AP - _111_

SWMUs No. 4 (Old Burn Pit) & No. 5 (Landfill Areas)

Work Plan

June 2014

NEW MEXICO
ENVIRONMENT DEPARTMENT

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CERTIFIED MAIL – RETURN RECEIPT REQUESTED

April 18, 2016

Mr. Ed Riege
Environmental Manager
Western Refining, Southwest Inc., Gallup Refinery
92 Giant Crossing Road
Gallup, New Mexico 87301

**RE: APPROVAL WITH MODIFICATIONS
REVISED INVESTIGATION WORK PLAN SWMU NO. 4 OLD BURN PIT AND SWMU NO. 5 LANDFILL AREAS
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-14-004**

Dear Mr. Riege:

The New Mexico Environment Department (NMED) has reviewed the revised *Investigation Work Plan Solid Waste Management Units (SWMU) No. 4 Old Burn Pit and SWMU No. 5 Landfill Areas* (Work Plan), dated November 2015, submitted on behalf of Western Refining Southwest Inc., Gallup Refinery (Permittee) and hereby issues this Approval with Modifications. The Permittee must address the following comments.

Comment 1

The Permittee submitted the Work Plan as an unbound document. Although there are no formal requirements to bind submittals, submittal of bound documents facilitates reviews and placement in the Hazardous Waste Bureau Administrative Record. Submit all future documents that contain more than 20 pages in binders or as bound documents. Additionally, ensure that all document pages (including figures, tables, and appendices) are sequentially paginated for appropriate review.

Comment 2
The NMED tracking number included within the response letter title is incorrect the correct tracking number is HWB-WRG-14-004. No response is required.

Comment 3
In the Executive Summary, page 2, paragraph two, the Permittee states, "[w]hile EPA had authority over the project during the earlier investigation phase, NMED received authorization on January 2, 1996 to implement the Hazardous and Solid Waste Act Corrective Action Program in New Mexico and was afforded an opportunity to intercede prior to and during the remedial actions. There is no record of NMED expressing concerns about or opposition to the remedial actions that were completed at the Old Burn Pit or the Landfill Areas." There is also no record of the EPA approving the additional sampling conducted at the SWMUs (Report on Additional Sampling, dated October 1, 1994) prior to capping the areas. Regardless, there are issues regarding the SWMUs that must be addressed in order to demonstrate that there are no unacceptable risks to human health and the environment prior to NMED drafting a statement of basis for corrective action complete for these SWMUs. The proposed additional soil and groundwater sampling at these SWMUs may provide the data necessary to demonstrate that the SWMUs are qualified for corrective action complete. No response is required.

Comment 4
Appendix D contains a "Closure Certification Report" regarding the landfills and the cover installed in 1998. It is dated April 23, 1998 and was apparently submitted as part of the Part B permit application in May 2000. This document was never formally reviewed as a closure report by NMED. Closure is not required for SWMUs. No response is required.

Comment 5
In the Investigation Report discuss whether or not SWMU 4 and/or SWMU 5 have been used for any refinery activities since the landfill covers were installed.

Comment 6
NMED must be notified a minimum of 15 days prior to the commencement of field activities.

If you have questions regarding this Approval with Modifications, please contact Kristen Van Horn of my staff at 505-476-6046.

Sincerely,

John E. Kieling
Chief
Hazardous Waste Bureau

cc: D. Cobrain, NMED HWB
N. Dhawan, NMED HWB
K. Van Horn, NMED HWB
C. Chavez, EMNRD OCD
A. Hains, WRG
L. King, EPA

File: Reading File and WRG 2016 File
WRG-14-004

Chavez, Carl J, EMNRD

From:	Riege, Ed <Ed.Riege@wnr.com>
Sent:	Friday, November 20, 2015 1:12 PM
To:	Kieling, John, NMENV
Cc:	Cobrain, Dave, NMENV; Dhawan, Neelam, NMENV; VanHorn, Kristen, NMENV; Chavez, Carl J, EMNRD; king.laurie@epa.gov; Allen, Ann; Hains, Allen; Scott Crouch
Subject:	Revised Investigation Work Plan for SWMUs 4 & 5
Attachments:	SWMU 4 and 5 Inv Work Plan - Revised Nov 2015 - redline.docx; SWMU 4 and 5 Inv Work Plan - revised Nov. 2015.pdf; 201511201253.pdf

Dear Mr. Kieling,
Please find attached Response To NMED Disapproval Investigation Work Plan SWMU No. 4 OLD BURN PIT And SWMU No. 5 Landfill Areas. Signed hard copy is in the US mail.

Thanks,
Ed

Ed Riege MPH
Environmental Manager

Western Refining
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Western Refining™
GALLUP

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November 19, 2015

Mr. John E. Kieling, Chief
New Mexico Environment Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Bldg 1
Santa Fe, New Mexico 87505-6303

RE: RESPONSE TO NMED DISAPPROVAL
INVESTIGATION WORK PLAN SWMU No. 4 OLD BURN PIT AND
SWMU No.5 LANDFILL AREAS
WESTERN REFINING SOUTHWEST INC., GALLUP REFINERY
EPA ID # NMD000333211
HWB-WRG-13-001

Dear Mr. Kieling:

The enclosed *Investigation Work Plan Solid Waste Management Unit (SWMU) No.4 Old Burn Pit and SWMU No. 5 Landfill Areas* has been revised pursuant to your letter dated August 17, 2015. Responses to your comments are provided below. For reference, your comments are included below in italics followed by Western's response.

NMED Comment 1

The Permittee states in the Executive Summary, page 2, "[w]hile EPA had authority over the Project during the earlier investigation phase, NMED received authorization on January 2, 1996 to implement the Hazardous and Solid Waste Act Corrective Action Program in New Mexico and was afforded an opportunity to intercede prior to and during the remedial actions. There is no record of NMED expressing concerns about or opposition to the remedial actions that were completed at the Old Burn Pit or the Landfill Area." The previous owner of the refinery submitted documentation regarding the closure of the SWMUs as well as information in the Petition /or No Further Action (NFA Report) and supplemental information requested by NMED soon thereafter. At the time, NMED reviewed the information, but no comments were sent regarding the submittals. Based on review of historical documents, NMED believes that further investigations are needed to define the extent of potential contamination at the SWMUs. Some of NMED's concerns regarding historical investigations are further outlined in the NFA Comments correspondence noted above. The Permittee must complete further investigations so that NMED has adequate data and information to make corrective action complete decisions. If corrective action complete determinations are made, then NMED will prepare a statement of basis to change the status of the SWMUs from "corrective action required" to "corrective action complete" in the RCRA Permit in accordance with 20.4.1.900 NMAC (incorporating 40 CFR §270.42).

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Western Response:
Western has revised the work plan to include further investigation. See specific changes discussed below.

NMED Comment 2
Some of the detected arsenic levels reported for the historic soil investigations (Work Plan Tables 1 and 2) exceed the current residential soil screening level (3.9 mg/kg). There are several options the Permittee may pursue to address elevated metals concentration. The Permittee may conduct a soil background study which may address the higher levels of arsenic in order to reach corrective action complete status depending on whether or not corrective action complete without controls status is preferred. The Permittee may also conduct a risk assessment to determine whether or not the arsenic levels are a risk to human health or the environment. No revision to the Work Plan is necessary.

Western Response:
None required.

Old Burn Pit (SWMU 4)
NMED Comment 3
It is not clear whether or not the Permittee sampled native soil during the soil sampling conducted during the 1994 Investigation. In the revised Work Plan the Permittee must propose to install one soil boring at SWMU 4. The soil boring must be advanced to a minimum of two feet into the native soil. Soil samples must be collected from the waste/native soil interface and from the bottom of the boring. Additional deeper soil samples must be collected, if field screening (e.g., headspace vapor, visual identification) or soil sample chemical analysis indicates potential contamination in deeper intervals (e.g., if the black layer of soil is encountered again (see Comment 6)). Soil samples must be analyzed for RCRA 8 (total) metals, total petroleum hydrocarbons (as gasoline, diesel and oil range organics), methyl tertiary-butyl ether (MTBE), VOCs, and semi-volatile organic compounds (SVOCs). In order to protect the integrity of the soil cap, the Permittee must propose to properly abandon the borehole and include a description of the abandonment procedures in the revised Work Plan.

Western Response:
The Work Plan (Section 4) is revised to include one soil boring at SWMU 4, which will be drilled two feet into native soil and to a depth sufficient to penetrate beneath any evidence of contamination. The soil samples will be analyzed for RCRA metals, total petroleum hydrocarbons (TPH), VOCs (including MTBE), and SVOCs. The borehole will be plugged to protect the integrity of the soil cap.

NMED Comment 4
In the NFA Report, a page titled "Unit Area Characteristics" under the heading "Operating Practices (Past and Present)" the description states, "[a]n old metal box uphill from the pit was used in the past to feet [sic] oil through a metal pipe in the burn pit. The area was then covered with soil." Please revise the Work Plan to discuss whether or not the metal box and pipe were removed from the site and whether or not soil samples were collected to determine if there were spills or leaks from the box or pipe. If soil samples were not collected at these locations, the Permittee must propose to collect soil samples from the location of the metal box and along the pipeline to the bum pit in the revised Work Plan.

Western Response:
The Work Plan (Section 2.1) has been revised to discuss the reference to the "metal box" and "metal pipe" in the NFA report. The metal box and pipe were removed some time in the past as there is no evidence of their existence at this time or where they were formerly located. The documentation to which NMED refers indicates the area was used from 1958 to 1976, but there is no record of exactly when the metal box and pipe were removed. There is no reference to these features in any of the RFI Investigation Reports that included SWMU 4, which indicates the metal box and pipe were removed prior to the RFI that was conducted in the early 1990s. Western has not been able to find documentation to show the location of the former metal box and pipe and thus cannot propose to collect the requested soil samples.

NMED Comment 5
The information provided in the NFA Report and Supplemental Information does not provide site-specific information concerning the presence and condition of groundwater beneath SWMU4. Provide information regarding groundwater at SWMU 4. Additionally, the Permittee must propose to collect groundwater samples, if groundwater is encountered during soil sampling activities, in the revised Work Plan.

Western Response:
The revised Work Plan (Section 4) now includes the collection of information regarding the presence of groundwater beneath SWMU 4 and the collection of groundwater samples for analysis, if present.

NMED Comment 6
During investigations in 1992 and 1994 a 'black layer" or "asphalt burn residue" layer was encountered, but never sampled. The soil boring logs for the 1992 investigation include descriptions of a "black layer" encountered in soil boring RFI0402 at 20 inches below ground surface (bgs) and at RFI0403 from 2.5-3.5 feel bgs. The black layer was described as a "black layer w/some tar like material" and "the black layer required steaming, solvent, steaming, and then regular washing to get augers and equipment clean." It does not appear that samples were collected directly from the black layer – samples were collected from RFI0402 at the ground surface and from depths of, 3, and 4.5 feet bgs, respectively, and from the same intervals in soil boring RFI0403. The black layer was not encountered in soil boring RFI0401. The soil sample collected from RFI0403 that was within the black layer contained high levels of lead, ethyl benzene, total xylenes, and dimethyl phthalate compared to the other soil boring samples. The black layer was encountered again during the 1994 investigation and described as "asphalt burn residue" at 3.8 feet bgs (RFI0405) and 5 feet bgs (RFI0406); no samples were collected for laboratory analysis from that layer. The Permittee must propose to install a soil boring within the Burn Pit in accordance with RCRA Permit Section IV.J.2.d (Drilling and Soil, Rock, and Sediment Sampling). Ensure that if the "black layer" or "asphalt burn residue" are encountered that samples of the black material are collected and analyzed. The "black layer" I "asphalt burn residue" presents a potential risk to construction workers and if the cap was not properly maintained over the years, potential leaching is a concern. Soil sample analysis must include RCRA 8 (total) metals, total petroleum hydrocarbons (as gasoline, diesel and oil range organics), methyl tertiary-butyl ether (MTBE), VOCs, semi-volatile organic compounds (SVOCs), and dioxins and furans. Additionally, the soil boring must be advanced to a depth of two feet into the native soil. Soil samples must be collected from the waste/native soil interface and from the bottom of the boring. In order to protect the integrity of the soil cap, the Permittee must propose to properly abandon the borehole and include a description of the proposed abandonment procedures in the Work Plan.

Western Response:
Based on Western's and NMED's review, chemical analyses were performed on samples collected from the apparent waste materials. As stated above, "The soil sample collected from RFI0403 that was within the black layer contained high levels of lead, ethyl benzene, total xylenes, and dimethyl phthalate compared to the other soil boring samples."

Pursuant to NMED's comment, a soil boring will be completed at SWMU 4 with the boring extended a minimum of two feet into the underlying native soils and deeper, as necessary, to extend below the depths of any observed potential impacts. Soil samples will be collected from the apparent waste layer, if encountered, the top of the native soil immediately below any apparent waste materials, and from the bottom of the boring. The soil samples will be analyzed for RCRA metals, TPH, VOCs (including MTBE), SVOCs, and dioxins/furans.

Landfill Areas (SWMU 5)
NMED Comment 7
Discuss groundwater elevations at SWMU 5. The EPA's Approval with Modifications for the Phase III Investigation Report required that the Permittee install deeper borings at the landfill area to "1) to verify that saturated zones found in 3 of the 12 deepest soil boring intervals are isolated and are not connected to the groundwater; 2) ensure that the vertical delineation of waste emplacement has been identified (soil boring logs indicate waste at the 8-9' zone, the deepest samples were at 9.5'); and, 3) ensure that the vertical extent of metal contamination has been identified (some of the 9.5' samples had elevated metals." In the Additional Sampling Report (1994), the boring logs do not indicate if the soils encountered were moist and contain very general descriptions of the lithology encountered; therefore, it is difficult to determine whether or not the saturated intervals encountered in the Phase III investigation were present. The Permittee must propose to install additional soil borings at SWMU 5 and properly log the soil borings to identify soil types and saturated intervals. Additionally, the Permittee must propose to collect soil samples for laboratory analysis in the revised Work Plan. If saturated intervals are encountered, the Permittee must propose to collect groundwater samples for chemical analysis (total metals, VOCs, SVOCs, MTBE, TPH (ORO, MRO, ORO)), if sufficient water is present.

Western Response:
Section 4 of the Work Plan has been revised to include the installation of additional soil borings at the Landfill Areas. The soil borings will be logged to identify lithology and the presence of soil moisture/groundwater. Soil samples will be collected and analyzed as described above for SWMU 4. In addition, if groundwater is encountered water samples will be collected and analyzed for total and dissolved metals, VOCs (including MTBE), SVOCs, and TPH (ORO, MRO, ORO).

NMED Comment 8
The Permittee must propose to advance one soil boring through the center of each landfill cell (for a total of four soil borings), in the revised Work Plan. The borings must be advanced to a minimum of two feet into native soil. Samples must be collected based on field observations of the waste and soils, from the native soil directly below the waste, and from the bottom of the boring. The Permittee must propose to install additional soil borings at SWMU 5 and properly log the soil borings to identify soil types and saturated intervals. If saturated intervals are encountered, the Permittee must propose to collect groundwater samples for chemical analysis, if sufficient water is present. The soil samples must be analyzed for RCRA 8 (total) metals, total petroleum hydrocarbons (as gasoline-, diesel- and

oil-range organics), MTBE, VOCs, and SVOCs. The boreholes must be properly logged in accordance with Permit Section IV.1.2.d.v and describe any waste encountered. The boreholes must also be properly abandoned.

Western Response:
NMED has requested that four soil borings be installed at SWMU 5, with one in each of the landfill cells. Three of the landfill "cells" (originally designated as Areas 2, 3 and 5) are actually contiguous and there is no indication of separate "cells" in this area, currently referred to as the main landfill area. A separate smaller landfill area (Area 1) was located approximately 50 feet to the north, as described in the North Further Action Report for SWMU 5 prepared in August 2001. Western proposes to install two new soil borings, one at the location formerly designated as Area 1 and the other boring in the main landfill area. The boring for the main land fill area will be located near the center of the main landfill. A review of the historical chemical analyses shows that arsenic and barium were the two primary constituents present at concentrations above the screening levels and they were found at elevated concentrations across the entire area of the main landfill. Western believes that one boring in the main landfill will be sufficient to evaluate the presence of shallow groundwater beneath the main landfill and to determine if groundwater has been impacted.

If there are any questions regarding the enclosed revised Investigation Work Plan, please contact Mr. Ed Riege at (505) 722-0217. Please note that, in submitting the preceding response and enclosures, Western makes no admissions and reserves all applicable rights and defenses.

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

William Carl McClain, Jr.

William Carl McClain, Jr.
Vice President and Refinery Manager
Western Refining Southwest, Inc. – Gallup Refinery

cc D. Cobrain NMED HWB without enclosure
N. Dhawan, NMED HWB without enclosure
K. Van Horn, NMED HWB without enclosure
C. Chavez, OCD
L. King, EPA without enclosure
A. Allen, Western El Paso

INVESTIGATION WORK PLAN
SWMU No. 4 Old Burn Pit and
SWMU No. 5 Landfill Areas

Gallup Refinery
Western Refining Southwest, Inc.
Gallup, New Mexico
EPA ID# NMD000333211

June 2014
(Revised November 2015)

Scott Crouch, P.G.
Senior Geologist

DiSorbo
Environmental Consulting Firm

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Executive Summary

The Gallup Refinery, which is located 17 miles east of Gallup, New Mexico, has been in operation since the 1950s. Past inspections by State [New Mexico Environment Department (NMED)] and federal environmental inspectors have identified locations where releases to the environment may have occurred. These locations are generally referred to as Solid Waste Management Units (SWMUs). Pursuant to the terms and conditions of the facility Resource Conservation and Recovery Act (RCRA) Post-Closure Care Permit and 20.4.1.500 New Mexico Administrative Code, this Investigation Work Plan has been prepared for the Old Burn Pit and the Landfill Areas. Attachment G of the facility's Post-Closure Care Permit provides a list of designated SWMUs and Areas of Concern (AOCs), and the Old Burn Pit and Landfill Areas are listed as SWMUs No. 4 and No. 5, respectively.

The Old Burn Pit occupied a small triangular shaped area of approximately 20 feet by 40 feet, which was located approximately 700 feet north of the refinery's main tank farm and a short distance west of the fire training area. The pit was used to burn acid soluble oils from the alkylation unit and was operated from 1958 through 1976. A RCRA Facility Investigation (RFI) was conducted in the area in early 1990s (three soil borings with depths of 4.5 feet in May 1992, which were extended to a depth of 10 feet in 1994) with the finding that the area did have relatively low concentrations of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals present in surface soils. Giant Refining Company recommended a soil cap be placed over the area of the burn pit and it was subsequently installed in 1997 pursuant to the United States Environmental Protection Agency's (EPA) approval of the Voluntary Corrective Action Plan. While EPA had authority over the project during the earlier investigation phase, NMED received authorization on January 2, 1996 to implement the Hazardous and Solid Waste Act Corrective Action Program in New Mexico and was afforded an opportunity to intercede prior to and during the remedial actions. There is no record of NMED expressing concerns about or opposition to the remedial actions that were completed at the Old Burn Pit or the Landfill Areas.

The Land Fill Areas were determined to include four small areas used to dispose of waste generated from refinery construction, maintenance, and operations. Three of the landfill areas were contiguous and were located northwest of the main refinery tank farm, approximately 500 feet northwest of tank 337. The fourth landfill area was located approximately 50 feet north of the other three landfills. The main landfill area is estimated to have been 100 feet wide by 350 feet long in a kidney shape. The separate landfill area to the north is estimated to have been 20 feet by 20 feet. The landfill areas were operated from 1958 through 1979. An RFI was conducted in the area in early 1990s (twelve soil borings to a depth of 9.5 feet in May 1992, with seven of these borings drilled deeper to a depth of 20 feet in 1994). The soil samples were analyzed for priority pollutant volatile organics and metals, with the finding that the area did primarily have metals present at concentrations above background. Giant Refining Company recommended a soil cap be placed over the area of the landfills and it was subsequently installed in early 1998 pursuant to the EPA's approval of the Voluntary Corrective Action Plan.

Giant Refining Company submitted documentation demonstrating proper closure of the Old Burn Pit and the Landfill Areas in 1998 (Practical Environmental Services, Inc., 1998a and b). The investigation and remediation (i.e., capping) of both SWMUs was overseen and approved by the US EPA. In 2001, Giant Refining again submitted information on the remediation of the Old Burn Pit and the Landfill Areas in the "Petition for *No Further Action*" (Giant Refining Company, 2001) NMED commented on the 2001 *No Further Action* petition and requested additional information for the Old Burn Pit and the Landfill Areas. All of the additional information requested by NMED for the Old Burn Pit and the Landfill Areas was submitted to MNED on October 2, 2002. Western Refining Southwest, Inc. submitted another request for NMED to respond to the previously submitted Petition for *No Further Action* on June 24, 2013. Western Refining Southwest, Inc. is confident that the previously approved and implemented remedial efforts have addressed any threats posed to the environment and/or human health that may have been present at the Old Burn Pit and the Landfill Areas prior to placement of the caps.

NMED has requested additional assessment of, in particular, deeper soils and groundwater, if present, beneath both SWMU 4 and 5. One soil boring will be completed at SWMU 4 and two soil borings will be completed at SWMU 5. Soil samples will be collected from any intervals indicating potential impacts and at deeper intervals to define the vertical extent of impacts to soils and/or groundwater. If groundwater is encountered, then water samples will also be collected. The soil samples collected at SWMU 4 will be analyzed for RCRA metals, VOCs (including MTBE), SVOCs, total petroleum hydrocarbons (TPH) and dioxins/furans. The soil samples collected at SWMU 5 will be analyzed for RCRA metals, VOCs (including MTBE), SVOCs, and TPH. Groundwater samples will be analyzed for total and dissolved RCRA metals, VOCs (including MTBE), SVOCs, and TPH.

Section 1
Introduction

The Gallup Refinery is located approximately 17 miles east of Gallup, New Mexico along the north side of Interstate Highway I-40 in McKinley County. The physical address is I-40, Exit #39 Jamestown, New Mexico 87347. The Gallup Refinery is located on 810 acres. Figure 1 presents the refinery location and the regional vicinity, which is characterized as high desert plain comprised primarily of public lands used for grazing by cattle and sheep.

The Gallup Refinery is a crude oil refinery currently owned and operated by Western Refining Southwest, Inc. ("Western"), formerly known as Giant Industries Arizona, Inc. and formerly doing business as Giant Refining Company Ciniza Refinery, an Arizona corporation. The Gallup Refinery generally processes crude oil from the Four Corners area transported to the facility by pipeline or tanker truck.

Various process units are operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, alkylation, isomerization, sulfur recovery, merox treater, and hydrotreating. Current and past operations have produced gasoline, diesel fuels, jet fuels, kerosene, propane, butane, and residual fuel.

