



May 24, 2019

#5E27962-BG1

NMOCD District 2
811 South First Street
Artesia, New Mexico 88210

SUBJECT: Remediation Closure Report Santo Nino 29 Fed 4 Release (2RP-5184), Eddy County, New Mexico

To Whom It May Concern,

On behalf of Mewbourne Oil Company (Mewbourne), Souder, Miller & Associates (SMA) has prepared this Remediation Closure Report that describes the remediation of a release of liquids related to oil and gas production activities at the Santo Nino 29 Fed site. The site is in Unit N, Section 29, Township 29S, Range 30E, Eddy County, New Mexico, on Federal land. Figure 1 illustrates the vicinity and site location on an USGS 7.5-minute quadrangle map.

Table 1 summarizes release information and Closure Criteria.

Table 1: Release Information and Closure Criteria			
Name	Santo Nino 29 Fed 4	Company	Mewbourne Oil Company
API Number	30-015-28643	Location	Lat. 32.7130623 Long. -103.9962845
Incident Number	2RP-5184		
Estimated Date of Release	12/24/2018	Date Reported to NMOCD	1/9/2019
Land Owner	Federal	Reported To	NMOCD (via email to Mike Bratcher)
Source of Release	Hole on back of tank		
Released Volume	120bbls	Released Material	Crude Oil
Recovered Volume	90bbls	Net Release	30 bbls
NMOCD Closure Criteria	>100 feet to groundwater		
SMA Response Dates	1/17/19, 4/26/2019, 5/3/2019		

1.0 Background

On December 24, 2018, a release was discovered at the Santo Nino 29 Fed 4 site due to hole in the tank. Initial response activities were conducted by the operator, and included source elimination, and site containment and stabilization activities, which included the excavation of the visibly stained material to 3 ft (bgs). Figures 1 and 2 illustrate the vicinity and site location, Figure 3 illustrates the release location. The C-141 forms are included in Appendix A.

2.0 Site Information and Closure Criteria

The Santo Nino 29 Fed 4 is located approximately 25.36 miles southeast of Artesia, New Mexico on Federal (BLM) land at an elevation of approximately 3,430 feet above mean sea level (amsl).

Based upon U.S. Geological Survey (USGS) & New Mexico Office of the State Engineer (NMOSE) data (Appendix B), depth to groundwater in the area is estimated to be 217 feet below grade surface (bgs). There are no known water sources within ½-mile of the location, according to the NMOSE website (https://gis.ose.state.nm.us/gisapps/ose_pod_locations/; accessed 2/5/2019). The nearest significant watercourse is Walters Lake, located approximately 2.74 miles northeast of the Santo Nino 29 Fed #4. Figure 2 illustrates the site with 200 and 300-foot radii to indicate that it does not lie within a sensitive area as described in 19.15.29.12.C(4) NMAC.

Based on the information presented herein, the applicable NMOCD Closure Criteria for this site is for groundwater depth of greater than 100 feet bgs. Pertinent well data is attached in Appendix B.

3.0 Release Characterization Activities and Findings

On January 17, 2019, SMA personnel arrived on site in response to the release associated with Santo Nino 29 Fed 4. SMA performed site delineation activities by collecting soil samples around the release site, throughout the visibly stained area and in the excavation that was part of the initial action.

A total of 10 sample locations (BG, L1-L5 and SW1-SW4) were investigated using a hand-auger, and excavated test pits to depths up to 19 feet bgs to determine horizontal and vertical delineation. A minimum of two samples were collected at each sampling location, with the exception of location L2. A total of 15 samples were collected for laboratory analysis for total chloride using EPA Method 300.0; benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8021B; and motor, diesel and gasoline range organics (MRO, DRO, and GRO) by EPA Method 8015D. Table 3 itemizes the samples results. Locations for all samples are depicted on Figure 3. Samples were placed into laboratory supplied glassware, labeled, and maintained on ice until delivery to Hall Environmental Analysis Laboratory in Albuquerque, New Mexico (Appendix D).

While sampling, SMA personnel observed pieces of white liner within the excavation area. After meeting with NMOCD, the decision was made to line the legacy pit area unearthed by excavation per ASTM standard. A berm would also be constructed between the pit area and remaining release area to prevent any additional or future impact. This proposed action was approved via email by Jim Amos and Deborah McKinney with the Carlsbad BLM Office. In accordance with 19.15.29.12.B(2) NMAC, a deferral was also requested in the area represented by L2 due to production pipelines in the area. The remaining contaminated areas (locations L4 and L5) were proposed to be excavated to meet NMOCD Closure Criteria and Reclamation requirements. The above-mentioned plans of action and deferral request were written into the remediation work plan dated February 26, 2019 and later approved by NMOCD on March 18, 2019.

4.0 Soil Remediation Summary

In accordance with the approved workplan, SMA returned to the site to oversee the excavation of remaining contaminated soil. After approval from area utilities via 811, SMA guided the excavation activities by collecting soil samples for field screening. The walls and base were excavated until field screening results indicated that the NMOCD Closure Criteria would be met, with the exception of the area represented by sample location L2. NMOCD was notified on April 23, 2019 that closure samples were expected to be collected in three (3) business days.

On April 26, 2019, SMA conducted confirmation sampling of the walls and base of the excavation. The confirmation samples were collected from within the excavation in accordance with the VSP sampling protocol included in Appendix C. As written in the approved workplan, confirmation samples were comprised of five-point composites of the base (BH1 & BH2) and walls (SW1-SW4).

The laboratory results for base sample BH1 indicated elevated TPH at 4 feet bgs. SMA returned to the location to extend the excavation vertically one more foot, and another confirmation sample was collected for BH1 at 5 ft bgs. The area representing BH2 was excavated to 5.5 ft bgs.

