend votes to avoid a shutdown.

Democrats, Republicans and the White House battled late into the night Monday and into Tuesday afternoon over whether to include provisions on President Donald Trump's border wall, a massive New York infrastructure project and the special counsel's Russia investigation, according to lawmakers and aides in both parties.

There were still a number of unresolved issues as of Tuesday evening, and multiple sources were pessimistic that negotiators would reach a deal in time to release the bill before Wednesday.

Asked how confident he was that the Senate would avoid weekend work, Sen. John Thune (R-S.D.) replied: “I’m not real confident at this point.”

Dragging the talks into Wednesday would increase the chance that lawmakers pass a short-term spending bill to prevent a temporary shutdown when funding lapses Friday evening.

Several issues remain open after administration officials participated in a lengthy meeting Tuesday afternoon with top leadership and appropriations staffers that did little to break the logjam.

“Everything that remains is going to be pulling teeth to resolve,” said a senior congressional aide with knowledge of the meeting, which included representatives from the White House and the Office of Management and Budget.

The New York-area Gateway project is a primary issue for the White House, according to the aide, but several other provisions are also still up in the air.

Trump is likely to support the bill if the Gateway project is excluded, the military receives a major budget boost and there is a significant infusion of border security funding, White House legislative affairs director Marc Short said at the Capitol Tuesday.

House Speaker Paul Ryan (R-Wis.) told his conference that he is planning to pass the massive, $1.3 trillion omnibus on Thursday, according to House Republicans.

"I'm hoping today," Ryan told reporters when asked Tuesday morning when leaders would wrap up negotiations. He said lawmakers were not yet considering a short-term funding patch to buy more negotiating time. "There are some unresolved issues. We're working through them as we speak."

Senate Majority Leader Mitch McConnell (R-Ky.) said he would keep the Senate in until the bill is passed.

"We anticipate the House filing later today, which will give the Senate plenty of time to take a look at it and see what's in it," McConnell said on Tuesday afternoon.

Still, on the House's current schedule, the Senate would have just a day to pass the bill before government funding runs out on Friday evening — allowing for any one senator to shut the government down briefly. Sen. Rand Paul (R-Ky.) caused such a shutdown last month in protest over a budget deal.

Paul would not rule out doing everything he can to stop the spending bill if he views it as poorly as he did a budget bill in February.

"I will oppose the bill. I have to make a decision about whether or I will accept a time agreement," Paul told reporters on Tuesday.

Senate leaders are already entertaining a short-term spending bill in preparation for any antics by Paul.

"We're going to be here into the weekend, perhaps. But I think there could be some measures taken to keep the lights on. But we'll get it done," said Senate Majority Whip John Cornyn (R-Texas). "Anything can happen around here."

Congressional leaders had hoped to file the bill, which would fund the government through the end of September, on Monday night with a House vote on Wednesday. But Congress is bogged down over policy provisions that various congressional factions are trying to attach to the must-pass bill. Many lawmakers view the legislation as their last chance to get their priorities signed into law before the midterm elections.

“Negotiations continue between the four leaders. A few sticking points remain, but we are very close," said Senate Minority Leader Chuck Schumer (D-N.Y.). "I think it will be a fair compromise."

Lawmakers and aides estimated there were as many as 20 provisions still being debated. One of the most controversial is $900 million in funding for the Gateway tunnel project in New York, a key priority of Schumer and New York-area Republicans and Democrats.

Gateway supporters are trying to include language that would allow the project to apply for competitive grant money and prevent the Trump administration from squashing the project. Trump has told Republicans he will veto a bill that funds the project specifically. Schumer and GOP leaders were still battling over the provision as of Tuesday afternoon, and the New Yorker said the tunnel is of national significance despite Trump's complaints.

The White House remains unmoved, however.

“The secretary of transportation has explained if you put that much money in one project it’s going to crimp projects across the country she needs to fund. It‘s also a project that a majority of House Republicans… voted against," Short said. “The president has made his wishes well known so I think we’re going to be fine."

Another sticking point: immigration. Talks to protect young immigrants facing deportation fell apart over the weekend, but congressional Democrats spent Monday and Tuesday pushing to freeze hiring of immigration enforcement officials in return for providing Trump more than $1 billion in funding on his border wall.

Democrats and Republicans are likely to agree on about $1.6 billion in border funding that would help finance some fencing and security and avoid directly funding the large concrete wall that Trump wants, according to a Democratic aide.

Republicans are seeking to fix an error in the new tax law that lowers tax bills for farmers that sell grain to cooperatives at the expense of other companies. Though Senate Democrats and

some Senate Republicans are willing to rewrite the provision in exchange for a boost in Low-Income Housing Tax Credits in the spending bill, Ryan has resisted, according to people in both parties. Ryan allies say that just because he rejected an offer from Schumer to fix

the so-called “grain glitch,” it doesn't mean the issue is dead altogether.

Congressional Democrats also pushed provisions to protect special counsel Robert Mueller but have been rebuffed by GOP leaders. An attempt to shore up Obamacare's insurance markets is also stalled in a battle over abortion.

Lawmakers believe neither of those provisions will be in the omnibus.

A Tuesday morning school shooting in Maryland, however, may have thrown another wild card into the mix: GOP leaders are pressing to include popular legislation that would improve the National Instant Criminal Background Check System for firearms purchases.

“We remain hopeful that Fix NICS is in the omni," Short said of the proposal to improve the FBI’s background check system.

But Democrats want a broader gun debate and note that the provision is a modest way to simply bolster existing gun laws. Meanwhile, conservatives believe it would make it more difficult for some veterans to buy a gun, which could keep that provision out as well.

"There are still some key questions. There's a NICS question, there's an Internet sales tax question, there‘s [an Obamacare] question. There's a Gateway project financing question," said Rep. Jim Jordan (R-Ohio), a conservative leader. "It looks like a lot of those things aren't gonna be in it, which is a good step, but it still spends way too much money."

The Wall Street Journal

https://www.wsj.com/articles/trump-to-ramp-up-trade-restraints-on-china-1521593091

Trump to Ramp Up Trade Restraints on China

By: Bob Davis, 3/20/18

The White House is preparing to crack down on what it says are improper Chinese trade practices by making it significantly more difficult for Chinese firms to acquire advanced U.S. technology or invest in American companies, individuals involved in the planning said.

The administration plans to release on Thursday a package of proposed punitive measures aimed at China that include tariffs on imports worth at least $30 billion.

But the tariffs won't be imposed immediately. Rather, U.S. industry will be given an opportunity to comment on which products should be subject to the duties. As part of the package, the White House will announce possible investment restrictions by Chinese firms in the U.S. and will direct the Treasury Department to outline rules governing investment from China.

Final details of the plan, including the amount of imports to be hit by tariffs, remain in flux, those involved with the discussions said. While the rough amount and rationale for the tariffs are expected to be disclosed on Thursday, the final decisions will come once U.S. industry has had its say, they said.

A White House spokeswoman declined to comment.

The effort stems from a monthslong investigation by the administration into Chinese intellectual property practices that found the damage to U.S. companies from forced technology transfer is $30 billion annually.

The administration has warned Beijing that it risked tariffs if it didn't significantly liberalize its market and eliminate practices that disadvantage foreign firms.

While the administration's plans to put tariffs on China have received most of the attention, it is considering other significant penalties, especially those aimed at state-owned Chinese firms. It plans to argue that Chinese state-owned firms buy U.S. technology not for commercial purposes, but to apply for military use and otherwise gain an edge in the race for global technological dominance.

The administration believes that Beijing, in requiring U.S. companies to form joint ventures to do business in China, then pressures them to transfer important technology to their Chinese partners. The U.S. also contends Beijing improperly subsidizes Chinese companies looking to overtake U.S. rivals in such advanced technologies as semiconductors, artificial intelligence and robotics.

Chinese officials have said that they are improving their protection of intellectual property and liberalizing their economy. They also complain that the U.S. hasn't given them a specific list of demands that they need to meet to head off tariffs.

The country's responses to challenges from President Donald Trump loomed large as China's leaders closed out an annual political gathering on Tuesday.

Premier Li Keqiang, the titular No. 2 leader, struck a conciliatory tone on trade with the U.S. At a news briefing in Beijing's Great Hall of the People, Mr. Li said "there are no winners" in a trade war between the world's two largest economies, and appealed for calm.

People involved in the planning say the Trump administration is looking at making reciprocity the core of U.S. investment relations with China, meaning that the U.S. would impose restrictions on Chinese investment similar to those that U.S. firms face in China. That could mean that the U.S. would insist that Chinese firms form joint ventures before doing business in the U.S., unless China dropped those restrictions.

The U.S. has already made it more difficult for Chinese companies to invest in the U.S. by blocking Chinese bids to purchase U.S. semiconductor firms. That is done by an interagency review of foreign acquisitions by the Committee on Foreign Investment in the U.S. Congress is

looking to broaden CFIUS reviews of acquisitions so they include joint ventures too.

The expansion would include reviews of technology transfers to foreigners and could apply to joint ventures both outside and within the U.S. But CFIUS looks solely at national security concerns. The administration wants to address economic harm as well, according to these people.

Any imposition of tariffs, without going first to the World Trade Organization, is sure to prompt a chorus of criticism not just from Beijing but from U.S. industry, which has opposed tariffs as counterproductive. The WTO adjudicates trade cases and has the power to authorize tariffs in cases where a losing party doesn't change its practices. The administration is also considering bringing a case against Chinese trade practices that are covered by the WTO.

Oregon Sen. Ron Wyden, the senior Democrat on the Senate Finance Committee, said he opposes the broad imposition of tariffs. "American producers who haven't gotten a fair shake in the past aren't going to get that back by just have tariffs slapped on imports indiscriminately," he said.

Tariffs are bound to cause China to retaliate, said Clement Leung, Hong Kong's representative in the U.S. Chinese officials "cannot show any weakness" at a time when the country's leader, Xi Jinping, has just been confirmed for his second term, Mr. Leung said. Hong Kong, a trading center that operates somewhat independently from the rest of China, would be hurt by limits on trade.

Whatever the political blowback, Harvard law professor Mark Wu, a trade expert, says that the White House has authority to impose tariffs under section 301 of the Trade Act of 1974.

"In situations where the U.S. Trade Representative deems unfair trade practices to fall outside the scope of a WTO-covered agreement, then the statute permits the executive branch to take action directly without first seeking recourse through WTO dispute settlement" procedures, he said.

Frustration with Chinese trade practices has been building among both the governments and private sectors of the U.S., Japan and Europe. One reason the U.S. is considering a separate WTO case is to try to recruit allies to pressure China. But any move to impose tariffs could allow Beijing to portray itself as a victim. Coalition-building has become more complicated in the wake of a separate U.S. action to levy tariffs on steel and aluminum imports from allied nations.

For instance, finance ministers and central bankers from the Group of 20 countries, meeting in Buenos Aires on Tuesday, failed to reach any new agreement on shared principles when it comes to trade policies, as the split between the U.S. and other major economies deepened over the U.S.'s tariff policies.

The administration is considering recommendations from two other reports that would impose draconian investment restrictions on China. The U.S.-China Economic and Security Review Commission, a Congressional panel that takes a hard line on China, last year urged the administration to prohibit "the acquisition of U.S. assets by Chinese state-owned or state-controlled entities, including sovereign wealth funds."

A report for the Pentagon by its Defense Innovation Unit Experimental, which examines technology issues, has recommended that the Pentagon pursue a policy of "deterring Chinese technology transfer" by broadening CFIUS's mandate and strengthening export controls on technology to China.

China Investment Corp, Chinese sovereign-wealth fund which could get hit by sanctions, is putting together a fund targeting as much as $5 billion with Goldman Sachs Group Inc., aimed at investing in U.S. manufacturing and other sectors. CIC hopes the fund would pass muster with U.S. regulators, say those people familiar with the plans.

It is unclear how far the administration will go in pursuing these ideas. Blocking the acquisition of all purchases by Chinese state firms, for instance, would mean that Chinese state-owned airlines couldn't buy Boeing jets. Toughening export controls on, say, semiconductor production machinery could cede the market to Japanese vendors.

The administration's actions on China come on the heels of plans to levy tariffs on steel and

aluminum imports. Japan, Korea and the European Union are scrambling to get exemptions from those levies, which are set to go into effect on Friday.

TRUMP TWEETS

Donald J. Trump @realDonaldTrump · 21h

Our Nation was founded by farmers. Our independence was won by farmers. And our continent was tamed by farmers. Our farmers always lead the way -- we are PROUD of them, and we are DELIVERING for them! #NationalAgricultureDay

28K 28K 115K

Donald J. Trump @realDonaldTrump · 2h

AUSTIN BOMBING SUSPECT IS DEAD. Great job by law enforcement and all concerned!

6.0K 11K 44K

Donald J. Trump @realDonaldTrump · 2h

Department of Justice should have urged the Supreme Court to at least hear the Drivers License case on illegal immigrants in Arizona. I agree with @LouDobbs. Should have sought review.

3.6K 4.5K 18K

Donald J. Trump @realDonaldTrump · 2h

...there was no probable cause for believing that there was any crime, collusion or otherwise, or obstruction of justice!" So stated by Harvard Law Professor Alan Dershowitz.

9.2K 5.4K 21K

Donald J. Trump @realDonaldTrump · 1h

"Special Council is told to find crimes, whether a crime exists or not. I was opposed to the selection of Mueller to be Special Council. I am still opposed to it. I think President Trump was right when he said there never should have been a Special Council appointed because.....

11K 4.2K 17K

To: Grantham, Nancy[Grantham.Nancy@epa.gov]
From: Kelly, Albert
Sent: Wed 12/20/2017 1:25:25 PM
Subject: FW: Google Alert - Superfund

So what is with this little paper trail stuff? No one has talked to me. They can look through my junky file anytime

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

From: Google Alerts [mailto:googlealerts-noreply@google.com]
Sent: Wednesday, December 20, 2017 8:06 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: Google Alert - Superfund

Superfund

Daily update December 20, 2017

NEWS

EPA Says **Superfund** Task Force Left Behind Little Paper Trail

U.S. News & World Report

EPA Says **Superfund** Task Force Left Behind Little Paper Trail. EPA says an internal task ... EPA Administrator Scott Pruitt in May announced the creation of a **Superfund** Task Force he said would reprioritize and streamline procedures for remediating more than 1,300 sites. In June, the group issued 42 ...

EPA says **Superfund** Task Force left behind little paper trail - Minneapolis Star Tribune

EPA says **Superfund** Task Force left behind little paper trail - Dayton Daily News

EPA puts 6 companies on the hook for East Chicago cleanup - E&E News

Full Coverage

Agreement Sets Pollution Testing Plan For Portland Harbor **Superfund** Site

OPB News

The U.S. Environmental Protection Agency has finalized the next big step in cleaning up the Portland Harbor **Superfund** site: inking an agreement for how pollution levels will be tested. The Oregon Department of Environmental Quality, which raised concerns about the agreement in October, says the ...

Flag as irrelevant

Lincoln school on board for **Superfund** cleanup

LaSalle News Tribune

The La Salle Elementary School board on Tuesday approved allowing the U.S. Environmental Protection Agency to sample for and, if necessary, clean up contaminated soil on the Lincoln Junior High School grounds as part of the EPA's **Superfund** cleanup of the Matthiessen and Hegeler Zinc smelting ...

Flag as irrelevant

EPA inks deal with industrial polluters to lead next phase of Portland Harbor **Superfund** work

Pamplin Media Group

TRIBUNE FILE PHOTO: STEVE LAW - Travis Williams of Willamette Riverkeeper, in center, Four industrial companies will take the lead on the next phase of the Portland Harbor **Superfund** cleanup. The U.S. Environmental Protection Agency announced Tuesday that it signed a consent order with the ...

Flag as irrelevant

EPA inks deal with industrial polluters to lead next phase of Portland Harbor **Superfund** work

Pamplin Media Group

Four industrial companies will take the lead on the next phase of the Portland Harbor **Superfund** cleanup. The U.S. Environmental Protection Agency announced Tuesday that it signed a consent order with the companies to fund and oversee a round of environmental sampling to determine baseline ...

EPA, four companies reach key Portland Harbor **Superfund** cleanup deal - Portland Business Journal

Full Coverage

Flag as irrelevant

John Berrey: Politico got it wrong on Tar Creek

Joplin Globe

This piece indicated that Oklahoma Sen. Jim Inhofe bears significant blame for the complicated nature of the cleanup of the Tar Creek **Superfund** site located on Quapaw land in Northeast Oklahoma. Even casual observers know that the complications at Tar Creek existed long before the tenure of Sen.

Flag as irrelevant

Industry **super fund** names new chair

Financial Standard

An industry **super fund** with more than $3.5 billion under management will see in the New Year with a new

independent chair. Former general counsel of Australian Unity Kirsten Mander stepped up to the role on December 15, replacing David Miles retired after 12 years at the helm. Mander has accrued ...

Flag as irrelevant

More tax on super, but savers are winners anyway

The Australian Financial Review

Mr Clare said the headline tax rate for **super fund** earnings was 15 per cent but when tax breaks were taken into account the average rate was only about 8 per cent. "The government takes 8 per cent of the higher-than-assumed investment returns and the fund members are actually taking 92 per cent, ...

Flag as irrelevant

Three Months After Harvey, Water Quality Questions Linger

Water Online (press release)

Even three months after Hurricane Harvey hit land and decimated areas of Texas, there are still questions about the water quality aftermath. In particular, as storm waters washed over so-called "**Superfund** sites," federally-designated areas containing hazardous waste, they brought unknown levels of ...

Flag as irrelevant

This is how your investments are taxed

Yahoo7 News

Recent research shows that 36% of the adult Australian population own investments listed on the stock market. That's nearly 6.5 million investors, some investing as individuals and some investing through Self- Managed **Super Funds** (SMSFs). Millions more own shares in privately owned companies, ...

Flag as irrelevant

WEB

Ho! Ho! Ho! for industry **super fund** members, cries Santa

AAP Medianet's

MEDIA RELEASE. 20 December 2017. Ho! Ho! Ho! for industry **super fund** members, cries Santa. Santa has made an early delivery to millions of industry **super fund** members with new independent figures showing continued strong returns. According to the latest SuperRatings numbers, industry super ...

Flag as irrelevant

PFAS Health Study Required By Congress May Lift Threat Of **Superfund** Suit

Inside EPA

Defense legislation signed into law by President Donald Trump Dec. 12 will authorize at least $7 million for a federal study on the human health impacts stemming from perfluorinated chemicals in drinking water near military facilities, potentially lifting the threat of a **Superfund** suit to force a study and ...

Flag as irrelevant

EPA says **Superfund** Task Force left behind little paper trail

New Country 923

WASHINGTON (AP) — The Environmental Protection Agency says an internal task force appointed to revamp how the nation's most polluted sites are cleaned up generated no record of its deliberations. EPA Administrator Scott Pruitt in May announced the creation of a **Superfund** Task Force he said ...

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Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/5/2018 3:30:20 PM
To: Edlund, Carl [Edlund.Carl@epa.gov]
Subject: Re: Tar creek

Thanks. Would it be acceptable to plan for the 20th? I don't want to inconvenience anyone.

Sent from my iPhone

On Feb 5, 2018, at 7:20 AM, Edlund, Carl <Edlund.Carl@epa.gov> wrote:

> Thanks Blake....a good list.
>
> Kell- interested in any of these events?
>
> Sent from my iPad
>
> On Feb 5, 2018, at 8:41 AM, Atkins, Blake <Atkins.Blake@epa.gov> wrote:
>
> > Carl, here are some upcoming Tar Creek trips that might be of interest. The reuse/redevelopment opportunity in Miami, and discussion regarding institutional controls with BIA may be of particular interest.
> >
> > 2/20/18: Meeting with the City of Miami and ODEQ to discuss Miami's interest in acquiring a commercial property and inactive rail spur located within the Tar Creek Superfund site. The acquisition is an economic development project for the City which will provide rail access to several companies located near the rail spur. A local chat processors has expressed interest in using the commercial property to ship chat.
> >
> > 2/20/18: Host a Tar Creek site tour for the BIA Miami Agency. The tour will include visits to restricted properties which need institutional controls (ICs) to protect the cleanup and ensure long term stewardship. EPA is working with BIA to reach an agreement on the ICs issue since the BIA is the federal agency with the regulatory authority to place deed notices on restricted properties.
> >
> > 2/21/18: Monthly Tar Creek meeting. Meeting attendees include representatives from EPA, ODEQ, the Quapaw Tribe and the BIA. All entities are involved with on-going remedial activities at the site.
> >
> > 3/28/18: Region 6 and Region 7 Managers meeting to discuss coordinated efforts for all operable units of the Tar Creek Superfund site.

3/28/18: Tar Creek Stakeholder meeting: EPA Regions 6 and 7 will participate in a meeting with the Tar Creek stakeholders to provide site updates and action status.

Blake Atkins, Chief
LA/NM/OK Remediation Section
EPA Region 6 Superfund Division
1445 Ross Ave (6SF-RL)
Dallas, TX 75202
214-665-2297 w
214-406-5907 c

From: Edlund, Carl
Sent: Sunday, February 04, 2018 7:40 PM
To: Phillips, Pam <phillips.pam@epa.gov>; Sanchez, Carlos <sanchez.carlos@epa.gov>; Casanova, Rafael <Casanova.Rafael@epa.gov>; Atkins, Blake <Atkins.Blake@epa.gov>
Subject: Fwd: Tar creek

Any thoughts? Events that he could hook into?