On October 31, 2013, the NMED issued a RCRA Post-Closure Care Permit ("Permit") to Western. The Permit authorizes post-closure care at a hazardous waste land treatment unit and also includes corrective action provisions. Section IV.H.5.a.i requires the Permitee to prepare and submit RCRA Facility Investigation Work Plans to the NMED in accordance with the schedule set forth in Permit Attachment E. The investigation work plan for SWMU No. 4 (Old Burn Pit) was due June 30, 2014 and the investigation work plan for SWMU No. 5 (Landfill Areas) was due September 30, 2014. A combined investigation work plan for both SWMUs was initially submitted on June 24, 2014.

The locations of SWMUs No. 4 and 5 are shown on Figure 2. Photographs of the SWMUs and the surrounding area are included in Appendix A.

The purpose of the site investigation that was conducted during the original RFI was to determine and evaluate the presence, nature, and extent of releases of contaminants in accordance with 20.4.1.500 New Mexico Administrative Code (NMAC) incorporating 40 Code of Federal Regulations (CFR) Section 264.101.

Section 2
Background

This section presents background information for SWMUs No. 4 and No. 5 including a review of historical waste management activities to identify the following:

- Type and characteristics of all waste and all contaminants handled in the SWMUs;
- Known and possible sources of contamination;
- History of releases; and
- Known extent of contamination.

Documents containing the results of previous investigations that explored the subsurface conditions at SWMUs 4 and 5 were reviewed to facilitate development of this work plan (Giant Refining Company, 1992; Giant Refining Company, 1994; Giant Refining Company, 2001; and Practical Environmental Services, Inc., 1998 a & b).

2.1 Old Burn Pit (SWMU No. 4)

The Old Burn Pit was originally included as a SWMU in the 1988 Hazardous and Solid Waste Act (HSWA) permit and subsequently included for investigation in the 1990 RFI Work Plan. The Old Burn Pit was put into service in 1958 and was removed from service in 1976, when the pit area was apparently covered with a layer of soil. It covered an area of approximately 20 feet by 40 feet with a triangular shape and had a depth of 10 to 12 feet (Figure 3). A Visual Site Inspection (VSI) was conducted on November 19 and 20, 1986 as part of the RCRA Facility Assessment. During this inspection, "An old metal box uphill from the pit" was described as being used to feed oil through a metal pipe to the burn pit. There is no subsequent mention of the steel box or pipe in the *SWMU Site-Specific Facility Investigation Workplan*, which provided a detailed discussion of site features and sampling locations (Applied Earth Sciences, Inc., 1990). Apparently the metal box and pipe were removed after the VSI was conducted in 1986 and the sometime before preparation of the *SWMU Site-Specific Facility Investigation Workplan* in 1990. Acid soluble oils from the alkylation unit were placed in the pit and burned. It is possible that spent silicon dioxide catalysts may have also been placed in the pit.

In 1992, during the Phase III RFI three soil borings (RFI0401V, RFI0402V, and RFI0403V) were completed to depths of 4.5 feet below ground surface (bgs) using a hand auger (Figure 3) (Giant Refining Company, 1992). Soil samples were collected from depths of 0.0 feet bgs, 3.0 feet bgs, and 4.5 feet bgs at each of the three soil borings. The soil samples were analyzed for metals (arsenic, barium, beryllium, cadmium, chromium, lead, nickel, mercury, and vanadium), VOCs, SVOCs, and pH and the results are presented in Table 1. For comparison the NMED soil screening levels (*Risk Assessment Guidance for Site Investigation and Remediation*, dated February 2012) and EPA Regional Screening Levels are also included in Table 1. Based on the detection of constituents in the samples collected in 1992, EPA directed that deeper samples be collected from the same three locations. As shown on Figure 4, three soil borings (RFI0404V, RFI0405V, and RFI0406V) were drilled using hollow-stem augers at the same locations in 1994 with soil samples collected at depths of 6.0 feet bgs and 10.0 feet bgs (Giant Refining Company, 1994). The soil samples were analyzed for VOCs, SVOCs, and metals and the results are summarized in Table 1.

One metal, three VOCs and one SVOC were detected at concentrations above the soil screening levels developed to protect groundwater assuming a dilution attenuation factor (DAF) of 1.0, but all reported concentrations were less than the residential soil screening level for direct contact. The soil samples were also screened in the field with a photo ionization detector (PID). Many of the PID readings were 0.0, but those with higher readings are as follows; RFI0402 V3.0 at 16 parts per million (ppm), RFI0402 V4.5 at 8.4 ppm, RFI0403 V3.0 at 3.2 ppm, and RFI0403 V4.5 at 12 ppm. The field data sheets are included in Appendix B.

Barium was detected in five soil samples (RFI0401 V0.0, RFI0101 V3.0, RFI0401 4.5, RFI0402 V0.0, and RFI0402 V3.0) at concentrations above the NMED soil screening for groundwater protection assuming a dilution attenuation factor (DAF) of 1.0. The concentrations of barium in these five samples ranged from 360 mg/kg to 1,300 mg/kg in comparison to the DAF = 1.0 screening level of 300 mg/kg (Table 1). The background value established in the 1992 Phase III RFI report for barium in soils less than five feet deep was 408.8 mg/kg (Giant Refining Company, 1992). There were three VOCs (chlorobenzene, ethylbenzene, and xylenes) detected at concentrations above their screening levels. Chlorobenzene was detected in one soil sample (RFI0403 V4.5) at 0.05 mg/kg, which slightly exceeded the DAF screening level of 0.049 mg/kg. Ethylbenzene was found at concentrations above the DAF 1.0 screening level of 0.013 mg/kg in three soil samples. These three soil samples were RFI0402 V3.0, RFI0403 V3.0, and RFI0403 V4.5 with concentrations of ethylbenzene of 1.0 mg/kg, 0.910 mg/kg, and 0.510 mg/kg, respectively. Xylenes (total) were also detected above the DAF 1.0 screening level (0.16 mg/kg) in the same three soil samples. Soil samples RFI0402 V3.0, RFI0403 V3.0, and RFI0403 V4.5 had concentrations of total xylenes of 2.1 mg/kg, 2.2 mg/kg, and 1.1 mg/kg, respectively. Naphthalene was the only SVOC to have a concentration in soil above the DAF

1.0 screening level of 0.0036 mg/kg. Naphthalene was detected at a concentration of 0.520 mg/kg.

Based on the detection of constituents in soils discovered during the Phase III RFI, Giant Refining Company recommended the placement of a soil cap over the area occupied by the burn pit. This activity was completed in 1997. During the week of March 23, 1998, an on-site inspection was conducted by Practical Environmental Services, Inc. in support of preparation of a RCRA Post-Closure Care Permit for the Gallup Refinery Land Treatment Unit. This inspection report, the applicable section of which is included in Appendix C, documents the remediation (i.e., construction of a low permeability soil cap) of the Old Burn Pit. The remediation was conducted under the review and authority of both EPA and NMED.

2.2 Landfill Areas (SWMU No. 5)

The Land Fill Areas were determined to include four areas used to dispose of waste generated from refinery construction, maintenance, and operations. The construction waste is reported to have included asphalt paving, concrete, and scrap metal. Some office, residential, and shop wastes were also identified. Wastes associated with operations may have included defluorinator bauxite and hydrotreating catalyst (cobalt, molybdenum, and nickel), and possibly outdated laboratory chemicals. Three of the landfill areas were contiguous and were located northwest of the main refinery tank farm, approximately 500 feet northwest of tank 337 (Figure 5). The fourth landfill area was located approximately 50 feet north of the other three landfills. The main landfill area is estimated to have been 100 feet wide by 350 feet long in a kidney shape. The separate landfill area to the north is estimated to have been 20 feet by 20 feet. The landfill areas were operated from 1958 through 1979.

An RFI was conducted in the area in May 1992 with twelve soil borings (RFI0501 through RFI0512) completed with a hand auger to a depth of 9.5 feet bgs (Figure 5). The soil samples were collected from depths of 0.0 feet bgs, 3.0 feet bgs, 7.0 feet bgs, and 9.5 feet bgs and analyzed for VOCs, metals, and pH. Based on the presence of waste materials at depths of 9.5 feet bgs), seven additional soil borings were drilled deeper to a minimum depth of 20 feet bgs in 1994. The deeper borings (RFI0513 through RFI0519) were completed using hollow-stem augers and were completed at the same location of previous soil borings RFI0502, RFI0503, RFI0504, RFI0505, RFI 0506, RFI 0507, and RFI 0509 (Figure 6). Soil samples were collected from depths of 11.0 feet bgs, 16.0 feet bgs, and 20.0 feet bgs and analyzed for VOCs, SVOCs, and metals. The analytical results are presented in Table 2.

Five metals (arsenic, barium, lead, mercury, and nickel) and one SVOC (di-n-butyl phthalate) were detected at concentrations above the soil screening levels developed to protect groundwater assuming a dilution attenuation factor (DAF) of 1.0 and all but one constituent (arsenic) had reported concentrations less than the residential soil screening level for direct contact. The soil samples were also screened in the field with a PID. Many of the PID readings were 0.0, but those with higher readings are as follows; RFI0504 V3.0 at 0.01 ppm and RFI0504 V9.5 at 0.4 ppm. The field data sheets are included in Appendix B.

As shown in Table 2, all of the detected results for arsenic were above the DAF 1.0 screening level of 0.013 mg/kg. Many of the reported arsenic concentrations also exceeded the residential direct contact screening level of 3.9 mg/kg. Arsenic concentrations ranged from non-detect at 2.5 mg/kg to 35 mg/kg. For some perspective on the arsenic DAF 1.0 screening level of 0.013 mg/kg and the residential direct contact screening level of 3.9 mg/kg, the background level for arsenic established in the 1992 Phase III RFI report was 11.73 mg/kg for soil less than 5 feet deep and 10.98 mg/kg for soils greater than 5 feet. Thirty three of the 75 soil samples collected reported barium with concentrations above the DAF 1.0 screening level of 300 mg/kg, while none of the samples exceeded the residential direct contact screening level of 16,000 mg/kg. Barium concentrations ranged from 56 mg/kg to 1,600 mg/kg. Twelve soil samples had lead present in concentrations above the EPA groundwater protection screening level of 14.0 mg/kg, but none exceeded the residential direct contract screening level of 400 mg/kg. Lead concentrations ranged from <5 mg/kg to 21 mg/kg. One soil sample had a reported concentration of mercury (0.31 mg/kg) that exceeded the DAF 1.0 screening level of 0.033 mg/kg, but no samples had concentrations above the residential direct contact screening level of 16 mg/kg. All other samples were non-detect for mercury at a reporting limit of 0.25 mg/kg. One soil sample had a concentration of nickel (83 mg/kg) that exceeded the DAF 1.0 screening level of 48 mg/kg, but no samples had concentrations above the residential direct contact screening level of 1,600 mg/kg. Nickel concentrations ranged from 3.6 to 83 mg/kg. Di-n-butyl phthalate was detected at a concentration above of the DAF 1.0 screening level of 7.0 mg/kg in one sample at a concentration of 9.6 mg/kg, while all other samples were non-detect at a reporting limit of 0.005 mg/kg.

Based on the detection of constituents in soils discovered during the Phase III RFI, Giant Refining Company recommended the placement of a soil cap over the area occupied by the landfills. This activity was completed in early 1998. During the week of March 23, 1998, an on-site inspection was conducted by Practical Environmental Services, Inc. to document the closure of SWMU No. 5. A Landfill Closure Certification Report was prepared, which documents the remediation (i.e., construction of a low permeability soil cap) of the Landfill Areas (Appendix D). The remediation was conducted under the review and authority of both EPA and NMED, in accordance with the Voluntary Corrective Action Plan approved by EPA on January 5, 1994.

Section 3
Site Conditions

The conditions at the site, including surface and subsurface conditions that could affect the fate and transport of any contaminants, are discussed below. This information is based on recent visual observations and historical subsurface investigations.

3.1 Surface Conditions

Local site topographic features include high ground in the southeast gradually decreasing to lowland fluvial plain in the northwest. Elevations on the refinery property range from 7,040 feet to 6,860 feet. The area of the site near SWNUs No. 4 and 5 is at an approximate elevation of 6,940 feet above mean sea level (msl). The pictures in Appendix A show the land surface in the immediate area.

The McKinley County soil survey identifies the soil in the area of SWMUs No. 4 and No. 5 as the Simitarq-Celavar sandy loams (USDA, 2005). The Simitarq-Celavar soils are well drained with a conservative permeability of 0.20 in/hr and minimal salinity. Simitarq soils have nearly neutral pH values ranging from 7.2 to 7.4 standard units.

Regional surface water features include the refinery evaporation ponds and aeration lagoons and a number of small ponds. The site is located in the Rio Puerco valley, north of the Zuni Uplift with overland flows directed northward to the tributaries of the Rio Puerco. The Rio Puerco continues to the east to the confluence with the Rio Grande. The South Fork of the Puerco River is intermittent and retains flow only during and immediately following precipitation events.

3.2 Subsurface Conditions

The shallow subsurface soils consist of fluvial and alluvial deposits comprised of clay and silt with minor inter-bedded sand layers. Very low permeability bedrock (e.g., claystones and siltstones) underlie the surface soils and effectively form an aquitard. The Chinle Formation, which is Upper Triassic, crops out over a large area on the southern margin of the San Juan Basin. The uppermost recognized local member is the Petrified Forest and the Sonsela Sandstone Bed is the uppermost recognized regional aquifer. Aquifer test of the Sonsela Bed northeast of Prewitt indicated a transmissivity of greater than 100 ft^2/day (Stone and others, 1983). The Sonsela Sandstone's highest point occurs southeast of the site and slopes downward to the northwest as it passes under the refinery. The Sonsela Sandstone forms a water-bearing reservoir with artesian conditions throughout the central and western portions of the refinery property. Groundwater within the Sonsela Sandstone flows downdip to the northwest.

The diverse properties and complex, irregular stratigraphy of the surface soils across the site cause a wide range of hydraulic conductivity ranging from less than 10^{-2} cm/sec for gravely sands immediately overlying the Chinle Formation to 10^{-8} cm/sec in the clay soils located near the surface (Western Refining, 2009). Generally, shallow groundwater at the refinery follows the upper contact of the Chinle Formation with prevailing flow from the southeast to the northwest, with some flow to the northeast on the northeastern portion of the refinery property. Figure 7 presents a cross section location map showing cross section (A-A'), which is included as Figure 8.

Section 4
Scope of Activities

The site investigation of soils and groundwater, if present, will be conducted to define the vertical extent of any impacts to soil and evaluate the presence of and potential for impacts to groundwater. The investigation will commence upon approval of this investigation work plan by NMED.

4.1 Investigation

A focused investigation of soils beneath the Old Burn Pit and the Landfill Areas will be conducted to complete the vertical delineation of potentially impacted soils that were previously identified during the site investigation conducted in 1992 through 1994. Soil borings will be located at the following locations:

- In the center of the Old Burn Pit;
- In the center of the area previous identified as Landfill Area 1; and
- In the center of the main landfill area.

The soil boring at the Old Burn Pit will be drilled to a minimum depth of two feet into the native soils (i.e., beneath any apparent waste materials identified or any other indications of fill material). The soil borings at the Landfill Areas will be drilled to a minimum depth of two feet into the native soils or to a depth of 20 feet, whichever is deeper. If there is field evidence of impacts at greater depths, then soil borings will be drilled deeper to achieve full vertical delineation. The investigation will also focus on identifying any zones of saturated soils. If saturation is encountered, then temporary wells will be installed to allow collection of groundwater samples.

4.1.1 Soil Sample Field Screening and Logging

All soil borings will be continuously logged and samples field screened. Samples obtained from the soil borings will be screened in the field on 2.0 foot intervals for evidence of contaminants. Field screening results will be recorded on the exploratory boring logs. Field screening results will be used to aid in the selection of soil samples for laboratory analysis. The primary screening methods include: (1) visual examination, (2) olfactory examination, and (3) headspace vapor screening for volatile organic compounds.

Visual screening includes examination of soil samples for evidence of staining caused by petroleum-related compounds or other substances that may cause staining of natural soils such as elemental sulfur or cyanide compounds. Headspace vapor screening targets volatile organic compounds and involves placing a soil sample in a plastic sample bag or a foil sealed container allowing space for ambient air. The container will be sealed and then shaken gently to expose the soil to the air trapped in the container. The sealed container will be allowed to rest for a minimum of 5 minutes while vapors equilibrate. Vapors present within the sample bag's headspace will then be measured by inserting the probe of the instrument in a small opening in the bag or through the foil. The maximum value and the ambient air temperature will be recorded on the field boring or test pit log for each sample.

The monitoring instruments will be calibrated each day to the manufacturer’s standard for instrument operation. A photo-ionization detector (PID) equipped with a 10.6 or higher electron volt (eV) lamp or a combustible gas indicator will be used for VOC field screening. Field screening results may be site- and boring-specific and the results may vary with instrument type, the media screened, weather conditions, moisture content, soil type, and type of contaminant, therefore, all conditions capable of influencing the results of field screening will be recorded on the field logs.

Discrete soil samples will be retained for laboratory analyses from within the following intervals:

- From the interval in each soil boring with the greatest apparent degree of contamination, based on field observations and field screening;
- From the top of native soil immediately below the presence of any waste materials (e.g., burn residue in the Old Burn Pit or landfill waste in the Landfill Areas);
- From the bottom of each borehole;
- From the 6” interval at the top of saturation (applicable only to borings that reach saturation); and
- Any additional intervals as determined based on field screening results.

The physical characteristics of the samples (such as mineralogy, ASTM soil classification, moisture content, texture, color, presence of stains or odors, and/or field screening results), depth where each sample was obtained, method of sample collection, and other observations will be recorded in the field log by a qualified geologist or engineer. Detailed logs of each boring will be completed in the field by a qualified engineer or geologist. Additional information, such as the presence of water-bearing zones and any unusual or noticeable conditions encountered during drilling, will be recorded on the logs.

Quality Assurance/Quality Control (QA/QC) samples will be collected to monitor the validity of the soil sample collection procedures as follows:

- Field duplicates will be collected at a rate of 10 percent; and
- Equipment blanks will be collected from all sampling apparatus at a frequency of one per day.

4.1.2 Drilling Activities

Soil borings will be drilled using hollow-stem augers. The drilling equipment will be properly decontaminated before drilling each boring. The NMED will be notified as early as practicable if conditions arise or are encountered that do not allow the advancement of borings to the specified depths or at planned sampling locations. Appropriate actions (e.g., installation of protective surface casing) will be taken to minimize any negative impacts from investigative borings. If contamination is detected at the water table, then the boring will be drilled five feet below the water table or to refusal, whichever occurs first.

After completion of sampling activities, the soil borings will be abandoned using a cement/bentonite grout mixture. The grout shall consist of approximately 3 to 5 pounds of bentonite with 6.5 gallons of water per sack of cement (94 pound bag), not to exceed 6% bentonite. The grout will be pumped through a tremie pipe/hose placed at the bottom of the soil boring and will extend to the land surface.

Known site features and/or site survey grid markers will be used as references to locate each boring. The boring locations will be measured to the nearest foot and locations will be recorded on a scaled site map upon completion of each boring.

4.1.3 Groundwater Sample Collection

If groundwater is encountered in any of the soil borings, then groundwater will be sampled and analyzed using temporary well completions. Temporary well completions will consist of two-inch rigid PVC well screen and blank casing set at the bottom of the soil boring with a sand filter pack installed to above the top of the screened interval. Temporary wells will be developed and groundwater samples collected using the same protocols as for permanent monitoring wells. Groundwater samples will be collected within 24 hours of the completion of well purging using disposal bailers. Alternatively, well sampling may also be conducted in accordance with the NMED's Position Paper *Use of Low-Flow and other Non-Traditional Sampling Techniques for RCRA Compliant Groundwater Monitoring* (October 30, 2001, as updated). Sample collection methods will be documented in the field monitoring reports. The samples will be transferred to the appropriate, clean, laboratory-prepared containers provided by the analytical laboratory.

Sample handling and chain-of-custody procedures will be in accordance with the procedures presented below in Section 4.1.4.

Groundwater samples intended for metals analysis will be submitted to the laboratory as both total and dissolved metals samples. QA/QC samples will be collected to monitor the validity of the groundwater sample collection procedures as follows:

- Field duplicate water samples will be obtained at a frequency of ten percent, with a minimum, of one duplicate sample per sampling event;

- Equipment rinsate blanks will be obtained for chemical analysis at the rate of ten percent or a minimum of one rinsate blank per sampling day. Equipment rinsate blanks will be collected at a rate of one per sampling day if disposable sampling equipment is used. Rinsate samples will be generated by rinsing deionized water through unused or decontaminated sampling equipment. The rinsate sample will be placed in the appropriate sample container and submitted with the groundwater samples to the analytical laboratory for the appropriate analyses; and

- Trip blanks will accompany laboratory sample bottles and shipping and storage containers intended for VOC analyses. Trip blanks will consist of a sample of analyte-free deionized water prepared by the laboratory and placed in an appropriate sample container. The trip blank will be prepared by the analytical laboratory prior to the sampling event and will be kept with the shipping containers and placed with other water samples obtained from the site each day. Trip blanks will be analyzed at a frequency of one for each shipping container of groundwater samples to be analyzed for VOCs.

4.1.4 Sample Handling

At a minimum, the following procedures will be used at all times when collecting samples during investigation, corrective action, and monitoring activities:

1. Neoprene, nitrile, or other protective gloves will be worn when collecting samples. New disposable gloves will be used to collect each sample;

2. All samples collected of each medium for chemical analysis will be transferred into clean sample containers supplied by the project analytical laboratory with the exception of soil, rock, and sediment samples obtained in Encore® samplers. Sample container volumes and preservation methods will be in accordance with the most recent standard EPA and industry accepted practices for use by accredited analytical laboratories. Sufficient sample volume will be obtained for the laboratory to complete the method-specific QC analyses on a laboratory-batch basis; and

3. Sample labels and documentation will be completed for each sample following procedures discussed below. Immediately after the samples are collected, they will be stored in a cooler with ice or other appropriate storage method until they are delivered to the analytical laboratory. Standard chain-of-custody procedures, as described below, will be followed for all samples collected. All samples will be submitted to the laboratory soon enough to allow the laboratory to conduct the analyses within the method holding times.

Chain-of-custody and shipment procedures will include the following:

1. Chain-of-custody forms will be completed at the end of each sampling day, prior to the transfer of samples off site.

2. Individual sample containers will be packed to prevent breakage and transported in a sealed cooler with ice or other suitable coolant or other EPA or industry-wide accepted method. The drainage hole at the bottom of the cooler will be sealed and secured in case of sample container leakage. Temperature blanks will be included with each shipping container.

