



Pace Analytical Services, LLC
1638 Roseytown Road - Suites 2,3,4
Greensburg, PA 15601
(724)850-5600

April 19, 2017

Ms. Tenley Miller
Reliance Laboratories, Inc.
2044 Meadowbrook Road
P.O. Box 4657
Bridgeport, WV 26330

RE: Project: 265743
Pace Project No.: 30216038

Dear Ms. Miller:

Enclosed are the analytical results for sample(s) received by the laboratory on April 13, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Robbin Robl
robbin.robbl@pacelabs.com
(724)850-5613
Project Manager

Enclosures



REPORT OF LABORATORY ANALYSIS

This report shall not be reproduced, except in full,
without the written consent of Pace Analytical Services, LLC.

CERTIFICATIONS

Project: 265743
Pace Project No.: 30216038

Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601
L-A-B DOD-ELAP Accreditation #: L2417
Alabama Certification #: 41590
Arizona Certification #: AZ0734
Arkansas Certification
California Certification #: 04222CA
Colorado Certification
Connecticut Certification #: PH-0694
Delaware Certification
Florida/TNI Certification #: E87683
Georgia Certification #: C040
Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification
Iowa Certification #: 391
Kansas/TNI Certification #: E-10358
Kentucky Certification #: 90133
Louisiana DHH/TNI Certification #: LA140008
Louisiana DEQ/TNI Certification #: 4086
Maine Certification #: PA00091
Maryland Certification #: 308
Massachusetts Certification #: M-PA1457
Michigan/PADEP Certification
Missouri Certification #: 235

Montana Certification #: Cert 0082
Nebraska Certification #: NE-05-29-14
Nevada Certification #: PA014572015-1
New Hampshire/TNI Certification #: 2976
New Jersey/TNI Certification #: PA 051
New Mexico Certification #: PA01457
New York/TNI Certification #: 10888
North Carolina Certification #: 42706
North Dakota Certification #: R-190
Oregon/TNI Certification #: PA200002
Pennsylvania/TNI Certification #: 65-00282
Puerto Rico Certification #: PA01457
Rhode Island Certification #: 65-00282
South Dakota Certification
Tennessee Certification #: TN2867
Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C
Wisconsin Certification
Wyoming Certification #: 8TMS-L

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SAMPLE SUMMARY

Project: 265743
Pace Project No.: 30216038

Lab ID	Sample ID	Matrix	Date Collected	Date Received
30216038001	265743-2017-W	Water	04/12/17 11:30	04/13/17 09:20
30216038002	265744-2017-W	Water	04/12/17 11:30	04/13/17 09:20
30216038003	265745-2017-W	Water	04/12/17 11:30	04/13/17 09:20

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SAMPLE ANALYTE COUNT

Project: 265743
Pace Project No.: 30216038

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30216038001	265743-2017-W	EPA 901.1	MAH	8
30216038002	265744-2017-W	EPA 901.1	MAH	8
30216038003	265745-2017-W	EPA 901.1	MAH	8

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PROJECT NARRATIVE

Project: 265743
Pace Project No.: 30216038

Method: EPA 901.1
Description: 901.1 Gamma Spec
Client: Reliance Laboratories, Inc.
Date: April 19, 2017

General Information:

3 samples were analyzed for EPA 901.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:

The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:

11 percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

REPORT OF LABORATORY ANALYSIS

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 265743
Pace Project No.: 30216038

