



Western Refining Southwest LLC

A subsidiary of Marathon Petroleum Corporation

I-40 Exit 39
Jamestown, NM 87347

January 11, 2023

Mr. Ricardo Maestas, Interim Chief
New Mexico Environmental Department
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505

**RE: Response to Disapproval
Area of Concern 35 Process Sewer Investigation Work Plan
Western Refining Southwest LLC, Marathon Gallup Refinery
EPA ID #NMD000333211
HWB-WRG-23-015**

Dear Mr. Maestas:

Attached please find the Response to Disapproval for the Area of Concern 35 Process Sewer Investigation Work Plan (Work Plan) as requested in the New Mexico Environment Department Disapproval letter dated October 24, 2023. Included with submittal are two hard copies and an electronic version of the revised Work Plan, an electronic redline-strikeout version of the Work Plan, and a response to comments letter.

A timeline of the report is provided below:

- April 3, 2023, Area of Concern 35 Process Sewer Investigation Work Plan
- October 24, 2023, Disapproval of Area of Concern 35 Process Sewer Investigation Work Plan

If you have any questions or comments regarding the information contained herein, please do not hesitate to contact Mr. John Moore at (505) 879-7643 or Ms. Kateri Luka at (714) 713-1218.

Mr. Ricardo Maestas
January 11, 2024
Page 2

Certification

I certify under penalty of law that this document and all attachments were prepared under my direction of 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,

Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery



Timothy J. Peterkoski
Director of Environment and Climate Strategy
Marathon Petroleum Company LP

Enclosures

pdfc: N. Dhawan, NMED HWB
L. Andress, NMED HWB
M. Suzuki, NMED HWB
L. Tsinnajinnie, NMED HWB
K. Luka, MPC
J. Moore, Marathon Gallup Refinery
H. Jones, Trihydro Corporation

ATTACHMENT A
RESPONSE TO COMMENTS

**New Mexico Environment Department (NMED) to Western Refining Southwest LLC (dba Marathon Gallup Refinery [Refinery])
 Comment Letter “Disapproval – Area of Concern 35 Process Sewer Investigation Work Plan” (October 24, 2023)**

NMED Comment	Western Response
<p>Comment 1:</p> <p>In Section 4.1 (Smoke Testing Methodology), page 11 of 13, paragraph 2, the Permittee states, “[t]o assist in determining where line integrity issues may be present, smoke will be introduced into the process sewer system in AOC 35 from selected manhole locations with a blower.” Although Figure 4-1 (Proposed Investigation Area) depicts the locations of the investigation area and process sewer line, the manhole locations where smoke will be introduced are not depicted. Revise Figure 4-1 to present the locations where smoke will be introduced. In addition, it is unclear how smoke will be generated and introduced to the sewer system through a manhole without smoke escaping into the atmosphere. Provide a schematic of the testing device that indicates where the smoke source is coming from and the placement of the blower in relation to the manhole. Explain how the device operations and how the Permittee will keep the smoke from escaping during the test. Revise the Work Plan accordingly.</p>	<p>Response 1:</p> <p>Section 4.1, page 11 of 13, of the report has been revised to state “Attachment A shows a schematic of the proposed smoke testing device. The blower fully covers the manhole with a neoprene gasket to reduce vibration and help seal the manhole. As smoke begins to exit the other manholes on the same sewer line, the manholes down the same sewer line will be covered with caps preventing further smoke to leave through those manholes. The sewer will be tested in sections by using balloon plugs to isolate sections of the line to increase testing efficiency.”</p> <p>Figure 4-1 has been updated to include the proposed manhole locations used for smoke entry. Section 4.1, page 11 of 13, of the report has been revised to state, “The smoke introduction locations will include all manhole and sump locations noted on Figure 4-1 and will be recorded in the daily field logs.”</p>
<p>Comment 2:</p> <p>In Section 4.1 (Smoke Testing Methodology), page 11 of 13, paragraph 2, the Permittee states, “[s]moke testing utilizes a non-toxic smoke approved by the Environmental Protection Agency for use in populated areas. A safety data sheet of the selected smoke will be reviewed prior to starting the field investigation.” The use of the selected smoke must be approved by NMED prior to the test. Provide a safety data sheet for the selected smoke in the revised Work Plan.</p>	<p>Response 2:</p> <p>The Refinery has added a safety data sheet for the proposed smoke used for smoke testing in Attachment B. Section 4.1, page 11 of 13, of the report has been revised to state “The safety data sheet for the liquid smoke proposed for smoke testing is provided as Attachment B.”</p>

**New Mexico Environment Department (NMED) to Western Refining Southwest LLC (dba Marathon Gallup Refinery [Refinery])
Comment Letter “Disapproval – Area of Concern 35 Process Sewer Investigation Work Plan” (October 24, 2023)**

NMED Comment	Western Response
<p>Comment 3:</p> <p>In Section 4.1 (Smoke Testing Methodology), page 11 of 13, paragraph 2, the Permittee states, [t]he smoke introduction locations will be determined onsite and will be recorded in the daily field logs. Locations in AOC 35 will be monitored by a three- to five-person team for the visual presence of the smoke coming from the ground surface and/or at any openings in the process sewer system. Potential leaks are expected to present with smoke within minutes of introducing smoke into the sewer.” Address the following:</p> <p>a) The smoke introduction locations must be evaluated and approved by NMED prior to the commencement of smoke testing. Provide the smoke introduction locations in the revised Work Plan. Comment 1 above requires the Permittee to “[r]evis[e] Figure 4-1 to present the locations where smoke will be introduced.”</p> <p>b) The statement indicates that visual observation is the only detection method for smoke. Visual observation of smoke may not be reliable detection method, depending on the weather. If quantitative detection methods (e.g., gas analyzer) are available to detect concentrations of compounds in the smoke, propose to use quantitative method(s) along with visual and olfactory observations. Revise the Work Plan accordingly.</p> <p>c) The sewer lines are buried, and a thick concrete slab may cover part of the ground surface of the investigation area where the sewer lines are buried. In this case, even if there are cracks and holes on the sewer lines, smoke may not come from the ground surface due to the presence of concrete. Include a provision to remove potential obstructions (e.g., concrete slab) from the investigation area, as necessary in the revised Work Plan.</p>	<p>Response 3:</p> <p>a) Please see response to Comment 1.</p> <p>b) Visual observation is the only detection technique known to the Refinery. The Refinery requests NMED to provide a specific gas analyzer that can detect sewer testing smoke should NMED require one to be used. Section 4.1, page 11 of 13, of the report has been revised to state, “To ensure visual observation of the smoke, the Refinery will conduct the smoke testing on a partly cloudy or sunny day with wind speeds less than 15 miles per hour.”</p> <p>c) The Refinery acknowledges that a concrete slab may inhibit smoke from reaching the surface through cracks and holes in the sewer line, but disagrees that complete removal would be necessary. Alternatively, the Refinery proposes to cut 12 inch (in) by 12 in squares through the concrete and asphalt every 10 feet (ft) directly above the process sewer line to provide the smoke a path to exit the subsurface if there are leaks within the sewer system. In addition to the squares that are cut, cracks that have naturally occurred in the asphalt and concrete will allow smoke to reach the surface if leaks are observed in the sewer system. Section 4.1, page 11 of 13, of the report has been revised to state, “To ensure the smoke is able to reach the surface, the Refinery will cut 12 in by 12 in squares in the concrete and asphalt layer every 10 ft above the process sewer line in the process sewer investigation area (Figure 4-1).”</p> <p>d) Section 4.1, page 11 of 13, of the report has been revised to state, “The Refinery estimates that the volume of process sewer in the investigation area is approximately 450 cubic ft (ft³). The Refinery will use at least 2,250 ft³ (5 times the volume of the sewer) of smoke to ensure the smoke has filled the sewer and has</p>

**New Mexico Environment Department (NMED) to Western Refining Southwest LLC (dba Marathon Gallup Refinery [Refinery])
Comment Letter “Disapproval – Area of Concern 35 Process Sewer Investigation Work Plan” (October 24, 2023)**

NMED Comment	Western Response
d) It is not clear how a sufficient volume of the smoke is applied to the sewer system during the test. The entire test section of the sewer system must be filled with smoke. If the smoke is applied to the one end of the investigation area through a manhole, it must exit from the other end of the investigation area through an opening (e.g., laboratory sink) to ensure a sufficient volume of the smoke is applied. Explain how a sufficient volume of the smoke is applied to the sewer system in the revised Work Plan.	sufficient volume to reach the surface from potential cracks in sewer line.”

ATTACHMENT B

RED LINE STRIKE OUT

AREA OF CONCERN 35 PROCESS SEWER INVESTIGATION WORK PLAN

(PLEASE SEE ATTACHED CD)



Process Sewer Investigation Work Plan

Area of Concern 35

Process Sewer Investigation Work Plan



Marathon Gallup Refinery
Western Refining Southwest, LLC
Gallup, New Mexico

EPA ID# NMD000333211

March 2023

Revised January 11, 2024



Process Sewer Investigation Work Plan

Executive Summary

Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) is submitting this “Area of Concern 35 Process Sewer Investigation Work Plan” as requested in the New Mexico Environmental Department in Comment 8 of “Approval with Modifications Revised Investigation Work Plan No. 2 Area of Concern 35” dated December 12, 2022 (NMED 2022).

Area of Concern (AOC) 35 contains the main trucking loading rack, the crude slop and ethanol unloading facility, the additive tank farm loading rack, and the marketing tank farm. The process sewer is used to carry oily wastewater to be treated at the Refinery. In 2019, work was completed on the process sewer lines after the historical dye tests were implemented (i.e., repairs/replacements and installation of additional lines). This investigation work plan will discuss proposed methods to assess the current integrity of the process sewer system in the vicinity of AOC 35.

Smoke testing will be completed in the process sewer lines contained in AOC 35. Smoke testing is a common method of identifying breaks and undocumented connections in sewer systems. If leaks are identified, the leaks will be marked and mapped. The Refinery will prepare an investigation report summarizing the smoke test results within 150 days of field investigation completion.



Process Sewer Investigation Work Plan

Table of Contents

Executive Summary 1

1.0 Introduction 6

2.0 Background 7

 2.1 Main Truck Loading Rack Area 7

 2.2 Crude Slop and Ethanol Unloading Facility 7

 2.3 Additive Tank Farm Loading Rack 7

 2.4 Marketing Tank Farm 7

 2.5 Historical AOC 35 Process Sewer Investigations 8

3.0 Site Conditions 10

 3.1 Surface Conditions 10

 3.2 Subsurface Conditions 10

4.0 Scope of Activity 11

 4.1 Smoke Testing Methodology 11

 4.2 Documentation of Field Activities 12

5.0 Schedule 13

6.0 References 14

Figures.....

Appendix A – Example Smoke Testing Log.....



Process Sewer Investigation Work Plan

List of Figures

- 1-1. Site Location Map, Process Sewer Investigation Work Plan, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico
- 1-2. AOC 35 Map and Process Sewer Lines, Process Sewer Investigation Work Plan, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico
- 3-1. Potentiometric Surface Map (August 2019), Process Sewer Investigation Work Plan, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico
- 4-1. Proposed Investigation Area, Process Sewer Investigation Work Plan, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico



Process Sewer Investigation Work Plan

List of Appendices

- A. [Smoke Testing Device Schematic](#)
- B. [Smoke Testing SDS](#)
- C. [Example Smoke Testing Log](#)



Process Sewer Investigation Work Plan

List of Acronyms

amsl	above mean sea level
AOC	Area of Concern
cm/sec	centimeters per second
<u>in</u>	<u>inch or inches</u>
ft	foot or feet
<u>ft³</u>	<u>cubic foot</u>
GPS	global positioning system
MKTF	marketing tank farm
MTBE	methyl tert butyl ether
NM	New Mexico
NMED	New Mexico Environment Department



Process Sewer Investigation Work Plan

1.0 Introduction

Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) is submitting this Area of Concern (AOC) 35 Process Sewer Investigation Work Plan as requested by the New Mexico Environment Department (NMED) in Comment 8 of "Approval with Modifications Revised Investigation Work Plan No. 2 Area of Concern 35" dated December 12, 2022 (NMED 2022). This investigation work plan will discuss methods to determine the integrity of the process sewer system in the vicinity of AOC 35 (Figure 1-2). The process sewer is used to carry oily wastewater to be treated at the Refinery. AOC 35 is in the southwest portion of the Refinery. It includes the Main Truck Loading Racks/Crude Slop, the Ethanol Unloading Facility, the Loading Rack Additive Tank Farm, and the Market Tank Farm. Historical dye tests and camera scope activity in this area indicated potential leaks from the process sewer system; however, Refinery personnel repaired and replaced portions of the process sewer system after the 2013 dye tests. This investigation will identify, if present, areas of the sewer still requiring repair.

The Refinery is located approximately 17 miles east of Gallup, New Mexico (NM) along the north side of Interstate Highway I-40 in McKinley County. The physical address is I-40, Exit #39 Jamestown, NM 87347. The Refinery is located on 810 acres. Figure 1-1 presents the Refinery location and the regional vicinity.

The Refinery has been indefinitely idled since August 2020. Historically, the Refinery generally processed crude oil transported to the facility by pipeline or tanker truck. Various process units were operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, alkylation, sulfur recovery, merox treater, and hydrotreating. Refinery operations have produced gasoline, diesel fuels, jet fuels, kerosene, propane, butane, and residual fuel.



2.0 Background

This section presents background information detailing the various components of AOC 35 and discussion of historical dye tests and camera scope activities in the process sewer contained in AOC 35. AOC 35 contains the main trucking loading rack, the crude slop and ethanol unloading facility, the additive tank farm loading rack, and the marketing tank farm.

2.1 Main Truck Loading Rack Area

The main truck loading rack is in the southwestern area of the formerly active Refinery (Figure 1-2). The main loading racks cover an area approximately 100 feet (ft) by 120 ft and were used to load refined petroleum products (e.g., gasoline and diesel) into tanker trucks. The loading racks appear to have been in operation in this same location since at least 1962.

The process sewer line near the main truck loading rack travel from the lab building to the loading rack and then continue to the north after picking up discharge from the loading rack sumps (Figure 1-2). The sumps were used to collect small spills on the loading rack concrete apron and de minimis volumes of product that drained from loading hoses.

2.2 Crude Slop and Ethanol Unloading Facility

The crude slop and ethanol unloading facility is located approximately 80 ft northwest of the main truck loading racks (Figure 1-2) and was used to unload recovered oil and transmix reclaimed from various locations within the Refinery. The area was also used to unload ethanol delivered to the Refinery via truck. The exact start of date of operation is unknown with records dating back to before the 1990s. The unloading area is approximately 15 ft by 40 ft and includes a concrete pad and sump, overhead pipelines, and various connections to support unloading operations. The concrete pad and sump are connected to the process sewer.

2.3 Additive Tank Farm Loading Rack

Petroleum product additives were stored in aboveground tanks at the additive tank farm loading rack (Figure 1-2). These additive tanks are small aboveground tanks located approximately 150 ft west of the main loading rack. The additive tanks were installed prior to 1997, but the exact date is uncertain. Only products (i.e., fuel additives) were managed in this area; wastes and methyl tert butyl ether (MTBE) were not stored in these tanks. The additive tanks were taken out of service and cleaned during the 2020/2021 calendar years. There are no products stored in any additive tanks at the time this investigation work plan was prepared.

2.4 Marketing Tank Farm

The marketing tank farm (MKTF) is located approximately 150 ft northwest of the main loading rack and includes Tanks 1 through 8, 912, 913, 1001, and 1002 (Figure 1-2). Retail petroleum products (e.g., gasoline, diesel, and biodiesel) were stored in these tanks. MTBE was stored in Tank 6 until 2006; ethanol was stored in Tank 6 after the use of MTBE was discontinued. The first tanks were constructed



Process Sewer Investigation Work Plan

in 1963 and have had routine external and internal inspections since construction. The MKTF tanks have been cleaned and emptied and remain in place.

The fuels were delivered to the marketing tanks via primarily aboveground pipelines. Ethanol was unloaded at the adjacent ethanol unloading facility and transferred to Tanks 5 and 6 via aboveground lines. The fuels and additives were subsequently transferred to the main loading racks via aboveground and underground pipelines where they were loaded into tanker trucks.

2.5 Historical AOC 35 Process Sewer Investigations

The process sewer lines that are present in the area (Figure 1-2) were evaluated in the past to determine if they could be leaking. After the discovery of hydrocarbons in Hydrocarbon Seep Area on June 26, 2013, an investigation into the source was summarized in "Interim Measures Report Hydrocarbon Seep Area" submitted July 28, 2016 (Western 2016). On July 8, 2013, one pint of fluorescent FWT red dye was poured into a sump/drain at the second bay from the south end at the truck loading rack. After several minutes, the red dye was observed in the sewer box located on the west side of the heat exchanger bundle cleaning pad, identifying the flow of the drain from the truck rack to the north in the main process sewer pipeline.

Subsequently, a second pint of FWT red dye was added to the sewer box on the west side of the bundle pad. Excavations at the previously identified hydrocarbon seep area (located west of the crude tanks) were inspected each day after addition of the dye and on the 8th day (July 16, 2013) red dye was identified in one of the excavations. The dye was not initially detected in the soil borings/temporary wells located south the hydrocarbon seep and west of the marketing tanks, but only in the area where the seep was identified. During a later fluid gauging event on August 14, 2013, dye was observed in MKTF-03 and MKTF-10 (Figure 1-2). The presence of dye in groundwater in the area of the seep was interpreted as indicating a likely release from the sewer system and a possible preferential migration pathway to the northwest.

Following the results of the July 2013 dye test, two additional dye tests were conducted in the process sewer system. On September 23, 2013, one pint of a yellow/green dye (Spectroline Oil-Glo 44G Fluorescent yellow/green) was introduced into the sewer at the Crude Slop and Ethanol Unloading area. On September 24, 2013, one pint of a FWT red dye was introduced at the lab sinks. On September 25, 2013, green dye was detected at the hydrocarbon seep. A fluid level gauging event was conducted at the MKTF monitoring wells on September 26, 2013; the red dye was identified in five temporary wells and several were subsequently kept as permanent monitoring wells [SB01 (MKTF-03), SB02, SB16 (MKTF-10), SB17 (MKTF-11), and SB22 (MKTF-14)] (Figure 1-2), all of which are located just south of the road that runs east-west along the north side of the marketing tanks. The green/yellow dye appeared to be present in these locations [SB04, SB05, SB06 (MKTF-05), SB08 (MKTF-06), SB10 (MKTF-07)] (Figure 1-2) closer to the crude slop and ethanol unloading area. Although the dye tests were not conclusive, the separate patterns of the two dyes suggest the possibility of two separate release points from the process sewer line.



Process Sewer Investigation Work Plan

Since the 2013 dye tests, repair work and installation of additional process sewer lines has occurred in the vicinity of AOC 35. In 2019, portions of the main process sewer lines near the MKTF were visually inspected using a camera and were determined to be in good condition with no breaks. Smaller lines were not inspected so the condition of those lines is unknown. No further dye testing was completed after the repairs in 2019. The Refinery is indefinitely idled at this time and the sewer is currently not in operation and has been blocked off via inflatable plugs.



3.0 Site Conditions

This section presents background information detailing the site condition. Average rainfall at the Refinery is less than 7 inches (in) per year, although it can vary to slightly higher levels elsewhere in the county, depending on elevation. Erosion features such as arroyos are present in portions of the property.