3. Each cooler or other container will be delivered directly to the analytical laboratory.

4. Glass bottles will be separated in the shipping container by cushioning material to prevent breakage.

5. Plastic containers will be protected from possible puncture during shipping using cushioning material.

6. The chain-of-custody form and sample request form will be shipped inside the sealed storage container to be delivered to the laboratory.

7. Chain-of-custody seals will be used to seal the sample-shipping container in conformance with EPA protocol.

8. Signed and dated chain-of-custody seals will be applied to each cooler prior to transport of samples from the site.

9. Upon receipt of the samples at the laboratory, the custody seals will be broken, the chain-of-custody form will be signed as received by the laboratory, and the conditions of the samples will be recorded on the form. The original chain-of-custody form will remain with the laboratory and copies will be returned to the relinquishing party.

10. Copies of all chain-of-custody forms generated as part of sampling activities will be maintained on-site.

4.1.5 Collection and Management of Investigation Derived Waste

Drill cuttings, excess sample material and decontamination fluids, and all other investigation derived waste (IDW) associated with soil borings will be contained and characterized using methods based on the boring location, boring depth, drilling method, and type of contaminants suspected or encountered. All purged groundwater and decontamination water will be characterized prior to disposal unless it is disposed in the refinery wastewater treatment system upstream of the API Separator. An IDW management plan is included as Appendix E.

4.1.6 Field Equipment Calibration

Field equipment requiring calibration will be calibrated to known standards, in accordance with the manufacturers' recommended schedules and procedures. At a minimum, calibration checks will be conducted daily, or at other intervals approved by the Department, and the instruments will be recalibrated, if necessary. Calibration measurements will be recorded in the daily field logs. If field equipment becomes inoperable, its use will be discontinued until the necessary repairs are made. In the interim, a properly calibrated replacement instrument will be used.

4.1.7 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field log book. Copies of the completed forms will be maintained in a bound and sequentially numbered field file for reference during field activities. Indelible ink will be used to record all field activities. Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

1. Site or unit designation;
2. Date;
3. Time of arrival and departure;
4. Field investigation team members including subcontractors and visitors;
5. Weather conditions;
6. Daily activities and times conducted;
7. Observations;
8. Record of samples collected with sample designations and locations specified;
9. Photographic log, as appropriate;
10. Field monitoring data, including health and safety monitoring;
11. Equipment used and calibration records, if appropriate;
12. List of additional data sheets and maps completed;
13. An inventory of the waste generated and the method of storage or disposal; and
14. Signature of personnel completing the field record.

4.1.8 Chemical Analyses

All samples collected for laboratory analysis will be submitted to an accredited laboratory. The laboratory will use the most recent standard EPA and industry-accepted analytical methods for target analytes as the testing methods for each medium sampled. Chemical analyses will be performed in accordance with the most recent EPA standard analytical methodologies and extraction methods.

Groundwater and soil samples collected at SWMUs 4 and 5 will be analyzed by the following methods:

- SW-846 Method 8260 for volatile organic compounds;
- SW-846 Method 8270 for semi-volatile organic compounds; and
- SW-846 Method 8015B gasoline range (C5-C10), diesel range (>C10-C28), and motor oil range (>C28-C36) organics.

In addition to the analyses specified above, the soil samples collected at SWMU 4 will also be analyzed for dioxins and furans using EPA Method 8290. Groundwater and soil samples will be analyzed for RCRA metals using the analytical methods shown below. Groundwater samples will be analyzed for both dissolved and total metals.

Inorganic Analytical Methods

Analyte	Analytical Method
Arsenic	SW-846 method 6010/6020
Barium	SW-846 method 6010/6020
Cadmium	SW-846 method 6010/6020
Chromium	SW-846 method 6010/6020
Lead	SW-846 method 6010/6020
Mercury	SW-846 method 7470/7471
Selenium	SW-846 method 6010/6020
Silver	SW-846 method 6010/6020

If groundwater is present, then field measurements will be obtained for pH, specific conductance, dissolved oxygen concentrations, oxidation-reduction potential, and temperature.

4.1.9 Data Quality Objectives

The Data Quality Objectives (DQOs) were developed to ensure that newly collected data are of sufficient quality and quantity to address the projects goals, including Quality Assurance/Quality Control (QA/QC) issues (EPA, 2006). The project goals are established to determine and evaluate the presence, nature, and extent of releases of contaminants at specified SWMUs. The type of data required to meet the project goals includes chemical analyses of soil and groundwater to determine if there has been a release of contaminants at the SWMU.

The quantity of data is SWMU specific and is based on the historical operations at individual locations. Method detection limits should be 20% or less of the applicable background levels, cleanup standards and screening levels.

Additional DQOs include precision, accuracy, representativeness, completeness, and comparability. Precision is a measurement of the reproducibility of measurements under a given set of circumstances and is commonly stated in terms of standard deviation or coefficient of variation (EPA, 1987). Precision is also specific to sampling activities and analytical performance. Sampling precision will be evaluated through the analyses of duplicate field samples and laboratory replicates will be utilized to assess laboratory precision.

Accuracy is a measurement in the bias of a measurement system and may include many sources of potential error, including the sampling process, field contamination, preservation, handling, sample matrix, sample preparation, and analysis techniques (EPA, 1987). An evaluation of the accuracy will be performed by reviewing the results of field/trip blanks, matrix spikes, and laboratory QC samples.

Representativeness is an expression of the degree to which the data accurately and precisely represent the true environmental conditions. Sample locations and the number of samples have been selected to ensure the data is representative of actual environmental conditions. Based on SWMU specific conditions, this may include either biased (i.e., judgmental) locations/depths or unbiased (systematic grid samples) locations. In addition, sample collection techniques (e.g., field monitoring and decontamination of sampling equipment) will be utilized to help ensure representative results.

Completeness is defined as the percentage of measurements taken that are actually valid measurements, considering field QA and laboratory QC problems. EPA Contract Laboratory Program (CLP) data has been found to be 80-85% complete on a nationwide basis and this has been extrapolated to indicate that Level III, IV, and V analytical techniques will generate data that are approximately 80% complete (EPA, 1987). As an overall project goal, the completeness goal is 85%; however, some samples may be critical based on location or field screening results and thus a sample–by-sample evaluation will be performed to determine if the completeness goals have been obtained.

Comparability is a qualitative parameter, which expresses the confidence with which one data set can be compared to another. Industry standard sample collection techniques and routine EPA analytical methods will be utilized to help ensure data are comparable to historical and future data. Analytical results will be reported in appropriate units for comparison to historical data and cleanup levels.

Section 5
References

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USDA, 2005, Soil Survey of McKinley County Area, New Mexico, McKinley County and Parts of Cibola and San Juan Counties, p. 683.

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Tables

Table 1
SWMU 4 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	Sample ID	RFI0401 V0.0	RFI0401 V3.0	RFI0401 V4.5	RFI0402 V0.0	RFI0402 V3.0	RFI0402 V4.5	RFI0403 V0.0	RFI0403 V3.0	RFI0403 V4.5	RFI0404 V6.0	RFI0404 V10.0	RFI0404 V10.0D	RFI0405 V6.0	RFI0405 V10.0	RFI0406 V6.0	RFI0406 V10.0
	Sample Depth (ft)	0	3	4.5	0	3	4.5	0	3	4.5	6	10	10	6	10	6	10
	Sample Date	5/6/1992	5/6/1992	5/6/1992	5/6/1992	5/6/1992	5/6/1992	5/6/1992	5/6/1992	5/6/1992	7/29/1994	7/29/1994	7/29/1994	7/29/1994	7/29/1994	7/29/1994	7/29/1994
Metals																	
Arsenic	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Barium	mg/kg	**380**	**1300**	**900**	**480**	**360**	160	120	290	110	130	240	260	170	230	150	22
Beryllium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Cadmium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Chromium	mg/kg	9.8	15	6.2	10	3.2	17	19	15	20	11	7.7	7.3	12	5.2	10	9.9
Lead	mg/kg	9.5	12	10	13	16	11	30	27	18	15	11	12	15	12	15	13
Mercury	mg/kg	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25
Nickel	mg/kg	11	12	9.1	11	6.3	17	20	21	36	16	10	11	18	9.2	18	9.5
Vanadium	mg/kg	7.9	9	6.8	11	<2.5	5.7	58	<2.5	28	5.4	3.7	4.7	6.5	4	6.4	4.6
Volatile Organic Compounds																	
1,2-Dibromoethane (EDB)	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2-Dichloroethane (EDC)	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dioxane	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2-Butanone	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	1.2	<0.001
2-Chloroethylvinyl Ether	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Carbon disulfide	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Chlorobenzene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	**0.050**	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	**1**	<0.0005	<0.0005	**0.910**	**0.510**	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Styrene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	0.420	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Toluene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	0.070	<0.0005	<0.0005	0.067	0.087	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Xylenes, Total	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	**2.1**	<0.0005	<0.0005	**2.2**	**1.1**	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Semi-Volatile Organic Compounds																	
1,2-Dichlorobenzene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,3-Dichlorobenzene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dichlorobenzene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2,4-Dimethylphenol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2,4-Dinitrophenol	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
7,12-Dimethylbenz(a)anthracene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1-Methylnaphthalene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-Methylphenol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	-	-	-	-	-	-	-
3-Methylphenol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4-Methylphenol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4-Nitrophenol	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Anthracene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benz(a)anthracene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(a)pyrene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(b)fluoranthene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(k)fluoranthene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Bis(2-ethylhexyl)phthalate	mg/kg	<0.005	<0.005	<0.005	0.400	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Butyl benzyl phthalate	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chrysene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dibenz(a,j)acridine	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dibenz(a,h)anthracene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Diethyl phthalate	mg/kg	<0.005	<0.005	<0.005	0.300	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dimethyl phthalate	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	0.890	<0.005	18	18	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Di-n-butyl phthalate	mg/kg	1.5	2.7	1.3	3	<0.005	1.8	0.430	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Di-n-octyl phthalate	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluoranthene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Indene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methylchrysene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Naphthalene	mg/kg	<0.005	<0.005	<0.005	<0.005	**0.520**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Phenanthrene	mg/kg	<0.005	<0.005	<0.005	<0.005	0.670	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Phenol	mg/kg	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Pyrene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Pyridine	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Benzenethiol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Bolded Value - concentration exceeds screening level
NA - Screening level not available
DAF - Dilution attentuation factor
\- - constituent not reported
NMED Screening levels (June 2012)
EPA Regional Screening Levels (Nov. 2012)

Table 1
SWMU 4 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	NMED Soil Screening Levels					EPA Regional Soil Screening Levels			
	Residential Soil (mg/kg)	Industrial/ Occupational Soil (mg/kg)	Construction Worker Soil (mg/kg)	Risk-based SSL for a DAF of 1 (mg/kg)	Risk-based SSL for a DAF of 20 (mg/kg)	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Groundwater Protection Risk-based (mg/kg)	Groundwater Protection MCL-based (mg/kg)
Metals									
Arsenic	3.9E+00	1.8E+01	5.3E+01	1.3E-02	2.6E-01	6.1E-01	2.4E+00	1.3E-03	2.90E-01
Barium	1.6E+04	2.2E+05	4.4E+03	3.0E+02	6.0E+03	1.5E+04	1.9E+05	1.2E+02	8.20E+01
Beryllium	1.6E+02	2.3E+03	1.4E+02	5.8E+01	1.2E+03	1.6E+02	2.0E+03	1.3E+01	3.20E+00
Cadmium	7.0E+01	9.0E+02	2.8E+02	1.4E+00	2.7E+01	NA	NA	5.2E-01	3.80E-01
Chromium	1.2E+05	1.7E+06	4.6E+05	9.9E+07	2.0E+09	1.2E+05	1.5E+06	2.8E+07	NA
Lead	4.0E+02	8.0E+02	8.0E+02	NA	NA	4.0E+02	8.0E+02		1.40E+01
Mercury	1.6E+01	7.4E+01	1.4E+01	3.3E-02	6.5E-01	1.0E+01	4.3E+01	3.3E-02	1.00E-01
Nickel	1.6E+03	2.3E+04	6.2E+03	4.8E+01	9.5E+02	1.5E+03	2.0E+04	2.0E+01	NA
Vanadium	3.9E+02	5.7E+03	1.5E+03	1.8E+02	3.7E+03	3.9E+02	5.1E+03	6.3E+01	NA
Volatile Organic Compounds									
1,2-Dibromoethane (EDB)	5.9E-01	3.2E+00	1.6E+01	1.5E-05	3.1E-04	3.4E-02	1.7E-01	1.8E-06	1.40E-05
1,2-Dichloroethane (EDC)	7.9E+00	4.4E+01	5.9E+01	3.6E-04	7.1E-03	4.3E-01	2.2E+00	4.2E-05	1.40E-03
1,4-Dioxane	4.9E+01	1.9E+02	1.7E+03	1.2E-03	2.4E-02	4.9E+00	1.7E+01	1.4E-04	NA
2-Butanone	3.7E+04	3.7E+05	8.4E+04	1.3E+00	2.5E+01	2.8E+04	2.0E+05	1.0E+00	NA
2-Chloroethylvinyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	1.5E+01	8.5E+01	1.4E+02	1.7E-03	3.5E-02	1.1E+00	5.4E+00	2.0E-04	2.60E-03
Carbon disulfide	1.5E+03	8.3E+03	1.6E+03	2.8E-01	5.7E+00	8.2E+02	3.7E+03	2.1E-01	
Chlorobenzene	3.8E+02	2.1E+03	4.1E+02	4.9E-02	9.8E-01	2.9E+02	1.4E+03	4.9E-02	6.80E-02
Ethylbenzene	6.8E+01	3.8E+02	1.8E+03	1.3E-02	2.6E-01	5.4E+00	2.7E+01	1.5E-03	7.80E-01
Styrene	7.3E+03	5.0E+04	1.0E+04	1.4E+00	2.8E+01	6.3E+03	3.6E+04	1.2E+00	1.10E-01
Toluene	5.3E+03	5.8E+04	1.3E+04	1.3E+00	2.5E+01	5.0E+03	4.5E+04	5.9E-01	6.90E-01
Xylenes, Total	8.1E+02	4.0E+03	7.4E+02	1.6E-01	3.1E+00	6.3E+02	2.7E+03	1.9E-01	9.80E+00
Semi-Volatile Organic Compounds									
1,2-Dichlorobenzene	2.3E+03	1.4E+04	2.7E+03	2.8E-01	5.6E+00	1.9E+03	9.8E+03	2.7E-01	5.80E-01
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	3.2E+01	1.8E+02	8.3E+02	3.2E-03	6.4E-02	2.4E+00	1.2E+01	4.0E-04	7.20E-02
2,4-Dimethylphenol	1.2E+03	1.4E+04	4.8E+03	6.7E-01	1.3E+01	1.2E+03	1.2E+04	3.2E-01	NA
2,4-Dinitrophenol	1.2E+02	1.4E+03	4.8E+02	6.3E-02	1.3E+00	1.2E+02	1.2E+03	3.4E-02	NA
7,12-Dimethylbenz(a)anthracene	NA	NA	NA	NA	NA	4.3E-04	6.2E-03	8.5E-05	NA
1-Methylnaphthalene	NA	NA	NA	NA	NA	1.6E+01	5.3E+01	5.1E-03	NA
2-Methylphenol	NA	NA	NA	NA	NA	3.1E+03	3.1E+04	5.7E-01	NA
3-Methylphenol	NA	NA	NA	NA	NA	6.1E+03	6.2E+04	1.1E+00	NA
4-Methylphenol	NA	NA	NA	NA	NA	6.1E+03	6.2E+04	NA	1.1E+00
4-Nitrophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	1.7E+04	1.8E+05	6.7E+04	2.7E+02	5.4E+03	1.7E+04	1.7E+05	4.2E+01	NA
Benz(a)anthracene	1.5E+00	2.3E+01	2.1E+02	7.8E-02	1.6E+00	1.5E-01	2.1E+00	1.0E-02	NA
Benzo(a)pyrene	1.5E-01	2.3E+00	2.1E+01	2.6E-02	5.2E-01	1.5E-02	2.1E-01	3.5E-03	2.40E-01
Benzo(b)fluoranthene	1.5E+00	2.3E+01	2.1E+02	2.7E-01	5.3E+00	1.5E-01	2.1E+00	3.5E-02	NA
Benzo(k)fluoranthene	1.5E+01	2.3E+02	2.1E+03	2.6E+00	5.2E+01	1.5E+00	2.1E+01	3.5E-01	NA
Bis(2-ethylhexyl)phthalate	3.5E+02	1.4E+03	4.8E+03	8.6E+00	1.7E+02	3.5E+01	1.2E+02	1.1E+00	1.40E+00
Butyl benzyl phthalate	NA	NA	NA	NA	NA	2.6E+02	9.1E+02	2.0E-01	NA
Chrysene	1.5E+02	2.3E+03	2.1E+04	8.0E+00	1.6E+02	1.5E+01	2.1E+02	1.1E+00	NA
Dibenz(a,j)acridine	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	1.5E-01	2.3E+00	2.1E+01	8.5E-02	1.7E+00	1.5E-02	2.1E-01	1.1E-02	NA
Diethyl phthalate	4.9E+04	5.5E+05	1.9E+05	9.7E+00	1.9E+02	4.9E+04	4.9E+05	4.7E+00	NA
Dimethyl phthalate	6.1E+05	6.8E+06	2.4E+06	8.1E+01	1.6E+03	NA	NA	NA	NA
Di-n-butyl phthalate	6.1E+03	6.8E+04	2.4E+04	7.0E+00	1.4E+02	6.1E+03	6.2E+04	1.7E+00	NA
Di-n-octyl phthalate	NA	NA	NA	NA	NA	6.1E+02	6.2E+03	4.4E+01	NA
Fluoranthene	2.3E+03	2.4E+04	8.9E+03	1.2E+02	2.4E+03	2.3E+03	2.2E+04	7.0E+01	NA
Indene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylchrysene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	4.3E+01	2.4E+02	1.6E+02	3.6E-03	7.1E-02	3.6E+00	1.8E+01	4.7E-04	NA
Phenanthrene	1.8E+03	2.1E+04	7.1E+03	2.9E+01	5.7E+02	NA	NA	NA	NA
Phenol	1.8E+04	2.1E+05	6.9E+04	5.0E+00	9.9E+01	1.8E+04	1.8E+05	2.6	NA
Pyrene	1.7E+03	1.8E+04	6.7E+03	8.9E+01	1.8E+03	1.7E+03	1.7E+04	9.5E+00	NA
Pyridine	NA	NA	NA	NA	NA	7.8E+01	1.0E+03	5.3E-03	NA
Quinoline	NA	N	NA	NA	NA	1.6E-01	5.7E-01	6.8E-05	NA
Benzenethiol	NA	N	NA	NA	NA	7.8E+01	1.0E+03	8.6E-03	NA

Bolded Value - concentration exceeds sc
NA - Screening level not available
DAF - Dilution attentuation factor
 - - constituent not reported
NMED Screening levels (June 2012)
EPA Regional Screening Levels (Nov. 20

Table 2
SWMU 5 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	Sample ID	RFI0501 V0.0	RFI0501 V3.0	RFI0501 V7.0	RFI0501 V9.5	RFI0501 D9.5	RFI0502 V0.0	RFI0502 V3.0	RFI0502 V7.0	RFI0502 V9.5	RFI0503 V0.0	RFI0503 V3.0	RFI0503 V7.0	RFI0503 V9.5	RFI0503 V9.5	RFI0504 V0.0	RFI0504 V3.0	RFI0504 V7.0	RFI0504 V9.5	RFI0505 V0.0	RFI0505 V3.0
	Sample Depth (ft)	0	3	7	9.5	9.5	0	3	7	9.5	0	3	7	9.5	9.5	0	3	7	9.5	0	3
	Sample Date	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992
Metals mg/kg																					
Arsenic	mg/kg	**4.3**	**14**	**9.4**	**6.6**	**2.7**	**12**	**6.7**	**9.6**	**7.8**	**19**	**16**	**15**	**23**	**22**	**8.5**	**22**	**14**	**24**	**22**	**20**
Barium	mg/kg	290	240	270	120	290	**340**	**380**	130	290	260	110	170	130	200	**460**	230	170	**320**	200	**730**
Beryllium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Cadmium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Chromium	mg/kg	8.7	6.8	8.3	27	12	8.2	5.7	16	8.5	110	10	12	11	5.8	21	270	8.9	31	9.3	10
Lead	mg/kg	10	8.1	6.5	10	11	7.8	9	14	6.5	**21**	9.4	**18**	ND	6.1	**16**	9.6	9	**16**	6.4	9.2
Mercury	mg/kg	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	**0.31**	<.25	<.25	<.25	<.25	<.25
Nickel	mg/kg	6.8	4.9	6.1	14	10	7.6	4.7	7.3	7.3	46	8.8	9.7	10	8.6	23	**83**	9.7	13	9	11
Vanadium	mg/kg	8.1	6.3	7	5.1	4.6	8.1	8.6	7.3	4.7	10	5.9	6.7	5.1	6.4	9.6	13	6.7	5.3	28	9.1
pH		7.3	7.4	8.3	9.2	9.5	8.4	9.2	7.7	8.6	8.1	8.8	9.1	9	8.8	9.2	8.1	8.5	9.4	9.3	7.5
Volatile Organic Compounds (mg/kg)																					
1,2-Dibromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dioxane	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Methyl ethyl ketone (2-butanone)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl Ether	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon disulfide	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total xylenes	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene (PCE)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-Trichloropropane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Hexanone	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acetone	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodiflouromethane	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dichloromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl isobutyl ketone	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroflouromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropylene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trans-1,3-Dichloropropylene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acrolein	mg/kg	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Acrylonitrile	mg/kg	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0

Table 2
SWMU 5 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	Sample ID	RFI0501 V0.0	RFI0501 V3.0	RFI0501 V7.0	RFI0501 V9.5	RFI0501 D9.5	RFI0502 V0.0	RFI0502 V3.0	RFI0502 V7.0	RFI0502 V9.5	RFI0503 V0.0	RFI0503 V3.0	RFI0503 V7.0	RFI0503 V9.5	RFI0503 V9.5	RFI0504 V0.0	RFI0504 V3.0	RFI0504 V7.0	RFI0504 V9.5	RFI0505 V0.0	RFI0505 V3.0
	Sample Depth (ft)	0	3	7	9.5	9.5	0	3	7	9.5	0	3	7	9.5	9.5	0	3	7	9.5	0	3
	Sample Date	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992
Cis-1,4-Dichloro-2-butene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trans-1,4-Dichloro-2-butene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethanol	mg/kg	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Ethylmethacrylate	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Iodomethane (Methyliodide)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl acetate	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Semi-Volatile Organic Compounds (mg/kg)																					
1,2-Dichlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Methylnaphthalene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(a)anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-octyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylchrysene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyridine	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quinoline	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzenethiol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Bolded Value - concentration exceeds screening level
NA - Screening level not available
DAF - Dilution attentuation factor
- - constituent not reported
NMED Screening levels (June 2012)
EPA Regional Screening Levels (Nov. 2012)