Sent from my iPad

Begin forwarded message:

> **From:** "Kelly, Albert" <kelly.albert@epa.gov>
> **Date:** February 4, 2018 at 2:01:17 PM CST
> **To:** "Edlund, Carl" <Edlund.Carl@epa.gov>
> **Subject: Tar creek**
>
> I would like to schedule a visit to Tar Creek. What would you suggest?
>
> Sent from my iPhone

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 7/27/2017 7:32:25 PM
To: Stalcup, Dana [Stalcup.Dana@epa.gov]
Subject: FW: July 15, 2017 Indiana Harbor CDF & USS Lead Superfund Meetings
Attachments: Mr Albert Kelly July 27, 2017.docx

Importance: High

This is on East Chicago. Would you identify someone to give me a bullet point analysis of this

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Larry Davis [mailto: Ex. 6 - Personal Privacy]
Sent: Wednesday, July 26, 2017 7:15 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: 'Larry Davis' < Ex. 6 - Personal Privacy >; 'Maritza Lopez' < Ex. 6 - Personal Privacy 'Rev. Cheryl Rivera' < Ex. 6 - Personal Privacy 'Thomas Frank' < Ex. 6 - Personal Privacy 'Akeeshea Daniels' < Ex. 6 - Personal Privacy >; 'Sara Lynn' < Ex. 6 - Personal Privacy 'Tara Adams' < Ex. 6 - Personal Privacy 'Mary Poe' < Ex. 6 - Personal Privacy >; 'Lori' < Ex. 6 - Personal Privacy 'Elbert Williams' < Ex. 6 - Personal Privacy >; 'raymond mosley' < Ex. 6 - Personal Privacy >; 'Sarah Willis' < Ex. 6 - Personal Privacy >; 'Byron Duke Florence' < Ex. 6 - Personal Privacy >; 'Byron Florence' < Ex. 6 - Personal Privacy >; Ex. 6 - Personal Privacy Ex. 6 - Personal Privacy >; 'Pamela Berry' < Ex. 6 - Personal Privacy >; 'Michael Jacobi' < Ex. 6 - Personal Privacy >; 'Deborah Gail Musiker' < Ex. 6 - Personal Privacy >; 'Waikar, Anjali' < Ex. 6 - Personal Privacy >; 'Geertsma, Meleah' < Ex. 6 - Personal Privacy >; 'Templeton, Mark' < Ex. 6 - Personal Privacy >; 'Emily Coffey' < Ex. 6 - Personal Privacy >; 'Kate Walz' <katewalz@povertylaw.org>; 'Gilman, Emily D.' < Ex. 6 - Personal Privacy >; 'Chizewer, David' < Ex. 6 - Personal Privacy >; 'Samuel Henderson' < Ex. 6 - Personal Privacy
Subject: RE: July 15, 2017 Indiana Harbor CDF & USS Lead Superfund Meetings
Importance: High

July 27, 2017

To: Mr. Albert Kelly
Senior Advisor to the Administrator
Office of the Administrator
United States Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460
(202) 564-5086
(202) 306-8830

< kelly.albert@epa.gov >

From: Larry Davis
268 S 600 W
Hebron, Indiana 46341

Ex. 6 - Personal Privacy

RE: July 15, 2017 Indiana Harbor CDF & USS Lead Superfund Meetings

Dear Mr. Kelly,

I want to personally thank you for enduring the five hours of toxic tribulations you witnessed Saturday July 15, 2017 in East Chicago, Indiana. This correspondence is entirely my own as a concerned taxpaying citizen I am not representing an organization.

I hope that you realize as I do that Superfund is broken and is failing to protect people of the United States from toxic wastes and their adverse health impacts.

In East Chicago we see the generational damage that chronic toxic waste exposure has produced. A community of color where children evacuated from one school built on the USS Lead Superfund site are relocated to a school that is one-third of a mile from where the United States Environmental Protection Agency (US EPA) and the United States Army Corps of Engineers (USACE) are creating the largest Dioxin & Polychlorinated biphenyl (PCBs) land disposal facility in the Great Lakes – most likely a future toxic waste Superfund site for Northwest Indiana...

I would like to provide you with some background on topic starting with the USS Lead Superfund site.

The ancient Greeks recognized Lead and Arsenic as poison over 2,200 years ago – anyone involved in this industry in East Chicago, Indiana saying that they did not know the hazards and risks of Lead and Arsenic are being deceitful...

The State of Indiana first discovered Lead contamination in 1985 with sample results with Lead levels "as high as 594,420 mg Pb/g (ppm)" parts per million (ppm) – in other words, over half Lead content in the soil off-site of the USS Lead Refinery's property.

This was followed up with sampling by US EPA which confirmed extremely high levels of Lead in the soil of the West Calumet area of East Chicago, Indiana.

In 1989 representatives for USS Lead Refinery signed a Partial Interim Agreed Order in Cause No. N-296 Indiana Department of Environmental Management (IDEM) versus USS Lead Refinery.

The Agreed Order required the company to conduct sampling and analysis for: "…all contaminated areas to determine the extent, area, and depth of contamination" and implement a cleanup plan that: "addresses what remedial action will be performed to ensure the removal of all contamination."

Today the US EPA, HUD, and the responsible parties are not providing anything close to what the company originally agreed to do in 1989.

All the decision making surrounding the USS Lead Superfund site has only been based upon what was considered a toxic particulate aerial deposition contamination event as a result of Lead smelting and alloying process smoke stacks and toxic dust from waste piles blowing with the wind…

We know that the West Calumet Housing Complex has extremely high levels of Lead in soil and inside homes with test results at 92,000 ppm Lead and 32,000 ppm Lead respectively. And we know the ground water there tests at 16,000 ppm Lead.

We know that millions of tons of Lead products were produced over the decades by the Lead industry operating in East Chicago, Indiana and that subsequently production of toxic wastes in the forms of dusts, slag, and dross were also generated by the millions of tons over time.

This toxic waste was dumped in nearby swamp – dune and swale topography consisting of twenty to thirty foot tall heavily vegetated sand dunes separated by low areas (swale) of wetlands similar to what can still be observed in nearby natural areas.

US EPA and the United States Department of Housing and Urban Development (HUD) have not identified where the millions of tons of these toxic wastes are located even though historical photographs clearly illustrate the land filling of the area over time.

Groundwater sampling is planned by US EPA without yet having identified any source(s) of contamination which is required to properly design a valid groundwater model and sampling plan. This is a waste of resources since we already know the groundwater at West Calumet tested at 16,000 ppm Lead. Sources of contamination must be identified first and a properly designed groundwater sampling and analysis plan needs to be implemented.

Currently US EPA and HUD plan to pay contractors to dig up the USS Lead Superfund site in the West Calumet Housing Complex three times:

1) Contractors paid to remove and stockpile contaminated soil during utility removal,
2) Contractors paid to replace the contaminated soil back into the utility excavations, and
3) Contractors paid to remove up to two feet of contaminated soil or implement some other interim or final remedy as selected by US EPA.

All these U.S. taxpayer dollars spent and contractor activity taking place on a toxic waste Superfund site and we still will not achieve any permanent remedy or complete cleanup of West Calumet. This is an outrageous squandering of tax dollars!

How many times does the federal government have to pay contractors to dig in the toxic soils found in the USS Lead Superfund site before we actually get a complete cleanup?

In fact, the money spent so far in not achieving a permanent remedy could have provided an equitable and just means for churches, businesses, property owners, and renters to move as a community to a clean & healthy area away from the USS Lead Superfund site.

Parallels between the infamous Love Canal toxic waste catastrophe In New York and the USS Lead Superfund site in Indiana include:

1) Residents are unaware of living on top of or adjacent to toxic wastes;
2) Children chronically exposed to contaminated dusts, soils, and waters;
3) Toxic waste contamination in schools, parks, and playgrounds;
4) Severely contaminated groundwater is documented and toxic contaminates are seeping into basements and drainage systems;
5) A portion of the Superfund site was forced to evacuate while other people are forced to remain behind in a known toxic waste contaminated environment;
6) Residents are told that it is safe to remain during demolition and emergency removal actions and are given false impressions of a permanent cleanup and restoration of their properties.

US EPA contractors are involved in an Emergency Removal Action only removing soil down to two feet deep at residences and parks. However US EPA in local public meetings speak of "Cleanups" and "Restoration" when in reality the Emergency Removal Action entails leaving areas under: sidewalks, patios, shrubs & trees, etc. unaddressed and ignores areas of visible contamination e.g. large chunks of slag found in parks and yards that are subsequently reburied by topsoil and sod even though visible contamination removal is required in USS Lead Superfund site's consent decree.

The lessons learned at the Love Canal and Tar Creek Superfund sites seem to have been lost and forgotten when it comes to East Chicago, Indiana.

No one in the United States of America should have to live on a toxic waste Superfund site.

The Superfund Amendments and Reauthorization Act (SARA): SARA requires U.S. EPA to give preference to and use permanent solutions and alternative treatment technologies "to the maximum extent practicable" with "reductions in volumes, mobility, and toxicity" of the wastes.

The only sure way to ensure toxic waste risk reduction is to eliminate the hazard.

And the only sure way to eliminate toxic waste liabilities for both the responsible parties and the community is to achieve a permanent cleanup. You might ask how clean?

"Moving hazardous waste from one hole in the ground to another is the non-solution that was behind SARA's preference for permanent cleanup." – U.S. Congress, Office of Technology Assessment (OTA)

"OTA considers that a site has been permanently cleaned up when the contamination that was the cause of high enough risk to warrant cleanup (either current or future risk) is rendered irreversibly harmless through destruction (e.g., incineration or biological treatment) or recovery and reuse of the hazardous substances (e.g., recovery of lead from contaminated soil and buried battery casings)" – U.S. Congress, Office of Technology Assessment

"Cost-benefit thinking allows nearly any kind of cleanup decision to be rationalized and undermines the environmental goals of Superfund. Cost-benefit reasoning backs up the selection of impermanent remedies because of excessive flexibility in cleanup goals." – U.S. Congress, Office of Technology Assessment

"Impermanent remedies results in: "Spending on cleanup remedies which are unlikely to be permanent, leading to more spending in the long term for re-cleanups and perhaps posing exposures, risks, and damage to health and environment." – U.S. Congress, Office of Technology Assessment

"…certain kinds of action are inconsistent with permanence, including any form of land disposal or containment, and any use of engineering or institutional controls, including long term monitoring for releases. All of these mean:

1) Site hazardous material remains hazardous;

2) There is uncertainty about releases of hazardous material and, therefore, risks to health and environment; and

3) There are a host of uncontrollable possible future events which might compromise the effectiveness of the protection.

"…OTA disagrees with the notion that land disposal or engineering or institutional controls provide a "degree of permanence." What varies is the level of protection provided by different cleanup technologies and methods, not the degree of permanence. To tell the public that a remedy is permanent for perhaps a decade does not build public confidence." – U.S. Congress, Office of Technology Assessment

Our government must provided an equitable and just means for churches, businesses, property owners, and renters to move as a community to a clean & healthy area away from the USS Lead Superfund site based upon the needs of the community.

Select a permanent remedy that ensures unrestricted and safe use of the land in the future – that will actually be a complete cleanup and restoration of the land and groundwater.

By comparison look what US EPA did in Pitcher, Oklahoma, at the Tar Creek Superfund site where "…EPA and the state of Oklahoma agreed to a mandatory evacuation and buyout of the entire township. The similarly contaminated satellite towns of Treece, Kansas and Cardin, Oklahoma were included in the Tar Creek Superfund site."

"EPA/HUD Joint Statement on the Picher, Oklahoma, Housing Authority
Release Date: 01/26/2009
Contact Information: Dave Bary or Anthony Suttice at 214-665-2200 or < r6press@epa.gov >

(Dallas, Texas – January 26, 2009) Officials of the Regional offices of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Housing and Urban Development (HUD) are working together to ensure that families living in the Picher area are not adversely affected by the Tar Creek Superfund site. EPA and HUD support the voluntary relocation of residents currently under way."

Metal Smelters are always a concern due the nature of the toxic wastes produced by smelting and alloying processes. The people within the Tar Creek Superfund site were bought out but where toxic metal was smelted and alloyed in East Chicago, Indiana people have been left behind to suffer more chronic exposures to toxic wastes…

When a person can safely grow a garden without worry about being poisoned and feed themselves and their family then it's clean enough.

When a person can safely drill a well without worry about being poisoned and use that source of fresh water safely then it's clean enough. This level of clean also would ensure that any basements with water seepage would be free from toxic contamination.

With respect to the Indiana Harbor and Canal (IHC) dredging operations and Indiana Harbor Confined Disposal Facility (CDF) operations the phrase: "making matters worse" comes to mind…

Once again we see federal contractors involved in an impermanent removal action and failing containment strategy involving toxic wastes which are untreated and open dumped into a land disposal facility that does not meet current federal and state laws and regulations for: Siting, Design, Construction, or Operation of a Toxic Substances Control Act (TSCA) chemical landfill.

We are witnessing the next toxic waste Superfund site being created before our own eyes and it does not begin to eliminate toxic threats to public health here in Northwest Indiana in fact it adds more Risk to adults and children who's health is already in jeopardy with a 310 in one million cancer risk due to current levels of pollution…

US EPA's normal acceptable risk level is 1 in one million cancer Risk.

Commonsense would tell you that a single toxic volatile chemical could not possibly represent the vast number of hazards and risks known to be present in the heavily contaminated toxic Dioxin & PCB laced IHC sediments that are being dredged up by the United States Army Corps of Engineers (USACE) and then open dumped one third of a mile from schools, parks and residences in East Chicago, Indiana.

These toxic sediments have been describe as; "among the most contaminated and toxic that have ever been reported."

And as ridiculous as it may sound, that single chemical is: Naphthalene, commonly known as traditional mothballs – a solid white crystalline chemical that has vapors heavier than air and evaporates very slowly making it less likely to be detected given the way USACE is conducting their single chemical air pollution monitoring.

One definition of "mothball" is: "a state of having been rejected for further use or dismissed from further consideration."

That definition precisely describes how people's concerns over further poisoning of their community are being dismissed from consideration by USACE, US EPA, and the Indiana Department of Environmental Management (IDEM).

The USACE has failed for over four decades to come up with anything better than dredging up heavily contaminated toxic waste laced with Dioxin & PCBs and open dumping it next to schools, parks and residences – something that if anyone else did would make themselves subject to criminal prosecution under the law.

The fraudulent scheme USACE and US EPA are using considers the hazard and risk posed by mothballs alone in calculating an "Acceptable Risk" to people's health – this is not representative of all the Risks in the highly contaminated toxic IHC sediments.

And Real Time Monitoring only for mothballs ensures that the true extent of the releases of toxic volatile chemicals, including Dioxin & PCBs, during dredging, debris separation, and disposal operations will never be adequately monitored or reported to the public.

Commonsense tells you that the real hazards and risks are far greater than just mothballs and that current operational practices are far from being acceptable for the heavily contaminated toxic Dioxin & PCB sediments being disturbed and dumped.

Real Time Monitoring must use state-of-the-art technology which is capable of monitoring for all toxic volatile chemical air pollution during dredging and disposal operations to ensure protection of public health and safety in Northwest Indiana.

As opposed current uncontrolled open air practices, heavily contaminated debris separation and toxic sediment handing must take place in an enclosed process that ensures zero discharge of toxic volatile chemicals into Northwest Indiana's air.

Current USACE plans include leaving 45% to 55% of the most heavily contaminated Dioxin & PCB sediments exposed in place in the IHC after dredging and covering with a gravel cap. The PCBs will still be in the water column as they volatize from the highly contaminated exposed sediments which are now destabilized by incomplete dredging.

To stop the release of these toxins into Lake Michigan all of heavily contaminated toxic Dioxin & PCB IHC sediment must be dredged to a clean bottom for the entire IHC regardless of the extent of

USACE's navigational boundaries. The USACE started this process and now must own the situation they have created in making matters worse by destabilizing toxic sediments in the IHC and increasing the spread of toxins into our air, water and land.

All debris and toxic sediments must be detoxified before land disposal to eliminate future toxic liability for both the polluting companies and the community's health – combinations of technologies to effectively do this have been around for decades (but due to length of this correspondence that is a subject for another discussion…).

Sincerely;

Larry Davis

Ex. 6 - Personal Privacy

P.S. More details or references for any above information are available upon request.

To: Epp, Timothy[Epp.Timothy@epa.gov]
From: Kelly, Albert
Sent: Thur 3/22/2018 1:38:24 PM
Subject: RE: EPA Morning News Highlights 03.21.18

Ex. 5 - Deliberative Process

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

From: Epp, Timothy
Sent: Thursday, March 22, 2018 9:35 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: RE: EPA Morning News Highlights 03.21.18

Ex. 5 - Deliberative Process

Tim

Timothy R. Epp

Assistant General Counsel
International Environmental Law
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Tel. 202-564-2830

From: Kelly, Albert
Sent: Thursday, March 22, 2018 9:21 AM
To: Epp, Timothy <Epp.Timothy@epa.gov>
Subject: FW: EPA Morning News Highlights 03.21.18

Ex. 5 - Deliberative Process

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

From: Hewitt, James
Sent: Wednesday, March 21, 2018 9:07 AM
To: Shimmin, Kaitlyn <shimmin.kaitlyn@epa.gov>; Beach, Christopher <beach.christopher@epa.gov>; Block, Molly <block.molly@epa.gov>; Jackson, Ryan <jackson.ryan@epa.gov>; Bowman, Liz <Bowman.Liz@epa.gov>; Dravis, Samantha <dravis.samantha@epa.gov>; Wilcox, Jahan <wilcox.jahan@epa.gov>; Konkus, John <konkus.john@epa.gov>; Ferguson, Lincoln <ferguson.lincoln@epa.gov>; McMurray, Forrest <mcmurray.forrest@epa.gov>; Ford, Hayley <ford.hayley@epa.gov>; Bennett, Tate <Bennett.Tate@epa.gov>; Abboud, Michael <abboud.michael@epa.gov>; Daniell, Kelsi <daniell.kelsi@epa.gov>; Hanson, Paige (Catherine) <hanson.catherine@epa.gov>; Letendre, Daisy <letendre.daisy@epa.gov>; Grantham, Nancy <Grantham.Nancy@epa.gov>; Beck, Nancy <Beck.Nancy@epa.gov>; Wehrum, Bill <Wehrum.Bill@epa.gov>; Gunasekara, Mandy <Gunasekara.Mandy@epa.gov>; Bodine, Susan <bodine.susan@epa.gov>; Ross, David P <ross.davidp@epa.gov>; Leopold, Matt <Leopold.Matt@epa.gov>; Yamada, Richard (Yujiro) <yamada.richard@epa.gov>; Kelly, Albert <kelly.albert@epa.gov>; Lyons, Troy <lyons.troy@epa.gov>
Subject: EPA Morning News Highlights 03.21.18

EPA Morning News Highlights 03.21.18

Tulsa World: EPA Administrator Scott Pruitt says lack of clean up of Tar Creek Superfund site is 'unacceptable'

Administrator Scott Pruitt of the U.S. Environmental Protection Agency said his new push on the nation's Superfund program finally can provide clarity and accountability to the Tar Creek area, for decades one of the oldest, largest and most complex toxic sites in the nation. "It is really unacceptable," Pruitt said as he recalled the history of the Tar Creek area in far northeastern Oklahoma, whose Superfund legacy dates back to 1983, as well as the amount of money and time deployed there. "You don't list a site in the mid-1980s and you don't take the kind of steps we have taken historically and still have issues today in 2018."The area in Ottawa County is contaminated by lead and other heavy metals from long-closed mining operations and is undermined with caverns that are prone to cave-ins. The Picher and Cardin communities were bought out by a federal program and are now ghost towns, but the mine wastes remain.

Hot Air: EPA Ends The Use Of "Secret Science" In Crafting Regulations

Just in case liberals didn't already have enough reasons to pin EPA Administrator Scott Pruitt's picture to their dart boards, he's just rolled out another policy change which will force the "party of science" to rely on actual science when pushing for regulatory changes. Promising to eliminate "secret science" in EPA deliberations, Pruitt is ordering all scientific studies used when considering new regulations to include publicly available data and methodologies. This was announced in an exclusive interview with The Daily Caller News Foundation.

Detroit News: EPA chief wants to eradicate lead from drinking water

The head of the Environmental Protection Agency says eradicating lead from drinking water is one of his top priorities three years after the Flint water crisis, and he's worried Americans aren't "sufficiently aware" of the threat. "I really believe that we ought to set a goal as a country that, over the next 10 years, that we ought to work with respect to investments in our infrastructure to eradicate lead in our drinking water," EPA Administrator Scott Pruitt told reporters this week at the agency's headquarters. "It can be achieved. Some of the mental-acuity levels of our children are being impacted adversely as a result of this." Pruitt is concerned that parents and citizens don't understand the threat of lead in drinking water or toys, and "we're looking at ways we can contribute to that dialogue," he said, according to an audio recording provided by the New York Post.

New York Post: EPA head calls for 'coordinated' response to NYC lead crisis

EPA Administrator Scott Pruitt called for a "coordinated" response between New York State and City officials to address the ongoing lead crisis. Asked whether federal intervention is needed to protect New York children and tenants from lead poisoning, the Environmental Protection Agency chief urged action on all fronts. "I think a local, state and federal response that is very coordinated and collaborative is terribly important," Pruitt said in an interview. "We each play a role. I'd love to see steps taken at the local level to invest." Gov. Cuomo already announced an emergency declaration for New York Housing Authority buildings and pledged an additional $250 million for upgrades. But heated public squabbles over resources and responsibility with rival Mayor de Blasio have complicated progress.

The Philadelphia Inquirer: Philly has a smog problem. Will Scott Pruitt's EPA say so?

Whether Philadelphia is violating the federal Clean Air Act remains in bureaucratic limbo. Despite deadlines, the EPA has refused to say whether Philadelphia and some other cities, including Pittsburgh, have met a 2015 benchmark of 70 parts per billion or less of ground-level ozone in the ambient atmosphere. Being out of compliance, or in "nonattainment," has a real-world impact on the state, city, businesses and industry, and even motorists through increased regulation and funding. The EPA was supposed to state whether Philadelphia was in compliance by last Oct. 1. Last week, a federal court ruled that the EPA, under its administrator, Scott Pruitt, broke the law by missing the deadline, and gave the EPA until April. On Monday, Pruitt's office said it would meet the deadline.

National Morning News Highlights 03.21.18

Politico: Congress struggles to clinch spending deal

Congressional leaders are racing to finalize a spending bill by the end of Tuesday but find themselves still at odds over a host of controversial issues — delaying plans to unveil the proposal and raising the prospect of weekend votes to avoid a shutdown. Democrats, Republicans and the White House battled late into the night Monday and into Tuesday afternoon over whether to include provisions on President Donald Trump's border wall, a massive New York infrastructure project and the special counsel's Russia investigation, according to lawmakers and aides in both parties. There were still a number of unresolved issues as of Tuesday evening, and multiple sources were pessimistic that negotiators would reach a deal in time to release the bill before Wednesday.

Wall Street Journal: Trump to Ramp Up Trade Restraints on China

The White House is preparing to crack down on what it says are improper Chinese trade practices by making it significantly more difficult for Chinese firms to acquire advanced U.S. technology or invest in American companies, individuals involved in the planning said. The administration plans to release on Thursday a package of proposed punitive measures aimed at China that include tariffs on imports worth at least $30 billion. But the tariffs won't be imposed immediately. Rather, U.S. industry will be given an opportunity to comment on which products should be subject to the duties. As part of the package, the White House will announce possible investment restrictions by Chinese firms in the U.S. and will direct the Treasury Department to outline rules governing investment from China.