3.1 Surface Conditions

Site topographic features include high ground in the southeast gradually decreasing to a lowland fluvial plain to the northwest. Elevations on the Refinery property range from 7,040 ft above mean sea level (amsl) to 6,860 ft amsl. Surface soils within most of the area of investigation are primarily Rehobeth silty clay loam. Rehobeth soil properties include a pH ranging from 8 to 9 standard units and salinity naturally occurring and typically measuring up to approximately 8 millimhos per centimeter.

The site is in the Puerco River Valley, north of the Zuni Uplift with overland flows directed northward to the tributaries of the Puerco River. The Puerco River continues to the west to the confluence with the Little Colorado River. The South Fork of the Puerco River is intermittent and retains flow only during and immediately following precipitation events. Additional regional surface water features include the Refinery evaporation ponds.

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 Group, which is Upper Triassic, crops out over a large area on the southern margin of the San Juan Basin. The uppermost recognized local Formation is the Petrified Forest Formation, 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 squared per 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.

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} centimeters per second (cm/sec) for gravel like sands immediately overlying the Petrified Forest Formation to 10^{-8} cm/sec in the clay soils located near the surface (Western, 2009). Generally, shallow groundwater at the Refinery follows the upper contact of the Petrified Forest Formation with prevailing flow from the southeast to the northwest, although localized areas may have varying flow directions (Figure 3-1).



4.0 Scope of Activity

This investigation will be conducted to assess the current integrity of the process sewer lines in the vicinity of AOC 35. This section outlines the scope of activity used to identify and record potential leaks in the process sewer.

4.1 Smoke Testing Methodology

To assist in determining where line integrity issues may be present, smoke will be introduced into the process sewer system in AOC 35 from selected manhole locations with a blower. The blower is a piece of equipment designed to move large volumes of air throughout the process sewer system. Smoke testing is a common method of identifying breaks and undocumented connections in sewer systems. Smoke testing also allows for inspection of smaller connections and lines that would be inaccessible to camera scope operations. Attachment A shows a schematic of the proposed smoke testing device. The blower fully covers the manhole with a neoprene gasket to reduce vibration and help seal the manhole. As smoke begins to exit the other manholes on the same sewer line, the manholes down the same sewer line will be covered with caps preventing further smoke to leave through those manholes. The sewer will be tested in sections by using balloon plugs to isolate sections of the line to increase testing efficiency. An experienced smoke testing subcontractor will be utilized to conduct testing. Smoke testing utilizes a non-toxic smoke approved by the Environmental Protection Agency for use in populated areas. The safety data sheet for the liquid smoke proposed for smoke testing is provided as Attachment B. A safety data sheet of the selected smoke will be reviewed prior to starting the field investigation. Figure 4-1 shows the section of process sewer where the investigation will be focused. The smoke introduction locations will include all manhole and sump locations noted on Figure 4-1 and will be recorded in the daily field logs. To ensure the smoke is able to reach the surface, the Refinery will cut 12 in by 12 in squares in the concrete and asphalt layer every 10 ft above the process sewer line in the process sewer investigation area (Figure 4-1). Locations in AOC 35 will be monitored by a three- to five-person team for the visual presence of the smoke coming from the ground surface and/or at any openings in the process sewer system. To ensure visual observation of the smoke, the Refinery will conduct the smoke testing on a partly cloudy or sunny day with wind speeds less than 15 miles per hour. The Refinery estimates that the volume of process sewer in the investigation area is approximately 450 cubic ft (ft³). The Refinery will use at least 2,250 ft³ (5 times the volume of the sewer) of smoke to ensure the smoke has filled the sewer and has sufficient volume to reach the surface from potential cracks in sewer line. Potential leaks are expected to present with smoke within minutes of introducing smoke into the sewer. The location of observed smoke will be flagged, marked by global positioning system (GPS), and recorded in the daily field log. A ground penetrating radar system will be used in conjunction with smoke testing to map the sewer line locations.



Process Sewer Investigation Work Plan

4.2 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field logbook. Indelible ink will be used to record all field activities (Appendix [AC](#)). Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

1. Date,
2. Smoke entrance GPS and descriptive locations,
3. Field investigation team members including subcontractors and visitors,
4. Weather conditions,
5. Smoke leak GPS and descriptive locations,
6. Observations, and
7. Photographic log, as appropriate



Process Sewer Investigation Work Plan

5.0 Schedule

The smoke investigation must be conducted on a clear day and will have the highest chance of success in late spring, during the dry season. Wet, icy, or snow-covered soil may block smoke from reaching the ground surface and prevent leaks from being detected therefore testing will only be conducted during a dry, clear day. The investigation will be conducted in the spring of 2024, pending NMED approval of this Work Plan. An investigation report, presenting the findings of the investigation, will be submitted to NMED no later than 150 days after the conclusion of the field investigation. Data presented in the investigation report will include extent of smoke testing was performed, where smoke was observed outside of the system (if applicable), copies of daily field logs, and photographs. A comprehensive map of the AOC 35 sewer system and any repairs needed, if required, will be created based on the data collected. Recommendations will be made based on the investigation findings will also be presented.



Process Sewer Investigation Work Plan

6.0 References

- New Mexico Environment Department (NMED). 2022. Approval with Modifications Revised Investigation Work Plan No. 2 Area of Concern 35, Western Refining Southwest Inc., Gallup Refinery, McKinley County, Gallup, New Mexico, EPA ID # NMD000333211, HWB-WRG-20-009. December 12.
- Stone, W.J., Lyford, F.P., Frenzel, P.F., Mizel, N.H., and Padgett, E.T. 1983. Hydrogeology and Water Resources of San Juan Basin, New Mexico; Hydrogeologic Report 6, New Mexico Bureau of Mines and Mineral Resources, p. 70.
- Western Refining. Southwest Inc., Gallup Refinery (Western). 2009. Facility Wide Groundwater Monitoring Work Plan. Western Refining Company, Southwest, Inc., Gallup Refinery, EPA ID # NMD000333211, HWB-GRCC-09-001. February 9.
- Western. 2016. Interim Measures Report Hydrocarbon Seep Area. Western Refining Southwest Inc, Gallup Refinery, EPA ID # NMD000333211, HWB-WRG-15-002. July 28.



Process Sewer Investigation Work Plan

Figures

\\TRIHYRO.COM\CLIENTS\TON\MARATHON\CADD\GALLUP\REPORTS\AOC\AOC35_MKTF\PROCESSEWERINVESTIGATION\202312_RTD_IWP\697-AOC35-PSI-PIA-202312

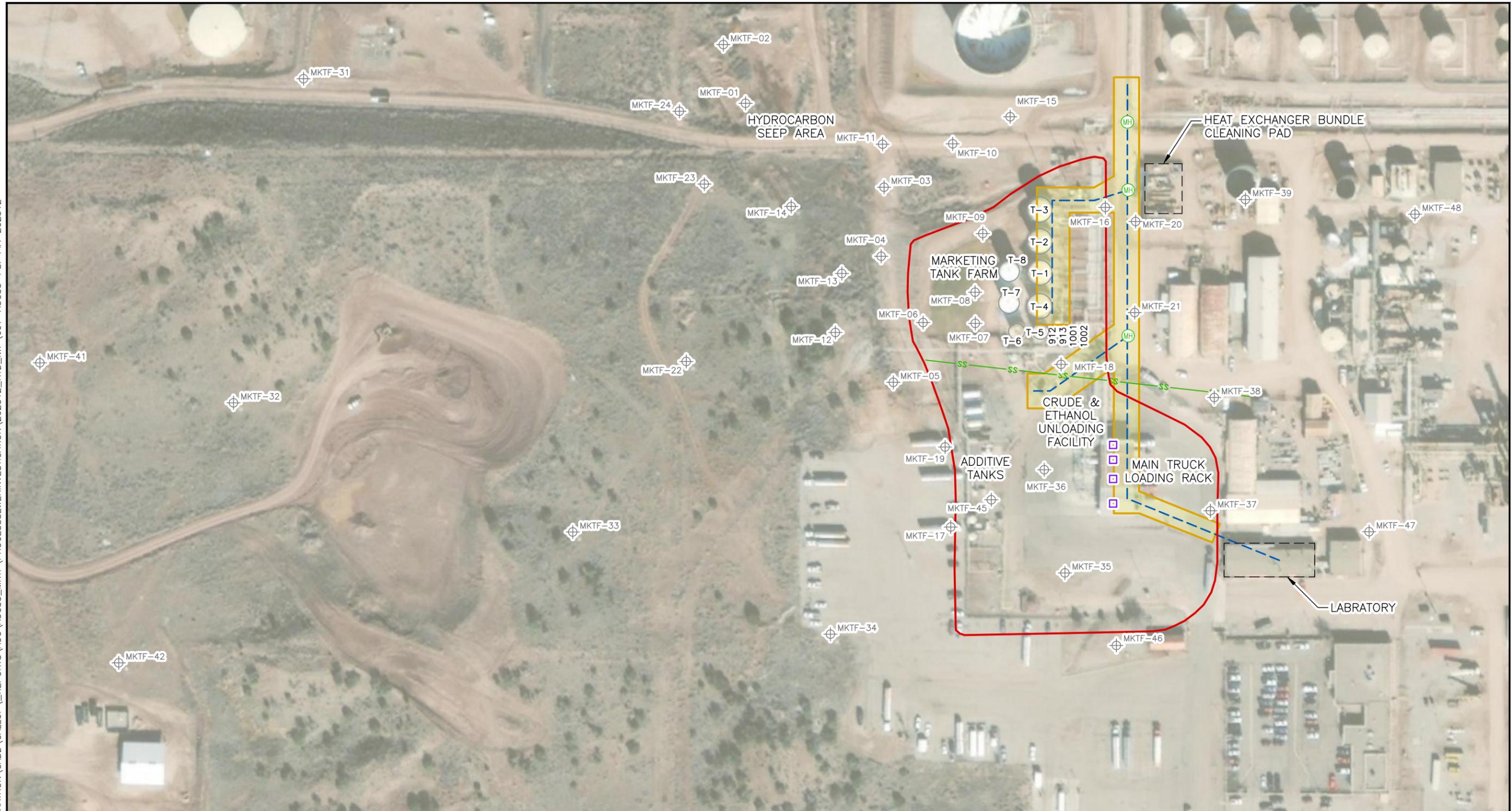
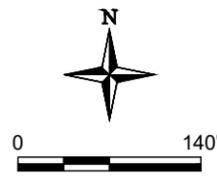


Image Cite: DigitalGlobe © CNES (2020) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION	
⊕ MKTF-34	EXISTING MONITORING WELL AND DESIGNATION
□	EXISTING SUMP LOCATION
Ⓜ	MANHOLE LOCATION
—	AOC
— (Red)	AOC 35 BOUNDARY
- - - (Blue)	PROCESS SEWER LINE
- - - (Green)	SANITARY SEWER LINE
▭ (Yellow)	PROCESS SEWER INVESTIGATION AREA
	AREA OF CONCERN

NOTE:
SMOKE WILL BE INTRODUCED INTO MANHOLE AND SUMP LOCATIONS.



Trihydro
CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 4-1

PROPOSED INVESTIGATION AREA, PROCESS SEWER INVESTIGATION WORK PLAN

**WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO**

Drawn By: REP	Checked By: BB	Scale: 1" = 140'	Date: 12/22/2023	File: 697-AOC35-PSI-PIA-202312
---------------	----------------	------------------	------------------	--------------------------------



Process Sewer Investigation Work Plan

Appendix A - Smoke Testing, Device Schematic

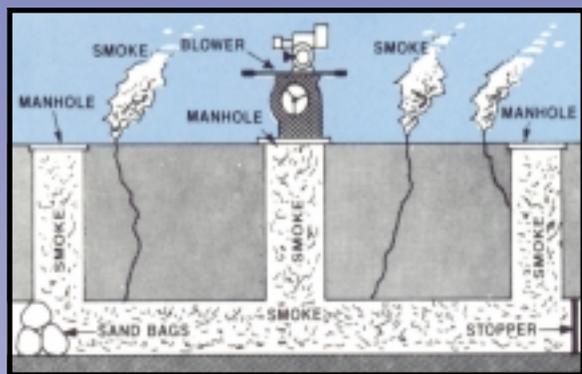
The SUPERIOR *Smoke Testing Technique*

**For Sewer Inflow Analysis, Maintenance,
Trouble Shooting and New Construction**



THE SUPERIOR SMOKE TESTING TECHNIQUE

High readings on treatment plant flow gauges immediately following rainfall is a positive indication of storm/surface water inflow. Smoke testing is the fastest, most economical and positive means of locating sources of inflow in sewer collection systems. Elimination of these sources as required by law, will improve treatment plant operations – and correct problems of overloading which are a major contributor to pollution of water resources.



The Superior Smoke Testing technique is a fast and easy way to quickly identify...

- Leaks permitting storm/surface water intrusion (inflow)
- Connected roof and cellar drains
- Cross connected sanitary and storm sewers
- All connected lines, including abandoned and supposedly unconnected lines
- Leaking manholes
- Yard and foundation drains
- Sump pumps

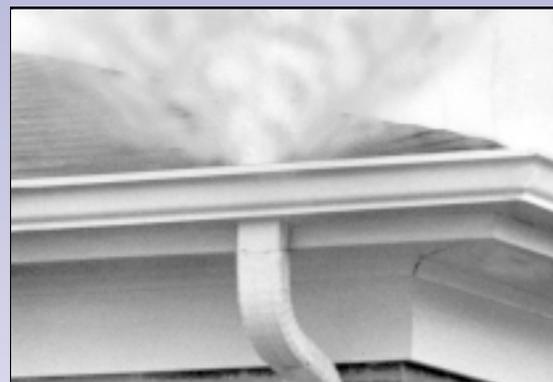
Industry Experts!

The **Superior** Smoke Testing Technique was developed in 1961 as a way to locate sewer faults at a low cost. It has **proven** to be an extremely effective method of pin-pointing sources of inflow and other sewer line problems in both existing and new collection systems. When you use Superior Smoke products you can be confident in your choice of suppliers. All products meet recommendations of NASSCO, EPA & WEF. Our products have identified inflow problems in millions of feet of sewer line in thousands of municipalities!

Recommended Equipment

Each test consists of two sections of line, generally 600-800 feet of 8-12" pipe, and require 5 to 6 minutes of smoke to walk the test area.

A portable air blower with a capacity of between 1500 and 2000 cfm is required. A blower of lesser capacity will not generate sufficient pressure to disclose all faults in a line. Recommended Blowers are the Superior Models 20-S or 10-S.



Other items required include line plugs and bags (partly filled with 1/4 round stones with an attached rope for easy positioning) and canvas or rubber flaps for confining the smoke in specific sections of line.

Materials for sketching location of faults to complete engineering reports, and a Polaroid camera or equivalent are also needed.

For information on advance notice – see specific heading.

Personnel and Cost

The smoke testing technique is uncomplicated and can be performed by regular maintenance crew members (2 or 3) who quickly master the fundamentals. A crew can easily test 10,000 linear feet of sewer line in an eight-hour period. The cost is only a few cents per foot for labor, blower, and smoke product. A fraction of the cost of other inspection methods.

PROCEDURE

As illustrated on the previous page, usually two sections of line (600-800 ft.) are tested simultaneously, with the smoke being introduced through a centrally located manhole. Blocking the far side of the upstream and downstream manholes is only necessary when isolating a section of line. The smoke under pressure will quickly fill the main plus all connected lines, and follow the path of least resistance. It will flow through all openings to the surface, revealing the location of the faults. Invariably, the fault will be found at the site or within a few feet of it. Only enough pressure to sufficiently overcome atmospheric pressure is required.

Smoke tests are effective regardless of surface, type of soil, or depth, provided openings exist for the smoke to follow. For example, it is not uncommon to see smoke exiting from cracks in paved surfaces, showing points of surface water entry.

Best results are obtained on dry days when water is not leaking into the line. (Other methods may overlook many sources of inflow, unless the passing camera picks up water actually leaking into the line).

The blower should not be started over the manhole because of the possibility of igniting flammable vapors in the line. The blower should be started first and then placed over the manhole. In less than a minute, smoke will be issuing from the roof vents of buildings connected to the line. If plugs are being used, do not tighten them before the smoke has fully penetrated the line, otherwise trapped air may prevent complete penetration.

The crew should check building, grounds and streets for telltale signs of smoke. Smoke immediately backing up into the blower indicates a line blockage. If this should occur, testing should be discontinued until the line has been cleared. Smoke issuing from the ground, pavement, yards, roof drains, etc., shows sources of inflow. Record for future repair.

Advance Notice

Press releases to the news media (newspapers, radio and TV) will generate much public good will and support for a program that will improve the local sewerage system, and assure compliance with EPA regulations. Such releases should outline the place, as well as the problems that will be solved by having the smoke testing done.

Local fire and police departments should be advised daily of the areas being tested, on a street to street basis. Personnel handling telephone inquiries should be acquainted with the purposes of the smoke testing program, and be prepared to advise against unnecessary exposure to the smoke.

Proper advance notices are necessary and the responsibility of the agency or contractor performing the tests. Door to door notification within 24 hours before the tests is recommended. This prevents unethical occupants from covering up illegal drains, sump pumps, etc. before the tests. While giving advance notice discrete neighborhood inquiries can identify persons suffering from heart and/or lung diseases, such as emphysema, who should never be exposed to any smoke, including Superior. Individuals with respiratory problems should be removed from the premises prior to the tests. Others, such as house confined invalids, sleeping shift workers and locked in animals should be identified and evacuated before the test.

To Whom It May Concern:

Please be informed that the Sewer Operating Committee will be testing lines in this area on (insert date) by the use of smoke. The smoke should not enter the premises unless a leak is present.

The presence of smoke in your house should be reported immediately to the personnel conducting the tests, or by calling (insert telephone number).

Avoid unnecessary exposure to the smoke. The smoke is relatively harmless but may be irritating to nasal passages. Any smoke irritation will be temporary and should quickly disappear after exposure has ceased. Persons with heart and respiratory ailments should leave the house during the test. House pets will react in a manner similar to a prudent person and leave the smokey area. If an exit is not available, be sure pets are provided with proper ventilation.

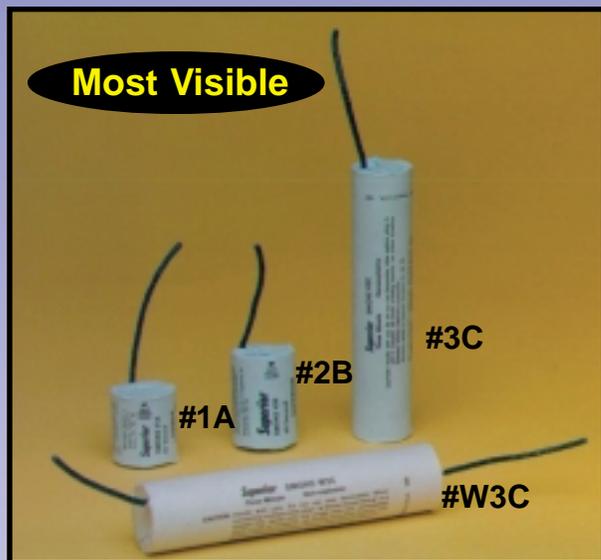
To minimize the chance of smoke entering your house, please pour water into all drains including floor drains prior to the date of the test.

Signed _____

CLASSIC SUPERIOR SMOKE

Classic Superior Smoke Candles quickly produce clean efficient smoke which varies in color from white to gray depending upon density and lighting. Superior Smoke items contain no explosive materials and offer a T.O.P. (total obscuring power) of 2100. T.O.P. is the scientific method of determining the quantity of smoke generated by a given unit of smoke composition. By comparison crude oil has a T.O.P. of 200.