Figure 3 shows the extent of the excavation, sample locations, liner, and berm. All initial and confirmation laboratory results are summarized in Table 3. Laboratory reports are included in Appendix D.

In addition to meeting the Closure Criteria, the top four (4) feet of impacted areas off of the well pad meet the Reclamation requirement of 19.15.29.13(D)(1). Contaminated soils were removed and replaced with clean backfill material to return the surface to previous contours. The contaminated soil was transported and disposed of at an NMOCD permitted disposal facility.

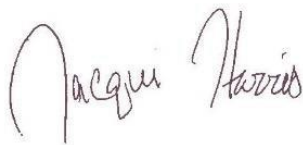
5.0 Scope and Limitations

The scope of our services included: assessment sampling; verifying release stabilization; regulatory liaison; remediation; and preparing this closure report. All work has been performed in accordance with generally accepted professional environmental consulting practices for oil and gas releases in the Permian Basin in New Mexico.

If there are any questions regarding this report, please contact either Jacqui Harris at 575-496-0780 or Shawna Chubbuck at 505-325-7535.

Submitted by:
SOUDER, MILLER & ASSOCIATES

Reviewed by:



Jacqui Harris
Project Manager



Shawna Chubbuck
Senior Scientist

ATTACHMENTS:

Figures:

Figure 1: Vicinity and Well Head Protection Map

Figure 2: Surface Water Radius Map

Figure 3: Site and Sample Location Map

Tables:

Table 2: NMOCD Closure Criteria Justification

Table 3: Summary of Sample Results

Appendices:

Appendix A: C141's

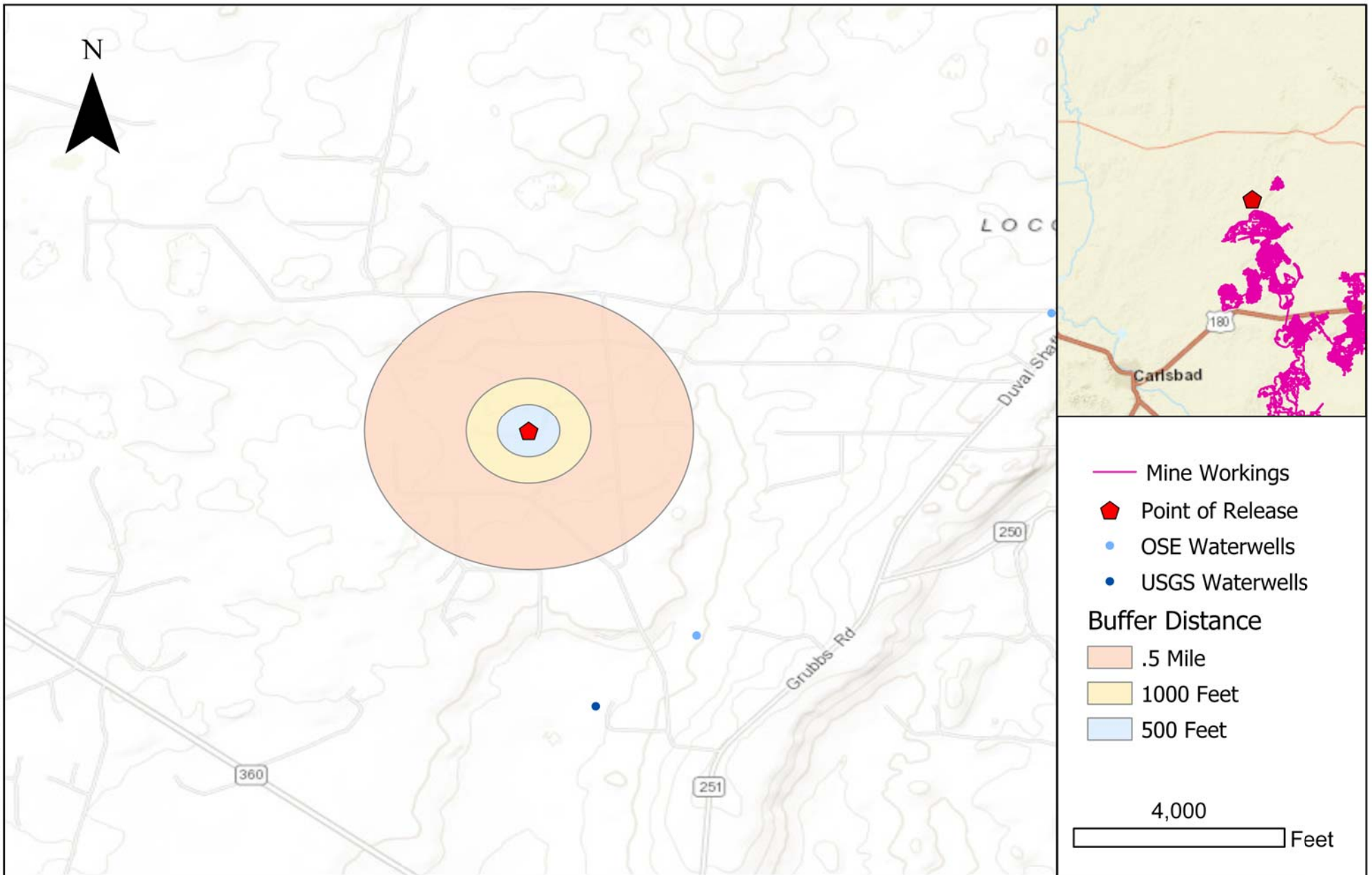
Appendix B: NMOSE Wells Report

Appendix C: VSP Sampling Protocol

Appendix D: Laboratory Analytical Reports

Appendix E: Excavation & Liner Photo

FIGURES



Regional Vicinity & Wellhead Protection Map
Santo Nino 29 Fed #4- Mewbourne

Figure 1

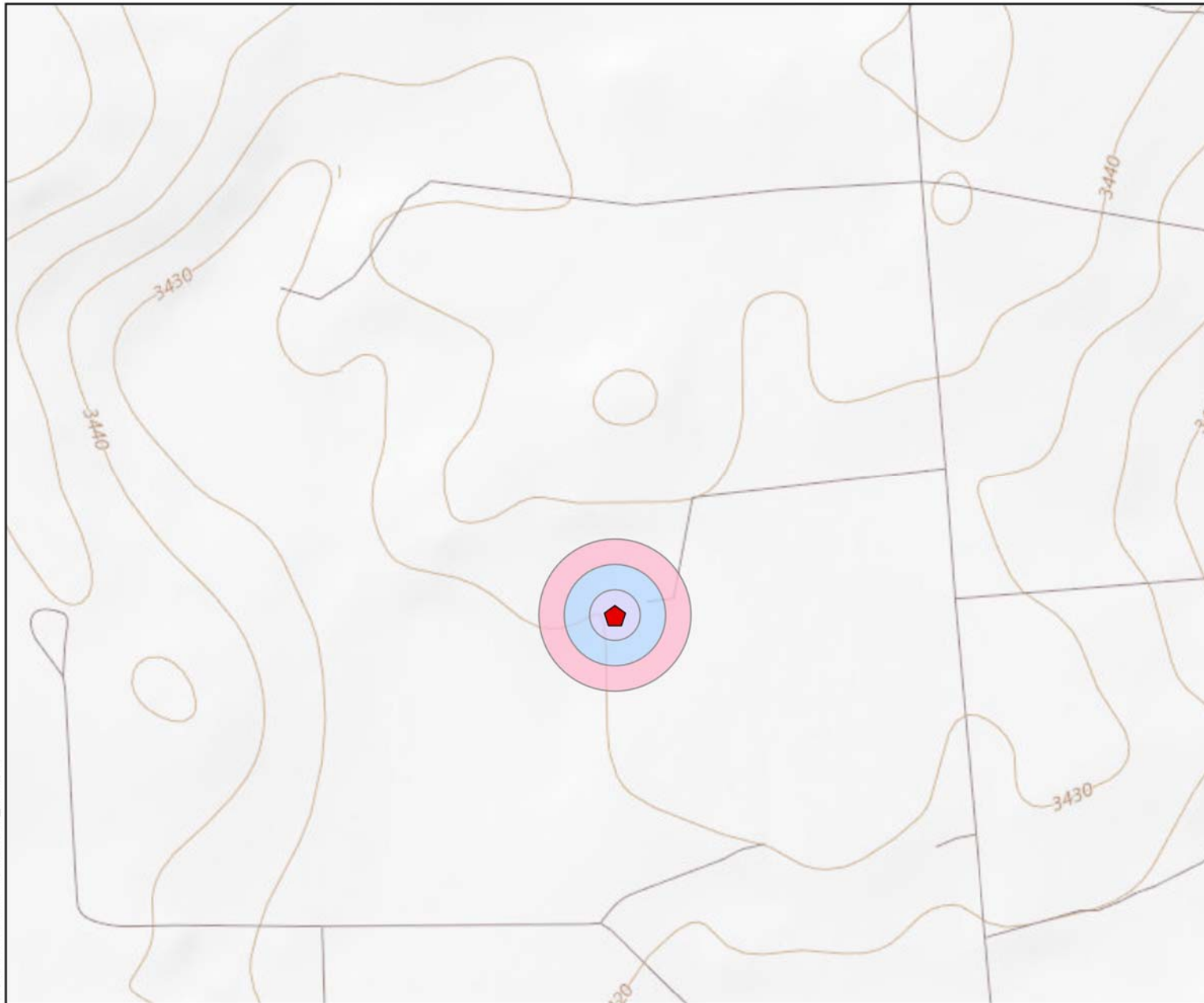
Date Saved:
2/21/2019




Revisions		
By: _____	Date: _____	Descr: _____
By: _____	Date: _____	Descr: _____

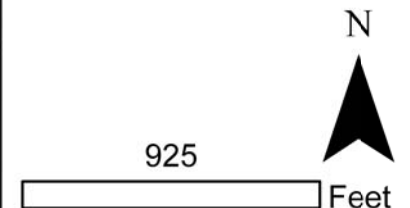
Drawn	JVH
Date	2/22/2019
Checked	_____
Approved	_____



201 South Halaguena Street
Carlsbad, New Mexico 88221
(575) 689-7040
Serving the Southwest & Rocky Mountains



-  Point of Release
-  Springs Seeps
-  Streams Canals
-  Rivers
-  NM Wetlands
-  Lakes Playas
-  FEMA Flood Zones 2011
- Buffer Distance**
-  100 Feet
-  200 Feet
-  300 Feet



Surface Water Protection Map
 Santo Nino 29 Fed #4 - Mewbourne
 Eddy County , NM

Figure 2

Revisions		
By: _____	Date: _____	Descr: _____
By: _____	Date: _____	Descr: _____