TRUMP TWEETS

Tulsa World

http://www.tulsaworld.com/homepagelatest/epa-administrator-scott-pruitt-says-lack-of-clean-up-of/article_4a3e4982-569e-5023-8141-392ebe629a65.html

EPA Administrator Scott Pruitt says lack of clean up of Tar Creek Superfund site is 'unacceptable'

By: Jim Myers, 3/21/18

Administrator Scott Pruitt of the U.S. Environmental Protection Agency said his new push on the nation's Superfund program finally can provide clarity and accountability to the Tar Creek area, for decades one of the oldest, largest and most complex toxic sites in the nation.

"It is really unacceptable," Pruitt said as he recalled the history of the Tar Creek area in far northeastern Oklahoma, whose Superfund legacy dates back to 1983, as well as the amount of money and time deployed there.

"You don't list a site in the mid-1980s and you don't take the kind of steps we have taken

historically and still have issues today in 2018."

The area in Ottawa County is contaminated by lead and other heavy metals from long-closed mining operations and is undermined with caverns that are prone to cave-ins. The Picher and Cardin communities were bought out by a federal program and are now ghost towns, but the mine wastes remain.

Pruitt blamed inconsistency, even within the EPA's 10 regions, as well as a lack of attention and focus, for slowing remediation outcomes.

"It is one of the things that seemed to be languishing as we arrived," Pruitt said, making it clear that the lack of urgency was something he found "palpable" at Superfund sites across the country.

"When it takes you 27, 28 years to make a decision — make a decision, not clean it up, not remediate, but make a decision on how you are going to remediate — that is unacceptable."

His comments came during one of several reporter roundtables he has been holding at the EPA's headquarters to mark his first year as administrator, during which he also became a leading voice in the Trump administration's major push on regulation reform.

Those efforts have prompted applause from his supporters and alarm from his critics.

Recently Pruitt is rarely out of the headlines, with stories ranging from travel expenses to speculation over whether his political future might include bids for a U.S. Senate seat or even the White House.

When given the chance to comment on yet another story this week about his political options, he took a pass.

Pruitt also declined to comment when asked about a recent decision by an Oklahoma judge to allow a lawsuit filed by Campaign for Accountability to continue. The lawsuit seeks to force the release of a 2014 audit of the Lead-Impacted Communities Relocation Trust, which was created in an effort to help move residents out of communities affected by the Tar Creek contamination.

"That is during my time as attorney general," he said. "I think it is better that I just keep it focused on the EPA matters."

Pruitt, who was Oklahoma's attorney general before being tapped by President Donald Trump to lead the EPA, had declined to file charges based on the audit by state Auditor Gary Jones and also had taken steps to bar its release to the public.

According to reporting by The Oklahoman, legal action in the case continues and eventually could include an appeal to the Oklahoma Supreme Court.

Pruitt's emphasis on Tar Creek and the other Superfund sites across the country grew out of a task force he created in 2017, just months after being sworn in as administrator.

Members of the Superfund Task Force came back with a list of specific recommendations under major goals ranging from expediting cleanup and remediation to promoting redevelopment and community revitalization.

As part of that process, Tar Creek landed on a list Pruitt says he will use to keep the emphasis on the program.

Hot Air

https://hotair.com/archives/2018/03/20/epa-ends-use-secret-science-crafting-regulations/

EPA Ends The Use Of "Secret Science" In Crafting Regulations

By: Jazz Shaw 3/20/18

Just in case liberals didn't already have enough reasons to pin EPA Administrator Scott Pruitt's picture to their dart boards, he's just rolled out another policy change which will force the "party of science" to rely on actual science when pushing for regulatory changes. Promising to eliminate "secret science" in EPA deliberations, Pruitt is ordering all scientific studies used when considering new regulations to include publicly available data and methodologies. This was announced in an exclusive interview with The Daily Caller News Foundation.

"We need to make sure their data and methodology are published as part of the record," Pruitt said in an exclusive interview with The Daily Caller News Foundation. "Otherwise, it's not transparent. It's not objectively measured, and that's important."

Pruitt will reverse long-standing EPA policy allowing regulators to rely on non-public scientific data in crafting rules. Such studies have been used to justify tens of billions of dollars worth of regulations.

EPA regulators would only be allowed to consider scientific studies that make their data available for public scrutiny under Pruitt's new policy. Also, EPA-funded studies would need to make all their data public.

"When we do contract that science out, sometimes the findings are published; we make that part of our rule-making processes, but then we don't publish the methodology and data that went into those findings because the third party who did the study won't give it to us," Pruitt added.

In other words, science is not being excluded from any EPA studies. The agency is simply ensuring that groups conducting studies publish the data used to reach the conclusions they forward to the EPA so it can be examined and potentially challenged if it's found to be faulty. Surely nobody who's really interested in following the science could object to that, right?

Wrong. Democrats were immediately arguing against such a move, saying that forcing research organizations to publish their figures "would reveal confidential patient data." That's a rather odd argument in a couple of different ways. First of all, there's a lot of data collected for various studies used by the EPA which have nothing to do with medical records. Examples include all of the groundwater studies done when the Obama administration was considering banning fracking.

But even in cases where medical information is required, the groups conducting the study were able to obtain the patient data. As Steve Milloy, the publisher of JunkScience.com was quoted as saying, California regularly makes such data available under the name, 'Public Use Death Files.' Other medical information can be compiled and have the patients' names and other identifying personal information scrubbed. This is already done on a regular basis.

In fact, barring some subject which might compromise national security – such as the handling of tactical weapons materials – it's difficult to imagine many true, scientific studies which couldn't publish their underlying data, making it available for peer review. So if you're still opposed to federal agencies wanting to see such data, the next logical question to ask is precisely what it is that you're hiding.

The Detroit News

https://www.detroitnews.com/story/news/politics/2018/03/20/epa-pruitt-lead-water-flint/33125283/

EPA chief wants to eradicate lead from drinking water

By: Melissa Nann Burke, 3/20/18

The head of the Environmental Protection Agency says eradicating lead from drinking water is one of his top priorities three years after the Flint water crisis, and he's worried Americans aren't "sufficiently aware" of the threat.

"I really believe that we ought to set a goal as a country that, over the next 10 years, that we ought to work with respect to investments in our infrastructure to eradicate lead in our drinking

water," EPA Administrator Scott Pruitt told reporters this week at the agency's headquarters.

"It can be achieved. Some of the mental-acuity levels of our children are being impacted adversely as a result of this."

Pruitt is concerned that parents and citizens don't understand the threat of lead in drinking water or toys, and "we're looking at ways we can contribute to that dialogue," he said, according to an audio recording provided by the New York Post.

"I do think that what happened in Flint is something that could happen elsewhere. We just simply need to take steps to do all that we can to address it prospectively and proactively," Pruitt said.

Pruitt said President Donald Trump's $1.5 trillion plan to bolster the nation's infrastructure over the next decade would include investments in aging water infrastructure.

Pruitt didn't describe a plan for replacing the thousands of lead service lines throughout the country – a cost estimated around $40 billion to $45 billion – but stressed the need for state and local governments to invest in such upgrades, perhaps with federal grant aid.

Pruitt added he would "love" to see local governments investing more in water infrastructure.

"These water treatment facilities – they have authority to bond out, to raise fees, to invest in corrosion control, the replacement of service lines and the rest," Pruitt said. "And some of them just aren't doing it."

Gov. Rick Snyder has proposed having water customers across Michigan pay a $5 annual fee to help upgrade aging infrastructure and replace lead pipes in their local communities, but the plan hasn't gained steam in the Republican-controlled Legislature.

U.S. Rep. Dan Kildee, D-Flint Township, said what Pruitt has described isn't really a plan.

"When it comes to Mr. Pruitt, nice words don't replace pipes. It takes money. What they have proposed is really nothing when it comes to infrastructure," Kildee said of the Trump administration.

Kildee said what would help is Pruitt putting his support behind Kildee's legislation that would reduce the acceptable amount of lead in drinking water to 5 parts per billion. The current federal action limit is 15 parts per billion.

"Force federal and state governments to stare this in the face by adopting a level that is science-based that says there is no acceptable level of lead," he said.

EPA has spent a decade trying to update the rule.

Snyder called the rule "dumb and dangerous" after the Flint disaster. The state has proposed draft rules to drop the acceptable amount of lead in drinking water to 10 parts per billion by 2024.

The New York Post

https://nypost.com/2018/03/21/epa-head-calls-for-coordinated-response-to-nyc-lead-crisis/

EPA head calls for 'coordinated' response to NYC lead crisis

By: Marisa Schultz, 3/21/18

EPA Administrator Scott Pruitt called for a "coordinated" response between New York State and

City officials to address the ongoing lead crisis.

Asked whether federal intervention is needed to protect New York children and tenants from lead poisoning, the Environmental Protection Agency chief urged action on all fronts.

"I think a local, state and federal response that is very coordinated and collaborative is terribly important," Pruitt said in an interview. "We each play a role. I'd love to see steps taken at the local level to invest."

Gov. Cuomo already announced an emergency declaration for New York Housing Authority buildings and pledged an additional $250 million for upgrades. But heated public squabbles over resources and responsibility with rival Mayor de Blasio have complicated progress.

Pruitt declined to weigh in on the Cuomo/de Blasio feud but encouraged broad infrastructure investment from all levels to prevent children from getting sick.

"I think the governor's call for that is important and it's something we think is important as well and we need to contribute to it along with the states, local cities and towns," Pruitt said.

While the problems in NYCHA are centered on lead paint, Pruitt has primarily tackled the issue of eliminating lead poisoning from water. He raised concerns over high lead levels found at certain New York City school water fountains.

"I do think that what happened in Flint is something that could happen elsewhere," Pruitt said. "We just simply need to take steps to do all that we can to address it prospectively and proactively."

Pruitt estimated it would take $40 billion – $45 billion to replace lead service lines nationwide and suggested President Trump's $1.5 trillion infrastructure plan can assist states and cities with the costs.

"I really believe that we ought to set a goal as a country that, over the next 10 years, that we ought to work with respect to investments in our infrastructure to eradicate lead in our drinking water," Pruitt said.

He added: "It can be achieved. Some of the mental-acuity levels of our children are being impacted adversely as a result of this."

The Philadelphia Inquirer

http://www.philly.com/philly/health/pruitt-epa-smog-philadelphia-ozone-20180320.html

Philly has a smog problem. Will Scott Pruitt's EPA say so?

By: Frank Kummer, 3/20/18

Mollie Michel of South Philadelphia keeps her children inside some days because of air pollution, so she's particularly irked by a long delay by the U.S. Environmental Protection Agency to say officially whether Philadelphia has a smog problem. That designation could mean more regulation to help clean up the dirty air, she said.

"You have a city with a childhood asthma rate twice as high as the national average," Michel said to bolster her argument. A member of Moms Clean Air Force, she gathered Tuesday with a few dozen other activists and local officials at City Hall to mark the first day of spring by protesting Trump administration policies.

Whether Philadelphia is violating the federal Clean Air Act remains in bureaucratic limbo. Despite deadlines, the EPA has refused to say whether Philadelphia and some other cities, including Pittsburgh, have met a 2015 benchmark of 70 parts per billion or less of ground-level ozone in the ambient atmosphere. Being out of compliance, or in "nonattainment," has a real-world impact on the state, city, businesses and industry, and even motorists through increased regulation and funding.

The EPA was supposed to state whether Philadelphia was in compliance by last Oct. 1. Last week, a federal court ruled that the EPA, under its administrator, Scott Pruitt, broke the law by missing the deadline, and gave the EPA until April.

On Monday, Pruitt's office said it would meet the deadline.

Pruitt said during a meeting with reporters at EPA headquarters in Washington that the scope of monitoring required to answer the smog question had caused the delay.

"The agency has been running behind for a number of years," said Pruitt, who took office a year ago.

Pruitt, who said he didn't have data specific to Philadelphia in front of him, also took issue with how the monitoring program has been carried out in the past, saving money by "modeling" — using data from one area and applying it to another.

"Real data is terribly important," Pruitt said. "When we go forward, we need to focus more on monitoring as opposed to modeling … You shouldn't get data from one monitor and extrapolate it over a whole area because you're not dealing with real data at that point."

He said his office is "exploring ways" to pay for monitoring.

If Philadelphia is declared to have a smog problem, the Pennsylvania Department of Environmental Protection would be responsible for crafting a plan to reduce ground-level ozone. Ozone is formed when volatile organic compounds and nitrogen oxides — created by burning fossil fuels, and power plants and other industries — combine in sunlight. Long, hot, humid days act as smog factories, so smog is expected to increase as the climate warms up.

James Garrow, a spokesman for the city's Department of Public Health, said, "Philadelphia is indeed out of compliance" as of March 1. He said the trend for ground-level ozone has been going down for years and Philadelphia expects to meet requirements within a few years.

At the protest, Flora Cardoni, an organizer with PennEnvironment, joined Democratic State Reps. James R. Roebuck Jr. and Brian K. Sims, as well as members of Deep Green Philly and the Clean Air Council, in speaking out. Cardoni said it's already been too long a wait for action.

"Philadelphians want to walk along the Schuylkill, play in Fairmount Park, and wander the historic city without worrying about choking on smog and soot," she said.

Politico

https://www.politico.com/story/2018/03/20/omnibus-vote-house-thursday-473010?lo=ap_e1

Congress struggles to clinch spending deal

By: Burgess Everett, Rachel Bade, Sarah Ferris and Heather Caygle, 3/20/18

Congressional leaders are racing to finalize a spending bill by the end of Tuesday but find themselves still at odds over a host of controversial issues — delaying plans to unveil the proposal and raising the prospect of weekend votes to avoid a shutdown.

Democrats, Republicans and the White House battled late into the night Monday and into Tuesday afternoon over whether to include provisions on President Donald Trump's border wall, a massive New York infrastructure project and the special counsel's Russia investigation, according to lawmakers and aides in both parties.

There were still a number of unresolved issues as of Tuesday evening, and multiple sources were pessimistic that negotiators would reach a deal in time to release the bill before Wednesday.

Asked how confident he was that the Senate would avoid weekend work, Sen. John Thune (R-S.D.) replied: “I’m not real confident at this point.”

Dragging the talks into Wednesday would increase the chance that lawmakers pass a short-term spending bill to prevent a temporary shutdown when funding lapses Friday evening.

Several issues remain open after administration officials participated in a lengthy meeting Tuesday afternoon with top leadership and appropriations staffers that did little to break the logjam.

“Everything that remains is going to be pulling teeth to resolve,” said a senior congressional aide with knowledge of the meeting, which included representatives from the White House and the Office of Management and Budget.

The New York-area Gateway project is a primary issue for the White House, according to the aide, but several other provisions are also still up in the air.

Trump is likely to support the bill if the Gateway project is excluded, the military receives a major budget boost and there is a significant infusion of border security funding, White House legislative affairs director Marc Short said at the Capitol Tuesday.

House Speaker Paul Ryan (R-Wis.) told his conference that he is planning to pass the massive, $1.3 trillion omnibus on Thursday, according to House Republicans.

"I'm hoping today," Ryan told reporters when asked Tuesday morning when leaders would wrap up negotiations. He said lawmakers were not yet considering a short-term funding patch to buy more negotiating time. "There are some unresolved issues. We're working through them as we speak."

Senate Majority Leader Mitch McConnell (R-Ky.) said he would keep the Senate in until the bill is passed.

"We anticipate the House filing later today, which will give the Senate plenty of time to take a look at it and see what's in it," McConnell said on Tuesday afternoon.

Still, on the House's current schedule, the Senate would have just a day to pass the bill before government funding runs out on Friday evening — allowing for any one senator to shut the government down briefly. Sen. Rand Paul (R-Ky.) caused such a shutdown last month in protest over a budget deal.

Paul would not rule out doing everything he can to stop the spending bill if he views it as poorly as he did a budget bill in February.

"I will oppose the bill. I have to make a decision about whether or I will accept a time agreement," Paul told reporters on Tuesday.

Senate leaders are already entertaining a short-term spending bill in preparation for any antics by Paul.

"We're going to be here into the weekend, perhaps. But I think there could be some measures taken to keep the lights on. But we'll get it done," said Senate Majority Whip John Cornyn (R-Texas). "Anything can happen around here."

Congressional leaders had hoped to file the bill, which would fund the government through the end of September, on Monday night with a House vote on Wednesday. But Congress is bogged down over policy provisions that various congressional factions are trying to attach to the must-pass bill. Many lawmakers view the legislation as their last chance to get their priorities signed into law before the midterm elections.

“Negotiations continue between the four leaders. A few sticking points remain, but we are very close," said Senate Minority Leader Chuck Schumer (D-N.Y.). "I think it will be a fair compromise."

Lawmakers and aides estimated there were as many as 20 provisions still being debated. One of the most controversial is $900 million in funding for the Gateway tunnel project in New York, a key priority of Schumer and New York-area Republicans and Democrats.

Gateway supporters are trying to include language that would allow the project to apply for competitive grant money and prevent the Trump administration from squashing the project. Trump has told Republicans he will veto a bill that funds the project specifically. Schumer and GOP leaders were still battling over the provision as of Tuesday afternoon, and the New Yorker said the tunnel is of national significance despite Trump's complaints.

The White House remains unmoved, however.

“The secretary of transportation has explained if you put that much money in one project it’s going to crimp projects across the country she needs to fund. It‘s also a project that a majority of House Republicans… voted against," Short said. “The president has made his wishes well known so I think we’re going to be fine."

Another sticking point: immigration. Talks to protect young immigrants facing deportation fell apart over the weekend, but congressional Democrats spent Monday and Tuesday pushing to freeze hiring of immigration enforcement officials in return for providing Trump more than $1 billion in funding on his border wall.

Democrats and Republicans are likely to agree on about $1.6 billion in border funding that would help finance some fencing and security and avoid directly funding the large concrete wall that Trump wants, according to a Democratic aide.

Republicans are seeking to fix an error in the new tax law that lowers tax bills for farmers that

sell grain to cooperatives at the expense of other companies. Though Senate Democrats and some Senate Republicans are willing to rewrite the provision in exchange for a boost in Low-Income Housing Tax Credits in the spending bill, Ryan has resisted, according to people in both parties. Ryan allies say that just because he rejected an offer from Schumer to fix

the so-called “grain glitch,” it doesn't mean the issue is dead altogether.

Congressional Democrats also pushed provisions to protect special counsel Robert Mueller but have been rebuffed by GOP leaders. An attempt to shore up Obamacare's insurance markets is also stalled in a battle over abortion.

Lawmakers believe neither of those provisions will be in the omnibus.

A Tuesday morning school shooting in Maryland, however, may have thrown another wild card into the mix: GOP leaders are pressing to include popular legislation that would improve the National Instant Criminal Background Check System for firearms purchases.

“We remain hopeful that Fix NICS is in the omni," Short said of the proposal to improve the FBI’s background check system.

But Democrats want a broader gun debate and note that the provision is a modest way to simply bolster existing gun laws. Meanwhile, conservatives believe it would make it more difficult for some veterans to buy a gun, which could keep that provision out as well.

"There are still some key questions. There's a NICS question, there's an Internet sales tax question, there‘s [an Obamacare] question. There's a Gateway project financing question," said Rep. Jim Jordan (R-Ohio), a conservative leader. "It looks like a lot of those things aren't gonna be in it, which is a good step, but it still spends way too much money."

The Wall Street Journal

https://www.wsj.com/articles/trump-to-ramp-up-trade-restraints-on-china-1521593091

Trump to Ramp Up Trade Restraints on China

By: Bob Davis, 3/20/18

The White House is preparing to crack down on what it says are improper Chinese trade practices by making it significantly more difficult for Chinese firms to acquire advanced U.S. technology or invest in American companies, individuals involved in the planning said.

The administration plans to release on Thursday a package of proposed punitive measures aimed at China that include tariffs on imports worth at least $30 billion.

But the tariffs won't be imposed immediately. Rather, U.S. industry will be given an opportunity to comment on which products should be subject to the duties. As part of the package, the White House will announce possible investment restrictions by Chinese firms in the U.S. and will direct the Treasury Department to outline rules governing investment from China.

Final details of the plan, including the amount of imports to be hit by tariffs, remain in flux, those involved with the discussions said. While the rough amount and rationale for the tariffs are expected to be disclosed on Thursday, the final decisions will come once U.S. industry has had its say, they said.

A White House spokeswoman declined to comment.

The effort stems from a monthslong investigation by the administration into Chinese intellectual property practices that found the damage to U.S. companies from forced technology transfer is $30 billion annually.

The administration has warned Beijing that it risked tariffs if it didn't significantly liberalize its

market and eliminate practices that disadvantage foreign firms.

While the administration's plans to put tariffs on China have received most of the attention, it is considering other significant penalties, especially those aimed at state-owned Chinese firms. It plans to argue that Chinese state-owned firms buy U.S. technology not for commercial purposes, but to apply for military use and otherwise gain an edge in the race for global technological dominance.

The administration believes that Beijing, in requiring U.S. companies to form joint ventures to do business in China, then pressures them to transfer important technology to their Chinese partners. The U.S. also contends Beijing improperly subsidizes Chinese companies looking to overtake U.S. rivals in such advanced technologies as semiconductors, artificial intelligence and robotics.

Chinese officials have said that they are improving their protection of intellectual property and liberalizing their economy. They also complain that the U.S. hasn't given them a specific list of demands that they need to meet to head off tariffs.

The country's responses to challenges from President Donald Trump loomed large as China's leaders closed out an annual political gathering on Tuesday.

Premier Li Keqiang, the titular No. 2 leader, struck a conciliatory tone on trade with the U.S. At a news briefing in Beijing's Great Hall of the People, Mr. Li said "there are no winners" in a trade war between the world's two largest economies, and appealed for calm.

People involved in the planning say the Trump administration is looking at making reciprocity the core of U.S. investment relations with China, meaning that the U.S. would impose restrictions on Chinese investment similar to those that U.S. firms face in China. That could mean that the U.S. would insist that Chinese firms form joint ventures before doing business in the U.S., unless China dropped those restrictions.

The U.S. has already made it more difficult for Chinese companies to invest in the U.S. by

blocking Chinese bids to purchase U.S. semiconductor firms. That is done by an interagency review of foreign acquisitions by the Committee on Foreign Investment in the U.S. Congress is looking to broaden CFIUS reviews of acquisitions so they include joint ventures too.