Smoke is created by a chemical reaction where the visible portion is mostly atmospheric moisture. Due to its high visibility, classic smoke simply provides the best results when testing sewers.



- Capable of being blown and seen 1000's of feet away.
- Optical density (obscuration) 10 times that of burning oil.
- Most consistent smoke; Same quality from beginning of test to end.
- Field adjustable cfm/static pressure option.
- Doesn't contain engine exhaust, and won't get wet.
- Works with most any blower.
- Meets recommendations of WEF, EPA, and NASSCO.

Sealpac Containers

Superior Smoke #'s 1A, 2B, 3C, and W3C can also be packaged in these unique resealable containers which protect them from exceptionally hot and humid climates.



Versatile! Combine different items for a variety of test section lengths.

Connect two #W3C's in tandem for a 6 minute burn time, or one #W3C and one #2B for four minutes. Choose the item, or combination that's just right for the job at hand. As a guideline use two consecutive #3C for each test lasting 5 to 6 minutes; generally two sections line, 600 to 800 feet of 8" to 12" pipe.

1 Year Warranty; Gauranteed to Work!

All Superior classic smoke candles are warranted for 1 year, and are guaranteed to work within this time period. If an item should fail, simply return for free replacement. Items have been known to work several years after date of manufacture when stored cool and dry.

All classic Superior Smoke generators are packaged and sold per dozen.

ITEM #	GENERATING TIME	VOLUME	ITEM SIZE	SHIPPING WEIGHT
#1A	30 Seconds	4000 cubic feet	1 1/2" x 1 1/2"	2 lbs. / doz.
#2B	60 Seconds	8000 cubic feet	1 1/2" x 2"	2 lbs. / doz.
#3C	3 Minutes	40,000 cubic feet	1 1/2" x 6"	6 lbs. / doz.
#W3C	3 Minutes*	40,000 cubic feet	1 1/2" x 6"	6 lbs. / doz.

*Note: Item #W3C is double wicked, furnished with quick clips for extending smoke generating time.

SUPERIOR SMOKE FLUID SYSTEMS

The most common problem associated with liquid based smoke systems has been thin / wet smoke. As cool liquid is introduced into the heating chamber it has a natural tendency to lower the temperature of the system to where efficient smoke production is impossible. Superior Signal Company, world leaders in sewer smoke testing products, has developed a fluid based smoke system engineered to minimize this effect, thus maximizing performance!

Engineered to optimize DRY smoke output!

- Superior Smoke fluid is injected through a **custom-machined precision orifice** designed to minimize the chances of “overloading” the heating chamber.
- The **unique heating chamber** is much larger than standard muffler type smokers, thus extending the time available for fluid to convert to smoke.
- The heating chamber is **insulated** to retain heat and maximize smoke production.
- Precision valve provides maximum control.
- Field adjustable cfm/static pressure option.
- Meets recommendations of WEF, EPA, and NASSCO.

Only from Superior Signal; your partner in Smoke Testing for over 40 years!

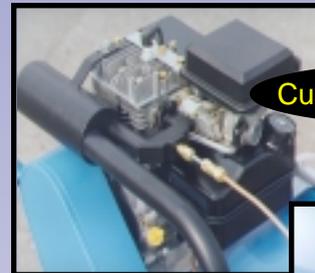
The Fluid

Superior Smoke Fluid is inexpensive, easy to use, and is as safe and clean as it gets. Available in single 1 gallon containers, a 5 gal. container, or in 55 gallon drums. Also works in competitive propeller driven systems.



Model 10-L

Reduces Fluid Overload!



Custom Fluid Injector



“Micro” Control Valve

Specifications All Blowers are single unit sturdy metal construction with carrying handles and 27 1/2 in. custom fiberglass base.

Model	Power	Carrying Weight	Standard Capacity
10-L	Briggs & Stratton 3.5 hp Gasoline	75 lbs.	1800 CFM @ 1.7 static pressure*
20-L	Briggs & Stratton 3.5 hp Gasoline	75 lbs.	1800 CFM @ 1.7 static pressure*

**Also available as 4200 CFM @ 3.0 static pressure, or 4000 CFM @ 4.0 static pressure.*

Model 20-L includes auxiliary outlet with removeable cover, 8' x 8" vinyl duct with draw strings to attach to outlet, and adjustable damper to direct air/smoke through base or auxiliary outlet.

Sewer Smoke Fluid

#SL-1 (1 gallon) #SL-5 (5 gal. container) #SL-55 (55 gal. drum)

Fluid Conversion Chamber Kit

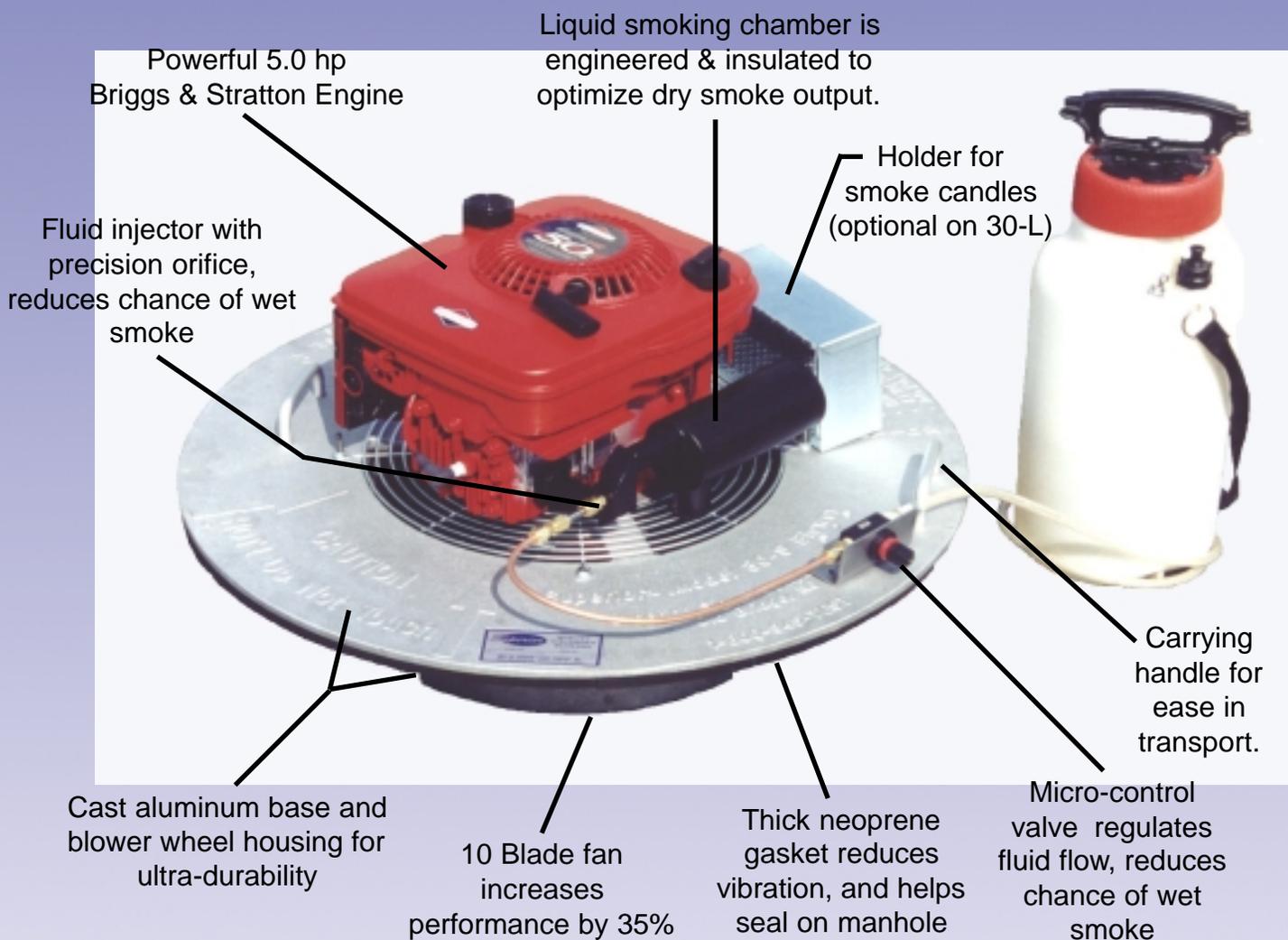
#519 Includes conversion chamber, fluid tank, injector, control valve and tubing. Fits all Superior 10-S and 20-S blowers.

WARRANTY: Superior Blowers are warranted to be free of defects in material and workmanship in normal use or service for a period of one year from date of purchase by the original purchaser and will be repaired without cost, if received at Superior Signal Company, 178 West Greystone Road, Spotswood, NJ 08884. Gasoline engines are covered by separate Briggs & Stratton warranty.

Superior Model 30-S/L Blowers

For powerful smoke testing, the 30-S/L offers the high quality and performance you've come to expect from Superior Signal.

Model 30-S; Uses Classic Smoke Candles Only
Model 30-L; Uses Classic or Liquid Smoke



Specifications

- Model:** 30-S / 30-L (Shown)
- Power:** 5 hp Briggs & Stratton Gasoline Engine
- Output:** 4,300 cfm
- Carrying Weight:** 65 lbs.
- Construction:** Low profile design, Cast Aluminum
- Fan Type:** 10 blade propeller
- Base diameter:** 30 inches
- Additional Uses:** Line Stringing, Ventilation

Liquid Conversion Kit #520; Quickly converts Superior model 30-S or similar blower to fluid smoker.

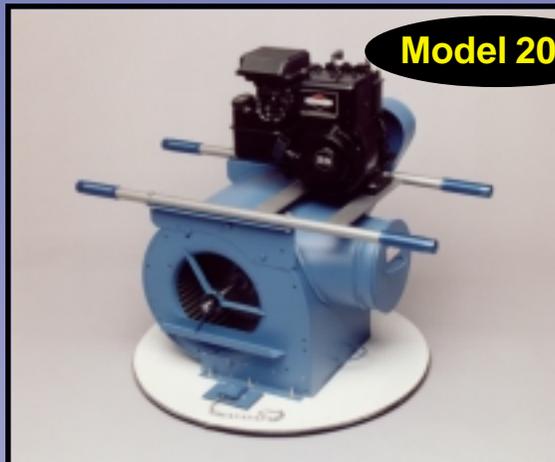
Kit contains...

- Fluid conversion chamber
- Custom injector
- Fluid tank
- Control valve
- All necessary hardware

SUPERIOR AIR/SMOKE BLOWERS

Superior air/smoke blowers are engineered for efficient and economical smoke testing of sewer lines to detect sources of inflow and leaks. Also for fast ventilation of sewerage collection systems and closed areas.

Manufactured in two models powered by dependable 3.5hp Briggs & Stratton gasoline engines. Both are single unit sturdy metal construction complete with carrying handles for easy handling, beltguard and 27 1/2" custom fiberglass base, eliminating need for separate manhole cover.



Model 20-S

Model 10-S Standard equipment as detailed above.

Model 20-S Standard equipment plus:

- Auxiliary outlet with removable cover.
- 8' x 8" vinyl duct with draw strings to attach to outlet.
- Adjustable damper to direct air/smoke through base into manhole or auxiliary outlet.

Specifications

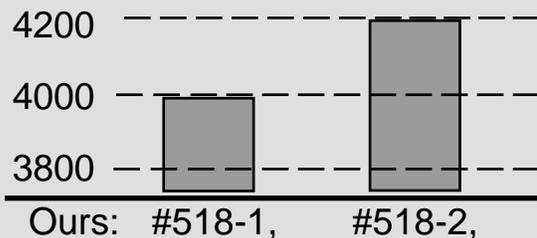
<u>Model</u>	<u>Power</u>	<u>Carrying Weight</u>	<u>Standard Capacity</u>
10-S	Briggs & Stratton 3.5 hp Gasoline	65 lbs.	1800 CFM @ 1.7 static pressure*
20-S	Briggs & Stratton 3.5 hp Gasoline	65 lbs.	1800 CFM @ 1.7 static pressure*
*Also available as 4200 CFM @ 3.0 static pressure, or 4000 CFM @ 4.0 static pressure.			
5-E	12v or 110v Electric	15 lbs.	180 CFM @ 1.3 static pressure

Pulley Kits provide a variety of CFM and Static Pressure Options

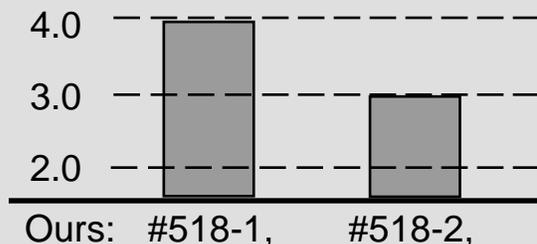
Superior Signal's Alternate Pulley Kit, is available for all new and existing 10-S/L and 20-S/L smoke blowers. Simple installation of matched sets of pulleys and belts can be easily interchanged to provide a variety of performance options.

PERFORMANCE COMPARISON

C.F.M.



Static Pressure



Pulley kit (order part # 518) includes...

- Pulley # 518-1; Provides 4000cfm at 4.0 inches static pressure.
- Pulley # 518-2; Provides 4200cfm at 3.0 inches static pressure.
- Belts, carrying case and installation instructions.



LATERALS AND HOUSE PLUMBING

Many inspectors and contractors prefer to test with smoke rather than use time-consuming water or air pressure tests. Consequently, smoke tests before acceptance are specified in many state and local plumbing codes. Smoke tests will reveal:

1. Leaks that permit surface water inflow
2. Drains of all types, including roof, cellar and yard drains that are connected to house lines and discharging into collection systems.
3. Poorly soldered or fitted joints and leaky seals, which may allow water damage or noxious gases to leak indoors.
4. Rodent passages into line.

Required Equipment

1. 2-3 Superior Smoke No. 2B (one minute)
2. Superior Electric Blower Model 5-E/12-Volt D.C. battery powered or 110-Volt A.C.
3. Pneumatic sewer plug or rubber balloon for sealing off house connections from main lines (optional)
4. Vent cap with open center hole to restrict the flow of air and smoke (optional)

Procedure

It is not absolutely necessary to have the house line blocked off from the main, but doing so will increase test efficiency. In most cases there is a clean-out opening through which a plug or balloon can be inserted between the opening and main, and then inflated. A length of windshield hose or similar type tubing can be attached to the balloon to facilitate inflation. Vents can be partially blocked allowing the air/smoke mixture to flow throughout the plumbing system.

When you are sure the building is unoccupied, connect the blower to the line and start introducing the smoke through the intake side of the blower.

Check the interior of the house for smoke. Any smoke should be quickly ventilated by opening doors and windows. Notations should be made of leak locations. Next the yard should be checked for smoke and the location of any smoke marked for later correction of faults.

All buildings connected to the lines being tested should be checked for smoke. Points of entry for the smoke should be located. If entry to the buildings is not possible once smoke is discovered, it is advisable to return later to determine the point of entry.

Model 5-E Electric Powered

Electric blower with flexible 8' x 4" hose. 180 CFM capacity. Available 12 volt or 110V. For testing house lines.



Superior Signal Company, Inc.

Over 56 years combined membership...

WEF
NRWA
NASSCO

Distributed By...

WARRANTY:

Superior warrants that these products conform to the Product Description contained in this literature. Superior makes no other warranty, whether expressed or implied, including warranties of merchantability or of fitness for a particular purpose or application. No statements or recommendations contained herein are to be construed as inducements to infringe any relevant patent, now or hereafter in existence. Superior neither assumes nor authorizes any representatives or other person to assume for it any obligation of liability other than such as is expressly set forth herein. Under no circumstances shall Superior be liable for incidental, consequential or other damages from any alleged negligence, breach of warranty, strict liability or any other theory, arising out of the use or handling of this product.



Process Sewer Investigation Work Plan

Appendix B - Smoke Testing SDS

Superior[®] SL Smoke Fluid

Safety Data Sheet

replaces all previous editions

Section 1. Product and Company Identification

1.1 Product Identifiers:

Product Name: Superior[®] SL Smoke Fluid

1.2 Recommended use:

Smoke generating fluid exclusively for use in approved professional smoke generating equipment, for Sewer Smoke Testing and other approved professional air flow marking applications. **For Professional Use ONLY. Use only as directed.**

1.3 Details of the supplier of the Safety Data Sheet

Supplier: Superior Signal Company LLC
P.O. Box 96, Spotswood, NJ, USA

Phone: 732-251-0800

Fax: 732-251-9442

Email: info@superiorsignal.com

1.4 Emergency telephone number:

Emergency Phone: 732-251-0800

Section 2. Hazards Identification

2.1 Globally Harmonized System (GHS) Hazard Classification:

OSHA Classification in accordance with 29 CFR 1910 (OSHA HCS): hazardous.

This SDS meets the requirements of GHS Revision 3, HCS 2012 (29 CFR 1910.1200).

GHS Classifications: Aspiration Hazard, Category 1.

2.2 GHS Label elements including precautionary statements:

Hazard pictograms:



GHS Signal word: Danger

Hazard Statement: May be fatal if swallowed and enters airways.

Precautionary Statements:

Prevention: Do not breathe gas/mist/vapors/spray. Wear protective gloves, eye or face protection. Avoid release to the environment. When used as directed, product does not pose hazard.

Response:

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do NOT induce vomiting.

If exposed or concerned, get medical advice/attention.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.

Superior[®] SL Smoke Fluid

IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs, get medical attention.

Storage: Store in accordance with local/regional/national/international regulation. Store locked up.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal. See section 13 of this SDS for disposal instructions.

2.3 Other hazards which are not included in the classification criteria:

Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic, and may have other central nervous system effects. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.

Prolonged/repeated contact may cause defating of the skin which can lead to dermatitis. Used oil may contain harmful impurities. Ingestion may result in nausea, vomiting, and/or diarrhea.

Section 3. Composition / Information on Ingredients

Substance

Chemical Name	CAS Number	Weight - %
Petroleum distillates, hydro treated light	64742-47-8	100
Products containing mineral oil with less than 3% DMSO extract as measured by IP 346		

Section 4. First-Aid Measures

General advice: Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

4.1 Inhalation: Move to fresh air. If breathing is difficult, give oxygen and continue to monitor. If not breathing, give artificial respiration. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. Call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband.

4.2 Skin contact: Wash skin with plenty of soap and water. Remove contaminated clothing and shoes. If symptoms persist, seek medical attention. Wash contaminated clothing before use.

4.3 Eye contact: Immediately flush eyes thoroughly with water for several minutes. Remove contact lenses after one to two minutes and continue flushing for several more minutes. If redness, itching or burning sensation develops, seek medical attention.

4.4 Ingestion: Aspiration hazard if swallowed. Material can enter lungs and cause damage. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101 ° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing. Give nothing by mouth. Get medical attention immediately. Call a poison center or physician. DO NOT INDUCE VOMITING. Never give anything by mouth to an unconscious person. Gently wipe or rinse the inside of the mouth with water. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband.

4.5 Most important acute and delayed symptoms/effects: Aspiration: If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever greater than 101 °F (38.3 °C). The onset of respiratory symptoms may be delayed for several hours after exposure.

Eye Contact: Excessive exposure may cause temporary redness and mild irritation to eyes.

Skin Contact: May cause redness, defating and cracking of skin.

Ingestion: May cause central nervous system (CNS) depression. May be fatal if swallowed and enters airways.

Superior[®] SL Smoke Fluid

Inhalation: May cause central nervous system (CNS) depression. May cause drowsiness and dizziness, nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness.

Chronic health effects: Chronic exposure may cause respiratory irritation.

Relevant routes of exposure: Eye, skin, inhalation.