Table 2
SWMU 5 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	Sample ID	RFI0505 V7.0	RFI0505 V9.5	RFI0506 V0.0	RFI0506 V3.0	RFI0506 V7.0	RFI0506 V9.5	RFI0507 V0.0	RFI0507 V3.0	RFI0507 V7.0	RFI0507 V9.5	RFI0507 V9.5	RFI0508 V0.0	RFI0508 V3.0	RFI0508 V7.0	RFI0508 V9.5	RFI0508 V9.5	RFI0509 V0.0	RFI0509 V3.0	RFI0509 V7.0	RFI0509 V9.5
	Sample Depth (ft)	7	9.5	0	3	7	9.5	0	3	7	9.5	9.5	0	3	7	9.5	9.5	0	3	7	9.5
	Sample Date	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992
Metals mg/kg																					
Arsenic	mg/kg	**18**	**35**	**ND**	**21**	**25**	**20**	**7.3**	**6.1**	**4.2**	**4.1**	**3.7**	<2.5	**3.4**	**5.5**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Barium	mg/kg	**410**	220	**390**	140	56	89	**720**	**340**	300	**520**	**760**	**590**	**440**	150	**700**	**490**	**600**	**680**	**370**	130
Beryllium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Cadmium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Chromium	mg/kg	9	9.8	9.6	12	8.7	6.4	5.6	6.1	5.1	7.8	5.2	7.2	10	4.7	7.1	8.3	15	7.3	7.2	4.1
Lead	mg/kg	7.8	9.3	13	7.9	6.9	7.1	ND	7	9.5	6	9	9.6	5.9	ND	9.6	11	**17**	6.2	ND	ND
Mercury	mg/kg	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25
Nickel	mg/kg	11	12	6.8	10	11	7.5	5.8	7.5	3.6	9.2	5.9	5.5	11	7.1	5.3	6.3	13	7.1	8.6	5
Vanadium	mg/kg	5.7	6.3	11	5.7	5	3.9	8.7	7.1	6.6	8.2	6.4	14	10	6.5	20	16	14	13	8.2	5.9
pH		8	7.9	8.7	8.8	8.9	9.3	8.8	8.2	9.1	8.6	8.4	8.2	8.5	7.7	9.1	9	8.7	7.9	8.3	8.8
Volatile Organic Compounds (mg/kg)																					
1,2-Dibromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,4-Dioxane	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Methyl ethyl ketone (2-butanone)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chloroethylvinyl Ether	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Carbon disulfide	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Styrene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Total xylenes	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,1-Trichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2,2-Tetrachloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Tetrachloroethene (PCE)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1,2-Trichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,1-Dichloroethene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2,3-Trichloropropane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
1,2-Dichloropropane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2-Hexanone	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Acetone	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromoform	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Bromomethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Carbon tetrachloride	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chlorobenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Chloroform	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Dibromochloromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dibromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Dichlorodiflouromethane	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Dichloromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Methyl isobutyl ketone	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
trans-1,2-Dichloroethene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroethene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trichloroflouromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl chloride	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropylene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trans-1,3-Dichloropropylene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Acrolein	mg/kg	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Acrylonitrile	mg/kg	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0

Table 2
SWMU 5 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	Sample ID	RFI0505 V7.0	RFI0505 V9.5	RFI0506 V0.0	RFI0506 V3.0	RFI0506 V7.0	RFI0506 V9.5	RFI0507 V0.0	RFI0507 V3.0	RFI0507 V7.0	RFI0507 V9.5	RFI0507 V9.5	RFI0508 V0.0	RFI0508 V3.0	RFI0508 V7.0	RFI0508 V9.5	RFI0508 V9.5	RFI0509 V0.0	RFI0509 V3.0	RFI0509 V7.0	RFI0509 V9.5
	Sample Depth (ft)	7	9.5	0	3	7	9.5	0	3	7	9.5	9.5	0	3	7	9.5	9.5	0	3	7	9.5
	Sample Date	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992
Cis-1,4-Dichloro-2-butene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Trans-1,4-Dichloro-2-butene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Ethanol	mg/kg	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0
Ethylmethacrylate	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Iodomethane (Methyliodide)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Vinyl acetate	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Semi-Volatile Organic Compounds (mg/kg)																					
1,2-Dichlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,3-Dichlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,4-Dichlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dimethylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2,4-Dinitrophenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7,12-Dimethylbenz(a)anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1-Methylnaphthalene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Methylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3-Methylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Methylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4-Nitrophenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benz(a)anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(a)pyrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(b)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzo(k)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bis(2-ethylhexyl)phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butyl benzyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chrysene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,j)acridine	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibenz(a,h)anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diethyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dimethyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-butyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Di-n-octyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methylchrysene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Naphthalene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenanthrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyridine	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Quinoline	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Benzenethiol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Bolded Value - concentration exceeds screening level
NA - Screening level not available
DAF - Dilution attentuation factor
 - - constituent not reported
NMED Screening levels (June 2012)
EPA Regional Screening Levels (Nov. 2012)

Table 2
SWMU 5 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	Sample ID	RFI0510 V0.0	RFI0510 V3.0	RFI0510 V7.0	RFI0510 V9.5	RFI0511 V0.0	RFI0511 V3.0	RFI0511 V7.0	RFI0511 V9.5	RFI0512 V0.0	RFI0512 V3.0	RFI0512 V7.0	RFI0512 V9.5	RFI0512 V9.5	RFI0513 V11.0	RFI0513 V16	RFI0513 V20	RFI0514 V11.0	RFI0514 V16	RFI0514 V20	RFI0515 V11.0
	Sample Depth (ft)	0	3	7	9.5	0	3	7	9.5	0	3	7	9.5	9.5	11	16	20	11	16	20	11
	Sample Date	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994
Metals mg/kg																					
Arsenic	mg/kg	<2.5	**3.6**	**5.4**	**2.6**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	**6.7**	**2.7**	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Barium	mg/kg	280	300	**370**	100	**850**	**1600**	**710**	**780**	**460**	**310**	**420**	190	200	140	**360**	**310**	190	**510**	**320**	140
Beryllium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Cadmium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Chromium	mg/kg	8.8	5.6	10	6.2	7.4	9.1	6.1	7.2	8.5	6.7	7.5	6.6	7.1	7.5	10	9.1	9.7	5.1	14	18
Lead	mg/kg	7.6	5	12	7.7	6.1	9.8	6.2	9.5	5.5	6.4	11	6.3	6	11	14	12	13	11	**15**	14
Mercury	mg/kg	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25
Nickel	mg/kg	8	5.6	5.7	6.9	7.8	7.2	5.4	5.2	6.6	4.5	6.2	7	7.6	10	11	12	12	7.9	16	13
Vanadium	mg/kg	11	6.4	8.2	27	12	6.5	6.6	11	9.4	4.8	9.2	4.9	4.2	4	11	6.2	5	7	8.2	6.7
pH		7.5	7.7	7.9	8.2	8.2	7.8	8.3	8.7	8.3	7.9	8.3	8.5	8.6	-	-	-	-	-	-	-
Volatile Organic Compounds (mg/kg)																					
1,2-Dibromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2-Dichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dioxane	mg/kg	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl ethyl ketone (2-butanone)	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Chloroethylvinyl Ether	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Carbon disulfide	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Chlorobenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Styrene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Total xylenes	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,1,1-Trichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Tetrachloroethene (PCE)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
2-Hexanone	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-
Acetone	mg/kg	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Bromoform	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Bromomethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Chloroethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-
Chloroform	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Chloromethane	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-
Dibromochloromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Dibromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Dichlorodiflouromethane	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	-	-	-	-	-	-	-
Dichloromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Methyl isobutyl ketone	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Trichloroethene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Trichloroflouromethane	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-
Cis-1,3-Dichloropropylene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Trans-1,3-Dichloropropylene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Acrolein	mg/kg	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	-	-	-	-	-	-	-
Acrylonitrile	mg/kg	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	-	-	-	-	-	-	-

Table 2
SWMU 5 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	Sample ID	RFI0510 V0.0	RFI0510 V3.0	RFI0510 V7.0	RFI0510 V9.5	RFI0511 V0.0	RFI0511 V3.0	RFI0511 V7.0	RFI0511 V9.5	RFI0512 V0.0	RFI0512 V3.0	RFI0512 V7.0	RFI0512 V9.5	RFI0512 V9.5	RFI0513 V11.0	RFI0513 V16	RFI0513 V20	RFI0514 V11.0	RFI0514 V16	RFI0514 V20	RFI0515 V11.0
	Sample Depth (ft)	0	3	7	9.5	0	3	7	9.5	0	3	7	9.5	9.5	11	16	20	11	16	20	11
	Sample Date	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	5/5/1992	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994
Cis-1,4-Dichloro-2-butene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Trans-1,4-Dichloro-2-butene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Ethanol	mg/kg	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	<10.0	-	-	-	-	-	-	-
Ethylmethacrylate	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-
Iodomethane (Methyliodide)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	-	-	-	-	-
Vinyl acetate	mg/kg	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds (mg/kg)																					
1,2-Dichlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,3-Dichlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dichlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2,4-Dimethylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2,4-Dinitrophenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
7,12-Dimethylbenz(a)anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1-Methylnaphthalene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-Methylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
3-Methylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4-Methylphenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4-Nitrophenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benz(a)anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(a)pyrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(b)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(k)fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Bis(2-ethylhexyl)phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Butyl benzyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chrysene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dibenz(a,j)acridine	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dibenz(a,h)anthracene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Diethyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dimethyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Di-n-butyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	**9.6**	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Di-n-octyl phthalate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluoranthene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Indene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methylchrysene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Naphthalene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Phenanthrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Phenol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Pyrene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Pyridine	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Benzenethiol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Bolded Value - concentration exceeds screening level
NA - Screening level not available
DAF - Dilution attentuation factor
- - constituent not reported
NMED Screening levels (June 2012)
EPA Regional Screening Levels (Nov. 2012)

Table 2
SWMU 5 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	Sample ID	RFI0515 V16	RFI0515 V20	RFI0516 V11.0	RFI0516 V16	RFI0516 V20	RFI0517 V11.0	RFI0517 V16	RFI0517 V20	RFI0518 V11.0	RFI0518 V16	RFI0518 V16	RFI0518 V20	RFI0519 V11.0	RFI0519 V16	RFI0519 V20
	Sample Depth (ft)	16	20	11	16	20	11	16	20	11	16	16	20	11	16	20
	Sample Date	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994
Metals mg/kg																
Arsenic	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	**2.9**
Barium	mg/kg	140	**380**	**370**	240	160	**490**	200	270	210	100	110	200	300	300	**390**
Beryllium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Cadmium	mg/kg	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
Chromium	mg/kg	11	13	9.7	5.2	7	5.9	3.6	9.3	8.8	4.8	5.3	7.7	9.9	7.9	16
Lead	mg/kg	**15**	14	**16**	12	14	11	9.7	**15**	13	9.6	11	12	**15**	**18**	**16**
Mercury	mg/kg	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25	<.25
Nickel	mg/kg	14	16	13	9.7	11	9.2	7.5	14	13	7.9	7.6	9.4	14	15	16
Vanadium	mg/kg	5.4	8.1	5.8	3.4	3.5	3.8	2.8	4.8	3.8	3.7	3.4	4.2	<2.5	<2.5	2.8
pH		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Volatile Organic Compounds (mg/kg)																
1,2-Dibromethane	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,2-Dichloroethane	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dioxane	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methyl ethyl ketone (2-butanone)	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2-Chloroethylvinyl Ether	mg/kg	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Benzene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Carbon disulfide	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Chlorobenzene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Ethylbenzene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Styrene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Toluene	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Total xylenes	mg/kg	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
1,1,1-Trichloroethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2,2-Tetrachloroethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetrachloroethene (PCE)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1,2-Trichloroethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,1-Dichloroethene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2,3-Trichloropropane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloroethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1,2-Dichloropropane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-Hexanone	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acetone	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromodichloromethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromoform	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromomethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon tetrachloride	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorobenzene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloroform	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloromethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromochloromethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibromethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichlorodiflouromethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichloromethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Methyl isobutyl ketone	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
trans-1,2-Dichloroethene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroethene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichloroflouromethane	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl chloride	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cis-1,3-Dichloropropylene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,3-Dichloropropylene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acrolein	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acrylonitrile	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Analyte	Sample ID	RFI0515 V16	RFI0515 V20	RFI0516 V11.0	RFI0516 V16	RFI0516 V20	RFI0517 V11.0	RFI0517 V16	RFI0517 V20	RFI0518 V11.0	RFI0518 V16	RFI0518 V16	RFI0518 V20	RFI0519 V11.0	RFI0519 V16	RFI0519 V20
	Sample Depth (ft)	16	20	11	16	20	11	16	20	11	16	16	20	11	16	20
	Sample Date	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994	7/28/1994
Cis-1,4-Dichloro-2-butene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trans-1,4-Dichloro-2-butene	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethanol	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ethylmethacrylate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iodomethane (Methyliodide)	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vinyl acetate	mg/kg	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Semi-Volatile Organic Compounds (mg/kg)																
1,2-Dichlorobenzene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,3-Dichlorobenzene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1,4-Dichlorobenzene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2,4-Dimethylphenol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2,4-Dinitrophenol	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
7,12-Dimethylbenz(a)anthracene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
1-Methylnaphthalene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2-Methylphenol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
3-Methylphenol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4-Methylphenol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
4-Nitrophenol	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Anthracene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benz(a)anthracene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(a)pyrene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(b)fluoranthene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Benzo(k)fluoranthene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Bis(2-ethylhexyl)phthalate	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Butyl benzyl phthalate	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Chrysene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dibenz(a,j)acridine	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dibenz(a,h)anthracene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Diethyl phthalate	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Dimethyl phthalate	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Di-n-butyl phthalate	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Di-n-octyl phthalate	mg/kg	<0.005	13	<0.005	7.5	13	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Fluoranthene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Indene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Methylchrysene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Naphthalene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Phenanthrene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Phenol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Pyrene	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Pyridine	mg/kg	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Quinoline	mg/kg	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Benzenethiol	mg/kg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005

Bolded Value - concentration exceeds screening level
NA - Screening level not available
DAF - Dilution attentuation factor
- - constituent not reported
NMED Screening levels (June 2012)
EPA Regional Screening Levels (Nov. 2012)

Table 2
SWMU 5 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

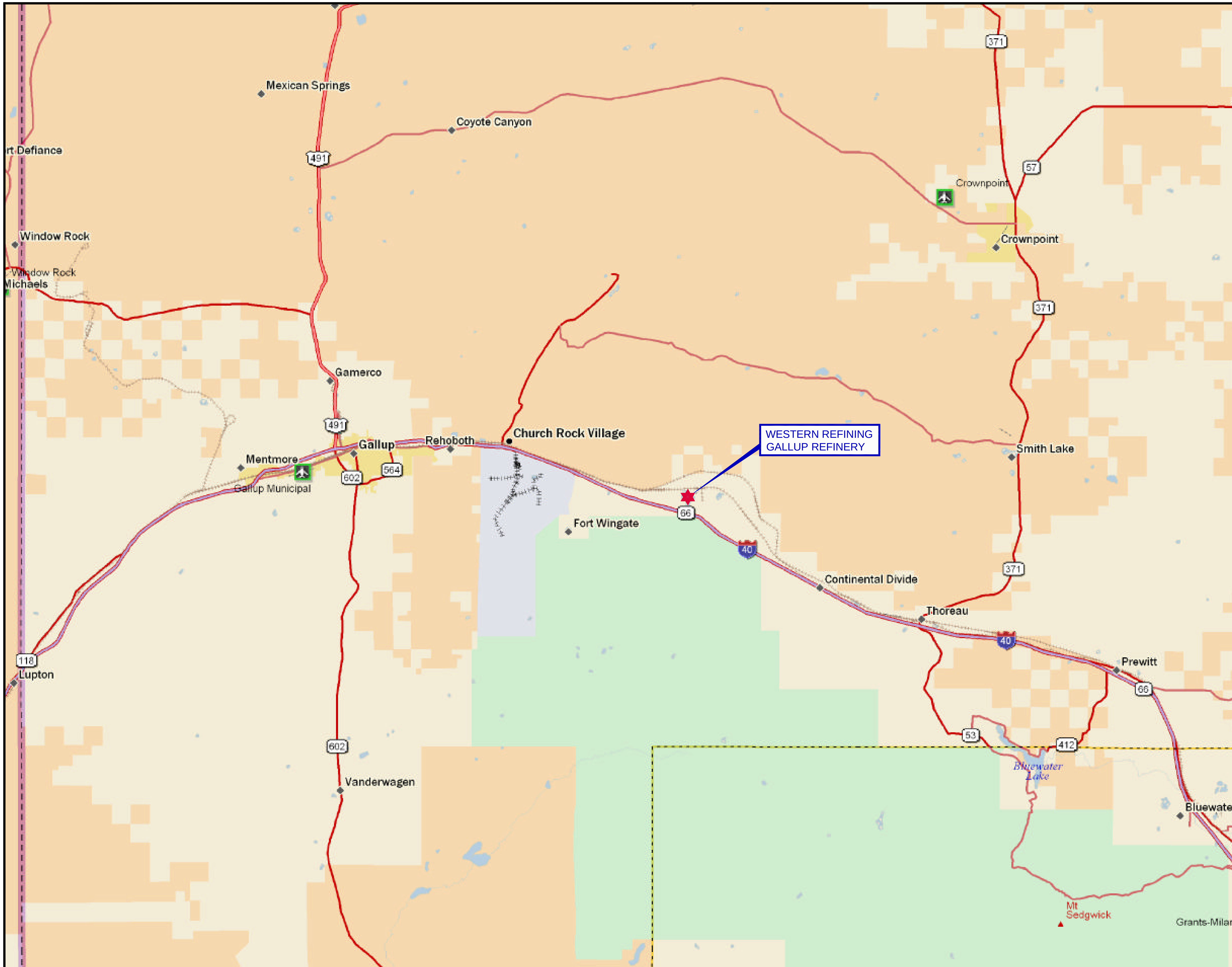
Analyte	Sample ID	NMED Soil Screening Levels					EPA Regional Soil Screening Levels			
	Sample Depth (ft) / Sample Date	Residential Soil (mg/kg)	Industrial/ Occupational Soil (mg/kg)	Construction Worker Soil (mg/kg)	Risk-based SSL for a DAF of 1 (mg/kg)	Risk-based SSL for a DAF of 20 (mg/kg)	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Groundwater Protection Risk-based (mg/kg)	Groundwater Protection MCL-based (mg/kg)
Metals mg/kg										
Arsenic	mg/kg	3.9E+00	1.8E+01	5.3E+01	1.3E-02	2.6E-01	6.1E-01	2.4E+00	1.3E-03	2.90E-01
Barium	mg/kg	1.6E+04	2.2E+05	4.4E+03	3.0E+02	6.0E+03	1.5E+04	1.9E+05	1.2E+02	8.20E+01
Beryllium	mg/kg	1.6E+02	2.3E+03	1.4E+02	5.8E+01	1.2E+03	1.6E+02	2.0E+03	1.3E+01	3.20E+00
Cadmium	mg/kg	7.0E+01	9.0E+02	2.8E+02	1.4E+00	2.7E+01	NA	NA	5.2E-01	3.80E-01
Chromium	mg/kg	1.2E+05	1.7E+06	4.6E+05	9.9E+07	2.0E+09	1.2E+05	1.5E+06	2.8E+07	NA
Lead	mg/kg	4.0E+02	8.0E+02	8.0E+02	NA	NA	4.0E+02	8.0E+02		1.40E+01
Mercury	mg/kg	1.6E+01	7.4E+01	1.4E+01	3.3E-02	6.5E-01	1.0E+01	4.3E+01	3.3E-02	1.00E-01
Nickel	mg/kg	1.6E+03	2.3E+04	6.2E+03	4.8E+01	9.5E+02	1.5E+03	2.0E+04	2.0E+01	NA
Vanadium	mg/kg	3.9E+02	5.7E+03	1.5E+03	1.8E+02	3.7E+03	3.9E+02	5.1E+03	6.3E+01	NA
pH		NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatile Organic Compounds (mg/kg)										
1,2-Dibromethane	mg/kg	5.88E-01	3.22E+00	1.60E+01	1.54E-05	3.08E-04				
1,2-Dichloroethane	mg/kg	7.89E+00	4.35E+01	5.87E+01	3.56E-04	7.11E-03				
1,4-Dioxane	mg/kg	4.86E+01	1.92E+02	1.66E+03	1.20E-03	2.38E-02				
Methyl ethyl ketone (2-butanone)	mg/kg	3.71E+04	3.75E+05	8.43E+04	1.27E+00	2.55E+01				
2-Chloroethylvinyl Ether	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	mg/kg	1.54E+01	8.47E+01	1.38E+02	1.73E-03	3.45E-02				
Carbon disulfide	mg/kg	1.53E+03	8.33E+03	1.58E+03	2.83E-01	5.65E+00				
Chlorobenzene	mg/kg	3.76E+02	2.12E+03	4.06E+02	4.92E-02	9.84E-01				
Ethylbenzene	mg/kg	6.84E+01	3.78E+02	1.83E+03	1.30E-02	2.60E-01				
Styrene	mg/kg	7.28E+03	5.00E+04	9.99E+03	1.39E+00	2.77E+01				
Toluene	mg/kg	5.27E+03	5.77E+04	1.34E+04	1.27E+00	2.53E+01				
Total xylenes	mg/kg	8.14E+02	3.98E+03	7.43E+02	1.56E-01	3.13E+00				
1,1,1-Trichloroethane	mg/kg	1.56E+04	7.89E+04	1.48E+04	2.91E+00	5.82E+01				
1,1,2,2-Tetrachloroethane	mg/kg	8.02E+00	4.35E+01	2.21E+02	2.13E-04	4.26E-03				
Tetrachloroethene (PCE)	mg/kg	7.02E+00	3.66E+01	2.12E+02	4.30E-04	8.61E-03				
1,1,2-Trichloroethane	mg/kg	2.81E+00	1.33E+01	4.72E+02	1.12E-04	2.23E-03				
1,1-Dichloroethane	mg/kg	6.45E+01	3.59E+02	1.70E+03	5.98E-03	1.20E-01				
1,1-Dichloroethene	mg/kg	4.49E+02	2.29E+03	4.32E+02	1.16E-01	2.32E+00				
1,2,3-Trichloropropane	mg/kg	4.97E-02	3.76E+01	7.23E+00	2.50E-06	5.00E-05				
1,2-Dichloroethane	mg/kg	7.89E+00	4.35E+01	5.87E+01	3.56E-04	7.11E-03				
1,2-Dichloropropane	mg/kg	1.52E+01	8.44E+01	2.50E+01	1.07E-03	2.14E-02				
2-Hexanone	mg/kg	NA	NA	NA	NA	NA	2.1E+02	1.4E+03	7.9E-03	
Acetone	mg/kg	6.66E+04	8.68E+05	2.21E+05	3.86E+00	7.71E+01				
Bromodichloromethane	mg/kg	5.41E+00	3.01E+01	1.43E+02	2.71E-04	5.41E-03				
Bromoform	mg/kg	NA	NA	NA	NA	NA	6.2E+01	2.2E+02	2.1E-03	2.1E-02
Bromomethane	mg/kg	1.65E+01	8.65E+01	1.64E+01	1.92E-03	3.85E-02				
Carbon tetrachloride	mg/kg	1.08E+01	5.98E+01	2.26E+02	1.60E-03	3.21E-02				
Chlorobenzene	mg/kg	3.76E+02	2.12E+03	4.06E+02	4.92E-02	9.84E-01				
Chloroethane	mg/kg	2.98E+04	1.41E+05	2.61E+04	5.37E+00	1.07E+02				
Chloroform	mg/kg	5.86E+00	3.27E+01	1.54E+02	4.59E-04	9.18E-03				
Chloromethane	mg/kg	2.75E+02	1.29E+03	2.41E+02	4.40E-02	8.79E-01				
Dibromochloromethane	mg/kg	1.21E+01	6.24E+01	3.32E+02	3.31E-04	6.61E-03				
Dibromethane	mg/kg	5.88E-01	3.22E+00	1.60E+01	1.54E-05	3.08E-04				
Dichlorodiflouromethane	mg/kg	1.68E+02	7.98E+02	1.49E+02	3.72E-01	7.43E+00				
Dichloromethane	mg/kg	5.16E+01	2.54E+02	3.10E+03	1.71E-03	3.42E-02				
Methyl isobutyl ketone	mg/kg	5.82E+03	7.38E+04	1.85E+04	3.84E-01	7.68E+00				
trans-1,2-Dichloroethene	mg/kg	2.70E+02	1.44E+03	2.73E+02	2.69E-02	5.38E-01				
Trichloroethene	mg/kg	8.77E+00	4.13E+01	7.68E+00	1.05E-03	2.11E-02				
Trichloroflouromethane	mg/kg	1.41E+03	6.94E+03	1.30E+03	8.89E-01	1.78E+01				
Vinyl chloride	mg/kg	7.28E-01	2.61E+01	1.49E+02	5.42E-05	1.08E-03				
Cis-1,3-Dichloropropylene	mg/kg	3.37E+01	1.77E+02	2.09E+02	1.24E-03	2.48E-02				
Trans-1,3-Dichloropropylene	mg/kg	3.37E+01	1.77E+02	2.09E+02	1.24E-03	2.48E-02				
Acrolein	mg/kg	4.04E-01	1.92E+00	3.56E-01	7.30E-06	1.46E-04				
Acrylonitrile	mg/kg	4.55E+00	2.43E+01	3.76E+01	8.48E-05	1.70E-03				