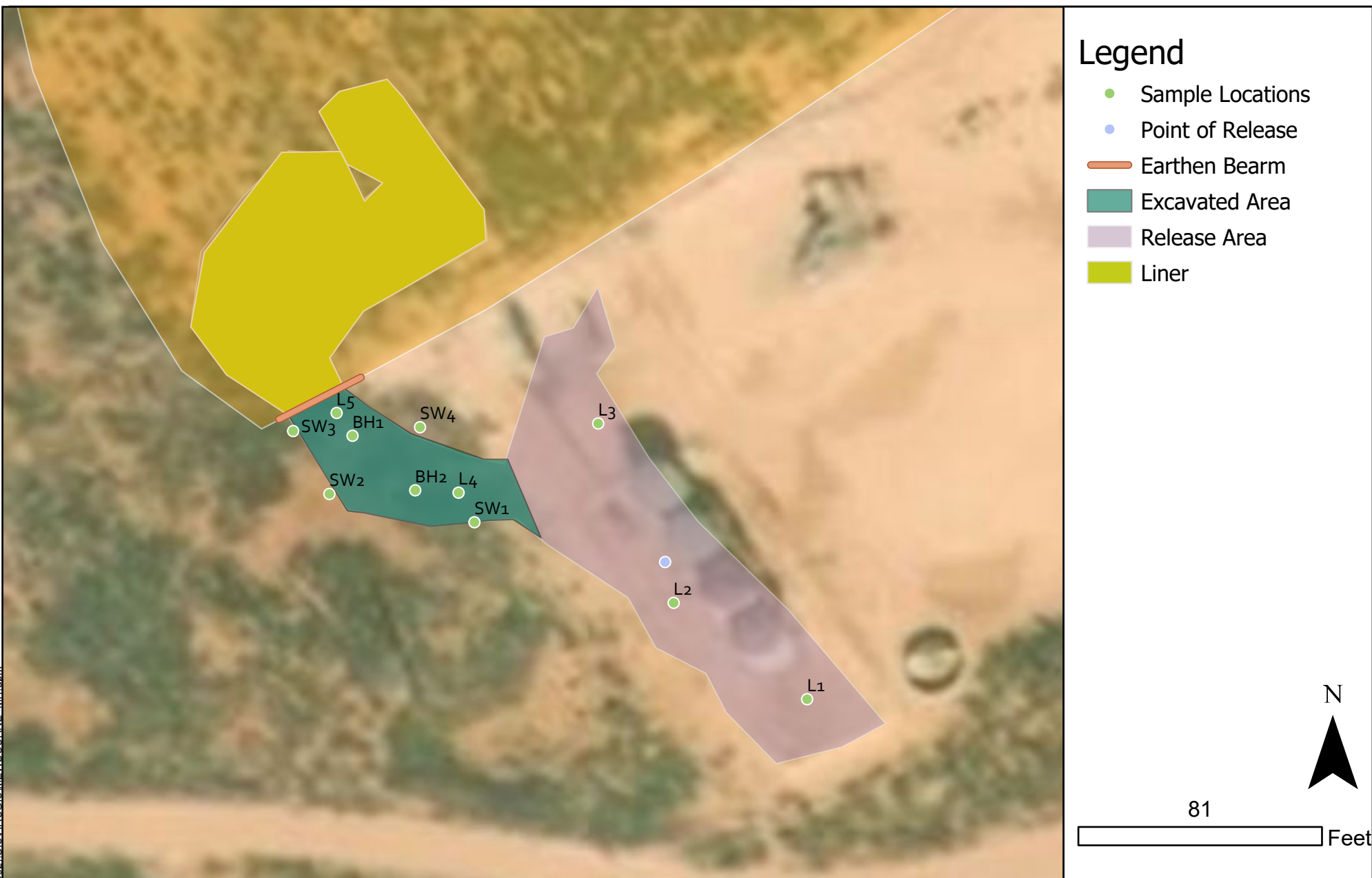
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Drawn JVH
 Date 2/22/2019
 Checked _____
 Approved _____



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P:\5-Mewbourne 2019 MSA (5E27962)\GIS\ARC\GIS\MEWBOURNE_MIT.aprx



Site and Sample Location Map
Mewbourne-Santo Nino 20 Fed #4
Unit Letter-N, Sec. 29, T18S, R30E. Eddy County, New Mexico

Figure 3

Revisions		
By: _____	Date: _____	Descr: _____
By: _____	Date: _____	Descr: _____
Copyright 2018-19 Souder, Miller & Associates - All Rights Reserved		

Drawn	LRB
Date	5/17/2019
Checked	_____
Approved	_____



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TABLES

Table 3:
Summary of Sample Results

Mewbourne
Santo Nino (2RP-5184)

Sample ID	Sample Date	Depth (feet bgs)	Proposed Action/ Action Taken	BTEX	Benzene	GRO	DRO	MRO	Total TPH	Cl-	Field screening
				mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
NMOCD Closure Criteria				50	10	1000			2500	20,000	
BG	1/17/2019	2'-3'	Sampled	--	--	--	--	--	--	<60	<237
L1	1/17/2019	2	Sampled	--	--	--	--	--	--	--	891
		4	Sampled	<0.225	<0.025	<5.0	<10	<50	<65	900	1,085
		5	Sampled	--	--	--	--	--	--	--	1,515
		7.5	Sampled	<0.225	<0.025	<5.0	<10	<50	<65	2600	2,776
		9	Sampled	--	--	--	--	--	--	--	2,280
		12	Sampled	--	--	--	--	--	--	--	2,351
		16	Sampled	<0.225	<0.025	<5.0	<10	<50	<65	2300	1,347
		19	Sampled	--	--	--	--	--	--	3,604	
L2	1/17/2019	4.5	Deferral	60.63	0.63	950	9500	5100	15550	560	616
L3	1/17/2019	1.5	Sampled	--	--	--	--	--	--	--	2,166
		2	Sampled	--	--	--	--	--	--	--	2,355
		3.5	Sampled	<0.225	<0.025	<5.0	<10	<50	<65	1700	1,761
		5	Sampled	<0.225	<0.025	<5.0	<10	<50	<65	280	374
L4	1/17/2019	4	Excavated	0.69	<0.025	16	1600	1100	2716	110	2,519
		5	Sampled	--	--	--	--	--	--	--	375
		6	Sampled	<0.225	<0.025	<5.0	<10	<50	<65	820	824
		8	Sampled	--	--	--	--	--	--	--	1,379
		10	Sampled	--	--	--	--	--	--	--	2,104
		12	Sampled	<0.225	<0.025	<5.0	<10	<50	<65	740	451
L5	1/17/2019	3	Sampled	--	--	--	--	--	--	--	861
		4	Sampled	<0.225	<0.025	<5.0	<10	<50	<65	<60	124
		5	Sampled	--	--	--	--	--	--	--	1,102
		6	Sampled	<0.225	<0.025	<5.0	<10	<50	<65	<60	131
BH1	4/26/2019	4	excavated	<0.224	<0.025	5.8	2600	1200	3805.8	690	--
	5/3/2019	5	sample	<0.225	<0.25	<5.0	<9.6	<48	<62.6	<60	--
BH2	4/26/2019	5.5	sample	<0.217	<0.024	<4.8	<9.9	<50	<64.7	390	--
SW1	1/17/2019	0-4'	sample	<0.225	<0.025	<5.0	12	<50	12	<60	218
	4/26/2019	0-4'	sample	<0.220	<0.024	<4.9	<9.7	<48	<62.6	<60	--
SW2	1/17/2019	0-2'	sample	<0.225	<0.025	<5.0	24	<50	24	<60	181
SW3	1/17/2019	0-1'	sample	<0.225	<0.025	<5.0	<10	<50	<65	140	179
	4/26/2019	0-4'	sample	<0.220	<0.024	<4.9	<8.6	<43	<56.5	<60	-
SW4	1/17/2019	0-1'	sample	<0.225	<0.025	<5.0	160	140	300	380	426
	4/26/2019	0-4'	sample	<0.224	<0.025	<5.0	<10	<50	<65	<60	--
"--" = Not Analyzed											