4.6 Indication of immediate medical attention and notes for physicians: Persons with pre-existing skin, eye, or respiratory conditions may be at an increased risk from the irritant properties of this material. Attending physician should treat exposed patients symptomatically. Aspiration during swallowing or vomiting may severely damage the lungs. If evacuation of stomach contents is necessary, use method least likely to cause aspiration.

Protection of First Aiders: No action should be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Section 5. Fire-Fighting Measures

5.1 Flammable Properties:

Flash point: 122°C / 252°F (COC)

Lower explosion limit: Not available

Upper explosion limit: Not available

Thermal decomposition: When heated, hazardous gases may be released including sulfur compounds.

Fire and Explosion Hazard: Material will burn. **Not a fire or explosion hazard.**

5.2 Extinguishing media:

Suitable extinguishing media: Combustible material. Use CO₂, dry chemical, or foam. Water can be used to cool and protect product.

Unsuitable extinguishing media: Forceful application of fire extinguishing agents or water spray may spread burning material.

5.3 Special hazards arising from the chemical:

Unusual fire and explosion hazards: When heated, hazardous gases may be released including: sulfur dioxide. A solid stream of water will spread the burning material. Material creates a special hazard because it floats on water. This material is harmful to aquatic life.

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition, which may be toxic and/or irritating.

5.4 Special protective equipment and precautions for firefighters:

Fire Fighting Procedures: Keep personnel away. Isolate fire and deny unnecessary entry. Do not apply direct water stream. Use fine water spray or foam. Cool surroundings with water to localize fire zone.

Special Protective Equipment for Firefighters: No special protective equipment required. Wear positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots, and gloves) to protect against other burning material. If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Section 6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:

Use personal protective equipment. Avoid breathing mists. Avoid skin and eye contact. Evacuate personnel to safe areas. Spilled material may cause a slipping hazard. Use appropriate safety equipment. See Section 8 for information on personal protection equipment.

Superior[®] SL Smoke Fluid

6.2 Environmental precautions and protective procedures:

Prevent further leakage or spillage if safe to do so. Do not let product enter drains, sewers, waterways, and/or groundwater. In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

6.3 Methods and material for containment and cleaning up:

Contain spilled material if possible. Eliminate all ignition sources including smoking, flares, sparks or flames in immediate area. All equipment used when handling the product must be grounded. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

Section 7. Handling and Storage

7.1 Precautions for safe handling:

Avoid breathing process mists. Avoid contact with eyes, skin and clothing. Use with adequate ventilation. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Do not eat, drink and/or smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage (including any incompatibilities):

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Store in accordance with good manufacturing practices. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge. Odorous and toxic fumes may form from the decomposition of this product if stored at temperatures in excess of 113° F (45° C) for extended periods of time or if heat sources in excess of 250° F (121° C) are used. Store away from incompatible materials. See section 10 for incompatible materials.

Section 8. Exposure Controls and Personal Protection

Consult with a Health and Safety Professional for specific selections.

8.1 Control parameter: Occupational exposure limits

ACGIH TLV (Absorbed through skin.) TWA: 200 mg/m³, (as total hydrocarbon vapor) 8 hours.

NIOSH 100 mg/m³ TWA 10 hour(s)

OSHA PEL: 100 PPM

Oil mist, mineral:

ACGIH TWA [Mist]: 5 mg/m³

ACGIH STEL [Mist]: 10 mg/m³

8.2 Appropriate engineering controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

8.3 Personal protective equipment:

Eye protection: Use safety glasses with side shields.

Body protection: No special clothing is required. See Hand protection.

Hand protection: Contact should be minimized. Use butyl rubber, Nitrile, or neoprene gloves. Use good industrial hygiene practices. In case of skin contact, wash hands and arms with soap and water. Use caution when opening covers of storage and transportation containers. 3-nitroaniline crystals may be present on the interior surface of these openings. 3-nitroaniline is toxic by dermal exposure.

Superior[®] SL Smoke Fluid

Respiratory protection: Concentration in air determines the level of respiratory protection needed. When airborne concentrations exceed the exposure limit, use only NIOSH certified respiratory equipment. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations.

Other: Remove contaminated clothing and wash before reuse. For non-fire emergencies, respiratory protection may be necessary and wear appropriate protective clothing to avoid contact with material. Have eyewash station in work area. Do not consume or store food in the work area. Wash hands before smoking or eating. Concentration of H₂S in tank headspaces may reach hazardous values, especially in case of prolonged storage. This situation is especially relevant for those operations which involve direct exposure to the vapors in the tank.

Section 9. Physical and Chemical Properties

Physical state: Liquid
 Color: Bright and Clear
 Odor: Characteristic of Petroleum
 Odor threshold: No Data Available
 pH: No Data Available
 Freezing Point: No Data Available
 Boiling Point / Range: No Data Available
 Flash Point (COC): 122°C / 252°F
 Evaporation rate: No Data Available
 Upper Explosive Limits (% air): No Data Available
 Lower Explosive Limits (% air): No Data Available
 Flammability (solid, gas): Not Applicable
 Vapor pressure: <1 mm Hg
 Vapor density (air=1): > 1
 Relative Density: 0.85
 Auto-ignition temperature: Not Determined
 Decomposition temperature: Not Determined
 Solubility in water: Negligible, 0-1 %
 Partition coefficient, n-octanol/water: > 4
 Viscosity @ 40°C: No Data
 Viscosity @ 100°C: No Data

Section 10. Stability and Reactivity

10.1 **Chemical stability:** Stable under normal temperature conditions and recommended use.

10.2 **Possibility of hazardous reactions:** No hazardous reactions if stored and handled as prescribed.

10.3 **Conditions to avoid:** Avoid heat, sparks, open flames and other ignition sources.

10.4 **Incompatible materials:** Strong oxidizers

10.5 **Hazardous decomposition products:**

Decomposition products depend upon temperature, air supply and the presence of other materials. Smoke, carbon monoxide, sulfur oxides, hydrogen sulfide, aldehydes, and other petroleum decomposition products in the case of incomplete combustion. Processing may release fumes and other decomposition products. Fumes can be irritating.

10.6 **Hazardous Polymerization:** Will not polymerize.

Superior[®] SL Smoke Fluid

Section 11. Toxicological Information

11.1 Information on the likely routes of exposure: Inhalation, ingestion, skin and eye contact, central nervous system.

11.2 Information on toxicological effects:

Acute toxicity (similar material)

- Oral LD50: > 5,000 mg/kg - Rat
- Inhalation 4 h LC50: > 5.2 mg/l - Rat
- Dermal LD50: > 2,000 mg/kg - Rabbit

- Skin corrosion/irritation: Causes mild skin irritation (Rabbit)
Classification: Not classified as irritant
- Serious eye damage/irritation: Slight or no eye irritation (Rabbit)
Classification: Not classified as irritant
- Inhalation: May cause mild respiratory tract irritation
Classification: Not classified
- Respiratory sensitization: Did not cause sensitization on laboratory animals, mouse
Classification: Does not cause respiratory sensitization
- Skin sensitization: Did not cause sensitization on laboratory animals, guinea pig
Classification: Does not cause skin sensitization
- Ingestion: May cause central nervous system (CNS) depression.
May be fatal if swallowed and enters airways.

Repeated dose toxicity

- Inhalation Rat: No toxicologically significant effects were found.
- Mutagenicity: Tests on bacterial or mammalian cell cultures did not show mutagenic effects
- Reproductive Toxicity: No known significant effects or critical hazards.
- Teratogenicity: No known significant effects or critical hazards.

Specific target organ toxicity (STOT):

- STOT-single exposure: Classification: Not classified
- STOT -repeated exposure: Classification: Not classified

Aspiration Hazard: Risk of chemical pneumonia after aspiration. May be fatal if swallowed and enters airways. (Based on physical data.)

Chronic effects: Prolonged inhalation may be harmful. May cause headaches and dizziness, is an anesthetic and may have other central nervous system effects.

Further information: Prolonged and/or repeated skin contact with low viscosity materials may defat the skin resulting in possible irritation and dermatitis

Symptoms related to the physical, chemical and toxicological characteristics:

Adverse symptoms may include the following:

- Eye contact: Pain or irritation, watering, redness
- Inhalation: Nausea or vomiting, headache, drowsiness/fatigue dizziness/vertigo, unconsciousness
- Skin contact: Irritation, redness, defatting of skin

11.3 Carcinogenicity: Not considered a carcinogen by IARC, NTP, OSHA, ACGIH.

Superior[®] SL Smoke Fluid

Section 12. Ecological Information

TOX DATA

TEST	VALUE		SPECIES	SOURCE
LC50	45mg/L	96H	Pimephales promelas	IUCLID
LC50	2.2mg/L	96H	Lepomis macrochirus	EPA
LC50	2.4mg/L	96H	Oncorhynchus mykiss	EPA

12.1 Mobility: Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. If product enters soil, one or more constituents will be mobile and may contaminate groundwater. Floats on water. Large volumes may penetrate soil and could contaminate groundwater

12.2 Aquatic and terrestrial ecotoxicity: Toxic long-term

12.3 Persistence and degradability: Readily degradable

12.4 Bioaccumulative potential: Low bioaccumulation expected. Contains constituents with the potential to bio accumulate.

12.5 Other adverse effects: Films formed on water may affect oxygen transfer and damage organisms.

Section 13. Disposal Considerations

13.1 Disposal methods:

Uncontaminated discarded product is not a hazardous waste under RCRA. Do not dump into any sewers, on the ground or into any body of water. All disposal practices must comply with all federal, state, and local laws and regulations. Offer surplus and non-recyclable material to a licensed disposal company. Contact a licensed professional waste disposal service for disposal.

13.2 Container disposal:

Empty container retains product residue. Observe all hazard precautions. Do not distribute, make available, furnish or reuse empty container except for storage and shipment of original product. Remove all product residue. Puncture or otherwise destroy empty container and dispose of in a facility permitted for nonhazardous waste.

Section 14. Transport Information

14.1 UN number: Not regulated

14.2 UN proper shipping name: Not regulated

14.3 Transport hazard class: Not regulated

14.4 Pacldng group (if applicable): Not regulated

14.5 Marine Pollutant (Yes/No): No

14.6 Special precaution: No information available

Section 15. Regulatory Information

U.S. Regulations

15.1 USA TSCA: Listed on the TSCA Inventory.

15.2 SARA Section 311/312 Hazard Categories:

Acute Hazard: Yes

Chronic Hazard: Yes

Superior[®] SL Smoke Fluid

Fire Hazard: No
Reactive Hazard: No
Sudden Pressure Release: No

15.3 CERCLA Hazardous Substance SARA Section 304 Release Reporting:

<u>Component(s)</u>	<u>Reportable Quantity</u>
None	

15.4 SARA Section 302 Extremely Hazardous Substances:

<u>Component(s)/CAS Number</u>	<u>Concentration</u>	<u>Min</u>	<u>Max</u>
None			

15.5 SARA Section 313 Toxic Chemicals:

<u>Component(s)/CAS Number</u>	<u>Reporting Threshold</u>	<u>Min – Concentration – Max</u>
None		

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

15.6 California Proposition 65: This product is not known to contain chemical(s) known to the State of California to cause cancer or reproductive harm.

15.7 Pennsylvania Worker and Community Right To Know Act: Hazardous Substances: NONE

15.8 New Jersey Worker and Community Right To Know Act: Hazardous Substances: NONE

15.9 International Regulations:

Canadian Regulations:

WHMIS Statement: This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the SDS contains all the information required by the *Controlled Products Regulations*. This product is classified as not controlled in accordance with the Canadian Controlled Products Regulations.

This product complies with RoHS (Restriction on Hazardous Substances).

Other requirements: Inventory Listing:

TSCA - <i>United States Toxic Substances Control Act Section 8(b) Inventory</i>	LISTED
DSL - <i>Canadian Domestic Substances List</i>	LISTED
NDSL - <i>Non-Domestic Substances List</i>	NOT LISTED
EINECS - <i>European Inventory of Existing Chemical Substances/European</i>	LISTED
ELINCS - <i>List of Notified Chemical Substances</i>	NOT LISTED
ENCS - <i>Japan Existing and New Chemical Substances</i>	LISTED
IECSC - <i>China Inventory of Existing Chemical Substances</i>	LISTED
KECL - <i>Korean Existing and Evaluated Chemical Substances</i>	LISTED
PICCS - <i>Philippines Inventory of Chemicals and Chemical Substances</i>	LISTED
AICS Australia - <i>Australian Inventory of Chemical Substances</i>	LISTED

Section 16. Other Information

16.1 NFPA and HMIS Hazard Ratings:

NFPA and HMIS ratings have been assigned to this product based on the hazards of its ingredient(s). Because the user is most aware of the application of the product, the user must ensure that the proper personal protective equipment (PPE) is provided consistent with information contained in the product SDS. This information is intended solely for the use of individuals trained in the particular hazard rating system.

Superior[®] SL Smoke Fluid

Key: 0 = least, 1 = slight, 2 = moderate, 3 = high, 4 = extreme

NFPA (National Fire Protection Association) - Classification

Health 1 slight
Flammability 1 slight
Instability or Reactivity 0 minimal

HMS[®] [Hazardous Materials Identification System (Paint & Coating)] - Classification

Health 1 slight
Flammability 1 slight
Reactivity 0 minimal

NFPA, HMS[®] rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this SDS must be considered. This information is supplied solely for the use of individuals trained in the particular hazard rating system.

16.2 Revision information:

Date of this revision: 10/27/2015 (Version 1.0)
Revision summary: GHS/OSHA compliant SDS

16.3 Training advice: For Professional use, only as directed. Provide adequate information, instruction and training for operators. Additional references static charges include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

16.4 Key or legend to abbreviations and acronyms used in the safety data sheet:

ACGIH	American Conference of Governmental Industrial Hygienists
BEI	Biological Exposure Index
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
NOAEL	No observed adverse effect level
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
OECD	Organization for Economic Co-operation and Development
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
OEL	Occupational Exposure Limit
PEL	Permissible Exposure Limit
ppm	parts per million
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average
Action Level	An exposure value set by OSHA that is lower than the PEL that will trigger the need for activities such as exposure monitoring and medical surveillance.

Declare to reader:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information, and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of SDS



Process Sewer Investigation Work Plan

Appendix A-C - Example Smoke Testing Log

ATTACHMENT C

AREA OF CONCERN 35 PROCESS SEWER INVESTIGATION WORK PLAN



Process Sewer Investigation Work Plan

Area of Concern 35

Process Sewer Investigation Work Plan



Marathon Gallup Refinery
Western Refining Southwest, LLC
Gallup, New Mexico

EPA ID# NMD000333211

March 2023

Revised January 11, 2024



Process Sewer Investigation Work Plan

Executive Summary

Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) is submitting this “Area of Concern 35 Process Sewer Investigation Work Plan” as requested in the New Mexico Environmental Department in Comment 8 of “Approval with Modifications Revised Investigation Work Plan No. 2 Area of Concern 35” dated December 12, 2022 (NMED 2022).

Area of Concern (AOC) 35 contains the main trucking loading rack, the crude slop and ethanol unloading facility, the additive tank farm loading rack, and the marketing tank farm. The process sewer is used to carry oily wastewater to be treated at the Refinery. In 2019, work was completed on the process sewer lines after the historical dye tests were implemented (i.e., repairs/replacements and installation of additional lines). This investigation work plan will discuss proposed methods to assess the current integrity of the process sewer system in the vicinity of AOC 35.

Smoke testing will be completed in the process sewer lines contained in AOC 35. Smoke testing is a common method of identifying breaks and undocumented connections in sewer systems. If leaks are identified, the leaks will be marked and mapped. The Refinery will prepare an investigation report summarizing the smoke test results within 150 days of field investigation completion.



Process Sewer Investigation Work Plan

Table of Contents

Executive Summary1

1.0 Introduction6

2.0 Background7

 2.1 Main Truck Loading Rack Area.....7

 2.2 Crude Slop and Ethanol Unloading Facility7

 2.3 Additive Tank Farm Loading Rack.....7

 2.4 Marketing Tank Farm7

 2.5 Historical AOC 35 Process Sewer Investigations8

3.0 Site Conditions 10

 3.1 Surface Conditions 10

 3.2 Subsurface Conditions..... 10

4.0 Scope of Activity 11

 4.1 Smoke Testing Methodology 11

 4.2 Documentation of Field Activities 12

5.0 Schedule..... 13

6.0 References 14

Figures.....

Appendix A – Smoke Testing, Device Schematic

Appendix B – Smoke Testing SDS

Appendix C – Example Smoke Testing Log



Process Sewer Investigation Work Plan

List of Figures

- 1-1. Site Location Map, Process Sewer Investigation Work Plan, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico
- 1-2. AOC 35 Map and Process Sewer Lines, Process Sewer Investigation Work Plan, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico
- 3-1. Potentiometric Surface Map (August 2019), Process Sewer Investigation Work Plan, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico
- 4-1. Proposed Investigation Area, Process Sewer Investigation Work Plan, Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery, Gallup, New Mexico



Process Sewer Investigation Work Plan

List of Appendices

- A. Smoke Testing Device Schematic
- B. Smoke Testing SDS
- C. Example Smoke Testing Log



Process Sewer Investigation Work Plan

List of Acronyms

amsl	above mean sea level
AOC	Area of Concern
cm/sec	centimeters per second
in	inch or inches
ft	foot or feet
ft ³	cubic foot
GPS	global positioning system
MKTF	marketing tank farm
MTBE	methyl tert butyl ether
NM	New Mexico
NMED	New Mexico Environment Department



Process Sewer Investigation Work Plan

1.0 Introduction

Western Refining Southwest LLC, D/B/A Marathon Gallup Refinery (Refinery) is submitting this Area of Concern (AOC) 35 Process Sewer Investigation Work Plan as requested by the New Mexico Environment Department (NMED) in Comment 8 of "Approval with Modifications Revised Investigation Work Plan No. 2 Area of Concern 35" dated December 12, 2022 (NMED 2022). This investigation work plan will discuss methods to determine the integrity of the process sewer system in the vicinity of AOC 35 (Figure 1-2). The process sewer is used to carry oily wastewater to be treated at the Refinery. AOC 35 is in the southwest portion of the Refinery. It includes the Main Truck Loading Racks/Crude Slop, the Ethanol Unloading Facility, the Loading Rack Additive Tank Farm, and the Market Tank Farm. Historical dye tests and camera scope activity in this area indicated potential leaks from the process sewer system; however, Refinery personnel repaired and replaced portions of the process sewer system after the 2013 dye tests. This investigation will identify, if present, areas of the sewer still requiring repair.

The Refinery is located approximately 17 miles east of Gallup, New Mexico (NM) along the north side of Interstate Highway I-40 in McKinley County. The physical address is I-40, Exit #39 Jamestown, NM 87347. The Refinery is located on 810 acres. Figure 1-1 presents the Refinery location and the regional vicinity.

The Refinery has been indefinitely idled since August 2020. Historically, the Refinery generally processed crude oil transported to the facility by pipeline or tanker truck. Various process units were operated at the facility, including crude distillation, reforming, fluidized catalytic cracking, alkylation, sulfur recovery, merox treater, and hydrotreating. Refinery operations have produced gasoline, diesel fuels, jet fuels, kerosene, propane, butane, and residual fuel.



2.0 Background

This section presents background information detailing the various components of AOC 35 and discussion of historical dye tests and camera scope activities in the process sewer contained in AOC 35. AOC 35 contains the main trucking loading rack, the crude slop and ethanol unloading facility, the additive tank farm loading rack, and the marketing tank farm.