Table 2
SWMU 5 - Historical Soil Analytical Data
Western Refining Southwest, Inc. - Gallup Refinery

Analyte	Sample ID	NMED Soil Screening Levels					EPA Regional Soil Screening Levels			
	Sample Depth (ft) / Sample Date	Residential Soil (mg/kg)	Industrial/ Occupational Soil (mg/kg)	Construction Worker Soil (mg/kg)	Risk-based SSL for a DAF of 1 (mg/kg)	Risk-based SSL for a DAF of 20 (mg/kg)	Resident Soil (mg/kg)	Industrial Soil (mg/kg)	Groundwater Protection Risk-based (mg/kg)	Groundwater Protection MCL-based (mg/kg)
Cis-1,4-Dichloro-2-butene	mg/kg	9.73E-02	5.45E-01	2.53E+00	4.33E-06	8.66E-05				
Trans-1,4-Dichloro-2-butene	mg/kg	9.73E-02	5.45E-01	2.53E+00	4.33E-06	8.66E-05				
Ethanol	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Ethylmethacrylate	mg/kg	4.55E+03	3.80E+04	2.79E+04	1.04E-01	2.09E+00				
Iodomethane (Methyliodide)	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl acetate	mg/kg	2.56E+03	1.23E+04	2.30E+03	7.59E-02	1.52E+00				
Semi-Volatile Organic Compounds (mg/kg)										
1,2-Dichlorobenzene	mg/kg	2.3E+03	1.4E+04	2.7E+03	2.8E-01	5.6E+00	1.9E+03	9.8E+03	2.7E-01	5.80E-01
1,3-Dichlorobenzene	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	mg/kg	3.2E+01	1.8E+02	8.3E+02	3.2E-03	6.4E-02	2.4E+00	1.2E+01	4.0E-04	7.20E-02
2,4-Dimethylphenol	mg/kg	1.2E+03	1.4E+04	4.8E+03	6.7E-01	1.3E+01	1.2E+03	1.2E+04	3.2E-01	NA
2,4-Dinitrophenol	mg/kg	1.2E+02	1.4E+03	4.8E+02	6.3E-02	1.3E+00	1.2E+02	1.2E+03	3.4E-02	NA
7,12-Dimethylbenz(a)anthracene	mg/kg	NA	NA	NA	NA	NA	4.3E-04	6.2E-03	8.5E-05	NA
1-Methylnaphthalene	mg/kg	NA	NA	NA	NA	NA	1.6E+01	5.3E+01	5.1E-03	NA
2-Methylphenol	mg/kg	NA	NA	NA	NA	NA	3.1E+03	3.1E+04	5.7E-01	NA
3-Methylphenol	mg/kg	NA	NA	NA	NA	NA	6.1E+03	6.2E+04	1.1E+00	NA
4-Methylphenol	mg/kg	NA	NA	NA	NA	NA	6.1E+03	6.2E+04	NA	1.1E+00
4-Nitrophenol	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Anthracene	mg/kg	1.7E+04	1.8E+05	6.7E+04	2.7E+02	5.4E+03	1.7E+04	1.7E+05	4.2E+01	NA
Benz(a)anthracene	mg/kg	1.5E+00	2.3E+01	2.1E+02	7.8E-02	1.6E+00	1.5E-01	2.1E+00	1.0E-02	NA
Benzo(a)pyrene	mg/kg	1.5E-01	2.3E+00	2.1E+01	2.6E-02	5.2E-01	1.5E-02	2.1E-01	3.5E-03	2.40E-01
Benzo(b)fluoranthene	mg/kg	1.5E+00	2.3E+01	2.1E+02	2.7E-01	5.3E+00	1.5E-01	2.1E+00	3.5E-02	NA
Benzo(k)fluoranthene	mg/kg	1.5E+01	2.3E+02	2.1E+03	2.6E+00	5.2E+01	1.5E+00	2.1E+01	3.5E-01	NA
Bis(2-ethylhexyl)phthalate	mg/kg	3.5E+02	1.4E+03	4.8E+03	8.6E+00	1.7E+02	3.5E+01	1.2E+02	1.1E+00	1.40E+00
Butyl benzyl phthalate	mg/kg	NA	NA	NA	NA	NA	2.6E+02	9.1E+02	2.0E-01	NA
Chrysene	mg/kg	1.5E+02	2.3E+03	2.1E+04	8.0E+00	1.6E+02	1.5E+01	2.1E+02	1.1E+00	NA
Dibenz(a,j)acridine	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	mg/kg	1.5E-01	2.3E+00	2.1E+01	8.5E-02	1.7E+00	1.5E-02	2.1E-01	1.1E-02	NA
Diethyl phthalate	mg/kg	4.9E+04	5.5E+05	1.9E+05	9.7E+00	1.9E+02	4.9E+04	4.9E+05	4.7E+00	NA
Dimethyl phthalate	mg/kg	6.1E+05	6.8E+06	2.4E+06	8.1E+01	1.6E+03	NA	NA	NA	NA
Di-n-butyl phthalate	mg/kg	6.1E+03	6.8E+04	2.4E+04	7.0E+00	1.4E+02	6.1E+03	6.2E+04	1.7E+00	NA
Di-n-octyl phthalate	mg/kg	NA	NA	NA	NA	NA	6.1E+02	6.2E+03	4.4E+01	NA
Fluoranthene	mg/kg	2.3E+03	2.4E+04	8.9E+03	1.2E+02	2.4E+03	2.3E+03	2.2E+04	7.0E+01	NA
Indene	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methylchrysene	mg/kg	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	mg/kg	4.3E+01	2.4E+02	1.6E+02	3.6E-03	7.1E-02	3.6E+00	1.8E+01	4.7E-04	NA
Phenanthrene	mg/kg	1.8E+03	2.1E+04	7.1E+03	2.9E+01	5.7E+02	NA	NA	NA	NA
Phenol	mg/kg	1.8E+04	2.1E+05	6.9E+04	5.0E+00	9.9E+01	1.8E+04	1.8E+05	2.6	NA
Pyrene	mg/kg	1.7E+03	1.8E+04	6.7E+03	8.9E+01	1.8E+03	1.7E+03	1.7E+04	9.5E+00	NA
Pyridine	mg/kg	NA	NA	NA	NA	NA	7.8E+01	1.0E+03	5.3E-03	NA
Quinoline	mg/kg	NA	N	NA	NA	NA	1.6E-01	5.7E-01	6.8E-05	NA
Benzenethiol	mg/kg	NA	N	NA	NA	NA	7.8E+01	1.0E+03	8.6E-03	NA

Bolded Value - concentration exceeds screening level
NA - Screening level not available
DAF - Dilution attentuation factor
\- - constituent not reported
NMED Screening levels (June 2012)
EPA Regional Screening Levels (Nov. 2012)

Figures



Map Source: DeLorme Street Atlas USA 2007 Plus.

N

0 5

SCALE IN MILES

Western Refining

GALLUP REFINERY

PROJ. NO.: Western Refining	DATE: 07/13/14	FILE: WestRef–B198

FIGURE 1

SITE LOCATION MAP

GALLUP REFINERY

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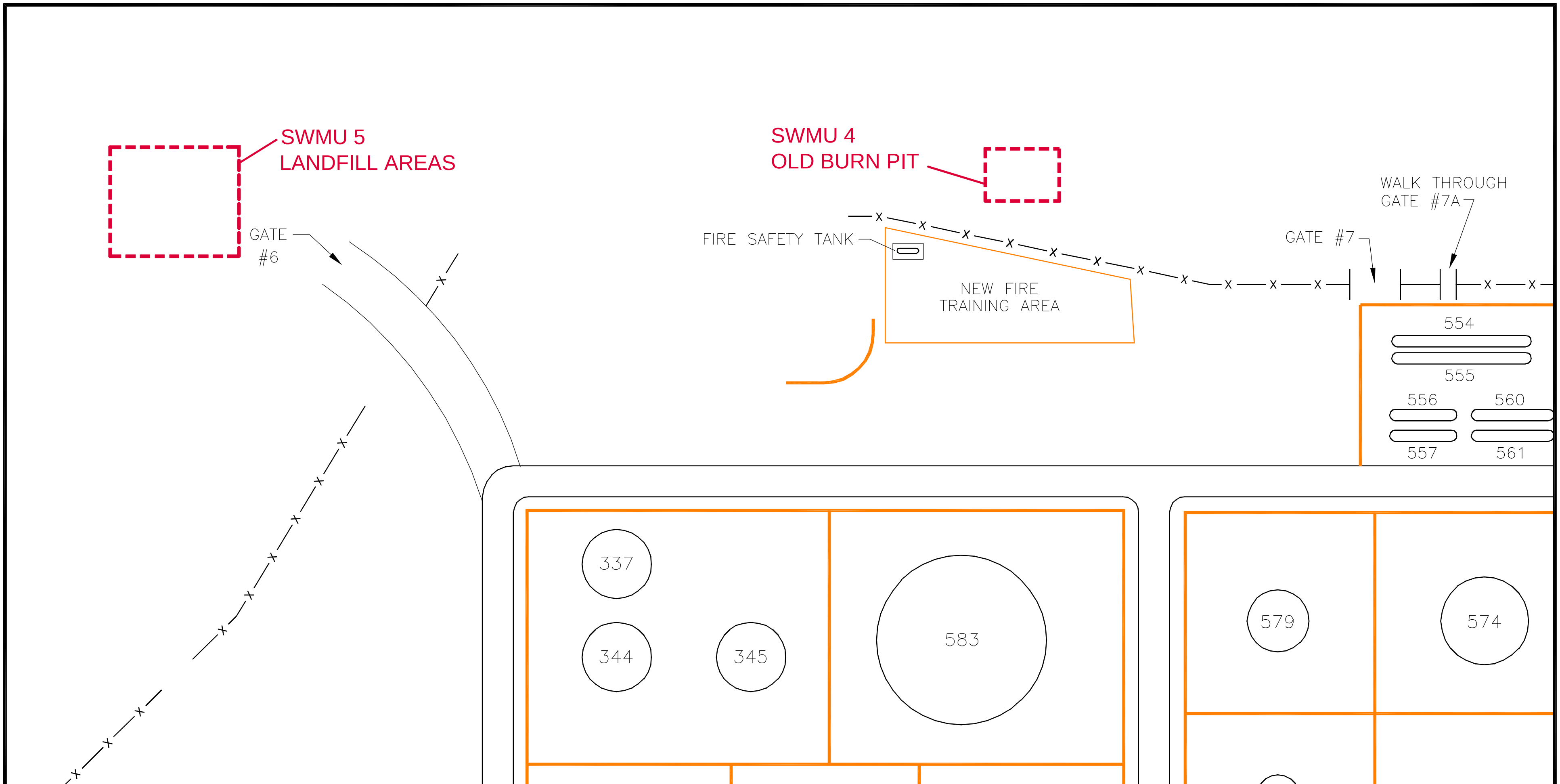

N

0 150
SCALE IN FEET

LEGEND

REFINERY PERIMETER FENCE

REFINERY AREA BERMS

SWMU LOCATIONS

Western Refining
GALLUP REFINERY

PROJ. NO.:Western Refining	DATE:11/11/15	FILE:WestRef–dA33

FIGURE 2
SWMU No. 4 & No. 5 LOCATION MAP

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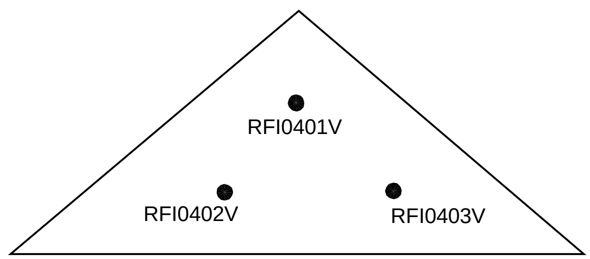

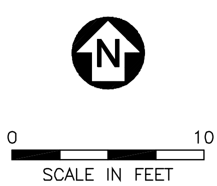

LEGEND

RFI0401V ● SOIL BORING LOCATION AND IDENTIFICATION NUMBER

Western Refining
GALLUP REFINERY

PROJ. NO.:Western Refining	DATE:11/11/15	FILE:WestRef-dA34

FIGURE 3
SWMU No. 4 OLD BURN PIT
1992 SAMPLE LOCATIONS
CINIZA REFINERY

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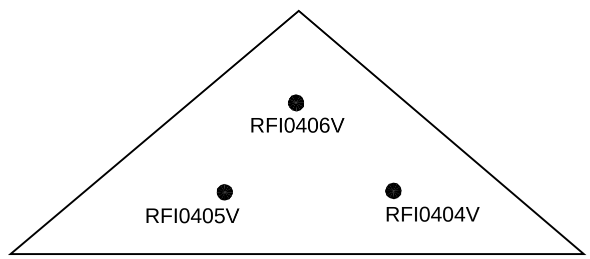

Western Refining
GALLUP REFINERY

PROJ. NO.:Western Refining	DATE:11/11/15	FILE:WestRef-dA35

FIGURE 4
SWMU No. 4 OLD BURN PIT
1994 SAMPLE LOCATIONS
CINIZA REFINERY

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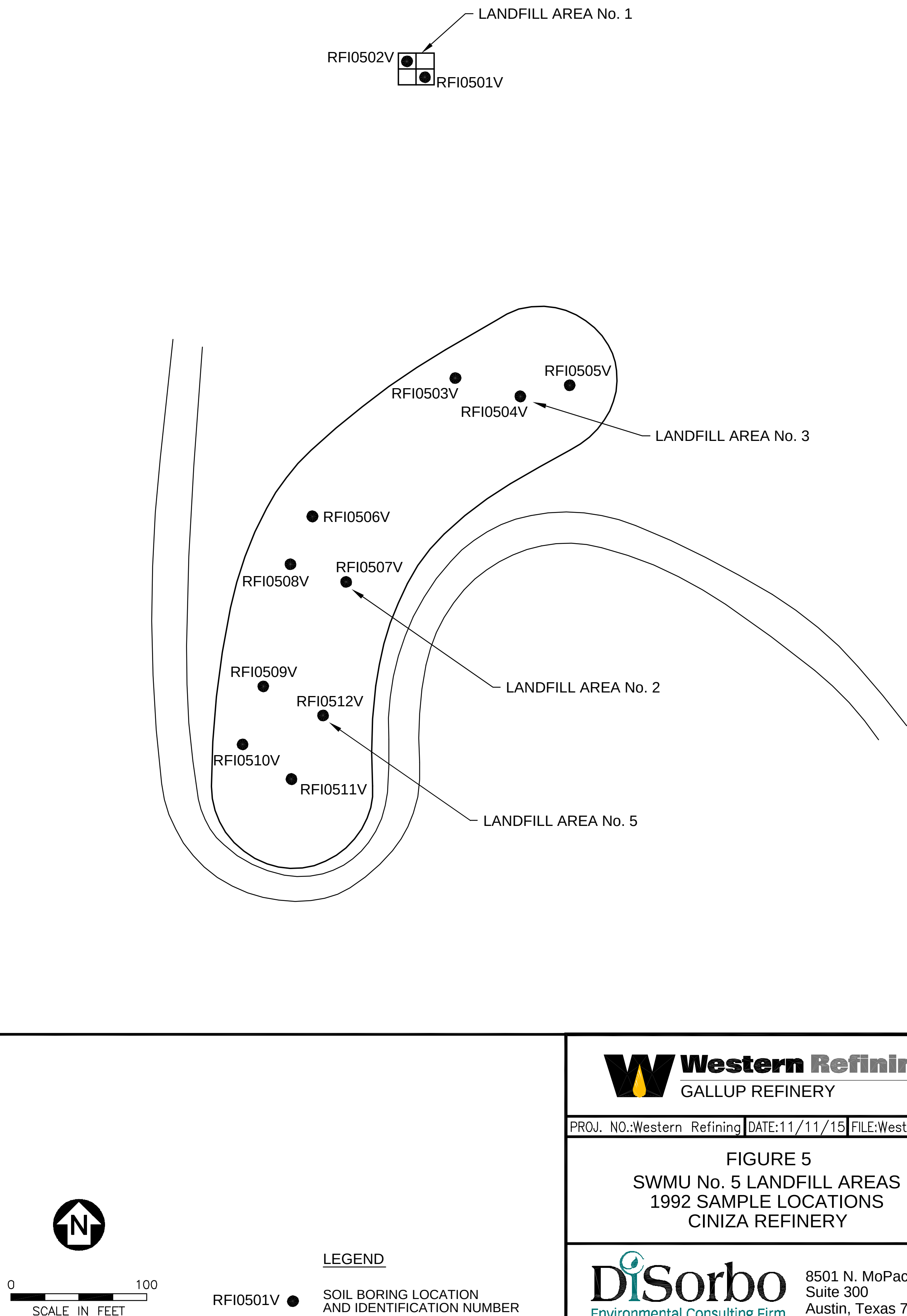
Environmental Consulting Firm
8501 N. MoPac Expy.
Suite 300
Austin, Texas 78759

N

0 10
SCALE IN FEET

LEGEND

RFI0404V ● SOIL BORING LOCATION AND IDENTIFICATION NUMBER



LEGEND

RFI0501V ● SOIL BORING LOCATION AND IDENTIFICATION NUMBER

Western Refining
GALLUP REFINERY

PROJ. NO.:Western Refining	DATE:11/11/15	FILE:WestRef-dA36

FIGURE 5
SWMU No. 5 LANDFILL AREAS
1992 SAMPLE LOCATIONS
CINIZA REFINERY

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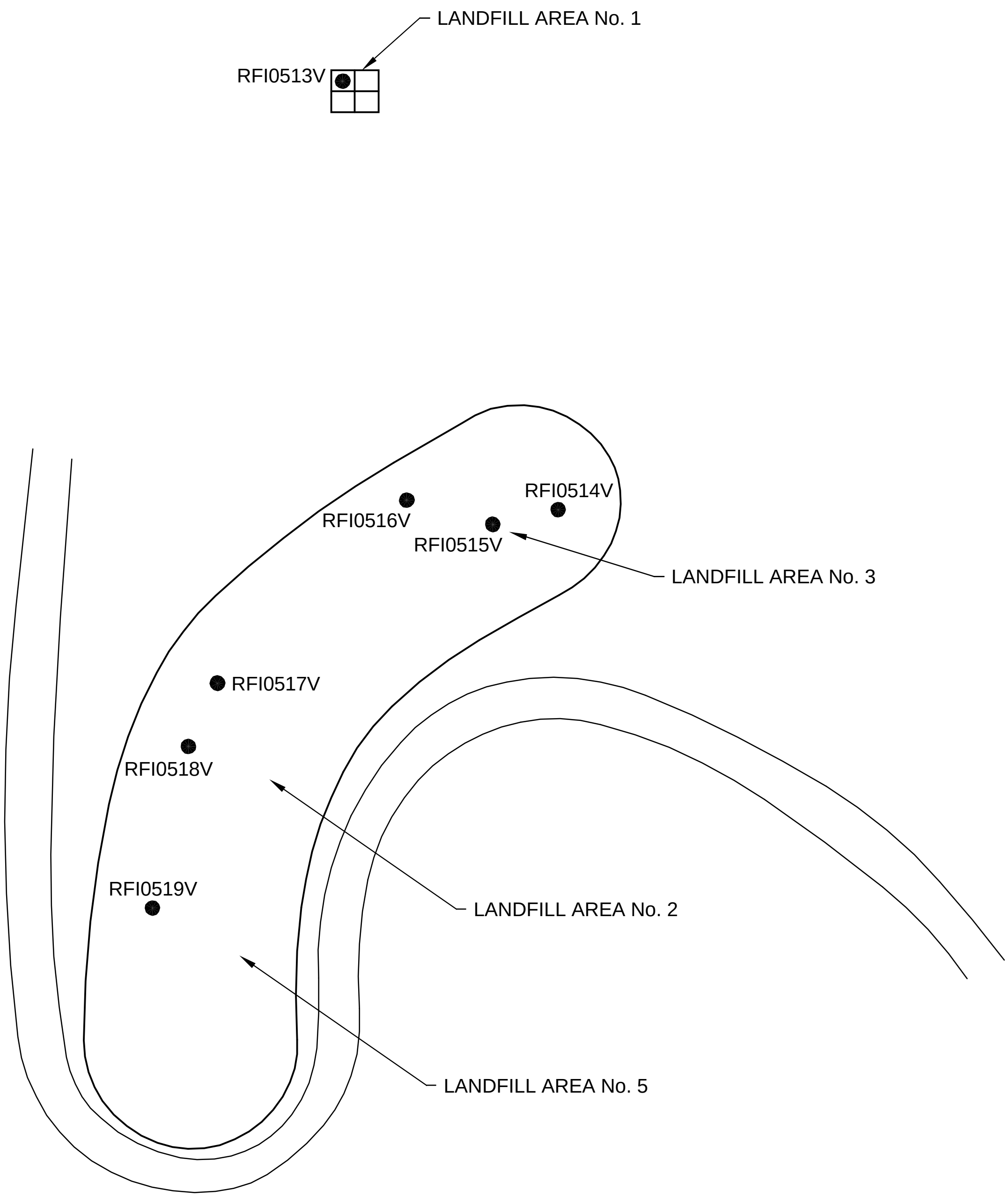