The expansion would include reviews of technology transfers to foreigners and could apply to joint ventures both outside and within the U.S. But CFIUS looks solely at national security concerns. The administration wants to address economic harm as well, according to these people.

Any imposition of tariffs, without going first to the World Trade Organization, is sure to prompt a chorus of criticism not just from Beijing but from U.S. industry, which has opposed tariffs as counterproductive. The WTO adjudicates trade cases and has the power to authorize tariffs in cases where a losing party doesn't change its practices. The administration is also considering bringing a case against Chinese trade practices that are covered by the WTO.

Oregon Sen. Ron Wyden, the senior Democrat on the Senate Finance Committee, said he opposes the broad imposition of tariffs. "American producers who haven't gotten a fair shake in the past aren't going to get that back by just have tariffs slapped on imports indiscriminately," he said.

Tariffs are bound to cause China to retaliate, said Clement Leung, Hong Kong's representative in the U.S. Chinese officials "cannot show any weakness" at a time when the country's leader, Xi Jinping, has just been confirmed for his second term, Mr. Leung said. Hong Kong, a trading center that operates somewhat independently from the rest of China, would be hurt by limits on trade.

Whatever the political blowback, Harvard law professor Mark Wu, a trade expert, says that the White House has authority to impose tariffs under section 301 of the Trade Act of 1974.

"In situations where the U.S. Trade Representative deems unfair trade practices to fall outside the scope of a WTO-covered agreement, then the statute permits the executive branch to take action directly without first seeking recourse through WTO dispute settlement" procedures, he said.

Frustration with Chinese trade practices has been building among both the governments and private sectors of the U.S., Japan and Europe. One reason the U.S. is considering a separate WTO case is to try to recruit allies to pressure China. But any move to impose tariffs could allow Beijing to portray itself as a victim. Coalition-building has become more complicated in the wake of a separate U.S. action to levy tariffs on steel and aluminum imports from allied nations.

For instance, finance ministers and central bankers from the Group of 20 countries, meeting in Buenos Aires on Tuesday, failed to reach any new agreement on shared principles when it comes to trade policies, as the split between the U.S. and other major economies deepened over the U.S.'s tariff policies.

The administration is considering recommendations from two other reports that would impose draconian investment restrictions on China. The U.S.-China Economic and Security Review Commission, a Congressional panel that takes a hard line on China, last year urged the administration to prohibit "the acquisition of U.S. assets by Chinese state-owned or state-controlled entities, including sovereign wealth funds."

A report for the Pentagon by its Defense Innovation Unit Experimental, which examines technology issues, has recommended that the Pentagon pursue a policy of "deterring Chinese technology transfer" by broadening CFIUS's mandate and strengthening export controls on technology to China.

China Investment Corp, Chinese sovereign-wealth fund which could get hit by sanctions, is putting together a fund targeting as much as $5 billion with Goldman Sachs Group Inc., aimed at investing in U.S. manufacturing and other sectors. CIC hopes the fund would pass muster with U.S. regulators, say those people familiar with the plans.

It is unclear how far the administration will go in pursuing these ideas. Blocking the acquisition of all purchases by Chinese state firms, for instance, would mean that Chinese state-owned airlines couldn't buy Boeing jets. Toughening export controls on, say, semiconductor production machinery could cede the market to Japanese vendors.

The administration's actions on China come on the heels of plans to levy tariffs on steel and aluminum imports. Japan, Korea and the European Union are scrambling to get exemptions from those levies, which are set to go into effect on Friday.

TRUMP TWEETS

Donald J. Trump @realDonaldTrump · 21h

Our Nation was founded by farmers. Our independence was won by farmers. And our continent was tamed by farmers. Our farmers always lead the way -- we are PROUD of them, and we are DELIVERING for them! #NationalAgricultureDay

28K 28K 115K

Donald J. Trump @realDonaldTrump · 2h

AUSTIN BOMBING SUSPECT IS DEAD. Great job by law enforcement and all concerned!

6.0K 11K 44K

Donald J. Trump @realDonaldTrump · 2h

Department of Justice should have urged the Supreme Court to at least hear the Drivers License case on illegal immigrants in Arizona. I agree with @LouDobbs. Should have sought review.

3.6K 4.5K 18K

Donald J. Trump @realDonaldTrump · 2h

...there was no probable cause for believing that there was any crime, collusion or otherwise, or obstruction of justice!" So stated by Harvard Law Professor Alan Dershowitz.

9.2K 5.4K 21K

Donald J. Trump @realDonaldTrump · 1h

"Special Council is told to find crimes, whether a crime exists or not. I was opposed to the selection of Mueller to be Special Council. I am still opposed to it. I think President Trump was right when he said there never should have been a Special Council appointed because.....

11K 4.2K 17K

To: Epp, Timothy[Epp.Timothy@epa.gov]
From: Kelly, Albert
Sent: Thur 3/22/2018 1:20:36 PM
Subject: FW: EPA Morning News Highlights 03.21.18
EPA Morning News Highlights 03.21.18 docx.docx

Do we have any involvement in the NYC issue listed below?

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

Ex. 6 - Personal Privacy

From: Hewitt, James
Sent: Wednesday, March 21, 2018 9:07 AM
To: Shimmin, Kaitlyn <shimmin.kaitlyn@epa.gov>; Beach, Christopher <beach.christopher@epa.gov>; Block, Molly <block.molly@epa.gov>; Jackson, Ryan <jackson.ryan@epa.gov>; Bowman, Liz <Bowman.Liz@epa.gov>; Dravis, Samantha <dravis.samantha@epa.gov>; Wilcox, Jahan <wilcox.jahan@epa.gov>; Konkus, John <konkus.john@epa.gov>; Ferguson, Lincoln <ferguson.lincoln@epa.gov>; McMurray, Forrest <mcmurray.forrest@epa.gov>; Ford, Hayley <ford.hayley@epa.gov>; Bennett, Tate <Bennett.Tate@epa.gov>; Abboud, Michael <abboud.michael@epa.gov>; Daniell, Kelsi <daniell.kelsi@epa.gov>; Hanson, Paige (Catherine) <hanson.catherine@epa.gov>; Letendre, Daisy <letendre.daisy@epa.gov>; Grantham, Nancy <Grantham.Nancy@epa.gov>; Beck, Nancy <Beck.Nancy@epa.gov>; Wehrum, Bill <Wehrum.Bill@epa.gov>; Gunasekara, Mandy <Gunasekara.Mandy@epa.gov>; Bodine, Susan <bodine.susan@epa.gov>; Ross, David P <ross.davidp@epa.gov>; Leopold, Matt <Leopold.Matt@epa.gov>; Yamada, Richard (Yujiro) <yamada.richard@epa.gov>; Kelly, Albert <kelly.albert@epa.gov>; Lyons, Troy <lyons.troy@epa.gov>
Subject: EPA Morning News Highlights 03.21.18

EPA Morning News Highlights 03.21.18

Tulsa World: EPA Administrator Scott Pruitt says lack of clean up of Tar Creek Superfund site is 'unacceptable'

Administrator Scott Pruitt of the U.S. Environmental Protection Agency said his new push on the nation's Superfund program finally can provide clarity and accountability to the Tar Creek area, for decades one of the oldest, largest and most complex toxic sites in the nation. "It is really unacceptable," Pruitt said as he recalled the history of the Tar Creek area in far northeastern Oklahoma, whose Superfund legacy dates back to 1983, as well as the amount of money and time deployed there. "You don't list a site in the mid-1980s and you don't take the kind of steps we have taken historically and still have issues today in 2018."The area in Ottawa County is contaminated by lead and other heavy metals from long-closed mining operations and is undermined with caverns that are prone to cave-ins. The Picher and Cardin communities were bought out by a federal program and are now ghost towns, but the mine wastes remain.

Hot Air: EPA Ends The Use Of "Secret Science" In Crafting Regulations

Just in case liberals didn't already have enough reasons to pin EPA Administrator Scott Pruitt's picture to their dart boards, he's just rolled out another policy change which will force the "party of science" to rely on actual science when pushing for regulatory changes. Promising to eliminate "secret science" in EPA deliberations, Pruitt is ordering all scientific studies used when considering new regulations to include publicly available data and methodologies. This was announced in an exclusive interview with The Daily Caller News Foundation.

Detroit News: EPA chief wants to eradicate lead from drinking water

The head of the Environmental Protection Agency says eradicating lead from drinking water is one of his top priorities three years after the Flint water crisis, and he's worried Americans aren't "sufficiently aware" of the threat. "I really believe that we ought to set a goal as a country that, over the next 10 years, that we ought to work with respect to investments in our infrastructure to eradicate lead in our drinking water," EPA Administrator Scott Pruitt told reporters this week at the agency's headquarters. "It can be achieved. Some of the mental-acuity levels of our children are being impacted adversely as a result of this." Pruitt is concerned that parents and citizens don't understand the threat of lead in drinking water or toys, and "we're looking at ways we can contribute to that dialogue," he said, according to an audio recording provided by the New York Post.

New York Post: EPA head calls for 'coordinated' response to NYC lead crisis

EPA Administrator Scott Pruitt called for a "coordinated" response between New York State and City officials to address the ongoing lead crisis. Asked whether federal intervention is needed to

protect New York children and tenants from lead poisoning, the Environmental Protection Agency chief urged action on all fronts. "I think a local, state and federal response that is very coordinated and collaborative is terribly important," Pruitt said in an interview. "We each play a role. I'd love to see steps taken at the local level to invest." Gov. Cuomo already announced an emergency declaration for New York Housing Authority buildings and pledged an additional $250 million for upgrades. But heated public squabbles over resources and responsibility with rival Mayor de Blasio have complicated progress.

The Philadelphia Inquirer: Philly has a smog problem. Will Scott Pruitt's EPA say so?

Whether Philadelphia is violating the federal Clean Air Act remains in bureaucratic limbo. Despite deadlines, the EPA has refused to say whether Philadelphia and some other cities, including Pittsburgh, have met a 2015 benchmark of 70 parts per billion or less of ground-level ozone in the ambient atmosphere. Being out of compliance, or in "nonattainment," has a real-world impact on the state, city, businesses and industry, and even motorists through increased regulation and funding. The EPA was supposed to state whether Philadelphia was in compliance by last Oct. 1. Last week, a federal court ruled that the EPA, under its administrator, Scott Pruitt, broke the law by missing the deadline, and gave the EPA until April. On Monday, Pruitt's office said it would meet the deadline.

National Morning News Highlights 03.21.18

Politico: Congress struggles to clinch spending deal

Congressional leaders are racing to finalize a spending bill by the end of Tuesday but find themselves still at odds over a host of controversial issues — delaying plans to unveil the proposal and raising the prospect of weekend votes to avoid a shutdown. Democrats, Republicans and the White House battled late into the night Monday and into Tuesday afternoon over whether to include provisions on President Donald Trump's border wall, a massive New York infrastructure project and the special counsel's Russia investigation, according to lawmakers and aides in both parties. There were still a number of unresolved issues as of Tuesday evening, and multiple sources were pessimistic that negotiators would reach a deal in time to release the bill before Wednesday.

Wall Street Journal: Trump to Ramp Up Trade Restraints on China

The White House is preparing to crack down on what it says are improper Chinese trade practices by making it significantly more difficult for Chinese firms to acquire advanced U.S.

technology or invest in American companies, individuals involved in the planning said. The administration plans to release on Thursday a package of proposed punitive measures aimed at China that include tariffs on imports worth at least $30 billion. But the tariffs won't be imposed immediately. Rather, U.S. industry will be given an opportunity to comment on which products should be subject to the duties. As part of the package, the White House will announce possible investment restrictions by Chinese firms in the U.S. and will direct the Treasury Department to outline rules governing investment from China.

TRUMP TWEETS

Tulsa World

http://www.tulsaworld.com/homepagelatest/epa-administrator-scott-pruitt-says-lack-of-clean-up-of/article_4a3e4982-569e-5023-8141-392ebe629a65.html

EPA Administrator Scott Pruitt says lack of clean up of Tar Creek Superfund site is 'unacceptable'

By: Jim Myers, 3/21/18

Administrator Scott Pruitt of the U.S. Environmental Protection Agency said his new push on the nation's Superfund program finally can provide clarity and accountability to the Tar Creek area, for decades one of the oldest, largest and most complex toxic sites in the nation.

"It is really unacceptable," Pruitt said as he recalled the history of the Tar Creek area in far northeastern Oklahoma, whose Superfund legacy dates back to 1983, as well as the amount of money and time deployed there.

"You don't list a site in the mid-1980s and you don't take the kind of steps we have taken historically and still have issues today in 2018."

The area in Ottawa County is contaminated by lead and other heavy metals from long-closed

mining operations and is undermined with caverns that are prone to cave-ins. The Picher and Cardin communities were bought out by a federal program and are now ghost towns, but the mine wastes remain.

Pruitt blamed inconsistency, even within the EPA's 10 regions, as well as a lack of attention and focus, for slowing remediation outcomes.

"It is one of the things that seemed to be languishing as we arrived," Pruitt said, making it clear that the lack of urgency was something he found "palpable" at Superfund sites across the country.

"When it takes you 27, 28 years to make a decision — make a decision, not clean it up, not remediate, but make a decision on how you are going to remediate — that is unacceptable."

His comments came during one of several reporter roundtables he has been holding at the EPA's headquarters to mark his first year as administrator, during which he also became a leading voice in the Trump administration's major push on regulation reform.

Those efforts have prompted applause from his supporters and alarm from his critics.

Recently Pruitt is rarely out of the headlines, with stories ranging from travel expenses to speculation over whether his political future might include bids for a U.S. Senate seat or even the White House.

When given the chance to comment on yet another story this week about his political options, he took a pass.

Pruitt also declined to comment when asked about a recent decision by an Oklahoma judge to allow a lawsuit filed by Campaign for Accountability to continue. The lawsuit seeks to force the release of a 2014 audit of the Lead-Impacted Communities Relocation Trust, which was created

in an effort to help move residents out of communities affected by the Tar Creek contamination.

"That is during my time as attorney general," he said. "I think it is better that I just keep it focused on the EPA matters."

Pruitt, who was Oklahoma's attorney general before being tapped by President Donald Trump to lead the EPA, had declined to file charges based on the audit by state Auditor Gary Jones and also had taken steps to bar its release to the public.

According to reporting by The Oklahoman, legal action in the case continues and eventually could include an appeal to the Oklahoma Supreme Court.

Pruitt's emphasis on Tar Creek and the other Superfund sites across the country grew out of a task force he created in 2017, just months after being sworn in as administrator.

Members of the Superfund Task Force came back with a list of specific recommendations under major goals ranging from expediting cleanup and remediation to promoting redevelopment and community revitalization.

As part of that process, Tar Creek landed on a list Pruitt says he will use to keep the emphasis on the program.

Hot Air

https://hotair.com/archives/2018/03/20/epa-ends-use-secret-science-crafting-regulations/

EPA Ends The Use Of "Secret Science" In Crafting Regulations

By: Jazz Shaw 3/20/18

Just in case liberals didn't already have enough reasons to pin EPA Administrator Scott Pruitt's picture to their dart boards, he's just rolled out another policy change which will force the "party of science" to rely on actual science when pushing for regulatory changes. Promising to eliminate "secret science" in EPA deliberations, Pruitt is ordering all scientific studies used when considering new regulations to include publicly available data and methodologies. This was announced in an exclusive interview with The Daily Caller News Foundation.

"We need to make sure their data and methodology are published as part of the record," Pruitt said in an exclusive interview with The Daily Caller News Foundation. "Otherwise, it's not transparent. It's not objectively measured, and that's important."

Pruitt will reverse long-standing EPA policy allowing regulators to rely on non-public scientific data in crafting rules. Such studies have been used to justify tens of billions of dollars worth of regulations.

EPA regulators would only be allowed to consider scientific studies that make their data available for public scrutiny under Pruitt's new policy. Also, EPA-funded studies would need to make all their data public.

"When we do contract that science out, sometimes the findings are published; we make that part of our rule-making processes, but then we don't publish the methodology and data that went into those findings because the third party who did the study won't give it to us," Pruitt added.

In other words, science is not being excluded from any EPA studies. The agency is simply ensuring that groups conducting studies publish the data used to reach the conclusions they forward to the EPA so it can be examined and potentially challenged if it's found to be faulty. Surely nobody who's really interested in following the science could object to that, right?

Wrong. Democrats were immediately arguing against such a move, saying that forcing research organizations to publish their figures "would reveal confidential patient data." That's a rather odd argument in a couple of different ways. First of all, there's a lot of data collected for various studies used by the EPA which have nothing to do with medical records. Examples include all of

the groundwater studies done when the Obama administration was considering banning fracking.

But even in cases where medical information is required, the groups conducting the study were able to obtain the patient data. As Steve Milloy, the publisher of JunkScience.com was quoted as saying, California regularly makes such data available under the name, 'Public Use Death Files.' Other medical information can be compiled and have the patients' names and other identifying personal information scrubbed. This is already done on a regular basis.

In fact, barring some subject which might compromise national security – such as the handling of tactical weapons materials – it's difficult to imagine many true, scientific studies which couldn't publish their underlying data, making it available for peer review. So if you're still opposed to federal agencies wanting to see such data, the next logical question to ask is precisely what it is that you're hiding.

The Detroit News

https://www.detroitnews.com/story/news/politics/2018/03/20/epa-pruitt-lead-water-flint/33125283/

EPA chief wants to eradicate lead from drinking water

By: Melissa Nann Burke, 3/20/18

The head of the Environmental Protection Agency says eradicating lead from drinking water is one of his top priorities three years after the Flint water crisis, and he's worried Americans aren't "sufficiently aware" of the threat.

"I really believe that we ought to set a goal as a country that, over the next 10 years, that we ought to work with respect to investments in our infrastructure to eradicate lead in our drinking water," EPA Administrator Scott Pruitt told reporters this week at the agency's headquarters.

"It can be achieved. Some of the mental-acuity levels of our children are being impacted

adversely as a result of this."

Pruitt is concerned that parents and citizens don't understand the threat of lead in drinking water or toys, and "we're looking at ways we can contribute to that dialogue," he said, according to an audio recording provided by the New York Post.

"I do think that what happened in Flint is something that could happen elsewhere. We just simply need to take steps to do all that we can to address it prospectively and proactively," Pruitt said.

Pruitt said President Donald Trump's $1.5 trillion plan to bolster the nation's infrastructure over the next decade would include investments in aging water infrastructure.

Pruitt didn't describe a plan for replacing the thousands of lead service lines throughout the country – a cost estimated around $40 billion to $45 billion – but stressed the need for state and local governments to invest in such upgrades, perhaps with federal grant aid.

Pruitt added he would "love" to see local governments investing more in water infrastructure.

"These water treatment facilities – they have authority to bond out, to raise fees, to invest in corrosion control, the replacement of service lines and the rest," Pruitt said. "And some of them just aren't doing it."

Gov. Rick Snyder has proposed having water customers across Michigan pay a $5 annual fee to help upgrade aging infrastructure and replace lead pipes in their local communities, but the plan hasn't gained steam in the Republican-controlled Legislature.

U.S. Rep. Dan Kildee, D-Flint Township, said what Pruitt has described isn't really a plan.

"When it comes to Mr. Pruitt, nice words don't replace pipes. It takes money. What they have proposed is really nothing when it comes to infrastructure," Kildee said of the Trump administration.

Kildee said what would help is Pruitt putting his support behind Kildee's legislation that would reduce the acceptable amount of lead in drinking water to 5 parts per billion. The current federal action limit is 15 parts per billion.

"Force federal and state governments to stare this in the face by adopting a level that is science-based that says there is no acceptable level of lead," he said.

EPA has spent a decade trying to update the rule.

Snyder called the rule "dumb and dangerous" after the Flint disaster. The state has proposed draft rules to drop the acceptable amount of lead in drinking water to 10 parts per billion by 2024.

The New York Post

https://nypost.com/2018/03/21/epa-head-calls-for-coordinated-response-to-nyc-lead-crisis/

EPA head calls for 'coordinated' response to NYC lead crisis

By: Marisa Schultz, 3/21/18

EPA Administrator Scott Pruitt called for a "coordinated" response between New York State and City officials to address the ongoing lead crisis.

Asked whether federal intervention is needed to protect New York children and tenants from

lead poisoning, the Environmental Protection Agency chief urged action on all fronts.

"I think a local, state and federal response that is very coordinated and collaborative is terribly important," Pruitt said in an interview. "We each play a role. I'd love to see steps taken at the local level to invest."

Gov. Cuomo already announced an emergency declaration for New York Housing Authority buildings and pledged an additional $250 million for upgrades. But heated public squabbles over resources and responsibility with rival Mayor de Blasio have complicated progress.

Pruitt declined to weigh in on the Cuomo/de Blasio feud but encouraged broad infrastructure investment from all levels to prevent children from getting sick.

"I think the governor's call for that is important and it's something we think is important as well and we need to contribute to it along with the states, local cities and towns," Pruitt said.

While the problems in NYCHA are centered on lead paint, Pruitt has primarily tackled the issue of eliminating lead poisoning from water. He raised concerns over high lead levels found at certain New York City school water fountains.

"I do think that what happened in Flint is something that could happen elsewhere," Pruitt said. "We just simply need to take steps to do all that we can to address it prospectively and proactively."

Pruitt estimated it would take $40 billion – $45 billion to replace lead service lines nationwide and suggested President Trump's $1.5 trillion infrastructure plan can assist states and cities with the costs.

"I really believe that we ought to set a goal as a country that, over the next 10 years, that we ought to work with respect to investments in our infrastructure to eradicate lead in our drinking

water," Pruitt said.

He added: "It can be achieved. Some of the mental-acuity levels of our children are being impacted adversely as a result of this."

The Philadelphia Inquirer

http://www.philly.com/philly/health/pruitt-epa-smog-philadelphia-ozone-20180320.html

Philly has a smog problem. Will Scott Pruitt's EPA say so?

By: Frank Kummer, 3/20/18

Mollie Michel of South Philadelphia keeps her children inside some days because of air pollution, so she's particularly irked by a long delay by the U.S. Environmental Protection Agency to say officially whether Philadelphia has a smog problem. That designation could mean more regulation to help clean up the dirty air, she said.

"You have a city with a childhood asthma rate twice as high as the national average," Michel said to bolster her argument. A member of Moms Clean Air Force, she gathered Tuesday with a few dozen other activists and local officials at City Hall to mark the first day of spring by protesting Trump administration policies.