"--" = Not Analyzed

* = per Reclamation Standard (19.15.29.13.D(1) NMAC)

APPENDIX A

C141'S

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural
Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	
District RP	2RP-5184
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party: Mewbourne Oil Company	OGRID: 14744
Contact Name: Robin Terrell	Contact Telephone: 575-602-2188
Contact email: rterrell@mewbourne.com	Incident # (assigned by OCD) 2RP-5184
Contact mailing address: P.O. Box 5270 Hobbs NM 88240	

Location of Release Source

Latitude 32.7130623

Longitude -103.9962845
(NAD 83 in decimal degrees to 5 decimal places)

Site Name: Santa Nino Fed Com #4	Site Type: Oil Well
Date Release Discovered: 12-24-18	API# (if applicable) 30-015-28643

Unit Letter	Section	Township	Range	County
N	29	18S	30E	Eddy

Surface Owner: ☐ State ☒ Federal ☐ Tribal ☐ Private (Name:)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

<input checked="" type="checkbox"/> Crude Oil	Volume Released (bbls) 120	Volume Recovered (bbls) 90
<input type="checkbox"/> Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<input type="checkbox"/> Condensate	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
<input type="checkbox"/> Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)

Cause of Release:

A swedge on the back of an oil tank developed a hole allowing oil to drain from the secondary containment into the pasture northwest of the battery

Incident ID	
District RP	2RP-5184
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: *Each of the following items must be included in the closure report.*

- ☒ A scaled site and sampling diagram as described in 19.15.29.11 NMAC
- ☒ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)
- ☒ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)
- ☒ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: Robin Terrell

Title: Environmental Representative

Signature: 

Date: _____

email: rterrell@mewbourne.com

Telephone: 575-393-59058

OCD Only

Received by: _____

Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date: _____

Printed Name: _____

Title: _____

APPENDIX B

NMOSE WELLS REPORT



New Mexico Office of the State Engineer

Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced,
O=orphaned,
C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-Code	basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
CP 00819 POD1	CP	LE		2	4	32	18S	30E		594878	3618720*	1450	150		
CP 00853 POD1	O	CP	ED	2	4	28	18S	30E		596472	3620340*	2440	350		
CP 00582 POD1	CP	ED				24	18S	29E		591048	3622096*	3719	150		

Average Depth to Water: --

Minimum Depth: --

Maximum Depth: --

Record Count: 3

UTMNAD83 Radius Search (in meters):

Easting (X): 594067.21

Northing (Y): 3619923

Radius: 5000

*UTM location was derived from PLSS - see Help

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

APPENDIX C

VSP SAMPLING PROTOCOL

VSP Sample Design Report for Using Stratified Sampling to Estimate the Population Mean

Summary

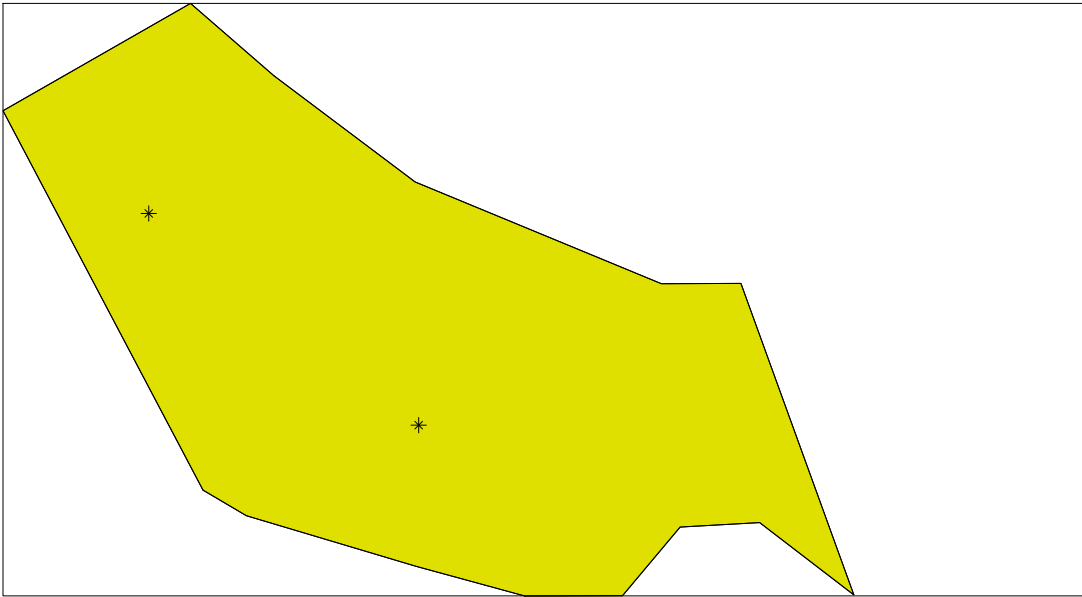
This report summarizes the stratified sampling design used, associated statistical assumptions, as well as general guidelines for conducting post-sampling data analysis. Sampling plan components presented here include how many sampling locations to choose and where within the sampling area to collect those samples. The type of medium to sample (i.e., soil, groundwater, etc.) and how to analyze the samples (in-situ, fixed laboratory, etc.) are addressed in other sections of the sampling plan. It is important to note that the decision for sample size calculation is determined for the combined strata, rather than any individual strata.