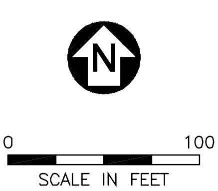

LEGEND

RFI0513V ● SOIL BORING LOCATION AND IDENTIFICATION NUMBER

Western Refining
GALLUP REFINERY

PROJ. NO.:Western Refining	DATE:11/11/15	FILE:WestRef-dA37

FIGURE 6
SWMU No. 5 LANDFILL AREAS
1994 SAMPLE LOCATIONS
CINIZA REFINERY

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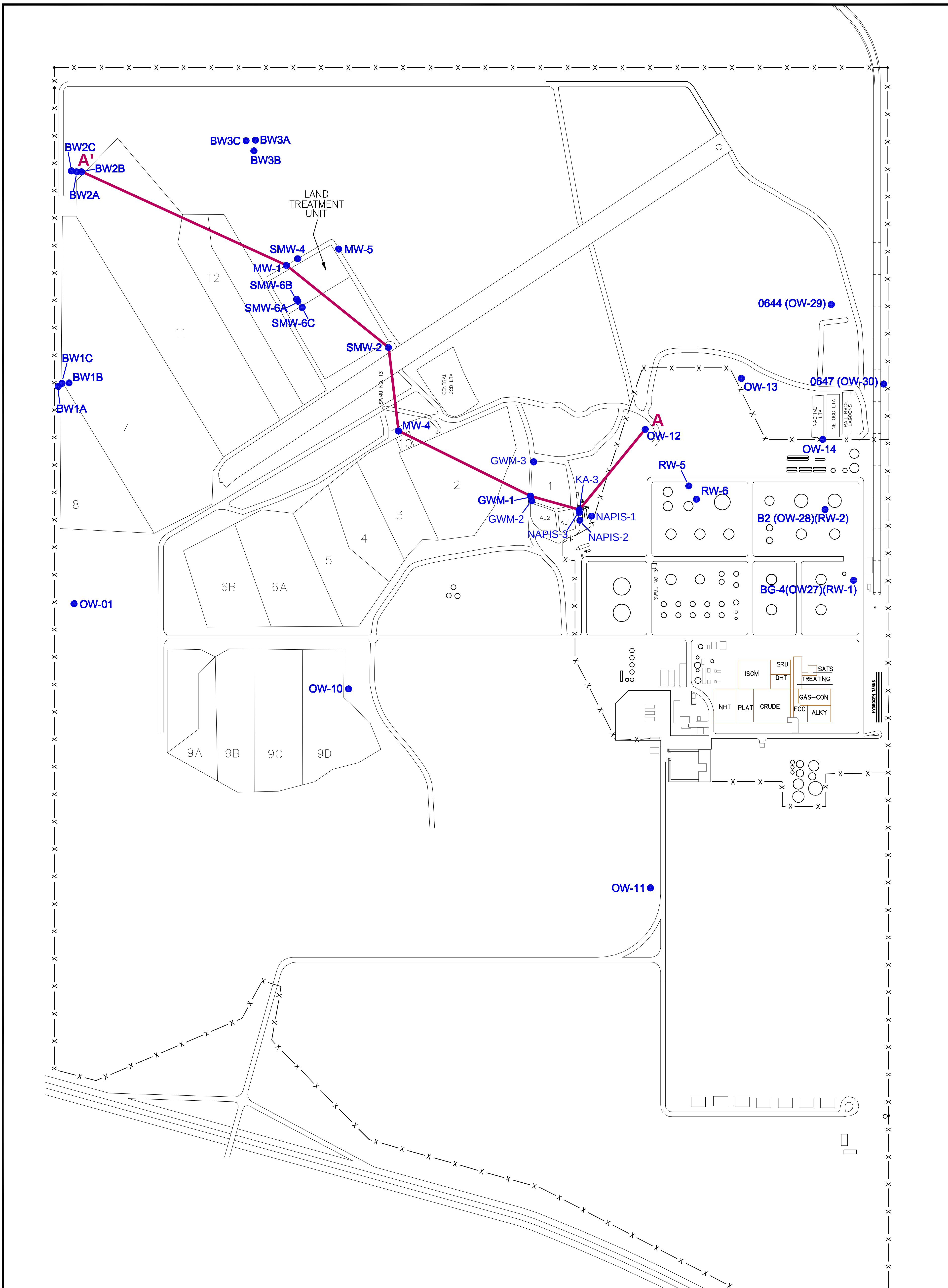

N

0 600

SCALE IN FEET

LEGEND

GWM-1 ● MONITORING WELL LOCATION

A —— A' LINE OF CROSS SECTION

Western Refining
GALLUP REFINERY

PROJ. NO.: Western Refining	DATE:11/11/15	FILE:WestRef-dB64

FIGURE 7
CROSS SECTION LOCATION MAP
GALLUP REFINERY

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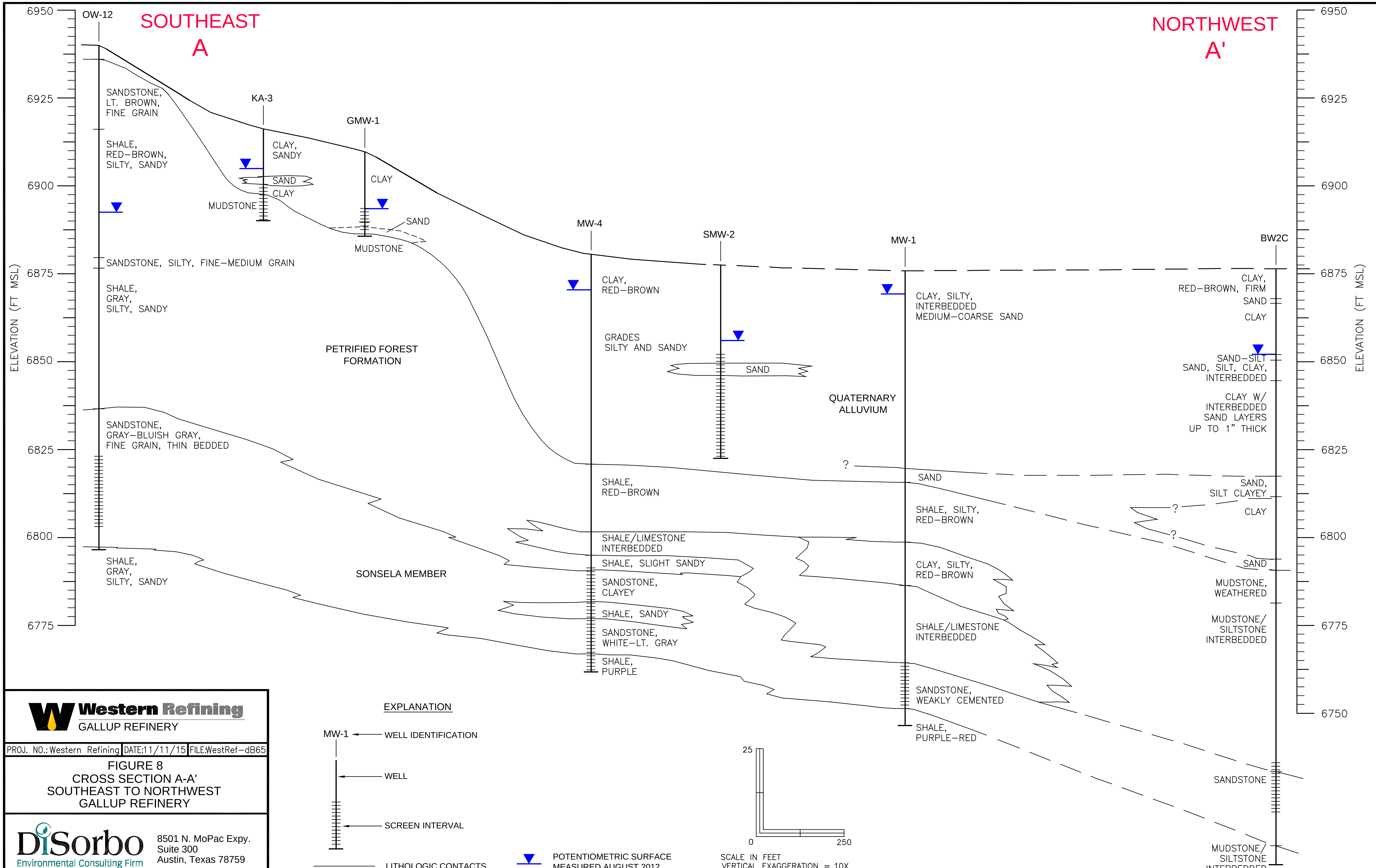

Western Refining
GALLUP REFINERY

PROJ. NO.: Western Refining | DATE: 11/11/15 | FILE: WestRef-dB65

FIGURE 8
CROSS SECTION A-A'
SOUTHEAST TO NORTHWEST
GALLUP REFINERY

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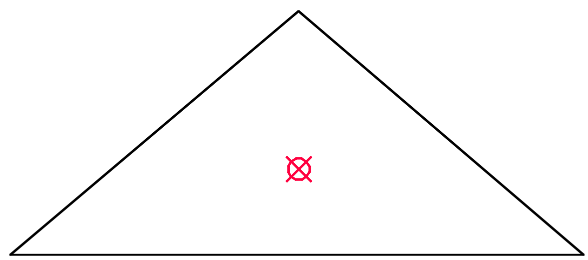
Austin, Texas 78759



N

0 10

SCALE IN FEET

LEGEND

PROPOSED SOIL BORING LOCATION

Western Refining

GALLUP REFINERY

PROJ. NO.:Western Refining	DATE:11/11/15	FILE:WestRef-dA38

FIGURE 9

SWMU No. 4 OLD BURN PIT

PROPOSED SAMPLE LOCATIONS

CINIZA REFINERY

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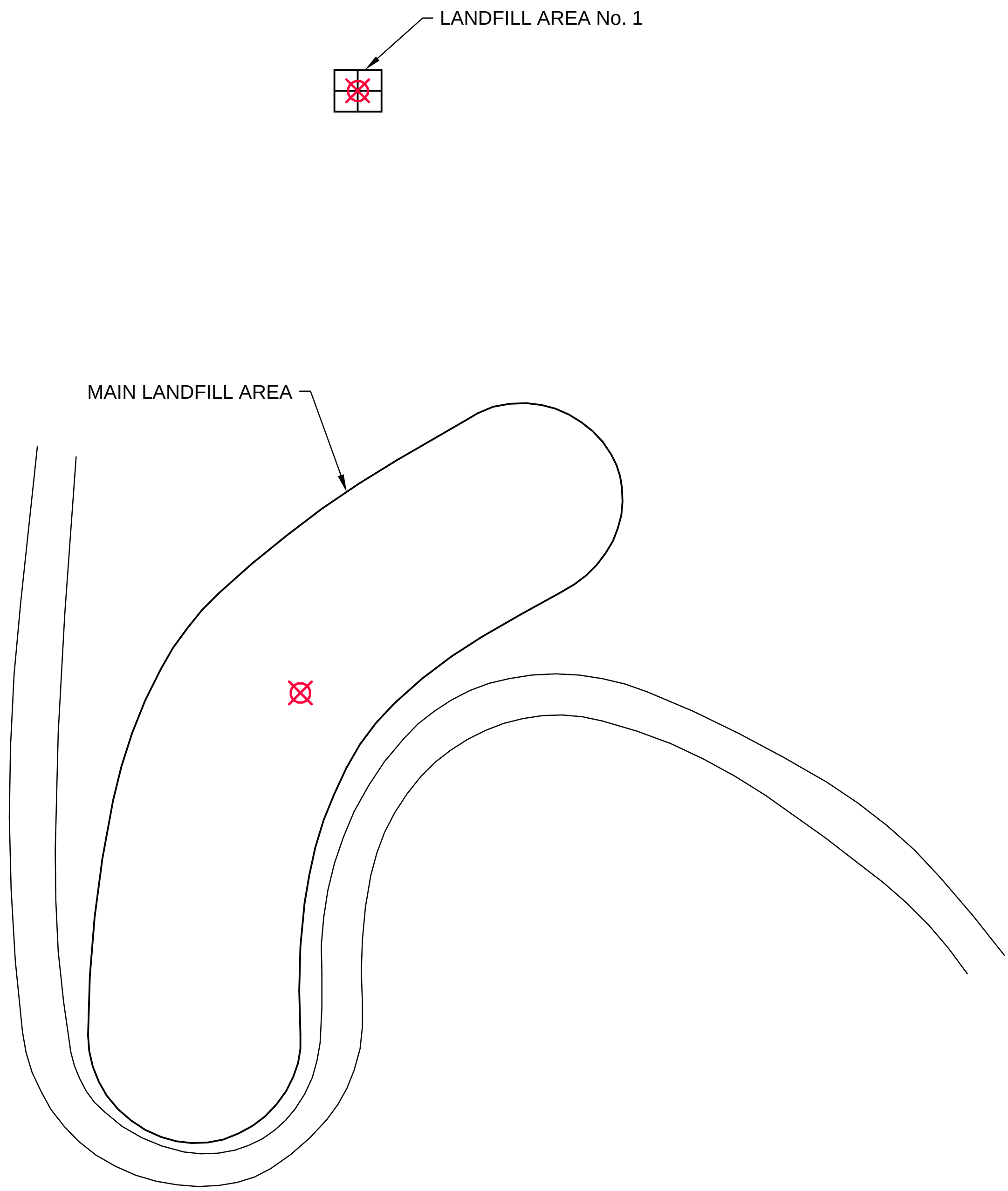
Austin, Texas 78759



0 100
SCALE IN FEET

LEGEND

PROPOSED SOIL BORING LOCATION

Western Refining
GALLUP REFINERY

PROJ. NO.:Western Refining	DATE:11/11/15	FILE:WestRef–dA39

FIGURE 10
SWMU No. 5 LANDFILL AREAS
PROPOSED SAMPLE LOCATIONS
CINIZA REFINERY

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Appendix A

Photographs

SWMU No. 5 Looking Northwest – February 2014

SWMU No. 5 Looking Northwest – February 2014

Appendix B

Field Data Sheets

DATA MANAGEMENT

Sample Location: SWMU #4 Sample Date: 5-5-92

Sample Type: SOIL

Team Leader: L. SHELTON

Sample Personnel: M BARNEY, T. ROGERS

Sampling Method: AUGER

Sample No. RFE0401V00 Sample Time/Description: 1:20 Pm CLAY
PID Ø

Sample No. RFE0401V30 Sample Time/Description: 2:35 Pm
PID - Ø

Sample No RFE0401V4.5 Sample Time/Description: 2:50 PM
PID - 6 OUTSIDE Ø SAMPLE

Sample No. ________ Sample Time/Description: ________

Sample No. ________ Sample Time/Description: ________

Surface Terrain: SLOPED, BARREN GROUND

Weather Conditions: OVERCAST, OCCASIONAL SPRINKLES, 65°F, ENE WIND @ 5-10 MPH

General Field Observations: SMOKE FROM FIRE TRAINING AREA HIT ABOUT 2:49 PM WHILE AUGERING AND LASTED FOR 12 MINUTES, PID READING WENT UP ON OUTSIDE AIR, Ø ON SAMPLE.

Boring Lithology: 0-1' SANDY CLAY TURNING TO MOIST RED CLAY, 1-2' VERIGATED CLAY, 2-2.5' LARGE SANDSTONE ROCK + BAKED CLAY, 2.5'-4.5 RED-GRAY CLAY, MOIST.

DATA MANAGEMENT

Sample Location: SWMU 4 Sample Date: 5-5-92

Sample Type: SOIL

Team Leader: L. SHELTON

Sample Personnel: M. BARNEY, T. ROGERS

Sampling Method: AUGER

Sample No. RFI0402V0.5 Sample Time/Description: 10:30 AM DRY SOIL PID-Ø

Sample No. RFI0402V3.0 Sample Time/Description: 11:10 AM BLACK LAYER PID - 4 OUTSIDE 16 SAMPLE

Sample No. RFI0402V4.5 Sample Time/Description: 1:00 PID - 4 OUT 8.4 SAMPLE

Sample No. ________ Sample Time/Description: ________

Sample No. ________ Sample Time/Description: ________

Surface Terrain: STEEP SLOPE, MOSTLY BARE, OCCASIONAL GROWTH TO 1.5 FT

Weather Conditions: PARTLY SUNNY, 70°F, 10-15 MPH EAST WIND

General Field Observations: STRICT ATTENTION PAID TO PROPER DECONTAMINATION. ALL PID READINGS @ 0-200 RANGE

BLACK LAYER REQUIRED STEAMING, SOLVENT, STEAMING AGAIN AND THEN REGULAR WASHING AND DECONTAMINATION.

Boring Lithology: 0-1' - LOOSE SANDY SOIL - GRAY TO REDDISH BROWN TURNING TO RED CLAY @ .75'. SOME COLOR VERIGATION FROM ROCKS. BLACK LAYER @ 20" SEMI-BRITTLE SOLID W/SOME TAR LIKE MATERIAL TO 39". 39" TO 51" SANDSTONE ROCK. 51" TO 54" - LIGHT RED MOIST CLAY W/SOME GRAY COLOR & SOME SAND

DATA MANAGEMENT

Sample Location: SINMU #4 Sample Date: 5-5-92

Sample Type: SOIL

Team Leader: L. SHELTON

Sample Personnel: M. BARNEY, T. ROGERS

Sampling Method: AUGER

Sample No. RFI0403V0.0 Sample Time/Description: 3:05 PM SOIL PID Ø

Sample No. RFI0403V3.0 Sample Time/Description: 3:20 PM SOIL PID 0-2000 SCALE 3.2 SAMPLE

Sample No. RFI0403V4.5 Sample Time/Description: 3:35 PM SOIL PID .8 OUTSIDE 12 SAMPLE

Sample No. ______ Sample Time/Description: ______

Sample No. ______ Sample Time/Description: ______

Surface Terrain: BROKEN TERRAIN, SPARSE VEGETATION

Weather Conditions: OVERCAST, OCCASIONAL SPRINKLES, E WIND @ 5-10 mph. 60°F.

General Field Observations: SPENT FCC CATALYST HAD BLOWN INTO THE LOWLYING AREA AND WAS SCRAPED BACK TO REVEAL ORIGINAL SURFACE FOR SAMPLING. THE BLACK LAYER REQUIRED STEAMING, SOLVENT, STEAMING, AND THEN REGULAR WASHING TO GET AUGERS AND EQUIPMENT CLEAN.

Boring Lithology: 0-1' RED & GRAY SAND/CLAY MIXED. SOME SPENT CATALYST FROM DISPOSAL AREA BLOWN IN AND MIXED WITH SAMPLE. 1'-2' VERIGATED RED SOIL. 2-2.5' ORANGE-RUSTY CLAY. 2.5'-3.25' BLACK LAYER W/SOME TAR LIKE MATERIAL. MIXED BLACK + GRAY SOIL TO 4.5' 4.5' → SOLID SANDSTONE

RFI DATA MANAGEMENT

Sample location:	SWMU #4	Sample Date:	07/29/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	J. Gearheart / L. Begay / M. Simpson / A. Arnold		
Sampling Method:	Coring		
Sample Number:	RFI 0404 V6.0	Sample Time/Description: (Include PID Reading)	1330 PID=0 Clay/Sand
Sample Number:	RFI 0404 V10.0	Sample Time/Description: (Include PID Reading)	1340 PID=0 Clay/Sand
Sample Number:	RFI 0404 V10.0D	Sample Time/Description: (Include PID Reading)	1340 PID=0 Clay/Sand
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Surface Terrain:	Flat, Bare		
Weather Conditions:	Clear, East Wind 5mph, 80°F		
Field Observations:	1.3-1.7 asphaltic		

RFI DATA MANAGEMENT

Sample location:	SWMU #4	Sample Date:	07/29/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	N. Luchetti / M. Simpson / W. Toomer / L. Begay		
Sampling Method:	Coring		
Sample Number:	RFI 0405V600	Sample Time/Description: (Include PID Reading)	1415 PID=0 Clay/Sand
Sample Number:	RFI 0405V1000	Sample Time/Description: (Include PID Reading)	1420 PID=0 Clay/Sand
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Surface Terrain:	Flat		
Weather Conditions:	Clear, East Wind 5mph, 80°F		
Field Observations:			

RFI DATA MANAGEMENT

Sample location:	SWMU #4	Sample Date:	07/29/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	M. Simpson / W. Turner / N. Luchetti / A. Arnold		
Sampling Method:	Coring		
Sample Number:	RFI0406V10.0	Sample Time/Description: (Include PID Reading)	1450 PID=0 clay
Sample Number:	RFI0406V12.0	Sample Time/Description: (Include PID Reading)	1500 PID=0 Sand
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Surface Terrain:			
Weather Conditions:	Clear, East wind, 80°F		
Field Observations:			

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-15-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. RFI0501V0.0 Sample Time/Description: 8:30 AM DRY SOIL PID - Ø

Sample No. 0501V3.0 Sample Time/Description: 8:40 AM DAMP SOIL PID - Ø

Sample No. 0501V7.0 Sample Time/Description: 8:50 AM MOIST SOIL PID - Ø

Sample No. 0501V9.5 Sample Time/Description: 9:00 AM MOIST SOIL PID - Ø

Sample No. 0501D9.5 Sample Time/Description: 9:00 AM MOIST SOIL PID - Ø

Surface Terrain: FLAT, HEAVY SURFACE VEGETATION. AROUND PERIMETER IS BRUSH 3-4' HIGH

Weather Conditions: CLEAR, 65°F, E WIND @ 2-5 MPH

General Field Observations:

Boring Lithology: 0-1' RED CLAY, 1'-3' MULTICOLORED SOIL W/SOME METAL DEBRIS, RUSTY, 3'-7' RED CLAY, VERY MOIST @ 7'-7.5' WITH MOSTLY GRAVEL LAYER. 7.5'-9.0' RED CLAY W/SOME GRAY STREAKING.