Whether Philadelphia is violating the federal Clean Air Act remains in bureaucratic limbo. Despite deadlines, the EPA has refused to say whether Philadelphia and some other cities, including Pittsburgh, have met a 2015 benchmark of 70 parts per billion or less of ground-level ozone in the ambient atmosphere. Being out of compliance, or in "nonattainment," has a real-world impact on the state, city, businesses and industry, and even motorists through increased regulation and funding.

The EPA was supposed to state whether Philadelphia was in compliance by last Oct. 1. Last week, a federal court ruled that the EPA, under its administrator, Scott Pruitt, broke the law by

missing the deadline, and gave the EPA until April.

On Monday, Pruitt's office said it would meet the deadline.

Pruitt said during a meeting with reporters at EPA headquarters in Washington that the scope of monitoring required to answer the smog question had caused the delay.

"The agency has been running behind for a number of years," said Pruitt, who took office a year ago.

Pruitt, who said he didn't have data specific to Philadelphia in front of him, also took issue with how the monitoring program has been carried out in the past, saving money by "modeling" — using data from one area and applying it to another.

"Real data is terribly important," Pruitt said. "When we go forward, we need to focus more on monitoring as opposed to modeling … You shouldn't get data from one monitor and extrapolate it over a whole area because you're not dealing with real data at that point."

He said his office is "exploring ways" to pay for monitoring.

If Philadelphia is declared to have a smog problem, the Pennsylvania Department of Environmental Protection would be responsible for crafting a plan to reduce ground-level ozone. Ozone is formed when volatile organic compounds and nitrogen oxides — created by burning fossil fuels, and power plants and other industries — combine in sunlight. Long, hot, humid days act as smog factories, so smog is expected to increase as the climate warms up.

James Garrow, a spokesman for the city's Department of Public Health, said, "Philadelphia is indeed out of compliance" as of March 1. He said the trend for ground-level ozone has been going down for years and Philadelphia expects to meet requirements within a few years.

At the protest, Flora Cardoni, an organizer with PennEnvironment, joined Democratic State Reps. James R. Roebuck Jr. and Brian K. Sims, as well as members of Deep Green Philly and the Clean Air Council, in speaking out. Cardoni said it's already been too long a wait for action.

"Philadelphians want to walk along the Schuylkill, play in Fairmount Park, and wander the historic city without worrying about choking on smog and soot," she said.

Politico

https://www.politico.com/story/2018/03/20/omnibus-vote-house-thursday-473010?lo=ap_e1

Congress struggles to clinch spending deal

By: Burgess Everett, Rachel Bade, Sarah Ferris and Heather Caygle, 3/20/18

Congressional leaders are racing to finalize a spending bill by the end of Tuesday but find themselves still at odds over a host of controversial issues — delaying plans to unveil the proposal and raising the prospect of weekend votes to avoid a shutdown.

Democrats, Republicans and the White House battled late into the night Monday and into Tuesday afternoon over whether to include provisions on President Donald Trump's border wall, a massive New York infrastructure project and the special counsel's Russia investigation, according to lawmakers and aides in both parties.

There were still a number of unresolved issues as of Tuesday evening, and multiple sources were pessimistic that negotiators would reach a deal in time to release the bill before Wednesday.

Asked how confident he was that the Senate would avoid weekend work, Sen. John Thune (R-S.D.) replied: "I'm not real confident at this point."

Dragging the talks into Wednesday would increase the chance that lawmakers pass a short-term spending bill to prevent a temporary shutdown when funding lapses Friday evening.

Several issues remain open after administration officials participated in a lengthy meeting Tuesday afternoon with top leadership and appropriations staffers that did little to break the logjam.

“Everything that remains is going to be pulling teeth to resolve,” said a senior congressional aide with knowledge of the meeting, which included representatives from the White House and the Office of Management and Budget.

The New York-area Gateway project is a primary issue for the White House, according to the aide, but several other provisions are also still up in the air.

Trump is likely to support the bill if the Gateway project is excluded, the military receives a major budget boost and there is a significant infusion of border security funding, White House legislative affairs director Marc Short said at the Capitol Tuesday.

House Speaker Paul Ryan (R-Wis.) told his conference that he is planning to pass the massive, $1.3 trillion omnibus on Thursday, according to House Republicans.

"I'm hoping today," Ryan told reporters when asked Tuesday morning when leaders would wrap up negotiations. He said lawmakers were not yet considering a short-term funding patch to buy more negotiating time. "There are some unresolved issues. We're working through them as we speak."

Senate Majority Leader Mitch McConnell (R-Ky.) said he would keep the Senate in until the bill is passed.

"We anticipate the House filing later today, which will give the Senate plenty of time to take a look at it and see what's in it," McConnell said on Tuesday afternoon.

Still, on the House's current schedule, the Senate would have just a day to pass the bill before government funding runs out on Friday evening — allowing for any one senator to shut the government down briefly. Sen. Rand Paul (R-Ky.) caused such a shutdown last month in protest over a budget deal.

Paul would not rule out doing everything he can to stop the spending bill if he views it as poorly as he did a budget bill in February.

"I will oppose the bill. I have to make a decision about whether or I will accept a time agreement," Paul told reporters on Tuesday.

Senate leaders are already entertaining a short-term spending bill in preparation for any antics by Paul.

"We're going to be here into the weekend, perhaps. But I think there could be some measures taken to keep the lights on. But we'll get it done," said Senate Majority Whip John Cornyn (R-Texas). "Anything can happen around here."

Congressional leaders had hoped to file the bill, which would fund the government through the end of September, on Monday night with a House vote on Wednesday. But Congress is bogged down over policy provisions that various congressional factions are trying to attach to the must-pass bill. Many lawmakers view the legislation as their last chance to get their priorities signed into law before the midterm elections.

"Negotiations continue between the four leaders. A few sticking points remain, but we are very close," said Senate Minority Leader Chuck Schumer (D-N.Y.). "I think it will be a fair compromise."

Lawmakers and aides estimated there were as many as 20 provisions still being debated. One of the most controversial is $900 million in funding for the Gateway tunnel project in New York, a key priority of Schumer and New York-area Republicans and Democrats.

Gateway supporters are trying to include language that would allow the project to apply for competitive grant money and prevent the Trump administration from squashing the project. Trump has told Republicans he will veto a bill that funds the project specifically. Schumer and GOP leaders were still battling over the provision as of Tuesday afternoon, and the New Yorker said the tunnel is of national significance despite Trump's complaints.

The White House remains unmoved, however.

“The secretary of transportation has explained if you put that much money in one project it’s going to crimp projects across the country she needs to fund. It‘s also a project that a majority of House Republicans… voted against," Short said. “The president has made his wishes well known so I think we’re going to be fine."

Another sticking point: immigration. Talks to protect young immigrants facing deportation fell apart over the weekend, but congressional Democrats spent Monday and Tuesday pushing to freeze hiring of immigration enforcement officials in return for providing Trump more than $1 billion in funding on his border wall.

Democrats and Republicans are likely to agree on about $1.6 billion in border funding that would help finance some fencing and security and avoid directly funding the large concrete wall that Trump wants, according to a Democratic aide.

Republicans are seeking to fix an error in the new tax law that lowers tax bills for farmers that sell grain to cooperatives at the expense of other companies. Though Senate Democrats and some Senate Republicans are willing to rewrite the provision in exchange for a boost in Low-Income Housing Tax Credits in the spending bill, Ryan has resisted, according to people in both parties. Ryan allies say that just because he rejected an offer from Schumer to fix

the so-called “grain glitch,” it doesn't mean the issue is dead altogether.

Congressional Democrats also pushed provisions to protect special counsel Robert Mueller but have been rebuffed by GOP leaders. An attempt to shore up Obamacare's insurance markets is also stalled in a battle over abortion.

Lawmakers believe neither of those provisions will be in the omnibus.

A Tuesday morning school shooting in Maryland, however, may have thrown another wild card into the mix: GOP leaders are pressing to include popular legislation that would improve the National Instant Criminal Background Check System for firearms purchases.

“We remain hopeful that Fix NICS is in the omni," Short said of the proposal to improve the FBI’s background check system.

But Democrats want a broader gun debate and note that the provision is a modest way to simply bolster existing gun laws. Meanwhile, conservatives believe it would make it more difficult for some veterans to buy a gun, which could keep that provision out as well.

"There are still some key questions. There's a NICS question, there's an Internet sales tax question, there‘s [an Obamacare] question. There's a Gateway project financing question," said Rep. Jim Jordan (R-Ohio), a conservative leader. "It looks like a lot of those things aren't gonna be in it, which is a good step, but it still spends way too much money."

The Wall Street Journal

https://www.wsj.com/articles/trump-to-ramp-up-trade-restraints-on-china-1521593091

Trump to Ramp Up Trade Restraints on China

By: Bob Davis, 3/20/18

The White House is preparing to crack down on what it says are improper Chinese trade practices by making it significantly more difficult for Chinese firms to acquire advanced U.S. technology or invest in American companies, individuals involved in the planning said.

The administration plans to release on Thursday a package of proposed punitive measures aimed at China that include tariffs on imports worth at least $30 billion.

But the tariffs won't be imposed immediately. Rather, U.S. industry will be given an opportunity to comment on which products should be subject to the duties. As part of the package, the White House will announce possible investment restrictions by Chinese firms in the U.S. and will direct the Treasury Department to outline rules governing investment from China.

Final details of the plan, including the amount of imports to be hit by tariffs, remain in flux, those involved with the discussions said. While the rough amount and rationale for the tariffs are expected to be disclosed on Thursday, the final decisions will come once U.S. industry has had its say, they said.

A White House spokeswoman declined to comment.

The effort stems from a monthslong investigation by the administration into Chinese intellectual property practices that found the damage to U.S. companies from forced technology transfer is $30 billion annually.

The administration has warned Beijing that it risked tariffs if it didn't significantly liberalize its market and eliminate practices that disadvantage foreign firms.

While the administration's plans to put tariffs on China have received most of the attention, it is considering other significant penalties, especially those aimed at state-owned Chinese firms. It

plans to argue that Chinese state-owned firms buy U.S. technology not for commercial purposes, but to apply for military use and otherwise gain an edge in the race for global technological dominance.

The administration believes that Beijing, in requiring U.S. companies to form joint ventures to do business in China, then pressures them to transfer important technology to their Chinese partners. The U.S. also contends Beijing improperly subsidizes Chinese companies looking to overtake U.S. rivals in such advanced technologies as semiconductors, artificial intelligence and robotics.

Chinese officials have said that they are improving their protection of intellectual property and liberalizing their economy. They also complain that the U.S. hasn't given them a specific list of demands that they need to meet to head off tariffs.

The country's responses to challenges from President Donald Trump loomed large as China's leaders closed out an annual political gathering on Tuesday.

Premier Li Keqiang, the titular No. 2 leader, struck a conciliatory tone on trade with the U.S. At a news briefing in Beijing's Great Hall of the People, Mr. Li said "there are no winners" in a trade war between the world's two largest economies, and appealed for calm.

People involved in the planning say the Trump administration is looking at making reciprocity the core of U.S. investment relations with China, meaning that the U.S. would impose restrictions on Chinese investment similar to those that U.S. firms face in China. That could mean that the U.S. would insist that Chinese firms form joint ventures before doing business in the U.S., unless China dropped those restrictions.

The U.S. has already made it more difficult for Chinese companies to invest in the U.S. by blocking Chinese bids to purchase U.S. semiconductor firms. That is done by an interagency review of foreign acquisitions by the Committee on Foreign Investment in the U.S. Congress is looking to broaden CFIUS reviews of acquisitions so they include joint ventures too.

The expansion would include reviews of technology transfers to foreigners and could apply to joint ventures both outside and within the U.S. But CFIUS looks solely at national security concerns. The administration wants to address economic harm as well, according to these people.

Any imposition of tariffs, without going first to the World Trade Organization, is sure to prompt a chorus of criticism not just from Beijing but from U.S. industry, which has opposed tariffs as counterproductive. The WTO adjudicates trade cases and has the power to authorize tariffs in cases where a losing party doesn't change its practices. The administration is also considering bringing a case against Chinese trade practices that are covered by the WTO.

Oregon Sen. Ron Wyden, the senior Democrat on the Senate Finance Committee, said he opposes the broad imposition of tariffs. "American producers who haven't gotten a fair shake in the past aren't going to get that back by just have tariffs slapped on imports indiscriminately," he said.

Tariffs are bound to cause China to retaliate, said Clement Leung, Hong Kong's representative in the U.S. Chinese officials "cannot show any weakness" at a time when the country's leader, Xi Jinping, has just been confirmed for his second term, Mr. Leung said. Hong Kong, a trading center that operates somewhat independently from the rest of China, would be hurt by limits on trade.

Whatever the political blowback, Harvard law professor Mark Wu, a trade expert, says that the White House has authority to impose tariffs under section 301 of the Trade Act of 1974.

"In situations where the U.S. Trade Representative deems unfair trade practices to fall outside the scope of a WTO-covered agreement, then the statute permits the executive branch to take action directly without first seeking recourse through WTO dispute settlement" procedures, he said.

Frustration with Chinese trade practices has been building among both the governments and private sectors of the U.S., Japan and Europe. One reason the U.S. is considering a separate WTO case is to try to recruit allies to pressure China. But any move to impose tariffs could allow

Beijing to portray itself as a victim. Coalition-building has become more complicated in the wake of a separate U.S. action to levy tariffs on steel and aluminum imports from allied nations.

For instance, finance ministers and central bankers from the Group of 20 countries, meeting in Buenos Aires on Tuesday, failed to reach any new agreement on shared principles when it comes to trade policies, as the split between the U.S. and other major economies deepened over the U.S.'s tariff policies.

The administration is considering recommendations from two other reports that would impose draconian investment restrictions on China. The U.S.-China Economic and Security Review Commission, a Congressional panel that takes a hard line on China, last year urged the administration to prohibit "the acquisition of U.S. assets by Chinese state-owned or state-controlled entities, including sovereign wealth funds."

A report for the Pentagon by its Defense Innovation Unit Experimental, which examines technology issues, has recommended that the Pentagon pursue a policy of "deterring Chinese technology transfer" by broadening CFIUS's mandate and strengthening export controls on technology to China.

China Investment Corp, Chinese sovereign-wealth fund which could get hit by sanctions, is putting together a fund targeting as much as $5 billion with Goldman Sachs Group Inc., aimed at investing in U.S. manufacturing and other sectors. CIC hopes the fund would pass muster with U.S. regulators, say those people familiar with the plans.

It is unclear how far the administration will go in pursuing these ideas. Blocking the acquisition of all purchases by Chinese state firms, for instance, would mean that Chinese state-owned airlines couldn't buy Boeing jets. Toughening export controls on, say, semiconductor production machinery could cede the market to Japanese vendors.

The administration's actions on China come on the heels of plans to levy tariffs on steel and aluminum imports. Japan, Korea and the European Union are scrambling to get exemptions from those levies, which are set to go into effect on Friday.

TRUMP TWEETS

Donald J. Trump @realDonaldTrump · 21h

Our Nation was founded by farmers. Our independence was won by farmers. And our continent was tamed by farmers. Our farmers always lead the way -- we are PROUD of them, and we are DELIVERING for them! #NationalAgricultureDay

28K 28K 115K

Donald J. Trump @realDonaldTrump · 2h

AUSTIN BOMBING SUSPECT IS DEAD. Great job by law enforcement and all concerned!

6.0K 11K 44K

Donald J. Trump @realDonaldTrump · 2h

Department of Justice should have urged the Supreme Court to at least hear the Drivers License case on illegal immigrants in Arizona. I agree with @LouDobbs. Should have sought review.

3.6K 4.5K 18K

Donald J. Trump @realDonaldTrump · 2h

...there was no probable cause for believing that there was any crime, collusion or otherwise, or obstruction of justice!" So stated by Harvard Law Professor Alan Dershowitz.

9.2K 5.4K 21K

Donald J. Trump @realDonaldTrump · 1h

"Special Council is told to find crimes, whether a crime exists or not. I was opposed to the selection of Mueller to be Special Council. I am still opposed to it. I think President Trump was right when he said there never should have been a Special Council appointed because.....

11K 4.2K 17K

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 4/6/2018 3:39:43 PM
To: John Berrey Ex. 6 - Personal Privacy
Subject: Re: DRAFT - Pruitt's EPA Gets High Marks for Pushing Superfund Clean-Up

Thank you Chairman

Sent from my iPhone

On Apr 6, 2018, at 10:27 AM, John Berrey < Ex. 6 - Personal Privacy > wrote:

Kel, this is a draft of a press event. I've spoken to our delegation and we are requesting quotes from them. Have a great day

---------- Forwarded message ---------
From: Sean Harrison < Ex. 6 - Personal Privacy >
Date: Fri, Apr 6, 2018 at 9:23 AM
Subject: DRAFT - Pruitt's EPA Gets High Marks for Pushing Superfund Clean-Up
To: John Berrey < Ex. 6 - Personal Privacy >, Tim L. Kent < Ex. 6 - Personal Privacy >, Craig Kreman < Ex. 6 - Personal Privacy >

Chairman, Tim and Craig — I wanted to show you my "start" on the EPA/Scott Pruitt news release, to make sure it is going in the right direction before I continue on it this morning. Please see below, and offer any suggestions you might have.

DRAFT – for internal review only
--

Pruitt's EPA Gets High Marks for Pushing Superfund Clean-Up

(QUAPAW, Okla.) — From this corner of Indian Country, opinion runs high of Administrator Scott Pruitt's tenure at the Environmental Protection Agency.

Pruitt has pushed through a remarkable improvement in the process and speed of cleaning up and reclaiming toxic former mining land in the Tar Creek district of northeast Oklahoma, an EPA superfund site previously mired in a generations-long stalemate.

"It's a dramatic change," said _____. "After decades wrought with administrative delays, lack of funding and neglect, we are now experiencing an efficient and well managed clean up of the Tar Creek Superfund site. It is amazing, the difference under Administrator Pruitt's leadership."

Where a few years ago enormous piles of lead- and zinc-poisoned mining waste stood, and where bleak, baron and useless land stretched for miles, there are now cattle grazing on a renewed landscape that hasn't seen green grass in ages. Some areas are ready for seeding row crops this spring. The Quapaw Tribe of Oklahoma, who has called this place home since about 1835 when its people were removed from Arkansas, is the local leader in the clean-up project.

The arrangement represents a government-to-government relationship that is serving as a model for what Pruitt had in mind when he took over the EPA — to empower the local stakeholders in the process of cleaning up prioritized superfund sites, because those are the people who will remain there afterward.

...

quote:
Under the current EPA management it is clear the focus on the mission of remediation at the Tar Creek Superfund has dramatically changed. Under the leadership of Administrator Scott Pruitt the changes at the site are palatable. More work at a lower cost has excellerated the environmental transformation from a moon scape to row crops. We are so proud of Scott's performance, it's the greatest government response we have ever seen at Tar Creek.

--
Sean Harrison

Ex. 6 - Personal Privacy

--
John L Berrey
Chairman
Quapaw Tribe BC, DDA

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 3/16/2018 12:05:00 AM
To: John Berrey Ex. 6 - Personal Privacy
Subject: RE: call

Chairman Berrey, I am sorry. Busy day and I am just getting to this. I have a fairly open day tomorrow if you have some time.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: John Berrey [mailto: Ex. 6 - Personal Privacy
Sent: Thursday, March 15, 2018 12:41 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: Re: call

Are you available at 330 today?

On Wed, Mar 14, 2018 at 9:12 PM Kelly, Albert <kelly.albert@epa.gov> wrote:

> Thanks. Call when it's convenient
>
> Sent from my iPhone
>
> On Mar 14, 2018, at 8:52 PM, John Berrey < Ex. 6 - Personal Privacy wrote:
>
> > Let's talk tomorrow, we had a great day today.
> >
> > On Wed, Mar 14, 2018 at 7:38 PM Kelly, Albert <kelly.albert@epa.gov> wrote:
> >
> > Hello Chairman Berry. When you have a convenient time, I would like to ask for a phone conversation to discuss Tar Creek
> >
> > Albert Kelly
> >
> > Senior Advisor to the Administrator
> >
> > 1200 Pennsylvania Avenue, NW

Washington, DC 20460

202 306 8830

--
John L Berrey
Chairman
Quapaw Tribe BC, DDA

--
John L Berrey
Chairman
Quapaw Tribe BC, DDA

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 3/15/2018 1:12:56 AM
To: John Berrey Ex. 6 - Personal Privacy
Subject: Re: call

Thanks. Call when it's convenient

Sent from my iPhone

On Mar 14, 2018, at 8:52 PM, John Berrey < Ex. 6 - Personal Privacy > wrote:

> Let's talk tomorrow, we had a great day today.
>
> On Wed, Mar 14, 2018 at 7:38 PM Kelly, Albert <kelly.albert@epa.gov> wrote:
>
>> Hello Chairman Berry. When you have a convenient time, I would like to ask for a phone conversation to discuss Tar Creek
>>
>> Albert Kelly
>>
>> Senior Advisor to the Administrator
>>
>> 1200 Pennsylvania Avenue, NW
>>
>> Washington, DC 20460
>>
>> 202 306 8830
>
> --
> John L Berrey
> Chairman
> Quapaw Tribe BC, DDA

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 5/1/2018 6:33:17 PM
To: Idsal, Anne [idsal.anne@epa.gov]
Subject: RE: Farewell

Thanks

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Idsal, Anne
Sent: Tuesday, May 1, 2018 2:28 PM
To: Hladick, Christopher <hladick.christopher@epa.gov>
Cc: Dunn, Alexandra <dunn.alexandra@epa.gov>; Kelly, Albert <kelly.albert@epa.gov>; Lopez, Peter <lopez.peter@epa.gov>; Servidio, Cosmo <Servidio.Cosmo@epa.gov>; Glenn, Trey <Glenn.Trey@epa.gov>; Stepp, Cathy <stepp.cathy@epa.gov>; Gulliford, Jim <gulliford.jim@epa.gov>; Benevento, Douglas <benevento.douglas@epa.gov>; Strauss, Alexis <Strauss.Alexis@epa.gov>
Subject: Re: Farewell

Kell,

Thank you for all of the support you afforded to Region 6. From Tar Creek to San Jacinto, among others, your work and assistance has been invaluable. Take care and know that you'll be missed.