The following table summarizes the mean stratified sampling design developed. A figure that shows sampling locations in the field and a table that lists sampling location coordinates are also provided below.

SUMMARY OF SAMPLING DESIGN	
Primary Objective of Design	Estimate the population mean of all strata combined
Criteria for Determining Total Number of Samples	Achieve pre-specified precision of the estimated mean for specified stratum costs, but no restriction on total costs
Sample Placement (Location) in the Field	Systematic sampling with a random start location within each stratum
Formula for calculating number of sampling locations	From Gilbert (1987, page 51)
Method for calculating number of sampling locations in each stratum	Optimal Allocation
Calculated total number of samples	2
Stratum 1	2 ^b
Total area of all strata	371.45 m ²

^a Including measurement analyses and fixed overhead costs. See the Cost of Sampling section for an explanation of the costs presented here.

^b The actual number of samples placed in the sample area may differ from the calculated number because of grid edge effects.



Area: Area 1										
X Coord	Y Coord	Z Coord	Label	Value	Type	Historical	Surface	LX	LY	Sample Area
196554.0610	189966.2846	0.0000			Systematic		Floor	196555.0610	189967.2846	
196547.2050	189971.6605	0.6000			Systematic		Ceiling	196548.2050	189972.6605	

Primary Sampling Objective

The primary purpose of sampling at this site is to estimate the mean for the entire site, i.e., for all strata combined, such that the estimated mean has the minimum possible standard deviation under the condition that the sampling and measurement costs cannot exceed a specified amount. Preexisting information was used to divide the site into 1 non-overlapping strata that were expected to be more homogeneous internally than for the entire site (all strata combined). The expected variability of values within each stratum was estimated or approximated, and the stratum weights, W_h , were determined so that the total number of samples could be allocated appropriately among the strata.

Number of Total Samples: Calculation Equation and Inputs

The total number of samples is computed to achieve the pre-specified precision of the estimated population mean for specified stratum costs, but no restriction on total costs. *Note that the calculation is for the total number of samples, i.e., for combined strata, rather than individual strata.*

The formula used to calculate the total number of samples is:

$$n = \frac{\left(\sum_{h=1}^L W_h S_h \sqrt{c_h} \right) \sum_{h=1}^L \frac{W_h S_h}{\sqrt{c_h}}}{V + \frac{1}{N} \sum_{h=1}^L W_h S_h^2}$$

where

L is the number of strata, $h=1,2,\dots,L$,

S_h is the estimated standard deviation of the measured values in stratum h ,

$W_h = N_h / N$ is the weight associated with stratum h ,

N_h is the total number of possible sampling locations (units) in stratum h ,

N is the total number of possible units in all strata combined, $N = \sum_{h=1}^L N_h$

V is the pre-specified variance or precision, and

c_h is the cost of collecting and measuring a sample in stratum h .

The values of these inputs that result in the calculated number of sampling locations are:

Parameter	Stratum
	1
S_h	0.21
W_h	167.925

Parameter	Input Value
V	0.0225

Allocation of Samples to Strata

The total number of samples is allocated to the individual strata on an optimal basis using the formula:

$$n_h = n \frac{N_h \sigma_h / \sqrt{c_h}}{\sum_{h=1}^L N_h \sigma_h / \sqrt{c_h}}$$

where

- n_h is the number of samples allocated to stratum h ,
- L is the number of strata,
- N_h is the total number of units in stratum h ,
- σ_h is the true population standard deviation for stratum h ,
- c_h is the cost per population unit in stratum h .

n is the total number of units sampled in all strata,
$$n = \sum_{h=1}^L n_h$$

Using this formula, the number of samples allocated to each stratum is:

Stratum	Number of Samples
1	2
Total Samples	2

Method for Determining Sampling Locations

Five methods for determining sample locations are provided in VSP: 1) simple random sampling, 2) random sampling within grids, 3) systematic sampling with a random start, 4) systematic sampling with a fixed start and 5) adaptive grid sampling. One may use a different method for each stratum, based on the conceptual site model and decision to be made for a given stratum. For this site, sample locations were chosen using a systematic grid in each stratum.

Locating the sample points over a systematic grid with a random start ensures a uniform spatial coverage of each stratum and the entire site. Statistical analyses of systematically collected data may be acceptable for making decisions. One disadvantage of collecting samples on a systematic grid is that spatial variability or patterns of data may not be discovered if the grid spacing is large relative to the spatial patterns. Also, if a spatial pattern of population values corresponds to the systematic spacing of sample locations, then the estimated mean may be very biased.