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-14-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. RFI0502V0.0 Sample Time/Description: 9:00AM DRY SOIL PID-Ø

Sample No. 0502V3.0 Sample Time/Description: 9:20AM DAMP SOIL PID-Ø

Sample No. 0502V7.0 Sample Time/Description: 9:30AM MOIST SOIL PID-Ø

Sample No. 0502V9.5 Sample Time/Description: 9:40AM MOIST SOIL PID-Ø

Sample No. 0502E9.5 Sample Time/Description: 9:45AM WATER

Surface Terrain: FLAT, DENSE SURFACE VEGETATION. BRUSH AROUND PERIMETER TO 4'.

Weather Conditions: CLEAR, 65°F, ESE WIND @ 2-3 mph.

General Field Observations:

Boring Lithology: 0-1.5' RED CLAY. 1.5-3.5' MULTICOLORED SOIL W/SOME DEBRIS. 3.5-7' RED/GRAY CLAY. 7'-8' GRAVEL W/SOME WATER. 8'-9.5' RED/GRAY CLAY. DISTINCT GRAY BAND AT 9.0'. 3" THICK.

DATA MANAGEMENT

Sample Location: SLWMU #5 Sample Date: 5-14-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. RFF0503V0.0 Sample Time/Description: 11:15AM DRY SOIL PID - Ø

Sample No. 0503V3.0 Sample Time/Description: 11:25AM DRY SOIL PID - Ø

Sample No. 0503V7.0 Sample Time/Description: 11:35AM DRY SOIL PID - Ø

Sample No. 0503V9.5 Sample Time/Description: 1Ø:45AM DRY SOIL PID - Ø

Sample No. 0503D9.5 Sample Time/Description: 11:45AM DRY SOIL PID - Ø

Surface Terrain: FLAT, SURFACE GROWTH TO 1½'.

Weather Conditions: CLEAR, 75°F, W WIND @ 5-10 mpH

General Field Observations:

Boring Lithology: 0-3' DEBRIS/SOIL. 3' TO 5' MIXED RED/WHITE CLAY W/SOME DEBRIS AND ROCK. 5'-9.5' RED CLAY

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-13-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY + T ROGERS

Sampling Method: AUGER

Sample No. RFI0504V0.0 Sample Time/Description: 1:00 DRY SOIL PID - Ø

Sample No. 0504V3.0 Sample Time/Description: 1:10 DRY SOIL PID - .01

Sample No. 0504V7.0 Sample Time/Description: 1:20 DRY SOIL PID - Ø

Sample No. 0504V9.5 Sample Time/Description: 1:30 DRY SOIL PID - .4

Sample No. 0504E9.5 Sample Time/Description: WATER

Surface Terrain: FLAT, SURFACE GROWTH TO 1½'

Weather Conditions: CLEAR, 75°F, W WIND @ 5-10 MPH

General Field Observations: SIDES OF HOLE ARE SLOUGHING BADLY BETWEE 1 + 7'. STRONG CHANCE OF SOME CROSS CONTAMINATION.

Boring Lithology: 0-1' - CLAY/SAND MIX, 1' - 7' DEBRIS + DISCOLORED SOIL (RUSTY + BROWN), 7'-8' MIXED SOIL + CONCRETE, 8'-9.5' RED CLAY

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-14-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. RFI0505V0.0 Sample Time/Description: 1:40 DRY SOIL PID - Ø

Sample No. RFI0505V3.0 Sample Time/Description: 1:50 SOIL PID - Ø

Sample No. RFI0505V7.0 Sample Time/Description: 2:00 SOIL PID - Ø

Sample No. RFI0505V9.5 Sample Time/Description: 2:10 SOIL PID - Ø

Sample No. ~~RFI0505V~~ Sample Time/Description:

Surface Terrain: SHALLOW SLOPE, SURFACE VEGETATION TO 1 1/2'

Weather Conditions: CLEAR, 75°F, W WIND @ 5-10 mPH

General Field Observations:

Boring Lithology: 0-1' MIXED CLAY/SAND. 1-1.5' BAND OF SOIL + DEBRIS. 1.5-6' . RED CLAY W/SOME SAND. 6'-7' SLIGHTLY RUSTY BAND. 7-9.5' DENSE RED CLAY

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-12-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. RFI0506V0.0 Sample Time/Description: 2:30 PM DRY SOIL PID - Ø

Sample No. 0506V3.0 Sample Time/Description: 2:45PM MOIST SOIL PID - Ø

Sample No. 0506V7.0 Sample Time/Description: 3:00 PM MOIST SOIL PID - Ø

Sample No. 0506V9.5 Sample Time/Description: 3:10 PM MOIST SOIL PID - Ø

Sample No. ________ Sample Time/Description: ________

Surface Terrain: OPEN, SLIGHT SLOPE, SCATTERED SURFACE VEGETATION

Weather Conditions: CLEAR, 75°F, WNW WIND @ 5-10 MPH

General Field Observations: ________

Boring Lithology: 0-2.5' MIXED CLAY/SAND 2.5'-7.5' RED CLAY W/MIXED ROCK AND GRAY CLAY. 2" LAYER OF SAND AT 6.0'. 7.5' TO 9.0' UNCONSOLIDATED CLAY/SAND/ROCK WITH 3 NARROW COLOR BANDS (RUSTY). 9.0-9.5' DENSE RED CLAY.

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-12-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. RFI0507V0.0 Sample Time/Description: 12:50 PM DRY SOIL PID-Ø

Sample No. 0507V3.0 Sample Time/Description: 1:00 PM DRY SOIL PID-Ø

Sample No. 0507V7.0 Sample Time/Description: 1:20 PM DRY SOIL PID-Ø

Sample No. 0507V9.5 Sample Time/Description: 1:40 PM DRY SOIL PID-Ø

Sample No. 0507D9.5 Sample Time/Description: 1:40 PM DRY SOIL PID-Ø

Surface Terrain: OPEN, SHALLOW SLOPE, SPARSE SURFACE VEGETATION

Weather Conditions: CLEAR, 70°F, W WIND @ 5 mpH (GUSTS TO 10-15 mpH)

General Field Observations:

Boring Lithology: 0-.5' CLAY/SAND/ROCKS, .5-3.5' DARKER BROWN CLAY/WITH WHITE (OR GRAY) CLAY MIXED. 3.5'-5.0' - RED CLAY W/SOME LIGHTER SPECKS. 5.0-7.0' - CLAY/SAND MIX WITH 60% ROCK, GRAVEL, AND RUSTY MATERIAL. 7'-9.5' MOSTLY RED CLAY W/SOME LIGHTER COLORING

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-12-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. REI0508V0.0 Sample Time/Description: 3:20 PM DAMP SOIL PID - Ø

Sample No. 0508V3.0 Sample Time/Description: 3:25 PM DRY SOIL PID - Ø

Sample No. 0508V7.0 Sample Time/Description: 3:35 PM DRY SOIL PID - Ø

Sample No. 0508V9.5 Sample Time/Description: 3:50 PM DRY SOIL PID - Ø

Sample No. 0508D9.5 Sample Time/Description: 3:50 PM DRY SOIL PID - Ø

Surface Terrain: SLOPE, HEAVY GROWTH.

Weather Conditions: CLEAR, 75°F, W WIND @ 10 MPH

General Field Observations:

Boring Lithology: 0-1.5' - CLAY/SAND MIX. 1.5-4.0' WHITE/RED CLAY MIX WITH SOME ROCK. 4.0-5.0' MIXED COLORED SOIL. 5.0-7.5' MOSTLY RED CLAY/SAND. 7.5-9.5' MIXED CLAY/SAND/ROCK.

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-13-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. RFI0509V0.0 Sample Time/Description: 10:40AM DRY SOIL PID-Ø

Sample No. 0509V3.0 Sample Time/Description: 10:50AM DRY SOIL PID-Ø

Sample No. 0509V7.0 Sample Time/Description: 11:00AM DRY SOIL PID-Ø

Sample No. 0509V9.5 Sample Time/Description: 11:10AM DRY SOIL PID-Ø

Sample No. 0509E9.5 Sample Time/Description: 11:20AM WATER

Surface Terrain: FLAT, SCATTERED SURFACE GROWTH

Weather Conditions: CLEAR, 70°F, W WIND @ 5-10mpH

General Field Observations:

Boring Lithology: 0-3' RED CLAY w/SOME SAND, 3-7.5' MIXED SOIL & ROCK, 7.5-8.5' ROCK W SOME SOIL (60-40 mix) 8.5-9.5 RED CLAY.

0-.5' MIXED SOIL & DEBRIS 1/4" LAYER OF BLACK CARBON MATERIAL @ .5'. .5-7.0' MIXED RED/GRAY CLAY.

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-14-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. RFI0510V0.0 Sample Time/Description: 10:10 AM DRY SOIL PID - Ø

Sample No. 0510V3.0 Sample Time/Description: 10:20 AM DAMP SOIL PID Ø

Sample No. 0510V7.0 Sample Time/Description: 10:30 AM DAMP SOIL PID Ø

Sample No. 0510V9.5 Sample Time/Description: 10:40 DAMP SOIL PID

Sample No. ______ Sample Time/Description: ______

Surface Terrain: OPEN, MOSTLY FLAT, SCATTERED DEBRIS

Weather Conditions: CLEAR, 70°F, W WIND @ 5 MPH

General Field Observations: ______

Boring Lithology: 0-1.5' MIXED SOIL AND DEBRIS, 1.5'-5' RED CLAY / SAND MIX SOME DEBRIS. 5-5.5' ROCK / GRAVEL / SAND LAYER 5.5-6.5' RED CLAY / SAND. 6.5-7.0' ROCK / GRAVEL / SAND LAYER. 7.0-9.5' RED CLAY / SAND.

DATA MANAGEMENT

Sample Location: SWMU # 5 Sample Date: 5-13-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. RFI0511V0.0 Sample Time/Description: 8:30Am DRY SOIL PID - Ø

Sample No. RFI0511V3.0 Sample Time/Description: 8:45Am MOIST SOIL PID - Ø

Sample No. 0511V7.0 Sample Time/Description: 9:00Am MOIST SOIL PID - Ø

Sample No. 0511V9.5 Sample Time/Description: 9:05Am DRY SOIL PID - Ø

Sample No. Sample Time/Description:

Surface Terrain: SLOPE, OPEN GROUND IN LANDFILL

Weather Conditions: CLEAR, 60°F, NNW WIND @ 5 mph

General Field Observations:

Boring Lithology: 0-2' RED/WHITE CLAY W/SOME SAND. 2-7' RED CLAY, SOME THIN LAYERS OF ROCK OR GRAVEL. 7-9.5' BROKEN ROCK / UNCONSOLIDATED SOIL

DATA MANAGEMENT

Sample Location: SWMU #5 Sample Date: 5-13-92

Sample Type: SOIL

Team Leader: L SHELTON

Sample Personnel: M BARNEY, T ROGERS

Sampling Method: AUGER

Sample No. 2FI0512V0.0 Sample Time/Description: 9:15AM DRY SOIL PID - Ø

Sample No. 0512V3.0 Sample Time/Description: 9:50Am PID - Ø MOIST SOIL

Sample No. 0512V7.0 Sample Time/Description: 10:10Am DRY SOIL PID - Ø

Sample No. 0512V9.5 Sample Time/Description: 10:20Am DRY SOIL PID - Ø

Sample No. 0512D9.5 Sample Time/Description: 10:20Am DRY SOIL PID - Ø

Surface Terrain: FLAT, OPEN BOTTOM OF LANDFILL, SCATTERED SURFACE GROWTH

Weather Conditions: CLEAR, 60°F, WNW WIND @ 5 mph

General Field Observations:

Boring Lithology: 0-3' RED CLAY / SAND. 3'-5' RED / WHITE CLAY MIX W/SOME ROCK & SAND, 5-7.5' MIXED SOIL & ROCK (60-40 MIX) 7.5+8.5' ROCKY LAYER, RUSTY COLOR W/SOME SOIL (80-20 MIX) 8.5-9.5' RED CLAY.

RFI DATA MANAGEMENT

Sample location:	SWMU #5	Sample Date:	07/28/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	J.Gearheart / A. Arnold / L. Begay		
Sampling Method:	Coring		
Sample Number:	RFI 0513 V.11.0	Sample Time/Description: (Include PID Reading)	9:15 PID = 0 Clay/Silty
Sample Number:	RFI 0513 V.16.0	Sample Time/Description: (Include PID Reading)	9:25 PID = 230 Clay/Sand
Sample Number:	RFI 0513 V.20.0	Sample Time/Description: (Include PID Reading)	9:38 PID = 0 Clay/Sand
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Surface Terrain:			
Weather Conditions:	Clear, East Winds 5mph, Temp 80°F		
Field Observations:	Miscellaneous Debris (2.8-5.0') (metal, wood, glass) PID 500-750		

RFI DATA MANAGEMENT

Sample location:	SWMU#5	**Sample Date:**	07/28/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	D. Gearheart / A. Arnold / L. Begay / M. Simpson		
Sampling Method:	Coring		
Sample Number:	RFI0514V11.0	**Sample Time/Description: (Include PID Reading)**	10:15 PID=0 Clay/Silty
Sample Number:	RFI0514V16.0	**Sample Time/Description: (Include PID Reading)**	10:30 PID=0 Clay/Silty
Sample Number:	RFI0514V20.0	**Sample Time/Description: (Include PID Reading)**	10:40 PID=0 Clay/Sand.
Sample Number:		**Sample Time/Description: (Include PID Reading)**	
Sample Number:		**Sample Time/Description: (Include PID Reading)**	
Sample Number:		**Sample Time/Description: (Include PID Reading)**	
Surface Terrain:			
Weather Conditions:	Clear, West Wind 5mph, Partly Cloudy, Temp 85°F		
Field Observations:	Miscellaneous Debris (0.-2.5') PID=0 (wood, rubber, plastic)		

RFI DATA MANAGEMENT

Sample location:	SWMU #5	**Sample Date:**	07/28/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	J. Gearheart/L. Begay/A. Arnold/M. Simpson		
Sampling Method:	Coring		
Sample Number:	RFI 0515 V11.0	**Sample Time/Description: (Include PID Reading)**	11:30 PID=0 Clay/Sand
Sample Number:	RFI 0515 V16.0	**Sample Time/Description: (Include PID Reading)**	11:50 PID=0 Clay/Sand
Sample Number:	RFI 0515 V20.0	**Sample Time/Description: (Include PID Reading)**	12:00 PID=0 Clay
Sample Number:		**Sample Time/Description: (Include PID Reading)**	
Sample Number:		**Sample Time/Description: (Include PID Reading)**	
Sample Number:		**Sample Time/Description: (Include PID Reading)**	
Surface Terrain:			
Weather Conditions:	Clear, West Winds 6mph, Partly Cloudy, Temp 87°F		
Field Observations:	Debris 6.0'		

RFI DATA MANAGEMENT

Sample location:	SWMU#5	Sample Date:	07/28/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	D.Gearheart/L.Begay/M.Simpson		
Sampling Method:	Coring		
Sample Number:	RFI0516V11.0	Sample Time/Description: (Include PID Reading)	1445 PID=0 Clay/Sand
Sample Number:	RFI0516V16.0	Sample Time/Description: (Include PID Reading)	1455 PID=0 Clay/Sand
Sample Number:	RFI0516V20.0	Sample Time/Description: (Include PID Reading)	1500 PID=0 Clay/Sand
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Surface Terrain:			
Weather Conditions:	Cloudy, East Winds 5mph, 75°F		
Field Observations:			

RFI DATA MANAGEMENT

Sample location:	SWMU #5	Sample Date:	07/28/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	J. Gearheart / L. Begay / M. Simpson		
Sampling Method:	Coring		
Sample Number:	RFI0517V11.0	Sample Time/Description: (Include PID Reading)	1535 PID=0 Clay/Sand
Sample Number:	RFI0517V16.0	Sample Time/Description: (Include PID Reading)	1545 PID=0 Clay/Sand
Sample Number:	RFI0517V20.0	Sample Time/Description: (Include PID Reading)	1555 PID=0 Clay
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Surface Terrain:			
Weather Conditions:	Cloudy, Northeast Wind 5mph, 85°F		
Field Observations:			

RFI DATA MANAGEMENT

Sample location:	SWMU #5	Sample Date:	Ø7/29/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	J. Gearheart / L. Begay / M. Simpson / A. Arnold		
Sampling Method:	Coring		
Sample Number:	RFI Ø518 V 11.Ø	Sample Time/Description: (Include PID Reading)	0847 PID=Ø Clay/Sand
Sample Number:	RFI 0518 V 16.Ø	Sample Time/Description: (Include PID Reading)	0857 PID=Ø Sand/Clay
Sample Number:	RFI Ø518 V 2ØØ	Sample Time/Description: (Include PID Reading)	0904 PID=Ø Clay/Sand
Sample Number:	* RFI Ø518 V 16.ØD	Sample Time/Description: (Include PID Reading)	0857
Sample Number:	* RFI Ø518 V 11.ØE	Sample Time/Description: (Include PID Reading)	0847
Sample Number:		Sample Time/Description: (Include PID Reading)	
Surface Terrain:			
Weather Conditions:	Clear, East Wind 5 mph, 75°F		
Field Observations:			

RFI DATA MANAGEMENT

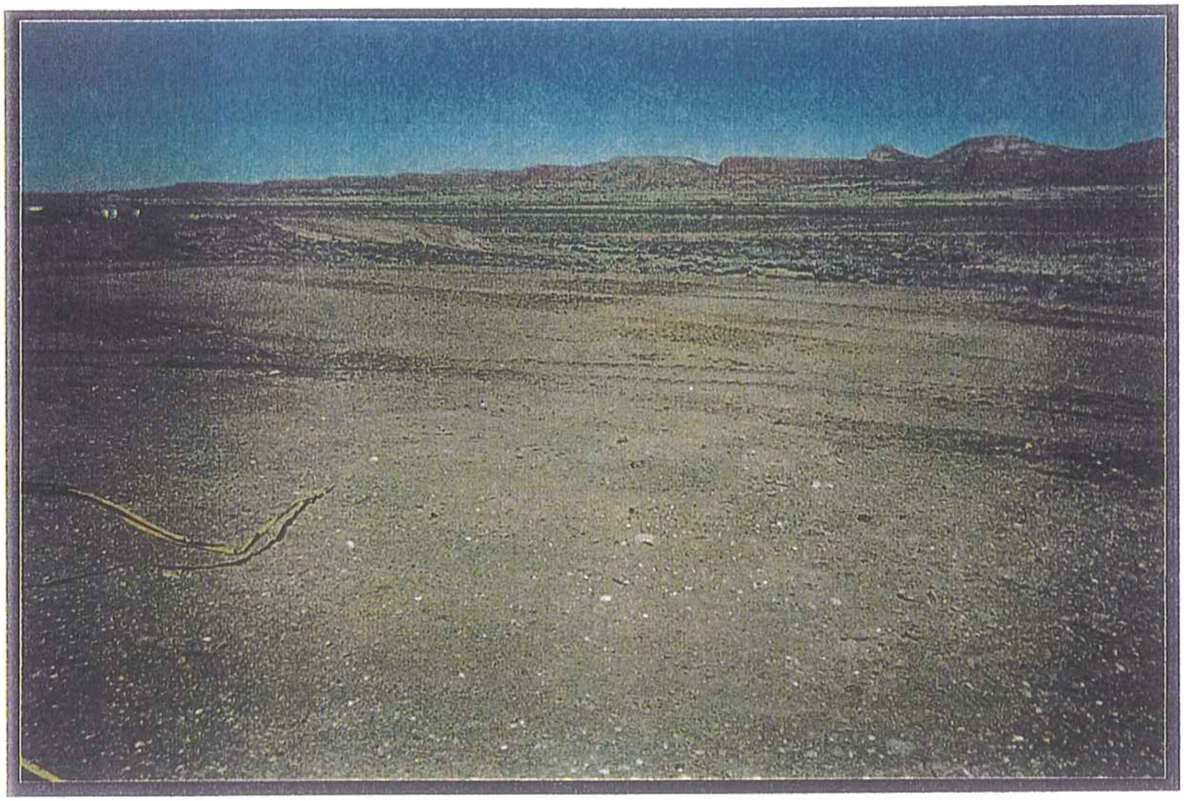
Sample location:	SWMU #5	Sample Date:	07/29/94
Sample Type:	SOIL		
Team Leader:	Lynn Shelton		
Sample Personnel:	D. Gearheart / L. Begay / M. Simpson / A. Arnold		
Sampling Method:	Coring		
Sample Number:	RFI 0519 V11.0	Sample Time/Description: (Include PID Reading)	0945 PID=0 Clay/Shale
Sample Number:	RFI 0519 V16.0	Sample Time/Description: (Include PID Reading)	1000 PID=0 Clay/Shale
Sample Number:	RFI 0519 V20.0	Sample Time/Description: (Include PID Reading)	1005 PID=0 Clay/Shale
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Sample Number:		Sample Time/Description: (Include PID Reading)	
Surface Terrain:			
Weather Conditions:	Clear, East Wind 5mph, 78°F		
Field Observations:	Wind has changed 5-10mph Westerly, 1000		

Appendix C

SWMU No. 4 Summary Report

SWMU #4 Summary Report

Old Burn Pit Area
Ciniza Refinery
McKinley County, New Mexico



Prepared for:

Ciniza Refinery
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

Prepared by:

Practical Environmental Services, Inc.
1444 Wazee Street, Suite 225
Denver, Colorado 80202

Job No. 98-205-03

April 23, 1998

All samples detected trace VOCs and SVOCs; of which, di methyl phthalate at 18 mg/kg was the highest detection. Most of the remaining constituents were detected in much lower concentrations, typically less than 3 mg/kg.

Per EPA request, a second round of sampling and analysis was conducted at depths of 6 and 10 feet below ground surface. Methyl ethyl ketone was detected in one sample at 1.2 mg/kg and at a depth of 6 feet. All other samples found no detection of VOCs or SVOCs; including all samples collected at 10 feet below ground surface.

All samples detected trace metals; of which, chromium and nickel were detected at levels slightly above ambient background concentration.