Best,
Anne

Sent from my iPhone

On May 1, 2018, at 1:12 PM, Hladick, Christopher <hladick.christopher@epa.gov> wrote:

> The Port of Portland project would not be moving without your help. Thank you. Best of luck.
>
> Sent from my iPhone
>
> On May 1, 2018, at 11:06 AM, Dunn, Alexandra <dunn.alexandra@epa.gov> wrote:
>
> > Kell,
> > We will miss you in Region 1. You personally advanced clean up work at several of our contentious sites and for that we – and the environment and public health - are grateful. Be well.
> >
> > Alexandra Dapolito Dunn, J.D.
> > Regional Administrator
> >
> > Region 1 New England
> > 5 Post Office Sq. Suite 100

Mail Code: ORA01-4
Boston, MA 02109-3912

Desk: (617) 918-1012
Mobile: (857) 291-4405
Fax: (617) 918-0012
dunn.alexandra@epa.gov

From: Kelly, Albert
Sent: Tuesday, May 1, 2018 2:00 PM
To: Dunn, Alexandra <dunn.alexandra@epa.gov>; Lopez, Peter <lopez.peter@epa.gov>; Servidio, Cosmo <Servidio.Cosmo@epa.gov>; Glenn, Trey <Glenn.Trey@epa.gov>; Stepp, Cathy <stepp.cathy@epa.gov>; Idsal, Anne <idsal.anne@epa.gov>; Gulliford, Jim <gulliford.jim@epa.gov>; Benevento, Douglas <benevento.douglas@epa.gov>; Strauss, Alexis <Strauss.Alexis@epa.gov>; Hladick, Christopher <hladick.christopher@epa.gov>
Subject: Farewell

I have now been able to speak with each of you about my departure. Thank you all again for making the last year one of my best professionally. You are all such good and committed leaders and make the EPA a better, more responsive agency. I hope to hear from you all over time. My personal contact information is Ex. 6 - Personal Privacy and Ex. 6 - Personal Privacy If I can be of help with anything, never hesitate to call. If you come across a job for a worn out Okie, please send it my way. Thanks again.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 3/14/2018 11:38:58 PM
To: Ex. 6 - Personal Privacy
Subject: FW: call

Hello Chairman Berry. When you have a convenient time, I would like to ask for a phone conversation to discuss Tar Creek

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 3/14/2018 11:36:24 PM
To: Ex. 6 - Personal Privacy
Subject: call

Hello Chairman Berry. When you have a convenient time, I would like to ask for a phone conversation to discuss Tar Creek

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/4/2018 8:01:17 PM
To: Edlund, Carl [Edlund.Carl@epa.gov]
Subject: Tar creek

I would like to schedule a visit to Tar Creek. What would you suggest?

Sent from my iPhone

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 2/2/2018 10:13:05 PM
To: Ex. 6 - Personal Privacy
Subject: call

Hello Ms. Jim, I hope you are well. I wanted to inquire and see if you would have time for a call so I can get your suggestions and ideas on the way forward at Tar Creek. If you would be so inclined, please give me a couple convenient times and the best number for you. Thank you.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/15/2017 11:35:43 PM
To: Woolford, James [Woolford.James@epa.gov]
CC: Mackey, Cyndy [Mackey.Cyndy@epa.gov]
Subject: Re: San Jacinto Background Materials

Great with me. Let me know time and dates and I will get there. I won't be back until Aug 21

Sent from my iPad

On Aug 15, 2017, at 10:09 AM, Woolford, James <Woolford.James@epa.gov> wrote:

> When you get back in, I would like to set up having a an hour long weekly or biweekly conf call or face-to-face with Cyndy and me, since many of our topics overlap. Check-in on topics, what you are hearing from Regions, task-force, etc.
>
> I am out on annual leave 8/21-9/4. So would like to pick this up after Labor Day.
>
> Hope your trips go well.
>
> Couple quick observations.
>
> On East Chicago – we are working with R 5 on remedy alternatives for zone 1 - They will want to come in to DC in a few weeks to discuss with you and others. Bob Kaplan, Barry and I had a call about this today.
>
> Bunker Hill – Couer d'Alene is a major challenge and a great success story. It is one of those sites listed in 1983 that is and will take decades to complete because of its size and complexity and cost. Our last Interim ROD had an estimated cost over $500 M and did not address to full extent of contamination in what is called the upper basin. The redevelopment/re-vegetation work is a great story, but more impressive is the reduction in blood lead levels in the impacted communities that comprise Silver Valley.
>
> Jim Woolford, Director
> Office of Superfund Remediation and Technology Innovation
> Office of Land and Emergency Management
> US Environmental Protection Agency
> 1200 Penn. Ave., NW
> Washington, DC 20460
> (Mail Code 5201-P)
>
> Our mission is to return the most contaminated areas of country to communities for safe reuse in a healthy environment.
>
> Phone: (703) 603 8960– Main Office Line
>
> Physically located at:
>
> Room 5622

One Potomac Yard (South)
2777 S. Crystal Dr.
Arlington, VA 22202

<image001.gif>

From: Kelly, Albert
Sent: Thursday, August 10, 2017 12:25 PM
To: Woolford, James <Woolford.James@epa.gov>
Cc: Breen, Barry <Breen.Barry@epa.gov>; Fonseca, Silvina <Fonseca.Silvina@epa.gov>
Subject: RE: San Jacinto Background Materials

Thanks Jim. I appreciate your thoughtfulness. I didn't think my tour was too important. I was really just getting some familiarity with the site and to try to be responsive. Just to be sure that you don't have to hear from the Regions where I might be wandering, I will give you any scheduled locations that I might be invited to or planning to visit. After Houston, I am going to the Tribal event in Tulsa and am going to tour the Tar Creek site. I am trying to travel to Des Moines after that to see the Dico site and then on Thursday to go with Region 10 to the Coeur D'Lane site. Then I am going back to East Chicago on the 19th for their monthly meeting.

If there is anything I need to know in advance of these visits, please let me know. Also, voice any concerns that you have that I need to know as well. I value your advice. Thank you.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Woolford, James
Sent: Thursday, August 10, 2017 11:42 AM
To: Kelly, Albert <kelly.albert@epa.gov>; Darwin, Veronica <darwin.veronica@epa.gov>; Fonseca, Silvina <Fonseca.Silvina@epa.gov>; Falvo, Nicholas <falvo.nicholas@epa.gov>
Cc: Edlund, Carl <Edlund.Carl@epa.gov>; Breen, Barry <Breen.Barry@epa.gov>; Hilosky, Nick <Hilosky.Nick@epa.gov>; Davis, Patrick <davis.patrick@epa.gov>; Brooks, Becky <Brooks.Becky@epa.gov>; Stalcup, Dana <Stalcup.Dana@epa.gov>; Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Poore, Christine <Poore.Christine@epa.gov>; Phillips, Pam <phillips.pam@epa.gov>
Subject: FW: San Jacinto Background Materials

Kell, we heard from Region 6 that you will be visiting the San Jacinto site near Houston Friday. Following the NRRB review, OSRTI has been working closely with Region 6 on this remedy. The PRPs came and did a presentation to me and my staff last December. We've been working collectively through issues raised by the PRPs and others over the past 8 months.

I asked my staff to prepare some materials for your visit. They are attached:

1. <!--[if !supportLists]--><!--[endif]-->Power point with schedule as of July 24 (also part of the 6 page summary)
2. <!--[if !supportLists]--><!--[endif]-->S/WP Proposed plan pdf – diagrams, pictures of site over time

3. <!--[if !supportLists]--><!--[endif]-->State comment – pdf – we found comments from Texas to be an objective view of the site/challenges
4. <!--[if !supportLists]--><!--[endif]-->A 6-7 page summary with a bit of the history & background on the site, main issues, NRRB comments, OSRTI/regional interactions, etc.
5. <!--[if !supportLists]--><!--[endif]-->An attachment that lays out in some detail the issues at hand from the 2 main alternatives.

Jim Woolford, Director
Office of Superfund Remediation and Technology Innovation
Office of Land and Emergency Management
US Environmental Protection Agency
1200 Penn. Ave., NW
Washington, DC 20460
(Mail Code 5201-P)

Our mission is to return the most contaminated areas of country to communities for safe reuse in a healthy environment.

Phone: (703) 603 8960– Main Office Line

Physically located at:

Room 5622
One Potomac Yard (South)
2777 S. Crystal Dr.
Arlington, VA 22202

<image001.gif>

From: Gartner, Lois
Sent: Thursday, August 10, 2017 9:47 AM
To: Woolford, James <Woolford.James@epa.gov>
Cc: Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Fitz-James, Schatzi <Fitz-James.Schatzi@epa.gov>; Ammon, Doug <Ammon.Doug@epa.gov>; Poore, Christine <Poore.Christine@epa.gov>; Legare, Amy <Legare.Amy@epa.gov>
Subject: SJC Material -- All Items Attached

Jim- Attached are the updated fact sheet and alternatives summary along with the State's letter, Gary Miller's (RPM) 2-page PPT update from the 7/24 and 7 figures from the proposed plan.

Lois Haas Gartner
Special Assistant
Office of Superfund Remediation
and Technology Innovation
U.S. Environmental Protection Agency
703.603.8711

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/15/2017 5:49:23 PM
To: Grantham, Nancy [Grantham.Nancy@epa.gov]
Subject: Re: tar creek press release

Thanks

Sent from my iPad

On Aug 15, 2017, at 12:46 PM, Grantham, Nancy <Grantham.Nancy@epa.gov> wrote:

> Bob Kaplan will pick you up at your hotel .. will get the time
>
> **Nancy Grantham**
> **Office of Public Affairs**
> **US Environmental Protection Agency**
> **202-564-6879 (desk)**
> **202-253-7056 (mobile)**
>
> **From:** Kelly, Albert
> **Sent:** Tuesday, August 15, 2017 12:16 PM
> **To:** Grantham, Nancy <Grantham.Nancy@epa.gov>
> **Subject:** Re: tar creek press release
>
> No I am coming from Idaho on Friday so I am at some hotel. No big deal if I can't get a ride
>
> Sent from my iPad
>
> On Aug 15, 2017, at 9:58 AM, Grantham, Nancy <Grantham.Nancy@epa.gov> wrote:
>
>> Will do .. presume you are arriving at ohare on Saturday morning
>>
>> Thanks ng
>>
>> **Nancy Grantham**
>> **Office of Public Affairs**
>> **US Environmental Protection Agency**
>> **202-564-6879 (desk)**
>> **202-253-7056 (mobile)**
>>
>> **From:** Kelly, Albert
>> **Sent:** Tuesday, August 15, 2017 10:56 AM
>> **To:** Grantham, Nancy <Grantham.Nancy@epa.gov>
>> **Subject:** Re: tar creek press release
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>> Sent from my iPad

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Will do

Nancy Grantham
Office of Public Affairs
US Environmental Protection Agency
202-564-6879 (desk)
202-253-7056 (mobile)

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Sent: Tuesday, August 15, 2017 10:05 AM
To: Grantham, Nancy <Grantham.Nancy@epa.gov>
Subject: Re: tar creek press release

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Sent from my iPad

On Aug 15, 2017, at 7:25 AM, Grantham, Nancy <Grantham.Nancy@epa.gov> wrote:

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Thanks ng

EPA and Tribal Officials Tour Tar Creek Superfund Site

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Among those attending the tour was Albert "Kell" Kelley, senior advisor to EPA Administrator Scott Pruitt specializing in land revitalization, as well as Jane Nishida, acting associate administrator for the Office of Indian and Tribal Affairs; Sarah Greenwalt, policy advisor to the administrator on cross-cutting issues; Felicia Wright, acting direct of the American Indian Office; and Jessica Snyder, tribal program coordinator in the Office of Land and Emergency Management.

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Superfund cleanups benefit the health of those who live on or near Superfund sites. Academic research has shown these cleanups reduce birth defects close to a site by as much as 25 percent. When EPA cleans up a site or a portion of a site, it frequently returns to beneficial uses. More than 850 Superfund sites nationwide have some type of actual or planned reuse underway. Cleanups also increase tax revenue and create jobs during and after cleanup. EPA reviewed 454 Superfund sites supporting use or reuse activities and found that these sites had approximately 3,900 businesses with 108,000 employees and annual sales of more than $29 billion.

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For information about Superfund and the NPL:
http://www.epa.gov/superfund

Nancy Grantham
Office of Public Affairs
US Environmental Protection Agency
202-564-6879 (desk)

202-253-7056 (mobile)

From: Grantham, Nancy
Sent: Tuesday, August 15, 2017 8:24 AM
To: Grantham, Nancy <Grantham.Nancy@epa.gov>
Subject: tar creek

<Document1.docx>

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/15/2017 4:15:53 PM
To: Grantham, Nancy [Grantham.Nancy@epa.gov]
Subject: Re: tar creek press release

No I am coming from Idaho on Friday so I am at some hotel. No big deal if I can't get a ride

Sent from my iPad

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Nancy Grantham
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202-253-7056 (mobile)

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Sent: Tuesday, August 15, 2017 8:24 AM
To: Grantham, Nancy <Grantham.Nancy@epa.gov>
Subject: tar creek

<Document1.docx>

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/15/2017 2:55:35 PM
To: Grantham, Nancy [Grantham.Nancy@epa.gov]
Subject: Re: tar creek press release

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To: Grantham, Nancy <Grantham.Nancy@epa.gov>
Subject: tar creek

<Document1.docx>

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/15/2017 2:05:13 PM
To: Grantham, Nancy [Grantham.Nancy@epa.gov]
Subject: Re: tar creek press release

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Sent from my iPad

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Nancy Grantham
Office of Public Affairs
US Environmental Protection Agency
202-564-6879 (desk)
202-253-7056 (mobile)

From: Grantham, Nancy
Sent: Tuesday, August 15, 2017 8:24 AM
To: Grantham, Nancy <Grantham.Nancy@epa.gov>
Subject: tar creek

<Document1.docx>

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/14/2017 4:29:38 PM
To: Frank Keating [Ex. 6 - Personal Privacy]
Subject: Re: Tar Creek

I will reach out to him

Sent from my iPad

On Aug 14, 2017, at 10:47 AM, Frank Keating <Ex. 6 - Personal Privacy> wrote:

> Kell: Brian Griffin (mobile Ex. 6 - Personal Privacy) was my secretary of environment and he developed the report. He is the best person to chat with.
> Thanks for doing this. It is a big deal.
> Frank
>
> Sent from my iPhone
>
> On Aug 14, 2017, at 10:40 AM, Kelly, Albert <kelly.albert@epa.gov> wrote:
>
> > Sent from my iPad
> >
> > Begin forwarded message:
> >
> > **From:** kelly.albert@epa.gov
> > **Date:** August 14, 2017 at 10:39:23 AM CDT
> > **To:** Ex. 6 - Personal Privacy
> > **Subject: Tar Creek**
> >
> > Hi Frank, I am at Tar Creek today looking for solutions. If you have suggestions, I would appreciate hearing them
> >
> > Sent from my iPad

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/14/2017 3:40:41 PM
To: Ex. 6 - Personal Privacy
Subject: Fwd: Tar Creek

Sent from my iPad

Begin forwarded message:

> **From:** kelly.albert@epa.gov
> **Date:** August 14, 2017 at 10:39:23 AM CDT
> **To:** Ex. 6 - Personal Privacy
> **Subject: Tar Creek**
>
> Hi Frank, I am at Tar Creek today looking for solutions. If you have suggestions, I would appreciate hearing them
>
> Sent from my iPad

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/14/2017 3:39:25 PM
To: Ex. 6 - Personal Privacy
Subject: Tar Creek

Hi Frank, I am at Tar Creek today looking for solutions. If you have suggestions, I would appreciate hearing them

Sent from my iPad

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/14/2017 3:34:52 PM
To: Grantham, Nancy [Grantham.Nancy@epa.gov]
CC: Gray, David [gray.david@epa.gov]
Subject: Re: tar creek press release

I think this would be good release in both Region 6 and Region 7as well as nationally.

Sent from my iPad

On Aug 14, 2017, at 10:33 AM, Grantham, Nancy <Grantham.Nancy@epa.gov> wrote:

> Kell –
>
> Looping us with David Gray in region 6 so we can get some of yours/and others' photos – David will have one of his folks do a draft release for us all to review.
>
> Thanks ng
>
> **Nancy Grantham**
> **Office of Public Affairs**
> **US Environmental Protection Agency**
> **202-564-6879 (desk)**
> **202-253-7056 (mobile)**

Message

From: Kelly, Albert [kelly.albert@epa.gov]
Sent: 8/10/2017 4:59:44 PM
To: Fonseca, Silvina [Fonseca.Silvina@epa.gov]
Subject: Fwd: San Jacinto Background Materials

???

Sent from my iPhone

Begin forwarded message:

> **From:** "Woolford, James" <Woolford.James@epa.gov>
> **Date:** August 10, 2017 at 12:46:24 PM EDT
> **To:** "Kelly, Albert" <kelly.albert@epa.gov>
> **Subject: Re: San Jacinto Background Materials**
>
> All your tours are important. And I hear you wonder as much as Moses.... 😉
>
> When you get a breather we should bring you more up to speed on OSRTI/Regional interactions.
>
> I do think we are going to have to talk about about balancing competing policy directions in the TF report and the Administrator's memo expectations for resource direction / redirection. E.g. Address human exposure sites, push redevelopment, prioritize RI/FS, pilot GW and sediments, more deletions, etc. I am concerned, and this has come thru calls with Regional DDs on prioritization of resources, that their perspective is that they want to retain the (total) discretion to decide precisely which area to focus on- so where one region is focusing on Human exposure sites, a second could be focusing on redevelopment while a third on GW sites - so this effort could, if we don't carefully manage it, become a splintered effort.
>
> Sorry I can't make the trip tomorrow.
>
> Sent from my iPhone
>
> On Aug 10, 2017, at 12:24 PM, Kelly, Albert <kelly.albert@epa.gov> wrote:
>
>> Thanks Jim. I appreciate your thoughtfulness. I didn't think my tour was too important. I was really just getting some familiarity with the site and to try to be responsive. Just to be sure that you don't have to hear from the Regions where I might be wandering, I will give you any scheduled locations that I might be invited to or planning to visit. After Houston, I am going to the Tribal event in Tulsa and am going to tour the Tar Creek site. I am trying to travel to Des Moines after that to see the Dico site and then on Thursday to go with Region 10 to the Coeur D'Lane site. Then I am going back to East Chicago on the 19th for their monthly meeting.
>>
>> If there is anything I need to know in advance of these visits, please let me know. Also, voice any concerns that you have that I need to know as well. I value your advice. Thank you.
>>
>> Albert Kelly
>> Senior Advisor to the Administrator
>> 1200 Pennsylvania Avenue, NW

Washington, DC 20460
202 306 8830

From: Woolford, James
Sent: Thursday, August 10, 2017 11:42 AM
To: Kelly, Albert <kelly.albert@epa.gov>; Darwin, Veronica <darwin.veronica@epa.gov>; Fonseca, Silvina <Fonseca.Silvina@epa.gov>; Falvo, Nicholas <falvo.nicholas@epa.gov>
Cc: Edlund, Carl <Edlund.Carl@epa.gov>; Breen, Barry <Breen.Barry@epa.gov>; Hilosky, Nick <Hilosky.Nick@epa.gov>; Davis, Patrick <davis.patrick@epa.gov>; Brooks, Becky <Brooks.Becky@epa.gov>; Stalcup, Dana <Stalcup.Dana@epa.gov>; Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Poore, Christine <Poore.Christine@epa.gov>; Phillips, Pam <phillips.pam@epa.gov>
Subject: FW: San Jacinto Background Materials

Kell, we heard from Region 6 that you will be visiting the San Jacinto site near Houston Friday. Following the NRRB review, OSRTI has been working closely with Region 6 on this remedy. The PRPs came and did a presentation to me and my staff last December. We've been working collectively through issues raised by the PRPs and others over the past 8 months.

I asked my staff to prepare some materials for your visit. They are attached:

1. <!--[if !supportLists]--><!--[endif]-->Power point with schedule as of July 24 (also part of the 6 page summary)
2. <!--[if !supportLists]--><!--[endif]-->S/WP Proposed plan pdf – diagrams, pictures of site over time
3. <!--[if !supportLists]--><!--[endif]-->State comment – pdf – we found comments from Texas to be an objective view of the site/challenges
4. <!--[if !supportLists]--><!--[endif]-->A 6-7 page summary with a bit of the history & background on the site, main issues, NRRB comments, OSRTI/regional interactions, etc.
5. <!--[if !supportLists]--><!--[endif]-->An attachment that lays out in some detail the issues at hand from the 2 main alternatives.

Jim Woolford, Director
Office of Superfund Remediation and Technology Innovation
Office of Land and Emergency Management
US Environmental Protection Agency
1200 Penn. Ave., NW
Washington, DC 20460
(Mail Code 5201-P)

Our mission is to return the most contaminated areas of country to communities for safe reuse in a healthy environment.

Phone: (703) 603 8960– Main Office Line

Physically located at:

Room 5622

One Potomac Yard (South)
2777 S. Crystal Dr.
Arlington, VA 22202

<image001.gif>

From: Gartner, Lois
Sent: Thursday, August 10, 2017 9:47 AM
To: Woolford, James <Woolford.James@epa.gov>
Cc: Crossland, Ronnie <Crossland.Ronnie@epa.gov>; Fitz-James, Schatzi <Fitz-James.Schatzi@epa.gov>; Ammon, Doug <Ammon.Doug@epa.gov>; Poore, Christine <Poore.Christine@epa.gov>; Legare, Amy <Legare.Amy@epa.gov>
Subject: SJC Material -- All Items Attached

Jim- Attached are the updated fact sheet and alternatives summary along with the State's letter, Gary Miller's (RPM) 2-page PPT update from the 7/24 and 7 figures from the proposed plan.

Lois Haas Gartner
Special Assistant
Office of Superfund Remediation
and Technology Innovation
U.S. Environmental Protection Agency
703.603.8711

To: STEPHANIE OKEEFE[Ex. 6 - Personal Privacy]
From: Kelly, Albert
Sent: Fri 12/8/2017 10:10:47 PM
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

8 your time

Sent from my iPad

On Dec 8, 2017, at 2:10 PM, Stephanie O'Keefe <Ex. 6 - Personal Privacy> wrote:

> UGH – at least you can catch up on em. When do you break for the evening?