Statistical Assumptions

The assumptions associated with the formulas for computing the number of samples are:

- The estimated stratum standard deviations, s_h , are reasonable and representative of the stratum populations being sampled.
- The sampling locations are selected using simple random sampling.
- The stratum costs, C_h , and the fixed cost C_0 , are accurate.

The first and third assumptions will be assessed in a post data collection analysis. The second assumption, although not strictly valid because systematic grid sampling was used rather than simple random sampling, is not expected to significantly affect conclusions of the study because (1) the gridded sample locations were selected based on a random start and (2) any patterns of contamination in the field that may exist are not expected to coincide with the regularity of the grid sampling pattern.

Recommended Data Analysis Activities

Post data collection activities generally follow those outlined in EPA's Guidance for Data Quality Assessment (EPA, 2000). The data analysts will become familiar with the context of the problem and goals for data collection and assessment. The data will be verified and validated before being subjected to statistical or other analyses. Graphical and analytical tools will be used to verify to the extent possible the assumptions of any statistical analyses that are performed as well as to achieve a general understanding of the data. The data will be assessed to determine whether they are adequate in both quality and quantity to support the primary objective of sampling.

Estimates for the mean and standard deviation of the population values will be calculated using the formulas appropriate for stratified sampling; these formulas are found in EPA QA/G-5S (EPA, 2001). Results of the exploratory and quantitative assessments of the data will be reported, along with conclusions that may be supported by them.

This report was automatically produced* by Visual Sample Plan (VSP) software version 7.11b.

This design was last modified 2/22/2019 9:36:54 AM.

Software and documentation available at <http://vsp.pnnl.gov>

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* - The report contents may have been modified or reformatted by end-user of software.

APPENDIX D
LABORATORY ANALYTICAL
REPORTS

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 1904D87

Date Reported:

CLIENT: Souder, Miller & Associates

Client Sample ID: BH1

Project: Santo Nino

Collection Date: 4/26/2019 10:00:00 AM

Lab ID: 1904D87-001

Matrix: SOIL

Received Date: 4/30/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	690	60		mg/Kg	20	5/1/2019 2:54:53 PM	44638
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	2600	98		mg/Kg	10	5/1/2019 12:29:09 PM	44624
Motor Oil Range Organics (MRO)	1200	490		mg/Kg	10	5/1/2019 12:29:09 PM	44624
Surr: DNOP	0	70-130	S	%Rec	10	5/1/2019 12:29:09 PM	44624
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	5.8	5.0		mg/Kg	1	5/1/2019 5:33:49 PM	44616
Surr: BFB	138	73.8-119	S	%Rec	1	5/1/2019 5:33:49 PM	44616
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	5/1/2019 5:33:49 PM	44616
Toluene	ND	0.050		mg/Kg	1	5/1/2019 5:33:49 PM	44616
Ethylbenzene	ND	0.050		mg/Kg	1	5/1/2019 5:33:49 PM	44616
Xylenes, Total	ND	0.099		mg/Kg	1	5/1/2019 5:33:49 PM	44616
Surr: 4-Bromofluorobenzene	94.2	80-120		%Rec	1	5/1/2019 5:33:49 PM	44616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 1904D87

Date Reported:

CLIENT: Souder, Miller & Associates

Client Sample ID: BH2

Project: Santo Nino

Collection Date: 4/26/2019 10:05:00 AM

Lab ID: 1904D87-002

Matrix: SOIL

Received Date: 4/30/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	390	60		mg/Kg	20	5/1/2019 3:07:18 PM	44638
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.9		mg/Kg	1	5/1/2019 12:51:42 PM	44624
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	5/1/2019 12:51:42 PM	44624
Surr: DNOP	94.6	70-130		%Rec	1	5/1/2019 12:51:42 PM	44624
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.8		mg/Kg	1	5/1/2019 7:07:42 PM	44616
Surr: BFB	90.6	73.8-119		%Rec	1	5/1/2019 7:07:42 PM	44616
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	5/1/2019 7:07:42 PM	44616
Toluene	ND	0.048		mg/Kg	1	5/1/2019 7:07:42 PM	44616
Ethylbenzene	ND	0.048		mg/Kg	1	5/1/2019 7:07:42 PM	44616
Xylenes, Total	ND	0.097		mg/Kg	1	5/1/2019 7:07:42 PM	44616
Surr: 4-Bromofluorobenzene	90.0	80-120		%Rec	1	5/1/2019 7:07:42 PM	44616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:

* Value exceeds Maximum Contaminant Level.
D Sample Diluted Due to Matrix
H Holding times for preparation or analysis exceeded
ND Not Detected at the Reporting Limit
PQL Practical Quantitative Limit
S % Recovery outside of range due to dilution or matrix

B Analyte detected in the associated Method Blank
E Value above quantitation range
J Analyte detected below quantitation limits
P Sample pH Not In Range
RL Reporting Limit

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 1904D87

Date Reported:

CLIENT: Souder, Miller & Associates

Client Sample ID: SW1

Project: Santo Nino

Collection Date: 4/26/2019 10:10:00 AM

Lab ID: 1904D87-003

Matrix: SOIL

Received Date: 4/30/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	60		mg/Kg	20	5/1/2019 3:44:31 PM	44638
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.7		mg/Kg	1	5/1/2019 1:13:40 PM	44624
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	5/1/2019 1:13:40 PM	44624
Surr: DNOP	94.8	70-130		%Rec	1	5/1/2019 1:13:40 PM	44624
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	5/1/2019 8:17:27 PM	44616
Surr: BFB	90.3	73.8-119		%Rec	1	5/1/2019 8:17:27 PM	44616
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	5/1/2019 8:17:27 PM	44616
Toluene	ND	0.049		mg/Kg	1	5/1/2019 8:17:27 PM	44616
Ethylbenzene	ND	0.049		mg/Kg	1	5/1/2019 8:17:27 PM	44616
Xylenes, Total	ND	0.098		mg/Kg	1	5/1/2019 8:17:27 PM	44616
Surr: 4-Bromofluorobenzene	90.7	80-120		%Rec	1	5/1/2019 8:17:27 PM	44616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 1904D87