6.0 ASSESSMENT

Based on the site inspection and data review, the old burn pit area is assessed as follows.

- The old burn pit area has been covered with an earthen cap using methods and materials consistent with State of New Mexico Environment Department requirements and regulations as set forth in 20 NMAC 9.1 Section 502.

- Residual organic contaminants are present in very low concentrations, confined to a 6 foot soil layer within the SWMU, and substantially consist of heavy molecular weight compounds with low mobility. These compounds are resistant to biodegradation and, as a result, containment is a preferred remedy to natural attenuation via tilling and aeration. The latter technique will expose soil metals to oxidation and precipitation; thereby mobilizing these contaminants and promoting migration.

- Residual metal contaminants are also present at very low levels; most of which fall within the range of ambient background concentration. However, chromium and nickel are present at slightly elevated levels and, as a result, isolation and containment is the preferred remedy.

- Local soil underlying this site has a very low hydraulic conductivity which effectively inhibits outward migration of contaminants. Similar low hydraulic conductivity soil has been used to cap the site and inhibit the infiltration of precipitation.

- The installation of the soil cap represents an appropriate remedy for the site.

7.0 PROFESSIONAL ENGINEER'S CERTIFICATION

This summary report for SWMU #4 has been prepared under the direct supervision and control of a Registered Professional Engineer.

Client: Ciniza Refinery
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

Job No.: 98-205-03

Date: April 23, 1998

Prepared and Certified by:

Thomas D. Atwood, P.E.
Colorado Registration No. 22866

Figure No. 1
Old Burn Pit Area

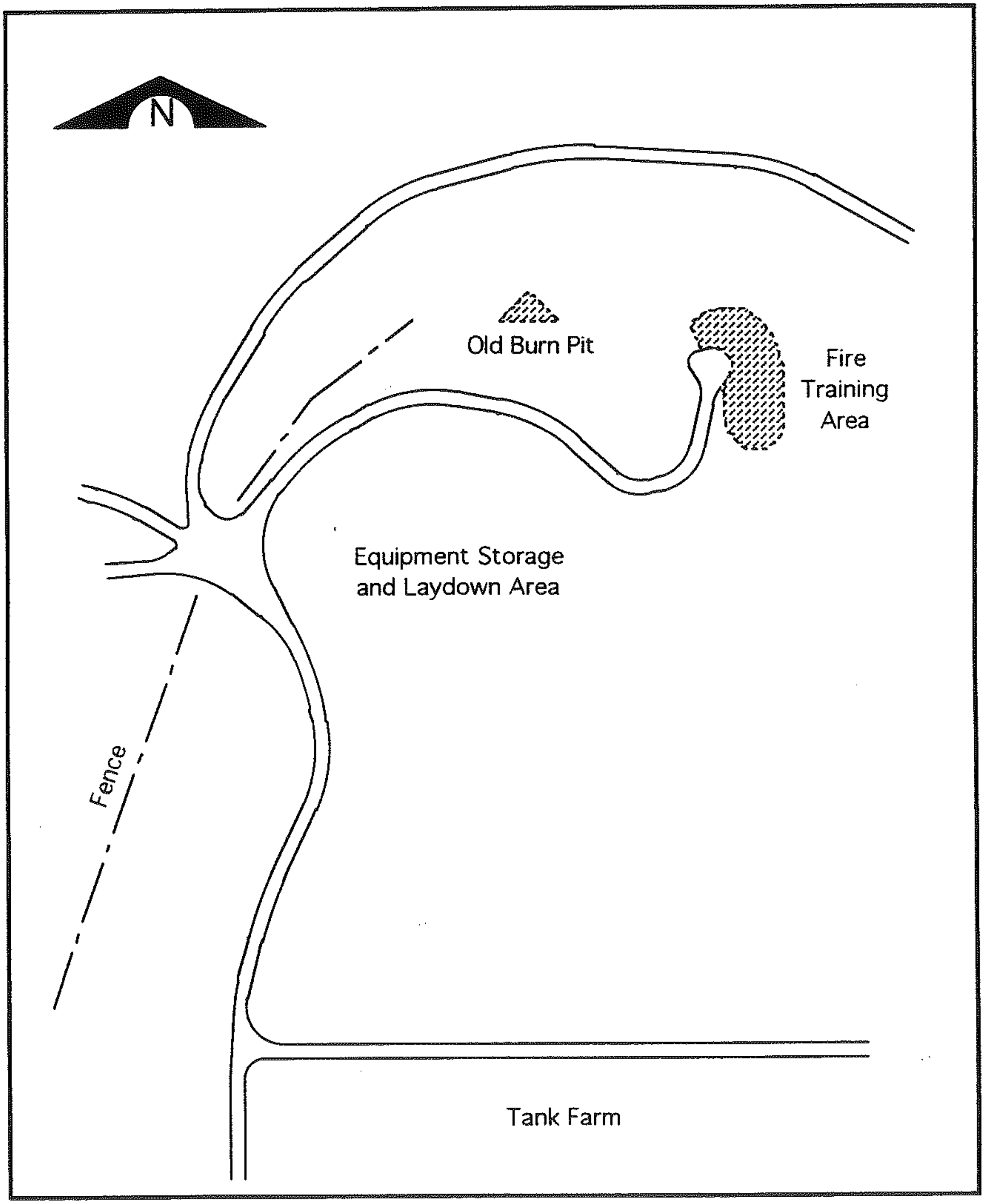


Figure 4-2. SWMU No. 4, Old Burn Pit

Figure 4-3. SWMU No. 4, Old Burn Pit

Appendix D

SWMU No. 5 Closure Certification Report

SWMU #5 Closure Certification Report

Solid Waste Landfill Areas
Ciniza Refinery
McKinley County, New Mexico

Prepared for:

Ciniza Refinery
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

Prepared by:

Practical Environmental Services, Inc.
1444 Wazee Street, Suite 225
Denver, Colorado 80202

Job No. 98-205-03

April 23, 1998

1.0 EXECUTIVE SUMMARY

Practical Environmental Services, Inc. (PES) has been retained by Giant-Ciniza Refinery (Ciniza) to perform detailed engineering design, construction oversight, and installation verification of a cap and related closure requirements for several solid waste landfill areas located within the Ciniza Refinery, in McKinley County, New Mexico.

These solid waste landfill areas were identified as a Solid Waste Management Unit (SWMU), and designated as SWMU #5, during a RCRA Facility Investigation conducted at the refinery in the early 1990's. This investigation included soil sampling and analysis, detected trace metals, and recommended corrective action.

In 1994, the Environmental Protection Agency Region VI Office (EPA) requested additional sampling at greater depth. Results confirmed previous findings. A voluntary corrective action plan (CAP) was prepared by Ciniza and approved by the EPA in 1994. The approved CAP was implemented in 1998.

Closure of SWMU #5 is now being performed in conjunction with submittal of a Resource Conservation and Recovery Act (RCRA) Part B permit application covering post closure care of the Ciniza Refinery Land Treatment Unit. Closure certification findings are summarized as follows.

⇒ The boundaries of the landfill areas have been delineated.

⇒ An engineered earthen cap composed of low hydraulic conductivity, native soil has been installed over the surface.

⇒ Run-on and run-off controls have been installed. The surface has been crowned to prevent ponding and gradually sloped to inhibit erosion. A perimeter ditch and culvert have been installed to redirect run-on.

⇒ Native manure, amendments, and a revegetation seed mix have been applied, tilled into the surface, and watered. Supplemental watering is planned until initial growth is well established.

⇒ Access roads in the vicinity of the landfill areas have been removed and redirected away from the site. Forbidden entry signs have been posted.

⇒ A post-closure care program is being implemented.

2.0 BACKGROUND

During 1987, a RCRA Facility Assessment was conducted at the Ciniza Refinery. This assessment identified various "solid waste management units" including five former solid waste landfill areas. No further action was recommended at one site. Further evaluation was recommended at four sites.

A RCRA Facility Investigation was subsequently conducted. The four sites recommended for further study were collectively designated as SWMU #5.

Applied Earth Sciences (AES) conducted the follow-up investigation. Soil samples were collected and analyzed. No organic contaminants were detected in any sample. Trace metals were detected in most samples; of which, a few samples indicated levels slightly above ambient background concentration. One surface soil sample indicated an elevated chromium concentration. As a result, AES recommended capping these areas. A voluntary corrective action plan was prepared and submitted to the EPA; which approved the plan in 1994.

These landfill areas are reported to contain inorganic, non-hazardous solid waste and debris from refinery construction, maintenance, and operational activities. No organic materials are known to be present in any of these areas.

All four landfill sites are located in close proximity to each other and are collectively identified as SWMU #5. Three of these sites are contiguous and therefore have been grouped under a single large cap. The fourth site is small and isolated, and has been capped separately. It is located approximately 50 feet north of the main area.

3.0 SITE LOCATION AND DESCRIPTION

SWMU #5 is located within the Ciniza Refinery's property boundary. This refinery is located on the north side of Interstate 40, approximately 17 miles east of Gallup, New Mexico. Within the refinery, SWMU #5 is located northwest of the tank farm, approximately 500 feet from Tank 337. See Drawing X1 in Appendix A for location details.

The main landfill cap is approximately kidney-shaped and borders an access road adjacent to an equipment laydown area. A 15 foot by 15 foot fenced storage area is located immediately to the east of the cap and is the most noteworthy local landmark. This area is located on an elevated bench. To the north and west of the cap is a flat plain at an elevation approximately 15 feet below the bench. The smaller, remote landfill area is located on the lower plain approximately 50 feet north of the main landfill cap.

4.0 CLOSURE REQUIREMENTS

State of New Mexico regulations (20 NMAC 9.1 Section 502) specify the following criteria for landfill closure:

- Installation of a final cover system to include a minimum 18 inch thick infiltration prevention layer of earthen material having a saturated hydraulic conductivity of less than or equal to natural subsoils or 10^{-5} cm/sec, whichever is less; plus a minimum 6 inch thick erosion layer capable of sustaining native plant growth; maximum 25% grade side slopes, and a final surface contour sufficient to prevent ponding.

- A written description of the final cover as installed, an estimate of the covered surface area and contained waste volume, and plan drawings showing the final contours and reclamation areas.

In addition, the approved corrective action plan also specifies closure criteria as follows:

- A soil cap shall be installed over the landfill areas to isolate waste material and prevent infiltration of precipitation. The cap shall be composed of native soil; properly wetted and compacted to achieve a low hydraulic conductivity.

- The site shall be graded and contoured to eliminate local depressions and achieve positive drainage.

- The surface soil shall be amended and seeded to promote revegetation.

- Post-closure care shall incorporate annual site inspections and maintenance of the soil cap.

5.0 DESIGN AND CONSTRUCTION

The four landfill areas associated with SWMU #5 have been located in the field. Due to close proximity to each other, a single contiguous cap has been specified for the three upper bench landfill areas. A small secondary cap has been specified for the remote landfill area located north of the main area.

Neighboring native soil, similar in composition to landfill area subsoils, has been specified and used for cap construction. This soil is predominantly bentonitic clays and silt, and has a very low hydraulic conductivity of less than 10^{-7} cm/sec. The use of locally derived soil also promotes a consistent appearance and character of the reclaimed areas vis-à-vis surrounding terrain.

Minimum depth of cover has been specified at two feet final compacted thickness. However, due to grading and surface contouring considerations, actual installed thickness ranges from four to eight feet.

Cap construction has been specified as building upward from existing grade by progressive placement of soil layers 6 to 8 inches thick; followed by wetting and compaction to 95 percent of Standard Proctor maximum dry density. Grading and contouring has been specified and conducted to achieve a finished slope of not greater than 25% (4:1) over any area of the landfill. Caps have been specified and installed as crowned masses with sustained downward slope and no local depressions.

A perimeter ditch has been specified and installed along the interior curve of the main cap adjacent to the access road. This ditch collects run-off from the adjoining equipment laydown area and funnels collected water to a low point invert as shown on Drawing X2. The ditch has been specified as not less than 2 feet wide by 2 feet deep, and sloped not less than 1/8th inch per foot downward to the invert.
In addition, a buried culvert is required to transmit collected water from the east side perimeter ditch to a west side outfall. This culvert has been specified and installed as 2 feet in diameter and sloped not less than 1/16th inch per foot downward to the outfall. The culvert has been buried within the built-up cap soil layer and above the landfill's solid waste zone.

Existing access roads, which traversed the main landfill area, have been covered over and eliminated. Access to the capped area has been restricted by road removal and realignment; plus installation of a new road which routes traffic around the landfill area. Forbidden access signs have also been posted adjacent to the remaining access road.

The surface of the cap has been amended to promote revegetation. Locally generated manure and appropriate grass seed have been tilled into soil and watered. Dryland Pasture Mix was used, consisting of various wheat and rye grass species.

Due to a lack of organic matter within the landfill areas, gas generation is not considered likely and therefore no venting system has been specified or installed.

6.0 SITE INSPECTION

During the week of January 20, 1998, while construction of the landfill caps and related facilities was in progress, an on-site inspection was performed. Photographs are presented in Appendix B. Observations are noted as follows:

- A small triangular portion of the equipment laydown area was eliminated in order to reshape the main landfill cap and improve the surface slope. This allowed consolidation of the main cap over the three landfill areas located on the upper bench.

- The main landfill cap has been crowned at high point west of the fenced storage area and then sloped progressively to the west and north until intersection with the lower plain. This has produced a gradual side slope which is less susceptible to erosion.

- A small, standalone cap was installed over the remote landfill area located north of the main cap.

- Two access roads in the area were eliminated and replaced by a new access road which routes traffic away from and around the main landfills area.

- Cap thickness was increased in several areas in order to accommodate contouring requirements. Installed thickness ranges from approximately four feet in some areas to over eight feet in other areas.

7.0 POST-CLOSURE CARE

A five year post-closure care period is proposed for the capped areas. During this time, the following activities shall be performed.

- During the first year's growing season, the site shall be watered monthly to promote initial rooting and plant growth. One gallon per square foot shall be spray applied.

- The site shall be visually inspected on an annual basis to detect erosion or deterioration of the caps, operability of the drainage ditch and culvert, health and coverage of the vegetation, and signs of unauthorized access.

- As necessary, maintain and repair the caps and drainage system. As necessary, re-seed areas where vegetation has not established. As necessary, prevent unauthorized access or other use of the landfill areas.

At the end of the five year post-closure care period, the site shall be inspected to confirm compliance with regulations and successful reclamation.

8.0 PROFESSIONAL ENGINEER'S CERTIFICATION

This landfill closure certification report has been prepared under the direct supervision and control of a Registered Professional Engineer.

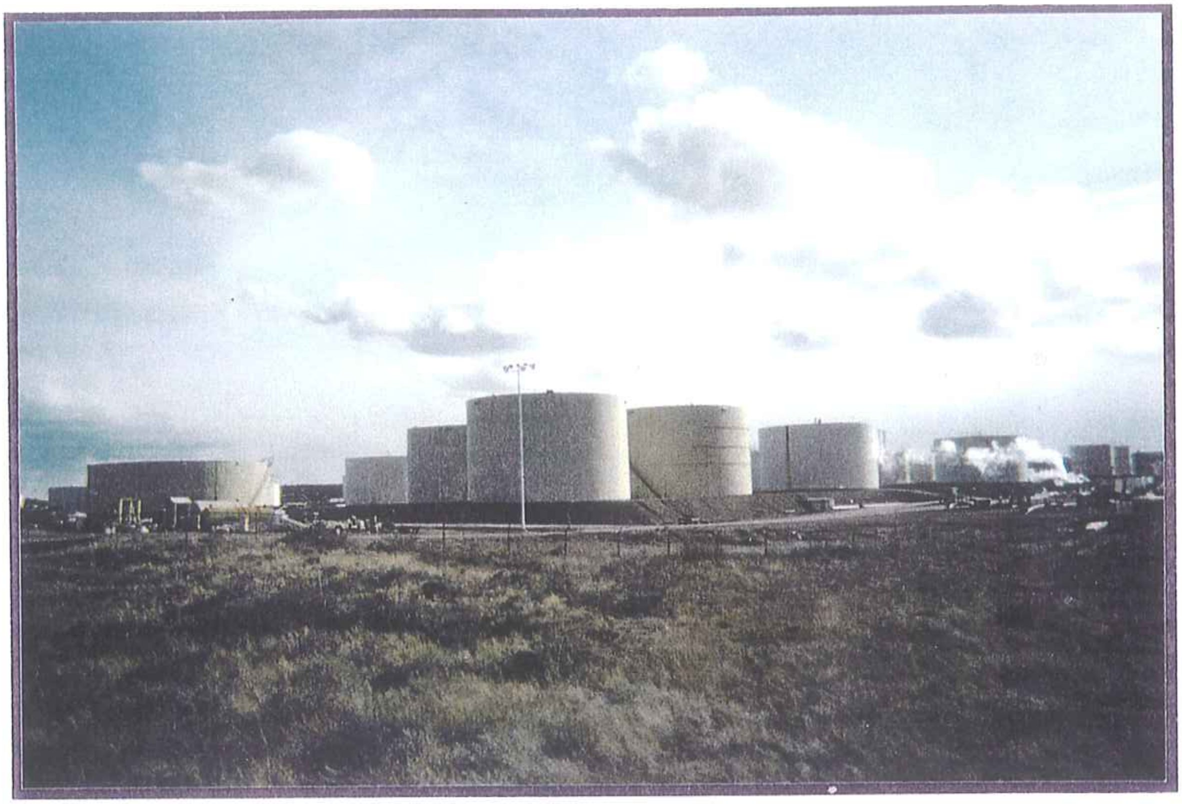
Client: Ciniza Refinery
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

Job No.: 98-205-03

Date: April 23, 1998

Prepared and Certified by:

Thomas D. Atwood, P.E.
Colorado Registration No. 22866



Landfill Location Reference – Tank Farm

Landfill Site Prior To Cap Installation

Side Slope Construction

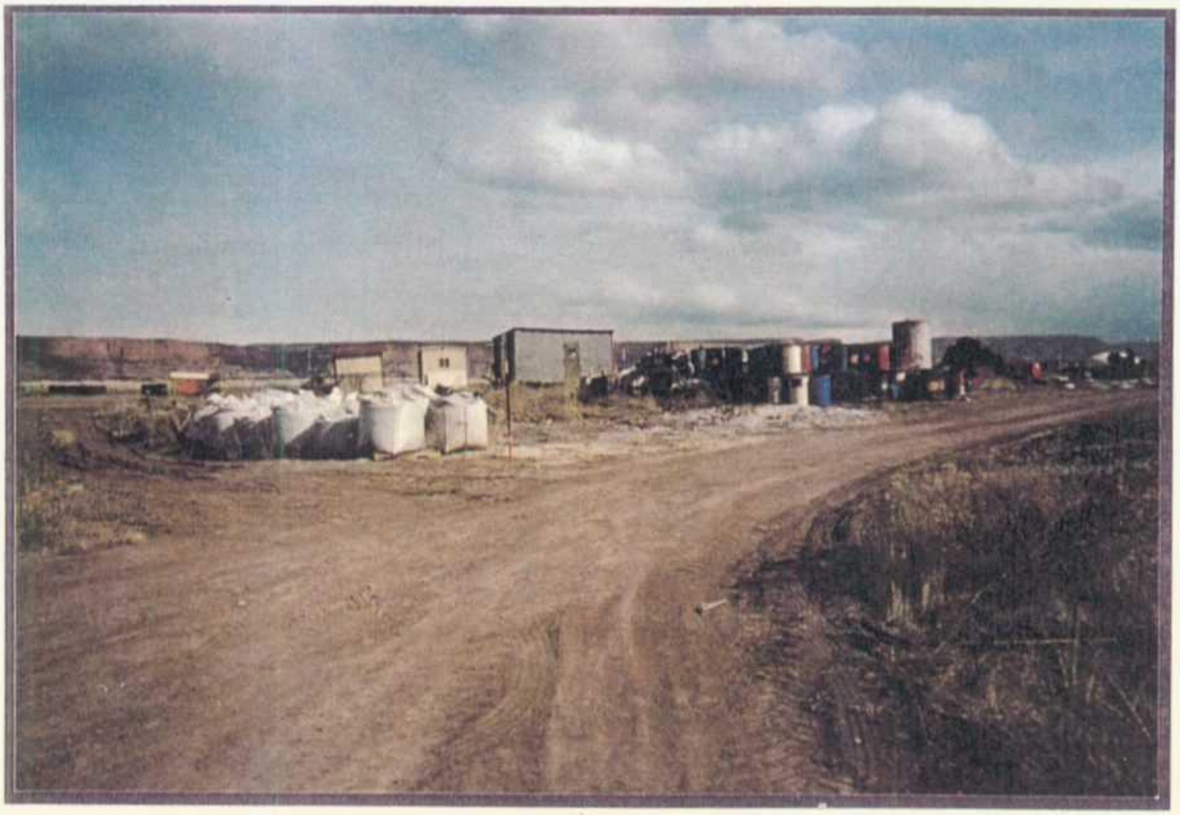
Side Slope Profile

Access Road Being Removed From Site

View of Landfill Site From Lower Flat

Clean Soil Being Trucked To Site

Soil Layer Placement



View of Adjacent Equipment Laydown Area

View of Storage Trailers

Appendix E

Investigation Derived Waste (IDW) Management Plan

IDW Management Plan

All IDW will be properly characterized and disposed of in accordance with all federal, State, and local rules and regulations for storage, labeling, handling, transport, and disposal of waste. The IDW may be characterized for disposal based on the known or suspected contaminants potentially present in the waste.

A dedicated decontamination area will be setup prior to any sample collection activities. The decontamination pad will be constructed so as to capture and contain all decontamination fluids (e.g., wash water and rinse water) and foreign materials washed off the sampling equipment. The fluids will be pumped directly into suitable storage containers (e.g., labeled 55-gallon drums), which will be located at satellite accumulation areas until the fluids are disposed in the refinery wastewater treatment system upstream of the API separator. The solids captured in the decontamination pad will be shoveled into 55-gallon drums and stored at the designated satellite accumulation area pending proper waste characterization for off-site disposal.

Drill cuttings generated during installation of soil borings will be placed directly into 55-gallon drums and staged in the satellite accumulation area pending results of the waste characterization sampling. The portion of soil cores, which are not retained for analytical testing, will be placed into the same 55-gallon drums used to store the associated drill cuttings.

The solids (e.g., drill cuttings and used soil cores) will be characterized by testing to determine if there are any hazardous characteristics in accordance with 40 Code of Federal Regulations (CFR) Part 261. This includes tests for ignitability, corrosivity, reactivity, and toxicity. If the materials are not characteristically hazardous, then further testing will be performed pursuant to the requirements of the facility to which the materials will be transported. All miscellaneous waste materials (e.g., discarded gloves, packing materials, etc.) will be placed into the refinery's solid waste storage containers for off-site disposal.