Stephanie Mathews O'Keefe
Chief Executive Officer
International Women's Forum and Leadership Foundation
T: Ex. 6 - Personal Privacy
E: Ex. 6 - Personal Privacy
www.iwforum.org

Facebook | Twitter | Instagram | LinkedIn

From: Kelly, Albert [mailto:kelly.albert@epa.gov]
Sent: Friday, December 8, 2017 5:08 PM
To: Stephanie O'Keefe <Ex. 6 - Personal Privacy>
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

Not on time. Loosely organized. Hard to get sense of purpose

Sent from my iPad

On Dec 8, 2017, at 2:04 PM, Stephanie O'Keefe <Ex. 6 - Personal Privacy> wrote:

> Given what you told me about the internal issues around new initiatives and rolling them out, that was probably a good way to go – soft launch.

How are things there?

Stephanie Mathews O'Keefe
Chief Executive Officer
International Women's Forum and Leadership Foundation
T: Ex. 6 - Personal Privacy
E: Ex. 6 - Personal Privacy
www.iwforum.org

Facebook | Twitter | Instagram | LinkedIn

From: Kelly, Albert [mailto:kelly.albert@epa.gov]
Sent: Friday, December 8, 2017 5:02 PM
To: Stephanie O'Keefe <Ex. 6 - Personal Privacy>
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

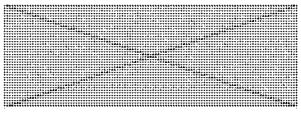
Yes. Scott quasi-announced this in his testimony yesterday

Sent from my iPad

On Dec 8, 2017, at 1:59 PM, Stephanie O'Keefe <Ex. 6 - Personal Privacy> wrote:

> Good to hear. I think your work on the lead stuff will also be very important around this kind of thing going forward.

Stephanie Mathews O'Keefe
Chief Executive Officer
International Women's Forum and Leadership Foundation
T: Ex. 6 - Personal Privacy
E: Ex. 6 - Personal Privacy
www.iwforum.org



Facebook | Twitter | Instagram | LinkedIn

From: Kelly, Albert [mailto:kelly.albert@epa.gov]
Sent: Friday, December 8, 2017 4:55 PM
To: Stephanie O'Keefe <Ex. 6 - Personal Privacy>
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

Yes I read it. Tar Creek is on the list so buckle your chin strap because we will really be on this. Can't speak to or do anything about past investigations.

Sent from my iPad

On Dec 8, 2017, at 1:44 PM, Stephanie O'Keefe <Ex. 6 - Personal Privacy> wrote:

> https://www.politico.com/magazine/story/2017/12/06/scott-pruitt-tar-creek-oklahoma-investigation-215854
>
> Looking for coverage of the release today, and ran across this – have you seen it?

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 4/4/2018 5:44:04 PM
To: John Berrey Ex. 6 - Personal Privacy
Subject: RE: Ril and Wetlands

Thanks

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: John Berrey [mailto: Ex. 6 - Personal Privacy
Sent: Wednesday, April 4, 2018 1:41 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: Re: Ril and Wetlands

I will call in about 30 minutes

On Wed, Apr 4, 2018 at 12:33 PM Kelly, Albert <kelly.albert@epa.gov> wrote:

Thank you Chairman Berrey. Do you have time today for a brief call?

Albert Kelly

Senior Advisor to the Administrator

1200 Pennsylvania Avenue, NW

Washington, DC 20460

202 306 8830

From: John Berrey [mailto: Ex. 6 - Personal Privacy
Sent: Monday, April 2, 2018 3:42 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Ex. 6 - Personal Privacy
Subject: Ril and Wetlands

Kel,

Here are some thoughts for Tar Creek. We are working on a WIFIA application for Arkansas as we speak.

John L Berrey

Chairman Quapaw Tribe Business Committee

Downstream Development Authority

--
John L Berrey
Chairman
Quapaw Tribe BC, DDA

To: STEPHANIE OKEEFE[Ex. 6 - Personal Privacy
From: Kelly, Albert
Sent: Fri 12/8/2017 10:07:56 PM
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

Not on time. Loosely organized. Hard to get sense of purpose

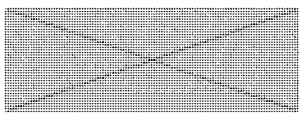
Sent from my iPad

On Dec 8, 2017, at 2:04 PM, Stephanie O'Keefe <Ex. 6 - Personal Privacy> wrote:

Given what you told me about the internal issues around new initiatives and rolling them out, that was probably a good way to go – soft launch.

How are things there?

Stephanie Mathews O'Keefe
Chief Executive Officer
International Women's Forum and Leadership Foundation
T: Ex. 6 - Personal Privacy
E: Ex. 6 - Personal Privacy
www.iwforum.org



Facebook | Twitter | Instagram | LinkedIn

From: Kelly, Albert [mailto:kelly.albert@epa.gov]
Sent: Friday, December 8, 2017 5:02 PM
To: Stephanie O'Keefe <Ex. 6 - Personal Privacy>
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

Yes. Scott quasi-announced this in his testimony yesterday

Sent from my iPad

On Dec 8, 2017, at 1:59 PM, Stephanie O'Keefe <Ex. 6 - Personal Privacy> wrote:

Good to hear. I think your work on the lead stuff will also be very important around this kind of thing going forward.

Stephanie Mathews O'Keefe
Chief Executive Officer
International Women's Forum and Leadership Foundation
T: Ex. 6 - Personal Privacy
E: Ex. 6 - Personal Privacy
www.iwforum.org

Facebook | Twitter | Instagram | LinkedIn

From: Kelly, Albert [mailto:kelly.albert@epa.gov]
Sent: Friday, December 8, 2017 4:55 PM
To: Stephanie O'Keefe <Ex. 6 - Personal Privacy>
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

Yes I read it. Tar Creek is on the list so buckle your chin strap because we will really be on this. Can't speak to or do anything about past investigations.

Sent from my iPad

On Dec 8, 2017, at 1:44 PM, Stephanie O'Keefe <Ex. 6 - Personal Privacy> wrote:

https://www.politico.com/magazine/story/2017/12/06/scott-pruitt-tar-creek-oklahoma-investigation-215854

Looking for coverage of the release today, and ran across this – have you seen it?

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 4/4/2018 5:33:29 PM
To: John Berrey [Ex. 6 - Personal Privacy]
Subject: RE: Ril and Wetlands

Thank you Chairman Berrey. Do you have time today for a brief call?

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: John Berrey [mailto: Ex. 6 - Personal Privacy]
Sent: Monday, April 2, 2018 3:42 PM
To: Kelly, Albert <kelly.albert@epa.gov>
Cc: Ex. 6 - Personal Privacy
Subject: Ril and Wetlands

Kel,
Here are some thoughts for Tar Creek. We are working on a WIFIA application for Arkansas as we speak.

John L Berrey
Chairman Quapaw Tribe Business Committee
Downstream Development Authority

To: STEPHANIE OKEEFE[Ex. 6 - Personal Privacy
From: Kelly, Albert
Sent: Fri 12/8/2017 10:02:02 PM
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

Yes. Scott quasi-announced this in his testimony yesterday

Sent from my iPad

On Dec 8, 2017, at 1:59 PM, Stephanie O'Keefe < Ex. 6 - Personal Privacy > wrote:

Good to hear. I think your work on the lead stuff will also be very important around this kind of thing going forward.

Stephanie Mathews O'Keefe
Chief Executive Officer
International Women's Forum and Leadership Foundation
T: Ex. 6 - Personal Privacy
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www.iwforum.org

Facebook | Twitter | Instagram | LinkedIn

From: Kelly, Albert [mailto:kelly.albert@epa.gov]
Sent: Friday, December 8, 2017 4:55 PM
To: Stephanie O'Keefe < Ex. 6 - Personal Privacy >
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

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Sent from my iPad

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https://www.politico.com/magazine/story/2017/12/06/scott-pruitt-tar-creek-oklahoma-investigation-215854

Looking for coverage of the release today, and ran across this – have you seen it?

To: STEPHANIE OKEEFE[Ex. 6 - Personal Privacy]
From: Kelly, Albert
Sent: Fri 12/8/2017 9:54:45 PM
Subject: Re: The Environmental Scandal in Scott Pruitt's Backyard

Yes I read it. Tar Creek is on the list so buckle your chin strap because we will really be on this. Can't speak to or do anything about past investigations.

Sent from my iPad

On Dec 8, 2017, at 1:44 PM, Stephanie O'Keefe <[Ex. 6 - Personal Privacy]> wrote:

https://www.politico.com/magazine/story/2017/12/06/scott-pruitt-tar-creek-oklahoma-investigation-215854

Looking for coverage of the release today, and ran across this – have you seen it?

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 12/8/2017 9:28:03 PM
To: Coleman, Sam [Coleman.Sam@epa.gov]
Subject: Tar Creek

Since this is now on Administrator list, I would like to meet with whomever is running the project and probably revisit the site. Who should I contact?

Sent from my iPad

Message

From: Kelly, Albert [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=08576E43795149E5A3F9669726DD044C-KELLY, ALBE]
Sent: 4/3/2018 12:00:17 PM
To: Ex. 6 - Personal Privacy
Subject: RE: A visit to Tar Creek

Thank you. I have been in communication with Chairman Berrey and others in Oklahoma. This is a high priority that given a few months, we will solve.

Albert Kelly
Senior Advisor to the Administrator
1200 Pennsylvania Avenue, NW
Washington, DC 20460
202 306 8830

From: Neok(rjim) [mailto: Ex. 6 - Personal Privacy
Sent: Tuesday, April 3, 2018 12:35 AM
To: Kelly, Albert <kelly.albert@epa.gov>
Subject: Re: A visit to Tar Creek

Mr. Kelly,
It takes me awhile, but I am putting a letter in the mail in the morning to you. We are still concerned about our children and another one year old was identified with a high lead level 2 weeks ago. I did a home visit and what a story their situation has become. All to say, just sure it will quickly be resolved and we will have better news for you soon.
~ Rebecca Jim

From: Kelly, Albert
Sent: Sunday, February 25, 2018 5:53 PM
To: Ex. 6 - Personal Privacy
Subject: Re: A visit to Tar Creek

Perhaps we could visit tomorrow

Sent from my iPad

On Feb 25, 2018, at 6:37 PM, Neok(rjim) < Ex. 6 - Personal Privacy > wrote:

> Mr. Kelly,
> Sure, I would be glad to let you know what I know. But stopping the flow of metals down Tar Creek is important, too. They all flow towards and then are ending up in Grand Lake, in our water and measurably in some of our fish. As one of the early EPA officials who came to work at this site said, "It's in the air, it's in the water, it's everywhere."
> It is the chat, it is the metals in the water and it is in the yards where children are being exposed and being lead poisoned. Nothing is quick, but it is all 3. Each one. The best of all worlds would be do them all and with all speed. I assure you, with all speed has never been tried here.
> Glad to visit when you have the time.
> Happy you must be feeling better.
> ~ Rebecca Jim

From: Kelly, Albert
Sent: Sunday, February 25, 2018 4:50 PM
To: Ex. 6 - Personal Privacy
Cc: Chancellor, Erin
Subject: Re: A visit to Tar Creek

Hello Ms. Jim. Thank you for your summary of the day's discussions. From reading, it would seem the first order of business is to get rid of the chat piles. How? Who is involved? Who is against that? Can we have an initial meeting by phone?

Sent from my iPad

On Feb 22, 2018, at 11:11 AM, Neok(rjim) <Ex. 6 - Personal Privacy wrote:

> *What a powerful experience we had at LEAD Agency this week with the visit from the EPA officials.*
> *I wanted to share some of what happened.*
>
> *Felt Respected by our listeners ~ Rebecca Jim*
>
> Rebecca Jim
> Executive Director
> LEAD Agency, Inc. &
> Tar Creekkeeper
> www.leadagency.org
> leadagency@att.net
>
> Ex. 6 - Personal Privacy
>
> "When we heal the earth, we heal ourselves." - David Orr
>
> Virus-free. www.avast.com
>
> <Elevator speech.docx>

Message

Sent: 4/27/2018 3:26:04 PM
To: White, Elizabeth [white.elizabeth@epa.gov]
Subject: RE: Non-Email Records Search - Bristol Bay
Attachments: 171030_Press Release Tracker.docx; Don.docx; Daily Communications Report 01_25_18.docx; 171128_Press Release Tracker.docx; 171128_Press Release Tracker.docx

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From: White, Elizabeth
Sent: Friday, April 27, 2018 10:35 AM
To: Konkus, John <konkus.john@epa.gov>
Subject: FW: Non-Email Records Search - Bristol Bay
Importance: High

Hey John – can you check for this?

Beth White
Director, Office of the Executive Secretariat
U.S. Environmental Protection Agency
(202) 564-1781 direct
(202) 816-1701 cell

From: White, Elizabeth
Sent: Wednesday, April 25, 2018 1:28 PM
To: Konkus, John <konkus.john@epa.gov>
Subject: Non-Email Records Search - Bristol Bay
Importance: High

John– can you search your paper documents, including paper phone logs and schedules, and non-email electronically stored information (meaning documents or information that are stored electronically but are not contained in emails) for documents responsive to the request below? If you could let me know by Monday that would be great. Call me if you want to discuss.

John Konkus

Date Range: 11/8/16-6/26/17

Subject matter:
1. All internal records, documentation, phone logs, schedules, and/or meetings involving the pre-inauguration Trump Transition team, the post-inauguration Trump beachhead team, and Administrator Pruitt's office about (1) withdrawal or recission of the Bristol Bay Watershed Assessment; (2) withdrawal or recission of the 2014 Proposed Determination regarding the Pebble deposit; (3) EPA's use of Section 404(c) with regard to the Pebble deposit; and (4) EPA's use of Section 404(c) generally.
2. All external communications from the post-inauguration Trump beachhead team and Administrator Pruitt's office to the non-EPA parties listed below about (1) withdrawal or recission of the Bristol Bay Watershed Assessment; (2) withdrawal or recission of the 2014 Proposed Determination regarding the Pebble deposit; (3) EPA's use of Section 404(c) with regard to the Pebble deposit; and (4) EPA's use of Section 404(c) generally.

External parties:

- Members of Congress, including any representatives or staff
- Pebble Limited Partnership, Northern Dynasty Minerals, and/or its officers and directors
- U.S. Department of Justice
- U.S. Army Corps of Engineers

Beth White
Director, Office of the Executive Secretariat
U.S. Environmental Protection Agency
(202) 564-1781 direct
(202) 816-1701 cell

Message

From: Polk, Denise [Polk.Denise@epa.gov]
Sent: 8/24/2017 8:36:26 PM
To: Konkus, John [konkus.john@epa.gov]
Subject: FW: (Weekly) Pending Report - New, Supplemental & Incremental - All Regions & HQ
Attachments: Pending Grants Report - New, Supplemental and Incremental - All Regions and HQ 2017-08-21-09-30-23.xlsx

Greetings, John, please review for clearance. Thanks!

Denise A. Polk, Director
Office of Grants and Debarment (OGD)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Mail Stop: 3901R
Washington, DC 20460

(202) 564-5306 (Phone)
(202) 306-1056 (Cell)
Email: Polk.Denise@epa.gov

-----Original Message-----
From: OGD_Grant_Reports
Sent: Monday, August 21, 2017 9:33 AM
To: Milbourn, Cathy <Milbourn.Cathy@epa.gov>
Cc: Grantham, Nancy <Grantham.Nancy@epa.gov>; Polk, Denise <Polk.Denise@epa.gov>; Neal, Kerry <neal.kerry@epa.gov>; Sylvester, Kenneth <Sylvester.Kenneth@epa.gov>; Jones, Laurice <Jones.Laurice@epa.gov>; Etheredge, William <Etheredge.William@epa.gov>; Milazzo, Julie <Milazzo.Julie@epa.gov>; Durand, Jessica <Durand.Jessica@epa.gov>; OGD_Grant_Reports <OGD_Grant_Reports@epa.gov>
Subject: (Weekly) Pending Report - New, Supplemental & Incremental - All Regions & HQ

Good morning Cathy,

Attached is the weekly pending grant actions report. It is provided for your information for possible press release opportunities. If you have any questions, please don't hesitate to contact me.

Amanda Schulz
Grants Competition Advocate's Office
Office of Grants and Debarment
U.S. Environmental Protection Agency
Phone: 202-564-7412

Message

From: OGD_Grant_Reports [OGD_Grant_Reports@epa.gov]
Sent: 8/23/2017 5:30:12 PM
To: OGD_Grant_Reports [OGD_Grant_Reports@epa.gov]
CC: Vizian, Donna [Vizian.Donna@epa.gov]; Showman, John [Showman.John@epa.gov]; Cooper, Marian [Cooper.Marian@epa.gov]; Bell, Matthew [Bell.Matthew@epa.gov]; Flynn, Mike [Flynn.Mike@epa.gov]; Milazzo, Julie [Milazzo.Julie@epa.gov]; Etheredge, William [Etheredge.William@epa.gov]; Neal, Kerry [neal.kerry@epa.gov]; Polk, Denise [Polk.Denise@epa.gov]; Sylvester, Kenneth [Sylvester.Kenneth@epa.gov]; Durand, Jessica [Durand.Jessica@epa.gov]
Subject: RE: Daily Grant Report (Congressional Notification)
Attachments: Congressional Notification Daily Report Previous Day 082317.xlsx

Good Afternoon,

All notifications from today's Congressional Notification Report have been cleared; however, any notification on this list that has been specifically placed on hold still remains on hold and should not move forward.

Amanda Schulz
National Policy, Training, and Compliance Division
Office of Grants and Debarment
U.S. Environmental Protection Agency
Phone: 202-564-7412

From: OGD_Grant_Reports
Sent: Wednesday, August 23, 2017 11:23 AM
To: OGD_Grant_Reports <OGD_Grant_Reports@epa.gov>
Cc: Vizian, Donna <Vizian.Donna@epa.gov>; Showman, John <Showman.John@epa.gov>; Cooper, Marian <Cooper.Marian@epa.gov>; Bell, Matthew <Bell.Matthew@epa.gov>; Flynn, Mike <Flynn.Mike@epa.gov>; Milazzo, Julie <Milazzo.Julie@epa.gov>; Etheredge, William <Etheredge.William@epa.gov>; Neal, Kerry <neal.kerry@epa.gov>; Polk, Denise <Polk.Denise@epa.gov>; Sylvester, Kenneth <Sylvester.Kenneth@epa.gov>; Durand, Jessica <Durand.Jessica@epa.gov>
Subject: Daily Grant Report (Congressional Notification)

EPA Colleagues,

Attached is the report for 8/22/17.

You are receiving this email because the Chief of Staff has requested that you be included on this daily report. The purpose of the attached report is to show monetary grant awards that were signed by EPA Award Officials the previous business day. When the award is signed, a Congressional Notification is automatically triggered within the Integrated Grants Management System (IGMS) database. The source of the information contained in the CN report is Grants Data Mart, which reflects information input into IGMS by Grants Management staff across the agency.

Please don't hesitate to reach out to OGD_Grant_Reports@epa.gov with any questions related to this submission.

Amanda Schulz
National Policy, Training, and Compliance Division
Office of Grants and Debarment
U.S. Environmental Protection Agency
Phone: 202-564-7412

Congressional Notification Daily Report for Awa
8/22/17

Grant No	Program Code	Awarding Region Code	EPA Amount This Action: This Action	Award Date	Applicant Name
83678601-1	X8	EPA HQ	$165,000	8/22/2017	OECD - Org. for Economic Coop. and Dev.
83586901-3	RD	EPA HQ	$191,232	8/22/2017	EMORYU - Emory University
00A00226-0	HC	EPA R1	$25,000	8/22/2017	HRA - Health Resources in Action

rds Signed

Project Title	Project Description
OECD Work on the Environment, Health, and Safety Programme	The objective of this grant is to provide financial support to the Organisation for Economic Co-Operation and Development's (OECD's) work on the environment, health, and safety programme. The effort will support work on test guidelines; the assessment of chemicals and nanomaterials; capacity building; facilitation of risk reduction; chemical accidents and pollutant release and transfer registers.
Wildfires & Future Impacts on PM2.5 & Health	This grant supports research using computer models to investigate air quality and climate-change-driven effects on particulate matter, ozone, and visibility, with an emphasis on wildfires in relation to current and future timeframes. This study evaluates how changing climate will affect the patterns of air pollutants and visibility in the Rocky Mountains Region and further estimate the impacts of future wildfires and urban pollution on air quality, population health, and public health decision making.
Building Capacity in New England	The applicant is proposing to build the capacity in individual states to address the impact of extreme weather events on vulnerable populations. The applicant will showcase innovative tools, practices and/or projects from both within New England (NE) and other parts of the country (e.g., University of Michigan School of Public Health Heat Stress Vulnerability Analysis). The applicant will also convene a regional capacity-building summit focused on asthma and impacts from extreme weather events, and will coordinate a learning community for the Center for Disease Control (CDC) funded NE Asthma Program for the six NE States. The applicant provided adequate information to demonstrate the approach they will use.

99156011-1	PB	EPA R1	$170,000	8/22/2017	VTDOH - Vermont D.O.H.
00A00223-0	LS	EPA R1	$530,420	8/22/2017	VTDEC - Vermont D.E.C.
96352401-0	EQ	EPA R3	$30,000	8/22/2017	BEA - Boxerwood Education Association
96352501-0	EQ	EPA R3	$30,000	8/22/2017	FRDODKRCRK - Friends of Deckers Creek Inc

Vermont Toxic Substances (Lead) Compliance Monitoring Fiscal Year 2017 & 2018	The Vermont Department of Health's Lead Program will: 1) maintain a lead accreditation certification program for individuals and contractors; 2) audit state certified lead training providers; 3) provide lead based paint education awareness to the regulated community; and 4) Apply for Renovation Repair and Painting (RRP) Authorization under 40 CFR 745. These efforts support Title IV, Section 404(g) of the Toxic Substances Control Act as well as Goal 4 of the EPA's Strategic Plan. The assigned Program Results Code is consistent with Goal 4 of the EPA's Strategic Plan.
Vermont Leaking Underground Storage Tank Trust Fund Program Cooperative Agreement	This agreement provides assistance to the Vermont Department of Environmental Conservation Leaking Underground Storage Tank (LUST) Program for Fiscal Years 2017 and 2018. Funds will be used to assist the State in identifying sites contaminated by petroleum and hazardous substance releases from underground storage tanks (USTs) and in overseeing the remediation of soils and groundwater at these sites. This award is the Fiscal Year 2017 allocation.
Boosting Community Well-Being through Youth Green Teams	Boxerwood Education Association (BEA) will develop and pilot a replicable model to advance citizen-level environmental stewardship in under-resourced, rural or small-town populations. The pilot will target the town of Buena Vista, a former manufacturing town in economic decline with little access to recycling resulting in plastics polluting local waterways. A primary component of the model is the creation of youth action teams who collaborate with small-scale, local community institutions such as churches, volunteer fire stations, and pre-schools.
Expanding Environmental Education Opportunities in Northern West Virginia	Friends of Deckers Creek, Inc. (FODC) will coordinate water quality workshops and field trips within the rural communities of Monongalia and Preston counties. These counties are home to large swaths of abandoned mine land that have contributed to local water impairment. FODC will lead tours of stream restoration projects, acid mine drainage remediation projects, water treatment facilities, and other areas within the watershed where environmental improvements are taking place.