2.1 Main Truck Loading Rack Area

The main truck loading rack is in the southwestern area of the formerly active Refinery (Figure 1-2). The main loading racks cover an area approximately 100 feet (ft) by 120 ft and were used to load refined petroleum products (e.g., gasoline and diesel) into tanker trucks. The loading racks appear to have been in operation in this same location since at least 1962.

The process sewer line near the main truck loading rack travel from the lab building to the loading rack and then continue to the north after picking up discharge from the loading rack sumps (Figure 1-2). The sumps were used to collect small spills on the loading rack concrete apron and de minimis volumes of product that drained from loading hoses.

2.2 Crude Slop and Ethanol Unloading Facility

The crude slop and ethanol unloading facility is located approximately 80 ft northwest of the main truck loading racks (Figure 1-2) and was used to unload recovered oil and transmix reclaimed from various locations within the Refinery. The area was also used to unload ethanol delivered to the Refinery via truck. The exact start of date of operation is unknown with records dating back to before the 1990s. The unloading area is approximately 15 ft by 40 ft and includes a concrete pad and sump, overhead pipelines, and various connections to support unloading operations. The concrete pad and sump are connected to the process sewer.

2.3 Additive Tank Farm Loading Rack

Petroleum product additives were stored in aboveground tanks at the additive tank farm loading rack (Figure 1-2). These additive tanks are small aboveground tanks located approximately 150 ft west of the main loading rack. The additive tanks were installed prior to 1997, but the exact date is uncertain. Only products (i.e., fuel additives) were managed in this area; wastes and methyl tert butyl ether (MTBE) were not stored in these tanks. The additive tanks were taken out of service and cleaned during the 2020/2021 calendar years. There are no products stored in any additive tanks at the time this investigation work plan was prepared.

2.4 Marketing Tank Farm

The marketing tank farm (MKTF) is located approximately 150 ft northwest of the main loading rack and includes Tanks 1 through 8, 912, 913, 1001, and 1002 (Figure 1-2). Retail petroleum products (e.g., gasoline, diesel, and biodiesel) were stored in these tanks. MTBE was stored in Tank 6 until 2006; ethanol was stored in Tank 6 after the use of MTBE was discontinued. The first tanks were constructed



Process Sewer Investigation Work Plan

in 1963 and have had routine external and internal inspections since construction. The MKTF tanks have been cleaned and emptied and remain in place.

The fuels were delivered to the marketing tanks via primarily aboveground pipelines. Ethanol was unloaded at the adjacent ethanol unloading facility and transferred to Tanks 5 and 6 via aboveground lines. The fuels and additives were subsequently transferred to the main loading racks via aboveground and underground pipelines where they were loaded into tanker trucks.

2.5 Historical AOC 35 Process Sewer Investigations

The process sewer lines that are present in the area (Figure 1-2) were evaluated in the past to determine if they could be leaking. After the discovery of hydrocarbons in Hydrocarbon Seep Area on June 26, 2013, an investigation into the source was summarized in "Interim Measures Report Hydrocarbon Seep Area" submitted July 28, 2016 (Western 2016). On July 8, 2013, one pint of fluorescent FWT red dye was poured into a sump/drain at the second bay from the south end at the truck loading rack. After several minutes, the red dye was observed in the sewer box located on the west side of the heat exchanger bundle cleaning pad, identifying the flow of the drain from the truck rack to the north in the main process sewer pipeline.

Subsequently, a second pint of FWT red dye was added to the sewer box on the west side of the bundle pad. Excavations at the previously identified hydrocarbon seep area (located west of the crude tanks) were inspected each day after addition of the dye and on the 8th day (July 16, 2013) red dye was identified in one of the excavations. The dye was not initially detected in the soil borings/temporary wells located south the hydrocarbon seep and west of the marketing tanks, but only in the area where the seep was identified. During a later fluid gauging event on August 14, 2013, dye was observed in MKTF-03 and MKTF-10 (Figure 1-2). The presence of dye in groundwater in the area of the seep was interpreted as indicating a likely release from the sewer system and a possible preferential migration pathway to the northwest.

Following the results of the July 2013 dye test, two additional dye tests were conducted in the process sewer system. On September 23, 2013, one pint of a yellow/green dye (Spectroline Oil-Glo 44G Fluorescent yellow/green) was introduced into the sewer at the Crude Slop and Ethanol Unloading area. On September 24, 2013, one pint of a FWT red dye was introduced at the lab sinks. On September 25, 2013, green dye was detected at the hydrocarbon seep. A fluid level gauging event was conducted at the MKTF monitoring wells on September 26, 2013; the red dye was identified in five temporary wells and several were subsequently kept as permanent monitoring wells [SB01 (MKTF-03), SB02, SB16 (MKTF-10), SB17 (MKTF-11), and SB22 (MKTF-14)] (Figure 1-2), all of which are located just south of the road that runs east-west along the north side of the marketing tanks. The green/yellow dye appeared to be present in these locations [SB04, SB05, SB06 (MKTF-05), SB08 (MKTF-06), SB10 (MKTF-07)] (Figure 1-2) closer to the crude slop and ethanol unloading area. Although the dye tests were not conclusive, the separate patterns of the two dyes suggest the possibility of two separate release points from the process sewer line.



Process Sewer Investigation Work Plan

Since the 2013 dye tests, repair work and installation of additional process sewer lines has occurred in the vicinity of AOC 35. In 2019, portions of the main process sewer lines near the MKTF were visually inspected using a camera and were determined to be in good condition with no breaks. Smaller lines were not inspected so the condition of those lines is unknown. No further dye testing was completed after the repairs in 2019. The Refinery is indefinitely idled at this time and the sewer is currently not in operation and has been blocked off via inflatable plugs.



3.0 Site Conditions

This section presents background information detailing the site condition. Average rainfall at the Refinery is less than 7 inches (in) per year, although it can vary to slightly higher levels elsewhere in the county, depending on elevation. Erosion features such as arroyos are present in portions of the property.

3.1 Surface Conditions

Site topographic features include high ground in the southeast gradually decreasing to a lowland fluvial plain to the northwest. Elevations on the Refinery property range from 7,040 ft above mean sea level (amsl) to 6,860 ft amsl. Surface soils within most of the area of investigation are primarily Rehobeth silty clay loam. Rehobeth soil properties include a pH ranging from 8 to 9 standard units and salinity naturally occurring and typically measuring up to approximately 8 millimhos per centimeter.

The site is in the Puerco River Valley, north of the Zuni Uplift with overland flows directed northward to the tributaries of the Puerco River. The Puerco River continues to the west to the confluence with the Little Colorado River. The South Fork of the Puerco River is intermittent and retains flow only during and immediately following precipitation events. Additional regional surface water features include the Refinery evaporation ponds.

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 Group, which is Upper Triassic, crops out over a large area on the southern margin of the San Juan Basin. The uppermost recognized local Formation is the Petrified Forest Formation, 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 squared per 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.

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} centimeters per second (cm/sec) for gravel like sands immediately overlying the Petrified Forest Formation to 10^{-8} cm/sec in the clay soils located near the surface (Western, 2009). Generally, shallow groundwater at the Refinery follows the upper contact of the Petrified Forest Formation with prevailing flow from the southeast to the northwest, although localized areas may have varying flow directions (Figure 3-1).



4.0 Scope of Activity

This investigation will be conducted to assess the current integrity of the process sewer lines in the vicinity of AOC 35. This section outlines the scope of activity used to identify and record potential leaks in the process sewer.

4.1 Smoke Testing Methodology

To assist in determining where line integrity issues may be present, smoke will be introduced into the process sewer system in AOC 35 from selected manhole locations with a blower. The blower is a piece of equipment designed to move large volumes of air throughout the process sewer system. Smoke testing is a common method of identifying breaks and undocumented connections in sewer systems. Smoke testing also allows for inspection of smaller connections and lines that would be inaccessible to camera scope operations. Attachment A shows a schematic of the proposed smoke testing device. The blower fully covers the manhole with a neoprene gasket to reduce vibration and help seal the manhole. As smoke begins to exit the other manholes on the same sewer line, the manholes down the same sewer line will be covered with caps preventing further smoke to leave through those manholes. The sewer will be tested in sections by using balloon plugs to isolate sections of the line to increase testing efficiency. An experienced smoke testing subcontractor will be utilized to conduct testing. Smoke testing utilizes a non-toxic smoke approved by the Environmental Protection Agency for use in populated areas. The safety data sheet for the liquid smoke proposed for smoke testing is provided as Attachment B. Figure 4-1 shows the section of process sewer where the investigation will be focused. The smoke introduction locations will include all manhole and sump locations noted on Figure 4-1 and will be recorded in the daily field logs. To ensure the smoke is able to reach the surface, the Refinery will cut 12 in by 12 in squares in the concrete and asphalt layer every 10 ft above the process sewer line in the process sewer investigation area (Figure 4-1). Locations in AOC 35 will be monitored by a three-to five-person team for the visual presence of the smoke coming from the ground surface and/or at any openings in the process sewer system. To ensure visual observation of the smoke, the Refinery will conduct the smoke testing on a partly cloudy or sunny day with wind speeds less than 15 miles per hour. The Refinery estimates that the volume of process sewer in the investigation area is approximately 450 cubic ft (ft³). The Refinery will use at least 2,250 ft³ (5 times the volume of the sewer) of smoke to ensure the smoke has filled the sewer and has sufficient volume to reach the surface from potential cracks in sewer line. Potential leaks are expected to present with smoke within minutes of introducing smoke into the sewer. The location of observed smoke will be flagged, marked by global positioning system (GPS), and recorded in the daily field log. A ground penetrating radar system will be used in conjunction with smoke testing to map the sewer line locations.



Process Sewer Investigation Work Plan

4.2 Documentation of Field Activities

Daily field activities, including observations and field procedures, will be recorded in a field logbook. Indelible ink will be used to record all field activities (Appendix C). Photographic documentation of field activities will be performed, as appropriate. The daily record of field activities will include the following:

1. Date,
2. Smoke entrance GPS and descriptive locations,
3. Field investigation team members including subcontractors and visitors,
4. Weather conditions,
5. Smoke leak GPS and descriptive locations,
6. Observations, and
7. Photographic log, as appropriate



Process Sewer Investigation Work Plan

5.0 Schedule

The smoke investigation must be conducted on a clear day and will have the highest chance of success in late spring, during the dry season. Wet, icy, or snow-covered soil may block smoke from reaching the ground surface and prevent leaks from being detected therefore testing will only be conducted during a dry, clear day. The investigation will be conducted in the spring of 2024, pending NMED approval of this Work Plan. An investigation report, presenting the findings of the investigation, will be submitted to NMED no later than 150 days after the conclusion of the field investigation. Data presented in the investigation report will include extent of smoke testing was performed, where smoke was observed outside of the system (if applicable), copies of daily field logs, and photographs. A comprehensive map of the AOC 35 sewer system and any repairs needed, if required, will be created based on the data collected. Recommendations will be made based on the investigation findings will also be presented.



Process Sewer Investigation Work Plan

6.0 References

- New Mexico Environment Department (NMED). 2022. Approval with Modifications Revised Investigation Work Plan No. 2 Area of Concern 35, Western Refining Southwest Inc., Gallup Refinery, McKinley County, Gallup, New Mexico, EPA ID # NMD000333211, HWB-WRG-20-009. December 12.
- Stone, W.J., Lyford, F.P., Frenzel, P.F., Mizel, N.H., and Padgett, E.T. 1983. Hydrogeology and Water Resources of San Juan Basin, New Mexico; Hydrogeologic Report 6, New Mexico Bureau of Mines and Mineral Resources, p. 70.
- Western Refining. Southwest Inc., Gallup Refinery (Western). 2009. Facility Wide Groundwater Monitoring Work Plan. Western Refining Company, Southwest, Inc., Gallup Refinery, EPA ID # NMD000333211, HWB-GRCC-09-001. February 9.
- Western. 2016. Interim Measures Report Hydrocarbon Seep Area. Western Refining Southwest Inc, Gallup Refinery, EPA ID # NMD000333211, HWB-WRG-15-002. July 28.



Process Sewer Investigation Work Plan

Figures

M:\ITON\MARATHON\CADD\GALLUP\REPORTS\AOC\AOC35\202302_RESPONSE\APP\MOD\697-GALLUPAOC35-SITELOC

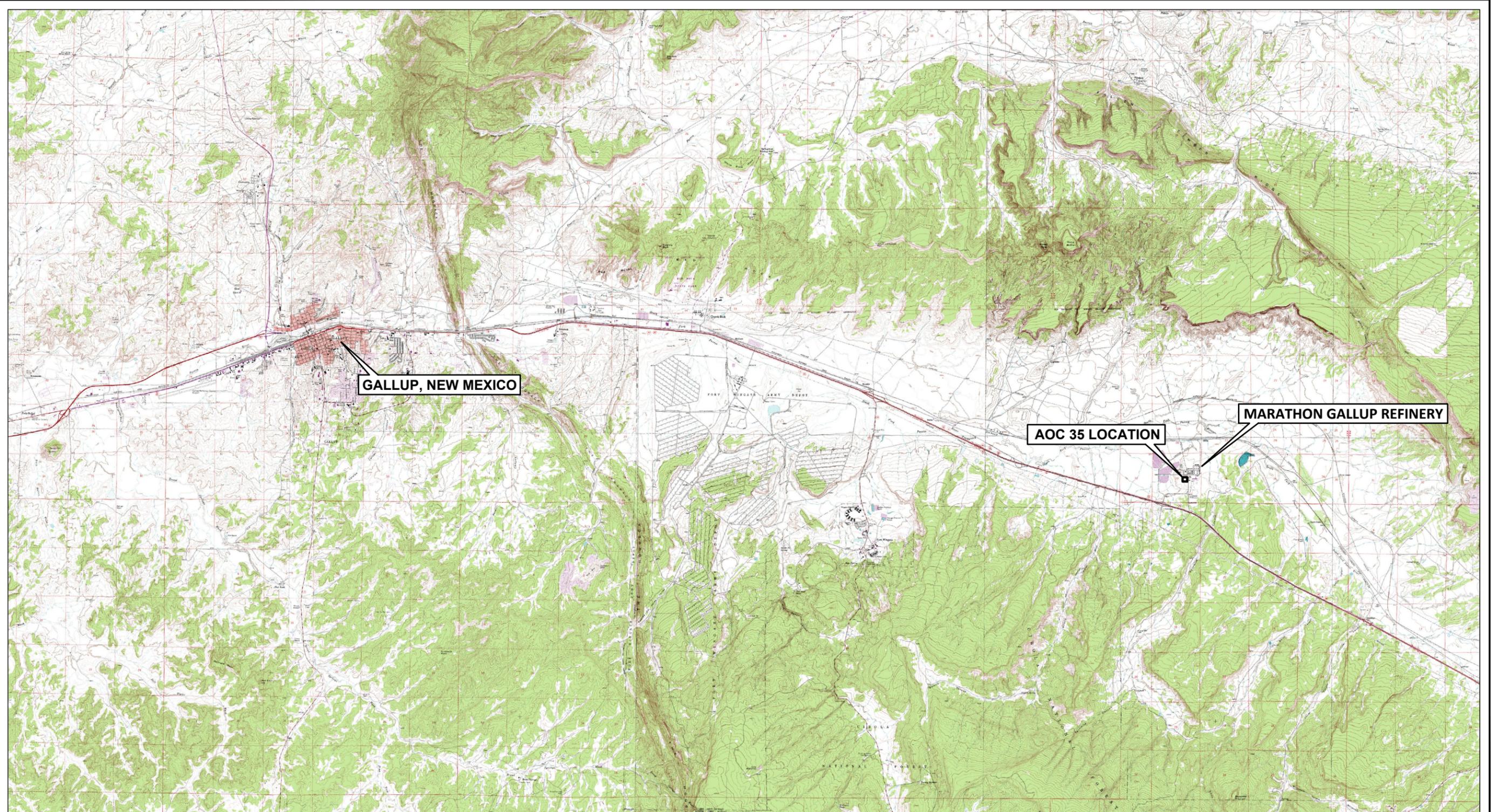


Image Cite: U.S. Geological Survey, 1:24,000—Scale 7.5 Minute Digital Raster Graphic Quadrangle, McKinley County, Publication: 2004



- NOTES:**
1. SITE LEGAL DESCRIPTION - TOWNSHIP 15 NORTH, RANGE 15 WEST, SECTION 33
 2. AOC = AREA OF CONCERN

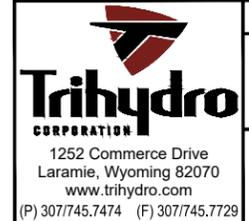
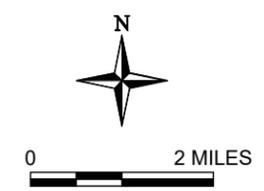


FIGURE 1-1

SITE LOCATION MAP
PROCESS SEWER INVESTIGATION WORK PLAN

WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: REP	Checked By: JP	Scale: 1" = 2 MILES	Date: 2/1/2023	File: 697-GALLUPAOC35-SITELOC
---------------	----------------	---------------------	----------------	-------------------------------

M:\ITON\MARATHON\CADD\GALLUP\REPORTS\AOC\AOC35_MKTF\PROCESSSEWERINVESTIGATION\697-AOC35-PSI-SITEMAP

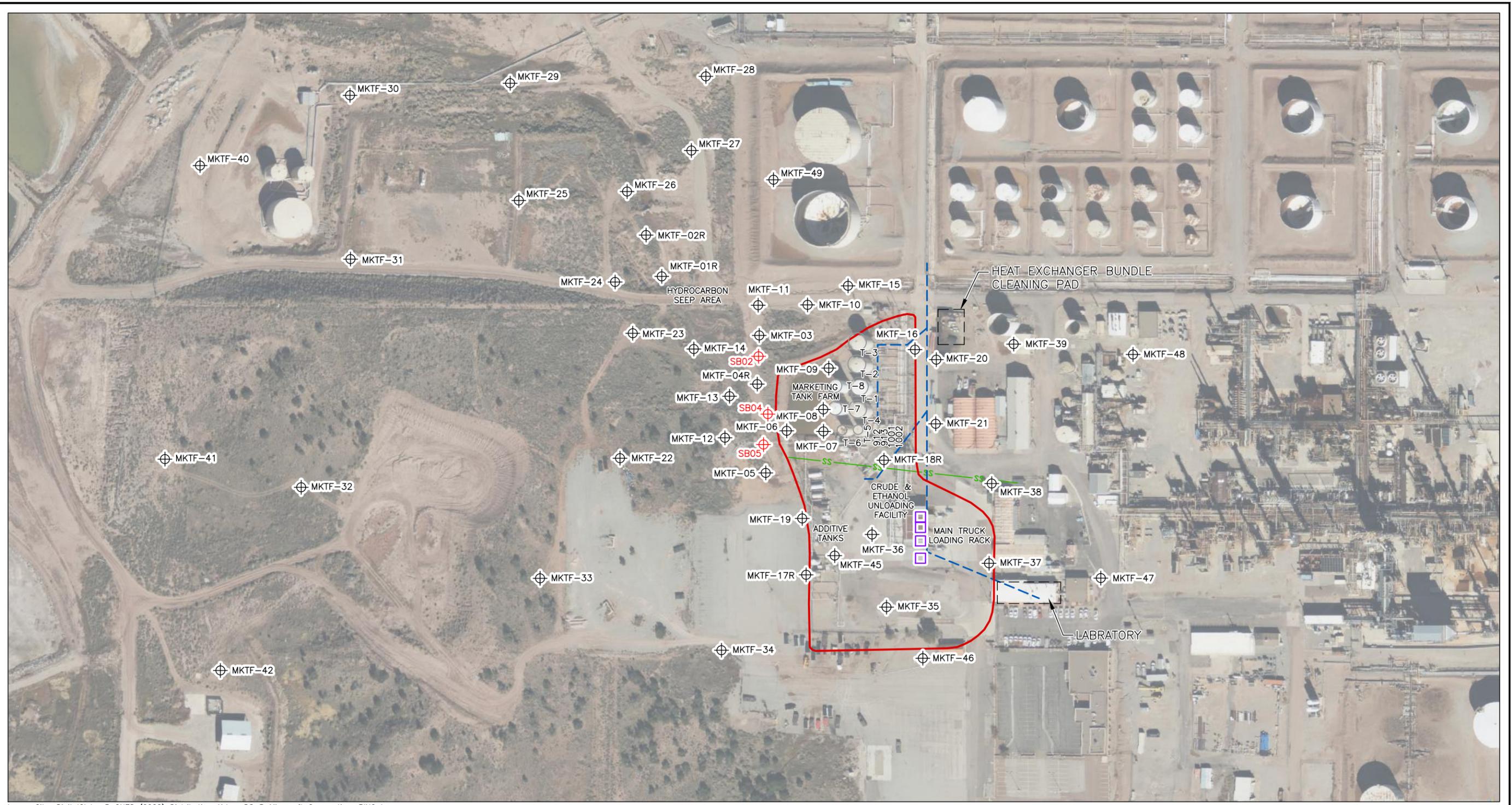
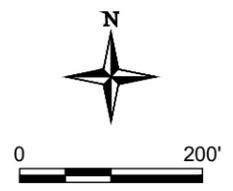


Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION	
⊕ MKTF-42	EXISTING MONITORING WELL AND DESIGNATION
⊕ SB04	TEMPORARY MONITORING WELL AND DESIGNATION
□	EXISTING SUMP LOCATION
— (Red)	AOC 35 BOUNDARY
- - - (Blue)	PROCESS SEWER LINE
- - - (Green)	SANITARY SEWER LINE
AOC	AREA OF CONCERN



Trihydro
CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 1-2
AOC 35 MAP
AND PROCESS SEWER LINES, PROCESS
SEWER INVESTIGATION WORK PLAN
WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO

Drawn By: PME | Checked By: BB | Scale: 1" = 200' | Date: 3/24/2023 | File: 697-AOC35-PSI-SITEMAP

\\TRIHYRO.COM\CLIENTS\TON\MARATHON\CADD\GALLUP\REPORTS\AOC\AOC35_MKTF_PROCESSSEWERINVESTIGATION\697-AOC35-PSI-PS-Q3_2019

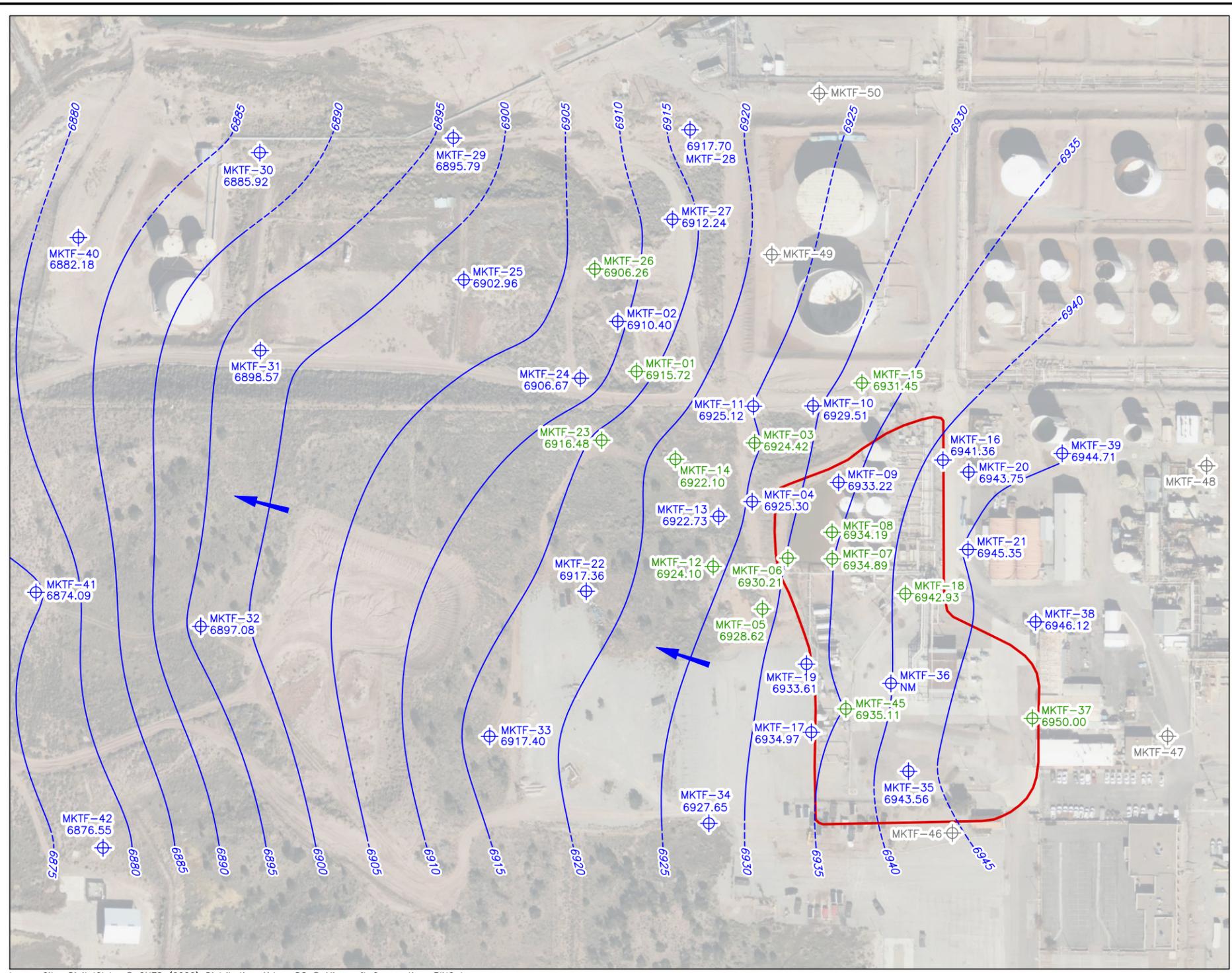
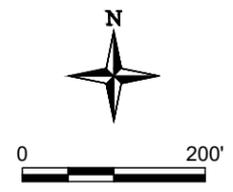


Image Cite: DigitalGlobe © CNES (2022) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION

	MKTF-39 6944.71	CHINLE/ALLUVIUM INTERFACE WELL AND DESIGNATION (SHOWING GROUNDWATER ELEVATION IN FT AMSL)
	MKTF-15 6931.45	MONITORING WELL WITH SPH AND DESIGNATION (SHOWING GROUNDWATER ELEVATION IN FT AMSL)
	MKTF-48	MONITORING WELL AND DESIGNATION (NON-EXIST THIRD QUARTER 2019)
	6940	LINE OF EQUAL GROUNDWATER ELEVATION IN FT AMSL, DASHED WHERE INFERRED (APPROXIMATE) UPPER WATER-BEARING ZONE
		GROUNDWATER FLOW DIRECTION
		AOC 35 BOUNDARY
AOC		AREA OF CONCERN
FT AMSL		FEET ABOVE MEAN SEA LEVEL
NM		NOT MEASURED
SPH		SEPARATE-PHASE HYDROCARBON



<p>Trihydro CORPORATION</p> <p>1252 Commerce Drive Laramie, Wyoming 82070 www.trihydro.com (P) 307/745.7474 (F) 307/745.7729</p>	FIGURE 3-1			
	POTENTIOMETRIC SURFACE MAP (AUGUST 2019)			
	PROCESS SEWER INVESTIGATION WORK PLAN WESTERN REFINING SOUTHWEST, LLC D/B/A MARATHON GALLUP REFINERY GALLUP, NEW MEXICO			
Drawn By: PME	Checked By: BB	Scale: 1" = 200'	Date: 3/3/2023	File: 697-AOC35-PSI-PS-Q3_2019

\\TRIHYRO.COM\CLIENTS\TON\MARATHON\CADD\GALLUP\REPORTS\AOC\AOC35_MKTF\PROCESSEWERINVESTIGATION\202312_RTD_IWP\697-AOC35-PSI-PIA-202312

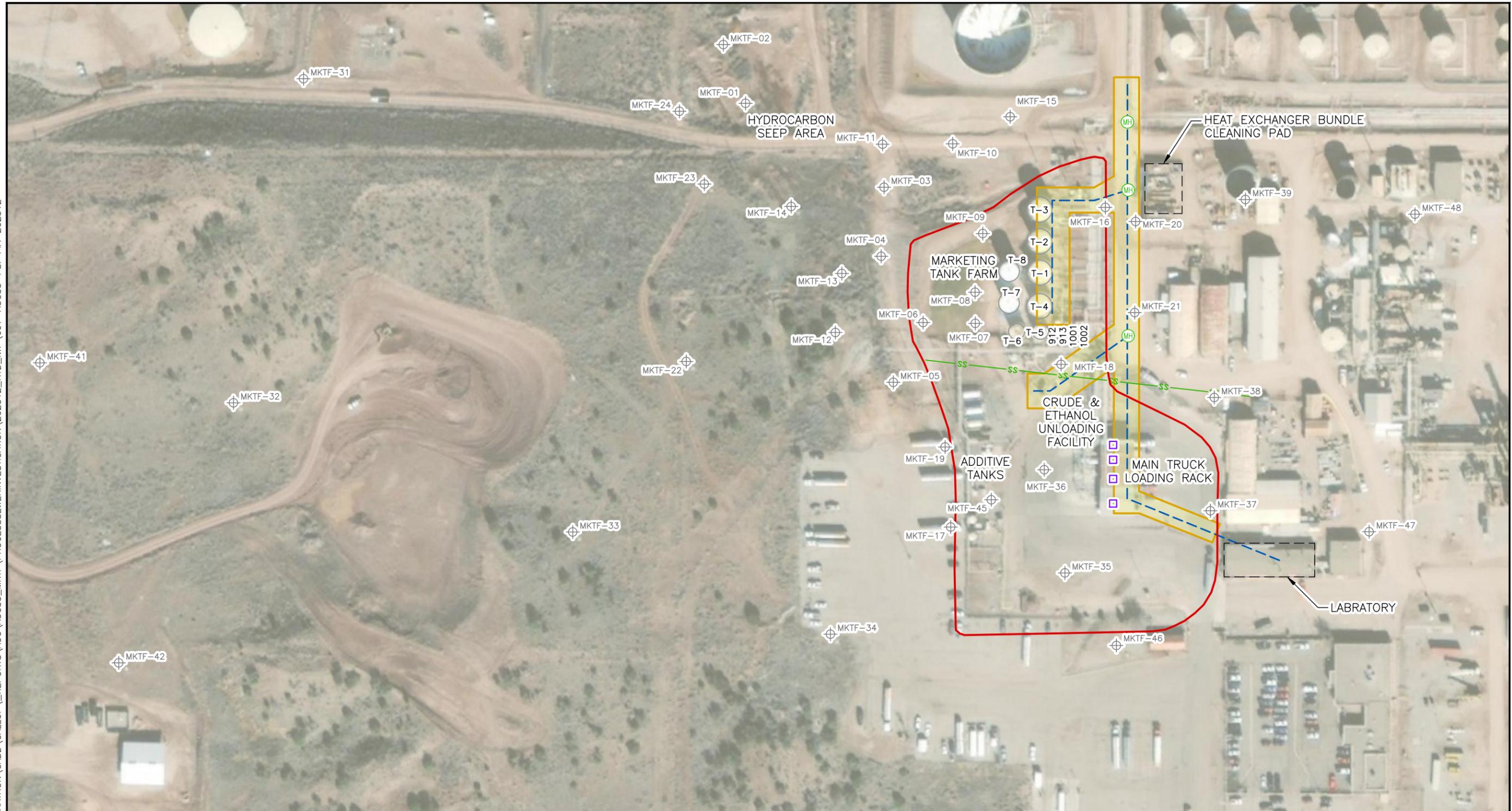
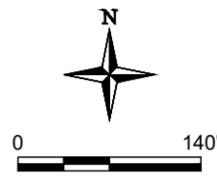


Image Cite: DigitalGlobe © CNES (2020) Distribution Airbus DS © Microsoft Corporation, BING Imagery

EXPLANATION	
⊕ MKTF-34	EXISTING MONITORING WELL AND DESIGNATION
□	EXISTING SUMP LOCATION
⊕ MH	MANHOLE LOCATION
—	AOC
— (Red)	AOC 35 BOUNDARY
- - - (Blue)	PROCESS SEWER LINE
- - - (Green)	SANITARY SEWER LINE
▭ (Yellow)	PROCESS SEWER INVESTIGATION AREA
	AREA OF CONCERN

NOTE:
SMOKE WILL BE INTRODUCED INTO MANHOLE AND SUMP LOCATIONS.



Trihydro CORPORATION
1252 Commerce Drive
Laramie, Wyoming 82070
www.trihydro.com
(P) 307/745.7474 (F) 307/745.7729

FIGURE 4-1

PROPOSED INVESTIGATION AREA, PROCESS SEWER INVESTIGATION WORK PLAN

**WESTERN REFINING SOUTHWEST LLC
D/B/A MARATHON GALLUP REFINERY
GALLUP, NEW MEXICO**

Drawn By: REP	Checked By: BB	Scale: 1" = 140'	Date: 12/22/2023	File: 697-AOC35-PSI-PIA-202312
---------------	----------------	------------------	------------------	--------------------------------



Process Sewer Investigation Work Plan

Appendix A – Smoke Testing, Device Schematic

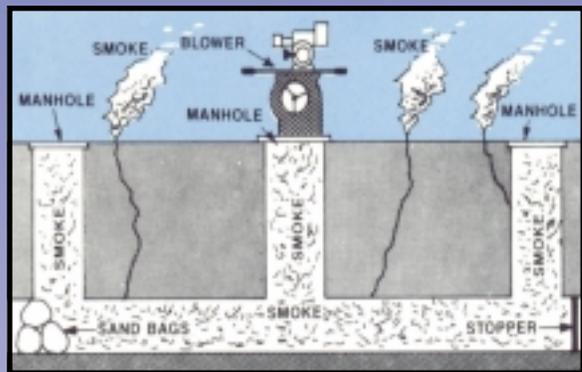
The SUPERIOR *Smoke Testing Technique*

**For Sewer Inflow Analysis, Maintenance,
Trouble Shooting and New Construction**



THE SUPERIOR SMOKE TESTING TECHNIQUE

High readings on treatment plant flow gauges immediately following rainfall is a positive indication of storm/surface water inflow. Smoke testing is the fastest, most economical and positive means of locating sources of inflow in sewer collection systems. Elimination of these sources as required by law, will improve treatment plant operations – and correct problems of overloading which are a major contributor to pollution of water resources.



The Superior Smoke Testing technique is a fast and easy way to quickly identify...

- Leaks permitting storm/surface water intrusion (inflow)
- Connected roof and cellar drains
- Cross connected sanitary and storm sewers
- All connected lines, including abandoned and supposedly unconnected lines
- Leaking manholes
- Yard and foundation drains
- Sump pumps

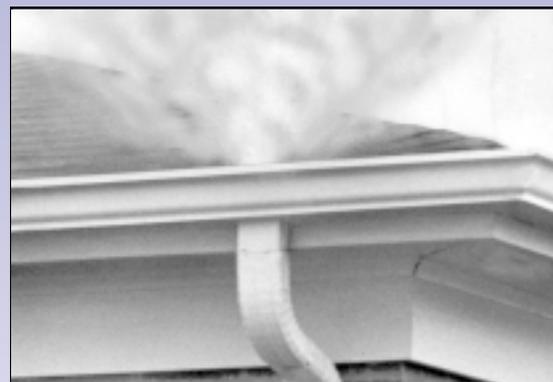
Industry Experts!

The **Superior** Smoke Testing Technique was developed in 1961 as a way to locate sewer faults at a low cost. It has **proven** to be an extremely effective method of pin-pointing sources of inflow and other sewer line problems in both existing and new collection systems. When you use Superior Smoke products you can be confident in your choice of suppliers. All products meet recommendations of NASSCO, EPA & WEF. Our products have identified inflow problems in millions of feet of sewer line in thousands of municipalities!

Recommended Equipment

Each test consists of two sections of line, generally 600-800 feet of 8-12" pipe, and require 5 to 6 minutes of smoke to walk the test area.

A portable air blower with a capacity of between 1500 and 2000 cfm is required. A blower of lesser capacity will not generate sufficient pressure to disclose all faults in a line. Recommended Blowers are the Superior Models 20-S or 10-S.



Other items required include line plugs and bags (partly filled with 1/4 round stones with an attached rope for easy positioning) and canvas or rubber flaps for confining the smoke in specific sections of line.

Materials for sketching location of faults to complete engineering reports, and a Polaroid camera or equivalent are also needed.

For information on advance notice – see specific heading.

Personnel and Cost

The smoke testing technique is uncomplicated and can be performed by regular maintenance crew members (2 or 3) who quickly master the fundamentals. A crew can easily test 10,000 linear feet of sewer line in an eight-hour period. The cost is only a few cents per foot for labor, blower, and smoke product. A fraction of the cost of other inspection methods.

PROCEDURE

As illustrated on the previous page, usually two sections of line (600-800 ft.) are tested simultaneously, with the smoke being introduced through a centrally located manhole. Blocking the far side of the upstream and downstream manholes is only necessary when isolating a section of line. The smoke under pressure will quickly fill the main plus all connected lines, and follow the path of least resistance. It will flow through all openings to the surface, revealing the location of the faults. Invariably, the fault will be found at the site or within a few feet of it. Only enough pressure to sufficiently overcome atmospheric pressure is required.

Smoke tests are effective regardless of surface, type of soil, or depth, provided openings exist for the smoke to follow. For example, it is not uncommon to see smoke exiting from cracks in paved surfaces, showing points of surface water entry.

Best results are obtained on dry days when water is not leaking into the line. (Other methods may overlook many sources of inflow, unless the passing camera picks up water actually leaking into the line).

The blower should not be started over the manhole because of the possibility of igniting flammable vapors in the line. The blower should be started first and then placed over the manhole. In less than a minute, smoke will be issuing from the roof vents of buildings connected to the line. If plugs are being used, do not tighten them before the smoke has fully penetrated the line, otherwise trapped air may prevent complete penetration.

The crew should check building, grounds and streets for telltale signs of smoke. Smoke immediately backing up into the blower indicates a line blockage. If this should occur, testing should be discontinued until the line has been cleared. Smoke issuing from the ground, pavement, yards, roof drains, etc., shows sources of inflow. Record for future repair.

Advance Notice

Press releases to the news media (newspapers, radio and TV) will generate much public good will and support for a program that will improve the local sewerage system, and assure compliance with EPA regulations. Such releases should outline the place, as well as the problems that will be solved by having the smoke testing done.

Local fire and police departments should be advised daily of the areas being tested, on a street to street basis. Personnel handling telephone inquiries should be acquainted with the purposes of the smoke testing program, and be prepared to advise against unnecessary exposure to the smoke.

Proper advance notices are necessary and the responsibility of the agency or contractor performing the tests. Door to door notification within 24 hours before the tests is recommended. This prevents unethical occupants from covering up illegal drains, sump pumps, etc. before the tests. While giving advance notice discrete neighborhood inquiries can identify persons suffering from heart and/or lung diseases, such as emphysema, who should never be exposed to any smoke, including Superior. Individuals with respiratory problems should be removed from the premises prior to the tests. Others, such as house confined invalids, sleeping shift workers and locked in animals should be identified and evacuated before the test.