Date Reported:

CLIENT: Souder, Miller & Associates

Client Sample ID: SW3

Project: Santo Nino

Collection Date: 4/26/2019 10:15:00 AM

Lab ID: 1904D87-004

Matrix: SOIL

Received Date: 4/30/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	60		mg/Kg	20	5/1/2019 3:56:56 PM	44638
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	8.6		mg/Kg	1	5/1/2019 1:35:50 PM	44624
Motor Oil Range Organics (MRO)	ND	43		mg/Kg	1	5/1/2019 1:35:50 PM	44624
Surr: DNOP	92.5	70-130		%Rec	1	5/1/2019 1:35:50 PM	44624
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	4.9		mg/Kg	1	5/1/2019 8:40:44 PM	44616
Surr: BFB	92.3	73.8-119		%Rec	1	5/1/2019 8:40:44 PM	44616
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.024		mg/Kg	1	5/1/2019 8:40:44 PM	44616
Toluene	ND	0.049		mg/Kg	1	5/1/2019 8:40:44 PM	44616
Ethylbenzene	ND	0.049		mg/Kg	1	5/1/2019 8:40:44 PM	44616
Xylenes, Total	ND	0.098		mg/Kg	1	5/1/2019 8:40:44 PM	44616
Surr: 4-Bromofluorobenzene	92.9	80-120		%Rec	1	5/1/2019 8:40:44 PM	44616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order: 1904D87

Date Reported:

CLIENT: Souder, Miller & Associates

Client Sample ID: SW4

Project: Santo Nino

Collection Date: 4/26/2019 10:20:00 AM

Lab ID: 1904D87-005

Matrix: SOIL

Received Date: 4/30/2019 9:00:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	60		mg/Kg	20	5/1/2019 4:09:21 PM	44638
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	5/1/2019 4:34:56 PM	44624
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	5/1/2019 4:34:56 PM	44624
Surr: DNOP	97.0	70-130		%Rec	1	5/1/2019 4:34:56 PM	44624
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	5/1/2019 9:03:58 PM	44616
Surr: BFB	94.8	73.8-119		%Rec	1	5/1/2019 9:03:58 PM	44616
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	5/1/2019 9:03:58 PM	44616
Toluene	ND	0.050		mg/Kg	1	5/1/2019 9:03:58 PM	44616
Ethylbenzene	ND	0.050		mg/Kg	1	5/1/2019 9:03:58 PM	44616
Xylenes, Total	ND	0.099		mg/Kg	1	5/1/2019 9:03:58 PM	44616
Surr: 4-Bromofluorobenzene	95.5	80-120		%Rec	1	5/1/2019 9:03:58 PM	44616

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

Hall Environmental Analysis Laboratory, Inc.

Analytical Report

Lab Order **1905375**

Date Reported:

CLIENT: Souder, Miller & Associates**Client Sample ID:** BH1**Project:** Santo Nino**Collection Date:** 5/3/2019 10:03:00 AM**Lab ID:** 1905375-001**Matrix:** SOIL**Received Date:** 5/8/2019 8:50:00 AM

Analyses	Result	RL	Qual	Units	DF	Date Analyzed	Batch
EPA METHOD 300.0: ANIONS							Analyst: MRA
Chloride	ND	60		mg/Kg	20	5/9/2019 11:11:31 PM	44837
EPA METHOD 8015M/D: DIESEL RANGE ORGANICS							Analyst: TOM
Diesel Range Organics (DRO)	ND	9.6		mg/Kg	1	5/9/2019 7:55:14 PM	44799
Motor Oil Range Organics (MRO)	ND	48		mg/Kg	1	5/9/2019 7:55:14 PM	44799
Surr: DNOP	95.6	70-130		%Rec	1	5/9/2019 7:55:14 PM	44799
EPA METHOD 8015D: GASOLINE RANGE							Analyst: NSB
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	5/10/2019 2:36:26 AM	44788
Surr: BFB	99.9	73.8-119		%Rec	1	5/10/2019 2:36:26 AM	44788
EPA METHOD 8021B: VOLATILES							Analyst: NSB
Benzene	ND	0.025		mg/Kg	1	5/10/2019 2:36:26 AM	44788
Toluene	ND	0.050		mg/Kg	1	5/10/2019 2:36:26 AM	44788
Ethylbenzene	ND	0.050		mg/Kg	1	5/10/2019 2:36:26 AM	44788
Xylenes, Total	ND	0.10		mg/Kg	1	5/10/2019 2:36:26 AM	44788
Surr: 4-Bromofluorobenzene	97.6	80-120		%Rec	1	5/10/2019 2:36:26 AM	44788

Refer to the QC Summary report and sample login checklist for flagged QC data and preservation information.

Qualifiers:	*	Value exceeds Maximum Contaminant Level.	B	Analyte detected in the associated Method Blank
	D	Sample Diluted Due to Matrix	E	Value above quantitation range
	H	Holding times for preparation or analysis exceeded	J	Analyte detected below quantitation limits
	ND	Not Detected at the Reporting Limit	P	Sample pH Not In Range
	PQL	Practical Quantitative Limit	RL	Reporting Limit
	S	% Recovery outside of range due to dilution or matrix		

APPENDIX E

EXCAVATION & LINER PHOTO

Photo of Excavation



Open excavation (Looking into excavation from pad)

Photos of Liner



Photos of Berm