96352601-0	EQ	EPA R3	$30,000	8/22/2017	NAIB - National Aquarium Inc.
96352301-0	EQ	EPA R3	$30,000	8/22/2017	WFHE - Women for a Healthy Environment
96343201-4	XA	EPA R3	$64,000	8/22/2017	OTC - Ozone Transport Commission
96354101-0	BF	EPA R3	$200,000	8/22/2017	CTYOTHOMAS - City of Thomas
96354301-0	BF	EPA R3	$200,000	8/22/2017	UCC - Upshur County Commission

Patapsco Latino Action Network: Empowering Community Anchors to Combat Marine Debris (PLAN)	The Patapsco Latino Action Network (PLAN) project seeks to clean-up marine debris in the local Baltimore neighborhoods of Brooklyn and Curtis Bay. These neighborhoods are in close proximity to high levels of industrial activity and the impaired Patapsco River branch of Baltimore Harbor. The project will expand the use of PLAN's community-led conservation model.
A Community Education Campaign: Lead in Pittsburgh	This project will provide education and outreach to community residents of Pittsburgh about public health risks associated with lead exposure and will provide solutions for reducing such risk. The project will develop a comprehensive educational awareness campaign on the sources of lead, its health impacts, strategies that can be taken to reduce those risks, and community training that focuses on equipping citizens with tools and resources to engage with decision-makers and advance policies and plans that address lead exposures.
Support for states in preparing regional haze and criteria pollutant State Implementation Plans.	This grant funds the Ozone Transport Commission in its capacity as the Mid-Atlantic/Northeast Visibility Union (MANE-VU) to assess and design strategies to reduce Regional Haze in the Northeastern United States with an emphasis on Class I areas, and to achieve the new and newly revised NAAQS for all criteria air pollutants via multi-pollutant SIP planning. The Ozone Transport Commission works with States and Tribes to provide model State Implemention Plans for Regional Haze
BROWNFIELDS ASSESSMENT COMMUNITY-WIDE (HAZARDOUS SUBSTANCES)	This assistance agreement will provide funding for the City of Thomas to inventory, characterize, assess, and conduct cleanup planning and community involvement related activities for Brownfields sites in the City of Thomas, WV.
BROWNFIELDS CLEANUP (HAZARDOUS SUBSTANCES)	This assistance agreement will provide funding to Upshur County Commission to cleanup a Brownfields site: Upshur County Youth Camp Tar Pit. The cleanup of the Tar Pit site will expand recreational opportunities to the camp, and to the broader community. The Commission plans for the site to be used as open space, as well as an archery range.

96342801-3	AI	EPA R3	$285,000	8/22/2017	U MD CP - University of Maryland - Office of Research Adminstration
00338319-3	LS	EPA R3	$450,289	8/22/2017	MDE - MD Dept of the Environment
42000117-0	CS	EPA R3	$52,518,000	8/22/2017	PAINV - PA Infrastructure Investment Authority
98409217-2	BG	EPA R4	$311,946	8/22/2017	NC DAg&CS - NC Dept of Agriculture & Consumer Services
95414317-0	L	EPA R4	$750,000	8/22/2017	NC DEQ - North Carolina DEQ
00D34617-0	LS	EPA R4	$1,122,000	8/22/2017	AL DEM - AL Dept of Environmental Management

Mid-Atlantic Finance Program	This project will provide communities throughout the Mid-Atlantic technical assistance and training to develop financing strategies designed to efficiently, sufficiently, and sustainably support local resource protection and restoration goals across three primary initiatives: Water Resources Management, Energy Efficiency and Climate Adaptation and Resiliency, and Community Sustainability. Funds in the amount of $4,475,000 are contingent upon availability.
LUST PROGRAM	To assist recipient in implementing an effective leaking underground storage tank regulatory program as set forth in Subtitle I of the Solid Waste Disposal Act, as amended.
Clean Water State Revolving Fund	To continue capitalizing the Pennsylvania Clean Water State Revolving Fund to provide a long term source of financing for construction of projects and other water quality management activities eligible under Section 603 (c) of the Clean Water Act as amended by the Water Resources Reform and Development Act of 2014.
Performance Partnership Grants	This action approves a partial award in the amount of $117,413 to the State of North Carolina in support of a comprehensive program of registration, labeling, training, certification, inspections and enforcement will prevent unnecessary exposure to humans and the land and water by ensuring that pesticides are used and disposed of in the manner specified on each product. Inspections and enforcement will deter non-compliance with product requirements.
State Underground Storage Tanks Program	This action approves an award in the amount of $750,000 to the State of North Carolina to assist in the development and maintenance of an effective underground storage tank (UST) program by implementing specified provisions of the Energy Policy Act of 2005. Funds will support inspections and other release prevention and compliance assurance activities for federally-regulated Underground Storage Tank (UST) systems, as well as for enforcement activities related to release prevention.
Leaking Underground Storage Tank Trust Fund Program	This action approves an award inthe amount of $1,122,000 to the State of Alabama Department of Environmental Management (ADEM) to assist in developing, implementing and maintaining an effective Underground Storage Tank (UST) program for the remediation of leaking USTs containing petroleum in the state.

00D30017-0	LS	EPA R4	$1,900,000	8/22/2017	FL DEP Wst - FL Dept of Environmental Protection
99465717-0	C9	EPA R4	$3,766,800	8/22/2017	NC DEQ - North Carolina DEQ
00E94504-1	DI	EPA R5	$37,750	8/22/2017	IT028 - Mille Lacs Band of Ojibwe
96580012-5	BG	EPA R5	$41,850	8/22/2017	IT904 - Nottawaseppi Huron Band of Potawatomi

Leaking Underground Storage Tank Trust Fund Program	This action approves an award in the amount of $1,900,000 to the Florida Department of Environmental Protection to assist the State of Florida in developing, implementing and maintaining an effective Underground Storage Tank Program for the remediation of leaking underground storage tanks containing petroleum. Funds will be used for information technology needs including staff augmentation and to augment site management and technical staffing needs.
Nonpoint Source Implementation	This action approves funding in the amount of $3,766,800 to the State of North Caroline Department of Environmental Quality (NCDEQ) for the implementation of programs and projects designed to reduce non point source pollution to achieve and maintain beneficial use of water in the State.
Mille Lacs Tribal UST Program	Through this agreement the Mille Lacs Band of Ojibwe will administer an Underground Storage Tank Program. The project will help ensure underground storage tank systems are installed properly; monitored for a release; protected from spills, overfills, and corrosion; and properly closed. The funds will be used to improve compliance through inspections, compliance assistance and other related activities within the boundaries of the Mille Lacs Band of Ojibwe and other participating tribal reservations.
Performance Partnership Grant	This Performance Partnership Grant with the Nottawaseppi Huron Band of Potawatomi Indians and consists of funds from the General Assistance Program (GAP), the Clean Water Act (CWA) Section 106 and CWA 319, and the Brownfields Section 128a Program. Specific activities during this grant period includes: Administrative oversight of the environmental program, continued establishment or enhancement of a site response program, water quality monitoring and data collection activities, ensure ambient and indoor air quality reduce waste, and manage pesticides on the reservation.

00E77005-1	I	EPA R5	$52,181	8/22/2017	IT023 - Sault Ste. Marie Tribe of Chippewa Indians
97580407-1	GA	EPA R5	$55,000	8/22/2017	IT038 - Lac Courte Oreilles Tribal Council
00E57505-2	I	EPA R5	$87,000	8/22/2017	IT038 - Lac Courte Oreilles Tribal Council
96552408-4	BG	EPA R5	$137,351	8/22/2017	IT902 - Little Traverse Bay Bands of Odawa Indians
96500804-9	XA	EPA R5	$501,441	8/22/2017	LADCO - Lake Michigan Air Directors Consortium

Sault Ste Marie (SSM) Tribe of Chippewa Indians Section 106	The project will assist the Sault Ste. Marie Tribe (SSM) to continue efforts in developing their capacity and infrastructure to manage environmental programs on the reservation. The Tribe will 1) continue to conduct surface water quality sampling; 2) prioritize the Tribe's water resource needs to better address environmental issues; 3) grow its understanding of CWA 303, 319, 401 and 404 programs to eventually develop those programs; 4) draft a TAS application for the CWA 319 program; 5) review their QAPP; 6) continue communicating with federal, tribal, state and local water resource managers; 7) build capacity of the environmental program for water resource management; 8) continue education and outreach, including Clean Boats Clean Waters events and storm drain markers.
Indian General Assistance Program	This action will provide General Assistance Program (GAP) funds to the Lac Courte Orreilles Tribal Council (LCO) in support of environmental capacity building activities. The funds will enable the tribe to assess, monitor and develop strategies for protection of human health and the environment. Specific activities during this period include: administrative oversight of the GAP program, legislative and regulatory capacities, and data analysis of the Reservation's water resources .
Lac Courte Oreilles Band of Lake Superior Chippewa	Under the Clean Water Act (CWA) Section 106 Program, Lac Courte Oreilles (LCO) is proposing to improve regulatory authority and water quality standards to protect the quality of the groundwater, wetlands, lakes, and streams on the Reservation. LCO will also administer its water management program to ensure clean and safe water resources in Indian Country.
Performance Partnership Grant	This action will provide funding in the Performance Partnership Grant (PPG) to the Little Traverse Bay Bands of Odawa Indians in support of environmental protection programs managed on the reservation. Funds being provided include Clean Water Act Section 106, Brownfields Tribal Response program Section 128(a) and General Assistance Program Funds.
LADCO Member State Technical, programmatic and training support	This grant will support state air pollution control programs, conducting data analysis to enhance understanding of air pollution problems, including updating conceptual models for ozone, PM 2.5, and regional haze; conducting energy related projects; serving on local, state, federal, and national committees; and other activities to help its member states better understand air pollution and air quality problems in the Great Lakes Region. It will also provide air pollution control training.

97581417-0	FS	EPA R5	$14,747,000	8/22/2017	MN PFA - Minnesota Public Facilities Authority
01F07501-3	RP	EPA R6	$25,000	8/22/2017	IT416 - Kickapoo Tribe of Oklahoma
00F74701-7	RP	EPA R6	$45,656	8/22/2017	IT400 - Absentee Shawnee Tribe of Indians of Oklahoma
00F68001-7	RP	EPA R6	$50,000	8/22/2017	TX RRCTX - Railroad Commission of Texas
00F69301-7	RP	EPA R6	$65,200	8/22/2017	OK CCa - Oklahoma Corporation Commission

2017 DWSRF Capitalization Grant	This agreement provides funding under the Safe Drinking Water Act to the state of Minnesota to capitalize its drinking water state revolving loan fund, which provides financing for the construction of drinking water treatment facilities, drinking water storage facilities, and drinking water transmission and distribution systems. This agreement will also set aside funds for wellhead protection, public water system supervision, and technical assistance activities.
Kickapoo Tribe of OK 128a Tribal Response Program	This project provides funding for the Kickapoo Tribe of Oklahoma's response program that includes timely survey and inventory of brownfield sites; oversight and enforcement authorities to ensure that response actions protect human health and the environment; resources to provide meaningful public involvement; mechanisms for approval of a cleanup plans and verification of complete responses.
Absentee Shawnee 128a Tribal Response Program	This project provides funding for the Absentee Shawnee Tribe's response program that includes timely survey and inventory of brownfield sites; oversight and enforcement authorities to ensure that response actions protect human health and the environment; resources to provide meaningful public involvement; mechanisms for approval of a cleanup plans and verification of complete responses.
TX RRC Brownfields 128a State Response Program	This project provides funding for the Railroad Commission of Texas's response program that includes timely survey and inventory of brownfield sites; oversight and enforcement authorities to ensure that response actions protect human health and the environment; resources to provide meaningful public involvement; mechanisms for approval of a cleanup plans and verification of complete responses. Additionally RRCTX plans to conduct site specific assessment and/or cleanup activities, outreach activities and technical assistance.
OCC Brownfields 128a State Response Program	This project provides funding for the Oklahoma Corporation Commission's response program that includes timely survey and inventory of brownfield sites; oversight and enforcement authorities to ensure that response actions protect human health and the environment; resources to provide meaningful public involvement; mechanisms for approval of a cleanup plans and verification of complete responses.

00F95901-4	V	EPA R6	$100,000	8/22/2017	OK DEQ - OK Dept of Env Quality
00F86401-2	GA	EPA R6	$125,000	8/22/2017	IT423 - Pawnee Nation of Oklahoma
00F88801-3	GA	EPA R6	$130,920	8/22/2017	IT059 - Pueblo of Pojoaque
00635117-2	E	EPA R6	$134,554	8/22/2017	AR SPB - Arkansas State Plant Board
00F70401-7	RP	EPA R6	$145,000	8/22/2017	OK DEQ - OK Dept of Env Quality
01F23501-4	X6	EPA R6	$150,400	8/22/2017	IT420 - Osage Nation

Superfund Tar Creek Operable Unit (OU-2) Remedial Design (RD)	This project provides funding for conducting site characterization activities at potential or confirmed hazardous waste sites. Also, undertakes response planning and implementation actions at referenced sites listed on the National Priorities List (NPL).
Pawnee Nation of Oklahoma GAP FY15-18	The objectives of this project are to develop the capability to manage specific programs and establish a core program for environmental protection. The specific project activities include building environmental capacity to manage an environmental department, build wetland program, manage solid/hazardous waste, and staff training.
Pojoaque Pueblo GAP 2017-18	The objectives of this project are to develop the capability to manage specific programs and establish a core program for environmental protection. The specific project activities include building environmental capacity to manage an environmental department, continue recycling/solid program, and outreach.
ASPB State FIFRA Spray Drift Project FY17	This cooperative agreement continues implementation of pesticide regulatory and enforcement programs in the State of Arkansas that will include, but are not limited to, activities such as, compliance monitoring, enforcement, certification and training for pesticide applicators, worker protection safety, and outreach and education.
ODEQ Brownfields 128a State Response Program	This project provides funding for the Oklahoma Department of Environmental Quality's response program that includes timely survey and inventory of Brownfields sites; oversight and enforcement authorities to ensure that response actions protect human health and the environment; resources to provide meaningful public involvement; mechanisms for approval of a cleanup plans and verification of complete responses.
Osage Nation Underground Injection (UIC) Program	The Osage Nation will carry out activities necessary to permit and monitor the construction and operation of underground Injection wells in a manner that protects human health & underground sources of drinking water in the Osage Nation, Oklahoma. The Osage Nation will conduct well testing and inspecting, enforcement and compliance, and permitting of injection wells.

00F68101-7	RP	EPA R6	$160,000	8/22/2017	NM ED - New Mexico Environment Department
00F67501-8	RP	EPA R6	$175,000	8/22/2017	TX TCEQ - Texas Commission on Environmental Quality
01F02701-4	V	EPA R6	$339,500	8/22/2017	OK DEQ - OK Dept of Env Quality
00625117-1	D	EPA R6	$404,116	8/22/2017	AR DEQ - Arkansas Department of Environmental Quality
00640512-0	L	EPA R6	$1,312,000	8/22/2017	TX TCEQ - Texas Commission on Environmental Quality

NMED 128a State and Tribal Response Program	This project provides funding for the New Mexico Environment Department's response program that includes timely survey and inventory of brownfield sites; oversight and enforcement authorities to ensure that response actions protect human health and the environment; resources to provide meaningful public involvement; mechanisms for approval of a cleanup plans and verification of complete responses.
TCEQ Brownfields 128a State Response Program	This project provides funding for the Texas Commission on Environmental Quality's response program that includes timely survey and inventory of brownfield sites; oversight and enforcement authorities to ensure that response actions protect human health and the environment; resources to provide meaningful public involvement; mechanisms for approval of a cleanup plans and verification of complete responses.
Superfund Consolidated 3	This project provides funding to ODEQ to supplement their Core, Site Assessment, and Management Assistance Programs, to conduct site characterization activities at potential hazardous waste sites, and to effectively implement the statutory requirement of CERCLA 121(f) which mandates substantial and meaningful State involvement. This award will also extend the project and budget period to 06/30/2018.
FY17 RCRA Cooperative Agreement	This program provides financial support to the state of Arkansas for the following activities: enforcement, facility hazardous waste inspections, corrective actions, RCRA permiting, state authorization, program management, and providing program information.
TCEQ FY18 LUST Prevention Program	This agreement provides assistance to the recipient to operate a state program to protect against leaks from underground storage tank systems. Activities include: Energy Policy Act (EPAct) related release prevention activities such as secondary containment and operator training; supporting states with inspections (including training inspectors), enforcement, and compliance assurance activities related for federally-regulated underground storage tank (UST) systems; and database management activities related to release prevention.

05000217-0	CS	EPA R6	$8,661,000	8/22/2017	AR NRC - Arkansas Natural Resources Commission
40000217-0	CS	EPA R6	$10,712,000	8/22/2017	OK WRB - Oklahoma Water Resources Board
98681417-0	FS	EPA R6	$13,279,000	8/22/2017	OK DEQ - OK Dept of Env Quality
00744709-1	LS	EPA R7	$667,000	8/22/2017	KDHE - Kansas Department of Health and Environment
99T68801-0	GA	EPA R9	$929,300	8/22/2017	IT124 A - Tohono O'Odham Nation

Clean Water State Revolving Fund (SRF) Capitalization Grant	This agreement is for a capitalization grant which provides funds for Arkansas's Clean Water State Revolving Fund program to provide low interest financing to recipients for costs associated with the planning, design, and construction of eligible water quality improvement and protection projects throughout the State of Arkansas. The objectives are to establish and manage an effective comprehensive Water Pollution and Control Revolving Funds program and to maintain a self-sustaining revolving fund so as to improve and protect water quality and public health.
Clean Water State Revolving Fund (CWSRF)	These funds will be used by the State of Oklahoma to provide loans and other types of financial assistance (not grants) to local communities and intermunicipal and interstate agencies for wastewater improvements. The effect of the financing will be improved water quality in streams, lakes, rivers and bays, with resulting benefits to aquatic life and for use as drinking water sources; and/or elimination of disease from health hazards like raw sewage discharges.
Drinking Water State Revolving Fund (DWSRF)	To provide federal funds to the State of Oklahoma for the purpose of providing loan assistance to eligible public water systems for infrastructure improvements needed to ensure safe drinking water and to provide funds for the following types of set-aside activities: Administrative, Small Systems Technical Assistance, Local Assistance and State Programs Management.
Kansas Leaking Underground Storage Tank Cooperative Agreement	Program funds will provide resources for the oversight/monitoring and cleanup of petroleum releases from Underground Storage Tanks (USTs). States have the authority to monitor and administer funds for UST corrective action using Leaking Underground Storage Tanks trust funds.
General Assistance Program	The objective of this project is to expand the Tribe's environmental program to include continued capacity building through training and participation in relevant workgroups; the expansion of the Nation's pollution prevention and recycling program; the development a composting program; and purchasing recycling hauling and collection equipment to serve 8 new remote and underserved communities and Tribal government offices. In addition, the project will include developing, testing and evaluating relevant community education and outreach tools during 9 separate tribal community events; updating of the outdated pesticide ordinance, and a waste tire collection event to mitigate the mosquito population.

98934917-0	FS	EPA R9	$77,545,000	8/22/2017	CSWRCB - CA State Water Res Ctrl Brd
00J53002-6	BG	EPA R10	$240,657	8/22/2017	IT308 - Samish Indian Nation

Safe Drinking Water State Revolving Fund	The primary purpose/objective of this grant is to capitalize California's Drinking Water State Revolving Fund (DW SRF) program for financing drinking water infrastructure improvements. The California State Water Resources Control Board (CA SWRCB) will lend these funds to drinking water systems in California (CA) at below market interest rates to address their drinking water infrastructure needs and to vitalize CA's economy. The grant also provides set-aside funds to the CA SWRCB for a number of programs such as administration of the DW-SRF, Public Water System Supervision (PWSS) state drinking water capacity development, and technical assistance to small systems programs.
Indian General Assistance Program, 106 and 319 Funding for 2017-18	Work under this two-year proposal will include tasks under GAP, CWA319, and CWA106. Tasks will be aimed at building capacity, community outreach, maintaining and improving the Tribe's Environmental Office, and work on tasks authorized under the CWA319 and 106 Programs.

Message

From: Jess Wilson [redacted]@gobigmediainc.com]
Sent: 1/22/2018 3:09:44 PM
To: Konkus, John [konkus.john@epa.gov]
CC: Peter Graves [redacted]@gobigmediainc.com]; Letendre, Daisy [letendre.daisy@epa.gov]
Subject: Re: FW: Newest PDF
Attachments: 12-08-17 EPA Year in Review 2017 2.pdf

Attached is the latest version with the region 6 hurricane language added.

On Fri, Jan 19, 2018 at 5:40 PM, Konkus, John <konkus.john@epa.gov> wrote:

Jess: Looping in Daisy on the updated draft (attached) that you sent earlier. Also attached is the final part for the disaster section in word format, rather than an excel chart.

From: Jess Wilson [mailto[redacted]@gobigmediainc.com]
Sent: Friday, January 19, 2018 3:20 PM
To: Konkus, John <konkus.john@epa.gov>
Cc: Peter Graves <[redacted]@gobigmediainc.com>
Subject: Newest PDF

Hey all,

Here's the latest version. I went ahead and added the fuel economy text you send over to the current section, but if you need the old text deleted just let me know.

Also, we still don't have a cover photo worked out. Let me know if you all had one in mind.

Thanks!

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Jess Wilson

Director, Graphic Design

Go BIG Media, Inc.

Ex. 6 - Personal Privacy

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Jess Wilson
Director, Graphic Design
Go BIG Media, Inc.
Ex. 6 - Personal Privacy