To Whom It May Concern:

Please be informed that the Sewer Operating Committee will be testing lines in this area on (insert date) by the use of smoke. The smoke should not enter the premises unless a leak is present.

The presence of smoke in your house should be reported immediately to the personnel conducting the tests, or by calling (insert telephone number).

Avoid unnecessary exposure to the smoke. The smoke is relatively harmless but may be irritating to nasal passages. Any smoke irritation will be temporary and should quickly disappear after exposure has ceased. Persons with heart and respiratory ailments should leave the house during the test. House pets will react in a manner similar to a prudent person and leave the smokey area. If an exit is not available, be sure pets are provided with proper ventilation.

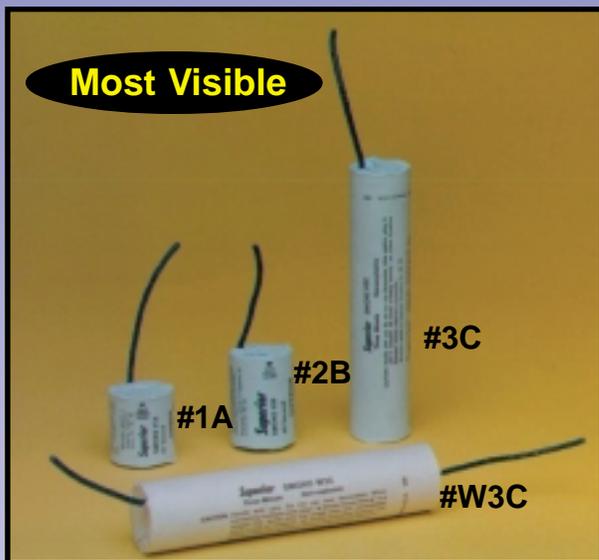
To minimize the chance of smoke entering your house, please pour water into all drains including floor drains prior to the date of the test.

Signed _____

CLASSIC SUPERIOR SMOKE

Classic Superior Smoke Candles quickly produce clean efficient smoke which varies in color from white to gray depending upon density and lighting. Superior Smoke items contain no explosive materials and offer a T.O.P. (total obscuring power) of 2100. T.O.P. is the scientific method of determining the quantity of smoke generated by a given unit of smoke composition. By comparison crude oil has a T.O.P. of 200.

Smoke is created by a chemical reaction where the visible portion is mostly atmospheric moisture. Due to its high visibility, classic smoke simply provides the best results when testing sewers.



- Capable of being blown and seen 1000's of feet away.
- Optical density (obscuration) 10 times that of burning oil.
- Most consistent smoke; Same quality from beginning of test to end.
- Field adjustable cfm/static pressure option.
- Doesn't contain engine exhaust, and won't get wet.
- Works with most any blower.
- Meets recommendations of WEF, EPA, and NASSCO.

Sealpac Containers

Superior Smoke #'s 1A, 2B, 3C, and W3C can also be packaged in these unique resealable containers which protect them from exceptionally hot and humid climates.



Versatile! Combine different items for a variety of test section lengths.

Connect two #W3C's in tandem for a 6 minute burn time, or one #W3C and one #2B for four minutes. Choose the item, or combination that's just right for the job at hand. As a guideline use two consecutive #3C for each test lasting 5 to 6 minutes; generally two sections line, 600 to 800 feet of 8" to 12" pipe.

1 Year Warranty; Gauranteed to Work!

All Superior classic smoke candles are warranted for 1 year, and are guaranteed to work within this time period. If an item should fail, simply return for free replacement. Items have been known to work several years after date of manufacture when stored cool and dry.

All classic Superior Smoke generators are packaged and sold per dozen.

ITEM #	GENERATING TIME	VOLUME	ITEM SIZE	SHIPPING WEIGHT
#1A	30 Seconds	4000 cubic feet	1 1/2" x 1 1/2"	2 lbs. / doz.
#2B	60 Seconds	8000 cubic feet	1 1/2" x 2"	2 lbs. / doz.
#3C	3 Minutes	40,000 cubic feet	1 1/2" x 6"	6 lbs. / doz.
#W3C	3 Minutes*	40,000 cubic feet	1 1/2" x 6"	6 lbs. / doz.

*Note: Item #W3C is double wicked, furnished with quick clips for extending smoke generating time.

SUPERIOR SMOKE FLUID SYSTEMS

The most common problem associated with liquid based smoke systems has been thin / wet smoke. As cool liquid is introduced into the heating chamber it has a natural tendency to lower the temperature of the system to where efficient smoke production is impossible. Superior Signal Company, world leaders in sewer smoke testing products, has developed a fluid based smoke system engineered to minimize this effect, thus maximizing performance!

Engineered to optimize DRY smoke output!

- Superior Smoke fluid is injected through a **custom-machined precision orifice** designed to minimize the chances of “overloading” the heating chamber.
- The **unique heating chamber** is much larger than standard muffler type smokers, thus extending the time available for fluid to convert to smoke.
- The heating chamber is **insulated** to retain heat and maximize smoke production.
- Precision valve provides maximum control.
- Field adjustable cfm/static pressure option.
- Meets recommendations of WEF, EPA, and NASSCO.

Only from Superior Signal; your partner in Smoke Testing for over 40 years!

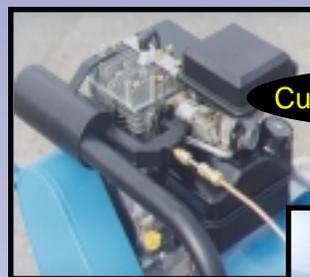
The Fluid

Superior Smoke Fluid is inexpensive, easy to use, and is as safe and clean as it gets. Available in single 1 gallon containers, a 5 gal. container, or in 55 gallon drums. Also works in competitive propeller driven systems.



Model 10-L

Reduces Fluid Overload!



Custom Fluid Injector



“Micro” Control Valve

Specifications All Blowers are single unit sturdy metal construction with carrying handles and 27 1/2 in. custom fiberglass base.

Model	Power	Carrying Weight	Standard Capacity
10-L	Briggs & Stratton 3.5 hp Gasoline	75 lbs.	1800 CFM @ 1.7 static pressure*
20-L	Briggs & Stratton 3.5 hp Gasoline	75 lbs.	1800 CFM @ 1.7 static pressure*

**Also available as 4200 CFM @ 3.0 static pressure, or 4000 CFM @ 4.0 static pressure.*

Model 20-L includes auxiliary outlet with removeable cover, 8' x 8" vinyl duct with draw strings to attach to outlet, and adjustable damper to direct air/smoke through base or auxiliary outlet.

Sewer Smoke Fluid

#SL-1 (1 gallon) #SL-5 (5 gal. container) #SL-55 (55 gal. drum)

Fluid Conversion Chamber Kit

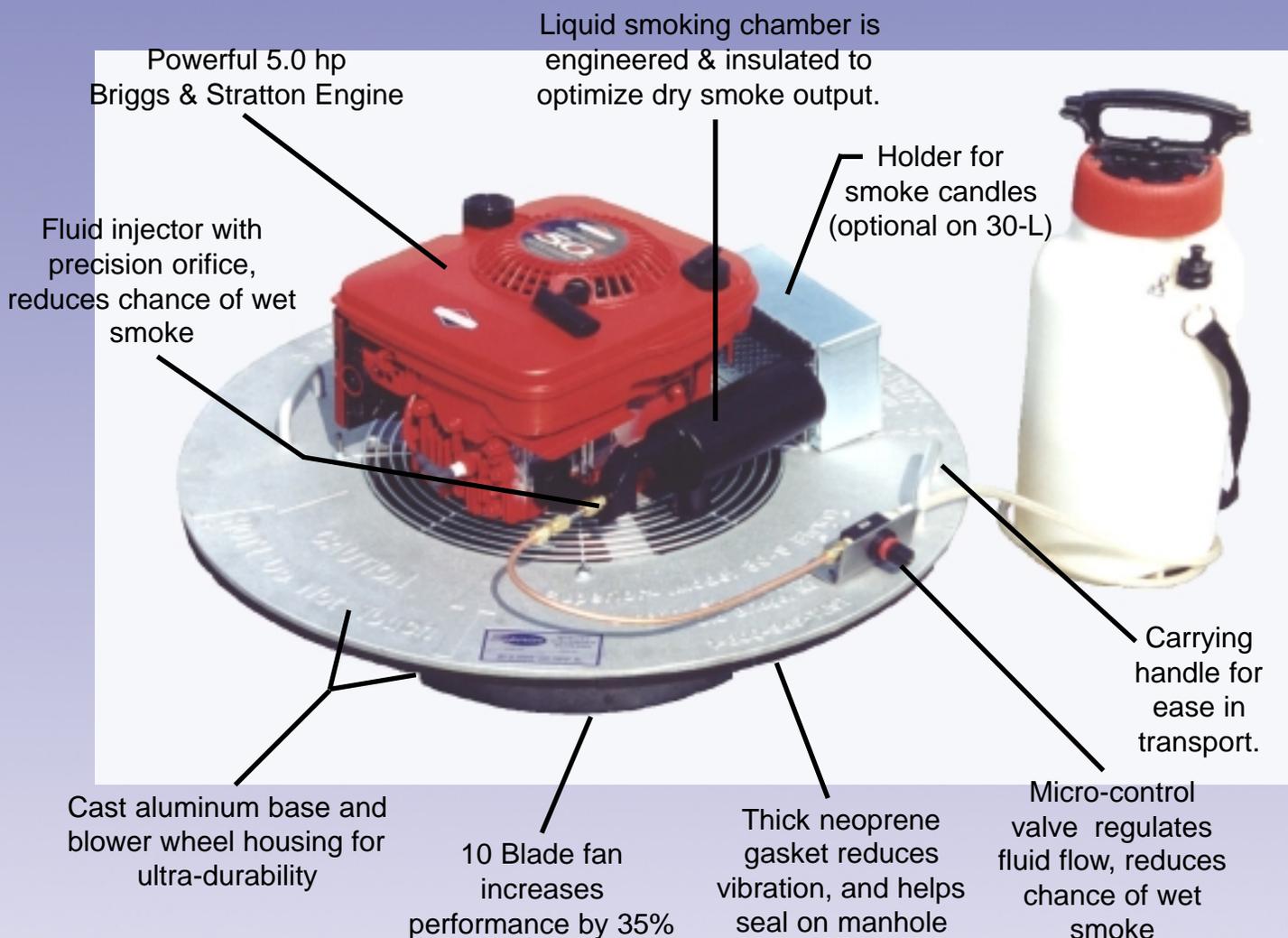
#519 Includes conversion chamber, fluid tank, injector, control valve and tubing. Fits all Superior 10-S and 20-S blowers.

WARRANTY: Superior Blowers are warranted to be free of defects in material and workmanship in normal use or service for a period of one year from date of purchase by the original purchaser and will be repaired without cost, if received at Superior Signal Company, 178 West Greystone Road, Spotswood, NJ 08884. Gasoline engines are covered by separate Briggs & Stratton warranty.

Superior Model 30-S/L Blowers

For powerful smoke testing, the 30-S/L offers the high quality and performance you've come to expect from Superior Signal.

Model 30-S; Uses Classic Smoke Candles Only
Model 30-L; Uses Classic or Liquid Smoke



Specifications

Model: 30-S / 30-L (Shown)
Power: 5 hp Briggs & Stratton Gasoline Engine
Output: 4,300 cfm
Carrying Weight: 65 lbs.
Construction: Low profile design, Cast Aluminum
Fan Type: 10 blade propeller
Base diameter: 30 inches
Additional Uses: Line Stringing, Ventilation

Liquid Conversion Kit #520; Quickly converts Superior model 30-S or similar blower to fluid smoker.

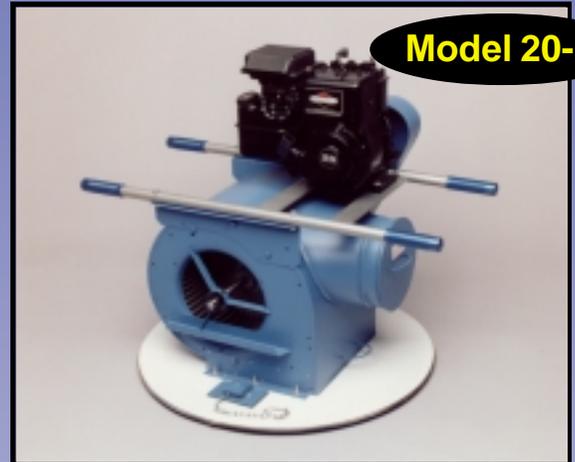
Kit contains...

- Fluid conversion chamber
- Custom injector
- Fluid tank
- Control valve
- All necessary hardware

SUPERIOR AIR/SMOKE BLOWERS

Superior air/smoke blowers are engineered for efficient and economical smoke testing of sewer lines to detect sources of inflow and leaks. Also for fast ventilation of sewerage collection systems and closed areas.

Manufactured in two models powered by dependable 3.5hp Briggs & Stratton gasoline engines. Both are single unit sturdy metal construction complete with carrying handles for easy handling, beltguard and 27 1/2" custom fiberglass base, eliminating need for separate manhole cover.



Model 10-S Standard equipment as detailed above.

Model 20-S Standard equipment plus:

- Auxiliary outlet with removable cover.
- 8' x 8" vinyl duct with draw strings to attach to outlet.
- Adjustable damper to direct air/smoke through base into manhole or auxiliary outlet.

Specifications

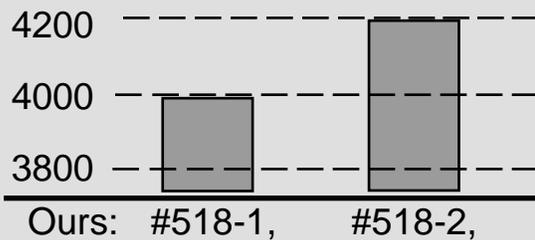
<u>Model</u>	<u>Power</u>	<u>Carrying Weight</u>	<u>Standard Capacity</u>
10-S	Briggs & Stratton 3.5 hp Gasoline	65 lbs.	1800 CFM @ 1.7 static pressure*
20-S	Briggs & Stratton 3.5 hp Gasoline	65 lbs.	1800 CFM @ 1.7 static pressure*
*Also available as 4200 CFM @ 3.0 static pressure, or 4000 CFM @ 4.0 static pressure.			
5-E	12v or 110v Electric	15 lbs.	180 CFM @ 1.3 static pressure

Pulley Kits provide a variety of CFM and Static Pressure Options

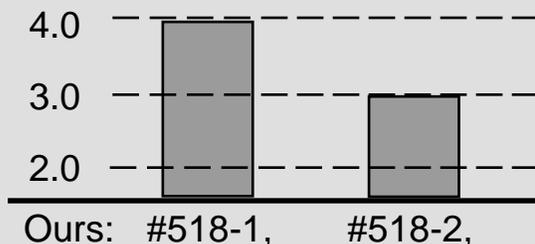
Superior Signal's Alternate Pulley Kit, is available for all new and existing 10-S/L and 20-S/L smoke blowers. Simple installation of matched sets of pulleys and belts can be easily interchanged to provide a variety of performance options.

PERFORMANCE COMPARISON

C.F.M.



Static Pressure



Pulley kit (order part # 518) includes...

- Pulley # 518-1; Provides 4000cfm at 4.0 inches static pressure.
- Pulley # 518-2; Provides 4200cfm at 3.0 inches static pressure.
- Belts, carrying case and installation instructions.



LATERALS AND HOUSE PLUMBING

Many inspectors and contractors prefer to test with smoke rather than use time-consuming water or air pressure tests. Consequently, smoke tests before acceptance are specified in many state and local plumbing codes. Smoke tests will reveal:

1. Leaks that permit surface water inflow
2. Drains of all types, including roof, cellar and yard drains that are connected to house lines and discharging into collection systems.
3. Poorly soldered or fitted joints and leaky seals, which may allow water damage or noxious gases to leak indoors.
4. Rodent passages into line.

Required Equipment

1. 2-3 Superior Smoke No. 2B (one minute)
2. Superior Electric Blower Model 5-E/12-Volt D.C. battery powered or 110-Volt A.C.
3. Pneumatic sewer plug or rubber balloon for sealing off house connections from main lines (optional)
4. Vent cap with open center hole to restrict the flow of air and smoke (optional)

Procedure

It is not absolutely necessary to have the house line blocked off from the main, but doing so will increase test efficiency. In most cases there is a clean-out opening through which a plug or balloon can be inserted between the opening and main, and then inflated. A length of windshield hose or similar type tubing can be attached to the balloon to facilitate inflation. Vents can be partially blocked allowing the air/smoke mixture to flow throughout the plumbing system.

When you are sure the building is unoccupied, connect the blower to the line and start introducing the smoke through the intake side of the blower.

Check the interior of the house for smoke. Any smoke should be quickly ventilated by opening doors and windows. Notations should be made of leak locations. Next the yard should be checked for smoke and the location of any smoke marked for later correction of faults.

All buildings connected to the lines being tested should be checked for smoke. Points of entry for the smoke should be located. If entry to the buildings is not possible once smoke is discovered, it is advisable to return later to determine the point of entry.

Model 5-E Electric Powered

Electric blower with flexible 8' x 4" hose. 180 CFM capacity. Available 12 volt or 110V. For testing house lines.



Superior Signal Company, Inc.

Over 56 years combined membership...

WEF
NRWA
NASSCO

Distributed By...

WARRANTY:

Superior warrants that these products conform to the Product Description contained in this literature. Superior makes no other warranty, whether expressed or implied, including warranties of merchantability or of fitness for a particular purpose or application. No statements or recommendations contained herein are to be construed as inducements to infringe any relevant patent, now or hereafter in existence. Superior neither assumes nor authorizes any representatives or other person to assume for it any obligation of liability other than such as is expressly set forth herein. Under no circumstances shall Superior be liable for incidental, consequential or other damages from any alleged negligence, breach of warranty, strict liability or any other theory, arising out of the use or handling of this product.



Process Sewer Investigation Work Plan

Appendix B – Smoke Testing SDS

Superior[®] SL Smoke Fluid

Safety Data Sheet

replaces all previous editions

Section 1. Product and Company Identification

1.1 Product Identifiers:

Product Name: Superior[®] SL Smoke Fluid

1.2 Recommended use:

Smoke generating fluid exclusively for use in approved professional smoke generating equipment, for Sewer Smoke Testing and other approved professional air flow marking applications. **For Professional Use ONLY. Use only as directed.**

1.3 Details of the supplier of the Safety Data Sheet

Supplier: Superior Signal Company LLC
P.O. Box 96, Spotswood, NJ, USA

Phone: 732-251-0800

Fax: 732-251-9442

Email: info@superiorsignal.com

1.4 Emergency telephone number:

Emergency Phone: 732-251-0800

Section 2. Hazards Identification

2.1 Globally Harmonized System (GHS) Hazard Classification:

OSHA Classification in accordance with 29 CFR 1910 (OSHA HCS): hazardous.

This SDS meets the requirements of GHS Revision 3, HCS 2012 (29 CFR 1910.1200).

GHS Classifications: Aspiration Hazard, Category 1.

2.2 GHS Label elements including precautionary statements:

Hazard pictograms:



GHS Signal word: Danger

Hazard Statement: May be fatal if swallowed and enters airways.

Precautionary Statements:

Prevention: Do not breathe gas/mist/vapors/spray. Wear protective gloves, eye or face protection. Avoid release to the environment. When used as directed, product does not pose hazard.

Response:

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. Do NOT induce vomiting.

If exposed or concerned, get medical advice/attention.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or physician if you feel unwell.

Superior[®] SL Smoke Fluid

IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs, get medical attention.
Storage: Store in accordance with local/regional/national/international regulation. Store locked up.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal. See section 13 of this SDS for disposal instructions.

2.3 Other hazards which are not included in the classification criteria:

Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic, and may have other central nervous system effects. Prolonged or repeated skin contact without proper cleaning can clog the pores of the skin resulting in disorders such as oil acne/folliculitis.

Prolonged/repeated contact may cause defating of the skin which can lead to dermatitis. Used oil may contain harmful impurities. Ingestion may result in nausea, vomiting, and/or diarrhea.

Section 3. Composition / Information on Ingredients

Substance

Chemical Name	CAS Number	Weight - %
Petroleum distillates, hydro treated light	64742-47-8	100
Products containing mineral oil with less than 3% DMSO extract as measured by IP 346		

Section 4. First-Aid Measures

General advice: Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

4.1 Inhalation: Move to fresh air. If breathing is difficult, give oxygen and continue to monitor. If not breathing, give artificial respiration. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. Call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband.

4.2 Skin contact: Wash skin with plenty of soap and water. Remove contaminated clothing and shoes. If symptoms persist, seek medical attention. Wash contaminated clothing before use.

4.3 Eye contact: Immediately flush eyes thoroughly with water for several minutes. Remove contact lenses after one to two minutes and continue flushing for several more minutes. If redness, itching or burning sensation develops, seek medical attention.

4.4 Ingestion: Aspiration hazard if swallowed. Material can enter lungs and cause damage. If any of the following delayed signs and symptoms appear within the next 6 hours, transport to the nearest medical facility: fever greater than 101 ° F (38.3°C), shortness of breath, chest congestion or continued coughing or wheezing. Give nothing by mouth. Get medical attention immediately. Call a poison center or physician. DO NOT INDUCE VOMITING. Never give anything by mouth to an unconscious person. Gently wipe or rinse the inside of the mouth with water. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt, or waistband.

4.5 Most important acute and delayed symptoms/effects: Aspiration: If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever greater than 101 °F (38.3 °C). The onset of respiratory symptoms may be delayed for several hours after exposure.

Eye Contact: Excessive exposure may cause temporary redness and mild irritation to eyes.

Skin Contact: May cause redness, defating and cracking of skin.

Ingestion: May cause central nervous system (CNS) depression. May be fatal if swallowed and enters airways.

Superior[®] SL Smoke Fluid

Inhalation: May cause central nervous system (CNS) depression. May cause drowsiness and dizziness, nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness.

Chronic health effects: Chronic exposure may cause respiratory irritation.

Relevant routes of exposure: Eye, skin, inhalation.

4.6 Indication of immediate medical attention and notes for physicians: Persons with pre-existing skin, eye, or respiratory conditions may be at an increased risk from the irritant properties of this material. Attending physician should treat exposed patients symptomatically. Aspiration during swallowing or vomiting may severely damage the lungs. If evacuation of stomach contents is necessary, use method least likely to cause aspiration.

Protection of First Aiders: No action should be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Section 5. Fire-Fighting Measures

5.1 Flammable Properties:

Flash point: 122°C / 252°F (COC)

Lower explosion limit: Not available

Upper explosion limit: Not available

Thermal decomposition: When heated, hazardous gases may be released including sulfur compounds.

Fire and Explosion Hazard: Material will burn. **Not a fire or explosion hazard.**

5.2 Extinguishing media:

Suitable extinguishing media: Combustible material. Use CO₂, dry chemical, or foam. Water can be used to cool and protect product.

Unsuitable extinguishing media: Forceful application of fire extinguishing agents or water spray may spread burning material.

5.3 Special hazards arising from the chemical:

Unusual fire and explosion hazards: When heated, hazardous gases may be released including: sulfur dioxide. A solid stream of water will spread the burning material. Material creates a special hazard because it floats on water. This material is harmful to aquatic life.

Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition, which may be toxic and/or irritating.

5.4 Special protective equipment and precautions for firefighters:

Fire Fighting Procedures: Keep personnel away. Isolate fire and deny unnecessary entry. Do not apply direct water stream. Use fine water spray or foam. Cool surroundings with water to localize fire zone.

Special Protective Equipment for Firefighters: No special protective equipment required. Wear positive-pressure self-contained breathing apparatus (SCBA) and protective firefighting clothing (includes firefighting helmet, coat, trousers, boots, and gloves) to protect against other burning material. If protective equipment is not available or not used, fight fire from a protected location or safe distance.

Section 6. Accidental Release Measures

6.1 Personal precautions, protective equipment and emergency procedures:

Use personal protective equipment. Avoid breathing mists. Avoid skin and eye contact. Evacuate personnel to safe areas. Spilled material may cause a slipping hazard. Use appropriate safety equipment. See Section 8 for information on personal protection equipment.

Superior[®] SL Smoke Fluid

6.2 Environmental precautions and protective procedures:

Prevent further leakage or spillage if safe to do so. Do not let product enter drains, sewers, waterways, and/or groundwater. In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

6.3 Methods and material for containment and cleaning up:

Contain spilled material if possible. Eliminate all ignition sources including smoking, flares, sparks or flames in immediate area. All equipment used when handling the product must be grounded. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

Section 7. Handling and Storage

7.1 Precautions for safe handling:

Avoid breathing process mists. Avoid contact with eyes, skin and clothing. Use with adequate ventilation. Material can accumulate static charges which may cause an electrical spark (ignition source). When the material is handled in bulk, an electrical spark could ignite any flammable vapors from liquids or residues that may be present (e.g., during switch-loading operations). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Do not eat, drink and/or smoke in work areas. Wash hands after use. Remove contaminated clothing and protective equipment before entering eating areas.

7.2 Conditions for safe storage (including any incompatibilities):

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Store in accordance with good manufacturing practices. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge. Odorous and toxic fumes may form from the decomposition of this product if stored at temperatures in excess of 113° F (45° C) for extended periods of time or if heat sources in excess of 250° F (121° C) are used. Store away from incompatible materials. See section 10 for incompatible materials.

Section 8. Exposure Controls and Personal Protection

Consult with a Health and Safety Professional for specific selections.

8.1 Control parameter: Occupational exposure limits

ACGIH TLV (Absorbed through skin.) TWA: 200 mg/m³, (as total hydrocarbon vapor) 8 hours.

NIOSH 100 mg/m³ TWA 10 hour(s)

OSHA PEL: 100 PPM

Oil mist, mineral:

ACGIH TWA [Mist]: 5 mg/m³

ACGIH STEL [Mist]: 10 mg/m³

8.2 Appropriate engineering controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

8.3 Personal protective equipment:

Eye protection: Use safety glasses with side shields.

Body protection: No special clothing is required. See Hand protection.

Hand protection: Contact should be minimized. Use butyl rubber, Nitrile, or neoprene gloves. Use good industrial hygiene practices. In case of skin contact, wash hands and arms with soap and water. Use caution when opening covers of storage and transportation containers. 3-nitroaniline crystals may be present on the interior surface of these openings. 3-nitroaniline is toxic by dermal exposure.

Superior[®] SL Smoke Fluid

Respiratory protection: Concentration in air determines the level of respiratory protection needed. When airborne concentrations exceed the exposure limit, use only NIOSH certified respiratory equipment. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations.

Other: Remove contaminated clothing and wash before reuse. For non-fire emergencies, respiratory protection may be necessary and wear appropriate protective clothing to avoid contact with material. Have eyewash station in work area. Do not consume or store food in the work area. Wash hands before smoking or eating. Concentration of H₂S in tank headspaces may reach hazardous values, especially in case of prolonged storage. This situation is especially relevant for those operations which involve direct exposure to the vapors in the tank.

Section 9. Physical and Chemical Properties

Physical state: Liquid
 Color: Bright and Clear
 Odor: Characteristic of Petroleum
 Odor threshold: No Data Available
 pH: No Data Available
 Freezing Point: No Data Available
 Boiling Point / Range: No Data Available
 Flash Point (COC): 122°C / 252°F
 Evaporation rate: No Data Available
 Upper Explosive Limits (% air): No Data Available
 Lower Explosive Limits (% air): No Data Available
 Flammability (solid, gas): Not Applicable
 Vapor pressure: <1 mm Hg
 Vapor density (air=1): > 1
 Relative Density: 0.85
 Auto-ignition temperature: Not Determined
 Decomposition temperature: Not Determined
 Solubility in water: Negligible, 0-1 %
 Partition coefficient, n-octanol/water: > 4
 Viscosity @ 40°C: No Data
 Viscosity @ 100°C: No Data

Section 10. Stability and Reactivity

10.1 **Chemical stability:** Stable under normal temperature conditions and recommended use.

10.2 **Possibility of hazardous reactions:** No hazardous reactions if stored and handled as prescribed.

10.3 **Conditions to avoid:** Avoid heat, sparks, open flames and other ignition sources.

10.4 **Incompatible materials:** Strong oxidizers

10.5 **Hazardous decomposition products:**

Decomposition products depend upon temperature, air supply and the presence of other materials. Smoke, carbon monoxide, sulfur oxides, hydrogen sulfide, aldehydes, and other petroleum decomposition products in the case of incomplete combustion. Processing may release fumes and other decomposition products. Fumes can be irritating.

10.6 **Hazardous Polymerization:** Will not polymerize.

Superior[®] SL Smoke Fluid

Section 11. Toxicological Information

11.1 Information on the likely routes of exposure: Inhalation, ingestion, skin and eye contact, central nervous system.

11.2 Information on toxicological effects:

Acute toxicity (similar material)

Oral LD50: > 5,000 mg/kg - Rat

Inhalation 4 h LC50: > 5.2 mg/l - Rat

Dermal LD50: > 2,000 mg/kg - Rabbit

Skin corrosion/irritation:	Causes mild skin irritation (Rabbit) Classification: Not classified as irritant
Serious eye damage/irritation:	Slight or no eye irritation (Rabbit) Classification: Not classified as irritant
Inhalation:	May cause mild respiratory tract irritation Classification: Not classified
Respiratory sensitization:	Did not cause sensitization on laboratory animals, mouse Classification: Does not cause respiratory sensitization
Skin sensitization:	Did not cause sensitization on laboratory animals, guinea pig Classification: Does not cause skin sensitization
Ingestion:	May cause central nervous system (CNS) depression. May be fatal if swallowed and enters airways.

Repeated dose toxicity

Inhalation Rat:	No toxicologically significant effects were found.
Mutagenicity:	Tests on bacterial or mammalian cell cultures did not show mutagenic effects
Reproductive Toxicity:	No known significant effects or critical hazards.
Teratogenicity:	No known significant effects or critical hazards.

Specific target organ toxicity (STOT):

STOT-single exposure: Classification: Not classified

STOT -repeated exposure: Classification: Not classified

Aspiration Hazard: Risk of chemical pneumonia after aspiration. May be fatal if swallowed and enters airways. (Based on physical data.)

Chronic effects: Prolonged inhalation may be harmful. May cause headaches and dizziness, is an anesthetic and may have other central nervous system effects.

Further information: Prolonged and/or repeated skin contact with low viscosity materials may defat the skin resulting in possible irritation and dermatitis

Symptoms related to the physical, chemical and toxicological characteristics:

Adverse symptoms may include the following:

Eye contact: Pain or irritation, watering, redness

Inhalation: Nausea or vomiting, headache, drowsiness/fatigue dizziness/vertigo, unconsciousness

Skin contact: Irritation, redness, defatting of skin

11.3 Carcinogenicity: Not considered a carcinogen by IARC, NTP, OSHA, ACGIH.

Superior[®] SL Smoke Fluid

Section 12. Ecological Information

TOX DATA

TEST	VALUE		SPECIES	SOURCE
LC50	45mg/L	96H	Pimephales promelas	IUCLID
LC50	2.2mg/L	96H	Lepomis macrochirus	EPA
LC50	2.4mg/L	96H	Oncorhynchus mykiss	EPA

12.1 Mobility: Partly evaporates from water or soil surfaces, but a significant proportion will remain after one day. If product enters soil, one or more constituents will be mobile and may contaminate groundwater. Floats on water. Large volumes may penetrate soil and could contaminate groundwater

12.2 Aquatic and terrestrial ecotoxicity: Toxic long-term

12.3 Persistence and degradability: Readily degradable

12.4 Bioaccumulative potential: Low bioaccumulation expected. Contains constituents with the potential to bio accumulate.

12.5 Other adverse effects: Films formed on water may affect oxygen transfer and damage organisms.

Section 13. Disposal Considerations

13.1 Disposal methods:

Uncontaminated discarded product is not a hazardous waste under RCRA. Do not dump into any sewers, on the ground or into any body of water. All disposal practices must comply with all federal, state, and local laws and regulations. Offer surplus and non-recyclable material to a licensed disposal company. Contact a licensed professional waste disposal service for disposal.

13.2 Container disposal:

Empty container retains product residue. Observe all hazard precautions. Do not distribute, make available, furnish or reuse empty container except for storage and shipment of original product. Remove all product residue. Puncture or otherwise destroy empty container and dispose of in a facility permitted for nonhazardous waste.

Section 14. Transport Information

14.1 UN number: Not regulated

14.2 UN proper shipping name: Not regulated

14.3 Transport hazard class: Not regulated

14.4 Packaging group (if applicable): Not regulated

14.5 Marine Pollutant (Yes/No): No

14.6 Special precaution: No information available

Section 15. Regulatory Information

U.S. Regulations

15.1 USA TSCA: Listed on the TSCA Inventory.

15.2 SARA Section 311/312 Hazard Categories:

Acute Hazard: Yes

Chronic Hazard: Yes

Superior[®] SL Smoke Fluid

Fire Hazard: No
 Reactive Hazard: No
 Sudden Pressure Release: No

15.3 CERCLA Hazardous Substance SARA Section 304 Release Reporting:

<u>Component(s)</u>	<u>Reportable Quantity</u>
None	

15.4 SARA Section 302 Extremely Hazardous Substances:

<u>Component(s)/CAS Number</u>	<u>Concentration</u>	<u>Min</u>	<u>Max</u>
None			

15.5 SARA Section 313 Toxic Chemicals:

<u>Component(s)/CAS Number</u>	<u>Reporting Threshold</u>	<u>Min – Concentration – Max</u>
None		

This material is classified as an oil under Section 311 of the Clean Water Act (CWA) and the Oil Pollution Act of 1990 (OPA). Discharges or spills which produce a visible sheen on waters of the United States, their adjoining shorelines, or into conduits leading to surface waters must be reported to the EPA's National Response Center at (800) 424-8802.

15.6 California Proposition 65: This product is not known to contain chemical(s) known to the State of California to cause cancer or reproductive harm.

15.7 Pennsylvania Worker and Community Right To Know Act: Hazardous Substances: NONE

15.8 New Jersey Worker and Community Right To Know Act: Hazardous Substances: NONE

15.9 International Regulations:

Canadian Regulations:

WHMIS Statement: This product has been classified in accordance with the hazard criteria of the *Controlled Products Regulations* and the SDS contains all the information required by the *Controlled Products Regulations*. This product is classified as not controlled in accordance with the Canadian Controlled Products Regulations.

This product complies with RoHS (Restriction on Hazardous Substances).

Other requirements: Inventory Listing:

TSCA - <i>United States Toxic Substances Control Act Section 8(b) Inventory</i>	LISTED
DSL - <i>Canadian Domestic Substances List</i>	LISTED
NDSL - <i>Non-Domestic Substances List</i>	NOT LISTED
EINECS - <i>European Inventory of Existing Chemical Substances/European</i>	LISTED
ELINCS - <i>List of Notified Chemical Substances</i>	NOT LISTED
ENCS - <i>Japan Existing and New Chemical Substances</i>	LISTED
IECSC - <i>China Inventory of Existing Chemical Substances</i>	LISTED
KECL - <i>Korean Existing and Evaluated Chemical Substances</i>	LISTED
PICCS - <i>Philippines Inventory of Chemicals and Chemical Substances</i>	LISTED
AICS Australia - <i>Australian Inventory of Chemical Substances</i>	LISTED

Section 16. Other Information

16.1 NFPA and HMIS Hazard Ratings:

NFPA and HMIS ratings have been assigned to this product based on the hazards of its ingredient(s). Because the user is most aware of the application of the product, the user must ensure that the proper personal protective equipment (PPE) is provided consistent with information contained in the product SDS. This information is intended solely for the use of individuals trained in the particular hazard rating system.

Superior[®] SL Smoke Fluid

Key: 0 = least, 1 = slight, 2 = moderate, 3 = high, 4 = extreme

NFPA (National Fire Protection Association) - Classification

Health 1 slight
Flammability 1 slight
Instability or Reactivity 0 minimal

HMIS[®] [Hazardous Materials Identification System (Paint & Coating)] - Classification

Health 1 slight
Flammability 1 slight
Reactivity 0 minimal

NFPA, HMIS[®] rating involves data interpretations that may vary from company to company. They are intended only for rapid, general identification of the magnitude of the specific hazard. To deal adequately with the safe handling of this material, all the information contained in this SDS must be considered. This information is supplied solely for the use of individuals trained in the particular hazard rating system.

16.2 Revision information:

Date of this revision: 10/27/2015 (Version 1.0)
Revision summary: GHS/OSHA compliant SDS

16.3 Training advice: For Professional use, only as directed. Provide adequate information, instruction and training for operators. Additional references static charges include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

16.4 Key or legend to abbreviations and acronyms used in the safety data sheet:

ACGIH	American Conference of Governmental Industrial Hygienists
BEI	Biological Exposure Index
LC50	Median Lethal Concentration
LD50	Median Lethal Dose
NOAEL	No observed adverse effect level
NOEC	No Observed Effect Concentration
NOEL	No Observed Effect Level
OECD	Organization for Economic Co-operation and Development
OPPTS	Office of Prevention, Pesticides, and Toxic Substances
OEL	Occupational Exposure Limit
PEL	Permissible Exposure Limit
ppm	parts per million
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average
Action Level	An exposure value set by OSHA that is lower than the PEL that will trigger the need for activities such as exposure monitoring and medical surveillance.

Declare to reader:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information, and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal, and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

End of SDS



Process Sewer Investigation Work Plan

Appendix C – Example Smoke Testing Log



Smoke Testing Log

Sheet 1 of ____

Project Name		Project Number	Smoke Test ID
Smoke Testing Company	Smoke Testing Staff		
Blower Model	Smoke Type	Date/Time Smoke Test Started	Date/Time Stopped
Smoke Entrance Location Description (include sketch in field map)		Trihydro Field Staff	
Smoke Entrance GPS Location		Weather Conditions	
Smoke Detection Results			
1)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
2)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
3)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
4)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
5)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
6)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		

Smoke Testing Log

Sheet 2 of ____

Project Name		Project Number	Smoke Test ID
Smoke Detection Results			
7)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
8)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
9)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
10)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
11)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
12)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
13)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		
14)	Time:		
	GPS Location:		
	Location Description:		
	Notes:		

Sante Fe Main Office
Phone: (505) 476-3441

General Information
Phone: (505) 629-6116

Online Phone Directory
<https://www.emnrd.nm.gov/ocd/contact-us>

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 302860

CONDITIONS

Operator: Western Refining Southwest LLC 539 South Main Street Findlay, OH 45840	OGRID: 267595
	Action Number: 302860
	Action Type: [UF-DP] Discharge Permit (DISCHARGE PERMIT)

CONDITIONS

Created By	Condition	Condition Date
joel.stone	Accepted for OCD record retention purposes.	2/7/2025