Sample: 265743-2017-W Lab ID: 30216038001 Collected: 04/12/17 11:30 Received: 04/13/17 09:20 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Bismuth-212	EPA 901.1	327.610 ± 132.230 (123.400) C:NA T:NA	pCi/L	04/17/17 15:26	14913-49-6	
Bismuth-214	EPA 901.1	700.010 ± 82.638 (23.440) C:NA T:NA	pCi/L	04/17/17 15:26	14733-03-0	
Lead-212	EPA 901.1	68.421 ± 15.874 (20.090) C:NA T:NA	pCi/L	04/17/17 15:26	15092-94-1	
Lead-214	EPA 901.1	663.130 ± 79.557 (25.140) C:NA T:NA	pCi/L	04/17/17 15:26	15067-28-4	
Potassium-40	EPA 901.1	799.020 ± 145.850 (87.120) C:NA T:NA	pCi/L	04/17/17 15:26	13966-00-2	
Radium-226	EPA 901.1	1707.900 ± 365.970 (317.300) C:NA T:NA	pCi/L	04/17/17 15:26	13982-63-3	
Radium-228	EPA 901.1	949.540 ± 112.330 (38.070) C:NA T:NA	pCi/L	04/17/17 15:26	15262-20-1	
Thallium-208	EPA 901.1	34.798 ± 11.241 (9.934) C:NA T:NA	pCi/L	04/17/17 15:26	14913-50-9	

Sample: 265744-2017-W Lab ID: 30216038002 Collected: 04/12/17 11:30 Received: 04/13/17 09:20 Matrix: Water
VS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Bismuth-212	EPA 901.1	175.570 ± 263.500 (286.400) C:NA T:NA	pCi/L	04/17/17 15:27	14913-49-6	
Bismuth-214	EPA 901.1	1131.200 ± 136.550 (40.350) C:NA T:NA	pCi/L	04/17/17 15:27	14733-03-0	
Lead-212	EPA 901.1	33.941 ± 22.117 (34.830) C:NA T:NA	pCi/L	04/17/17 15:27	15092-94-1	
Lead-214	EPA 901.1	999.290 ± 123.980 (42.150) C:NA T:NA	pCi/L	04/17/17 15:27	15067-28-4	
Potassium-40	EPA 901.1	2450.300 ± 367.940 (146.900) C:NA T:NA	pCi/L	04/17/17 15:27	13966-00-2	
Radium-226	EPA 901.1	3655.400 ± 668.800 (496.800) C:NA T:NA	pCi/L	04/17/17 15:27	13982-63-3	
Radium-228	EPA 901.1	1592.900 ± 189.230 (74.450) C:NA T:NA	pCi/L	04/17/17 15:27	15262-20-1	
Thallium-208	EPA 901.1	15.320 ± 20.399 (22.260) C:NA T:NA	pCi/L	04/17/17 15:27	14913-50-9	

Sample: 265745-2017-W Lab ID: 30216038003 Collected: 04/12/17 11:30 Received: 04/13/17 09:20 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Bismuth-212	EPA 901.1	403.510 ± 194.930 (188.800) C:NA T:NA	pCi/L	04/18/17 11:27	14913-49-6	
Bismuth-214	EPA 901.1	1907.300 ± 209.730 (34.160) C:NA T:NA	pCi/L	04/18/17 11:27	14733-03-0	
Lead-212	EPA 901.1	131.490 ± 24.734 (29.610) C:NA T:NA	pCi/L	04/18/17 11:27	15092-94-1	

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ANALYTICAL RESULTS - RADIOCHEMISTRY

Project: 265743
Pace Project No.: 30216038

Sample: 265745-2017-W Lab ID: 30216038003 Collected: 04/12/17 11:30 Received: 04/13/17 09:20 Matrix: Water
PWS: Site ID: Sample Type:

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Lead-214	EPA 901.1	1704.900 ± 189.800 (37,460) C:NA T:NA	pCi/L	04/18/17 11:27	15067-28-4	
Potassium-40	EPA 901.1	1318.000 ± 209.980 (113.900) C:NA T:NA	pCi/L	04/18/17 11:27	13966-00-2	
Radium-226	EPA 901.1	7002.700 ± 867.150 (423,200) C:NA T:NA	pCi/L	04/18/17 11:27	13982-63-3	
Radium-228	EPA 901.1	2456.700 ± 276.420 (54,680) C:NA T:NA	pCi/L	04/18/17 11:27	15262-20-1	
Thallium-208	EPA 901.1	31.429 ± 14,206 (14,640) C:NA T:NA	pCi/L	04/18/17 11:27	14913-50-9	

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QUALITY CONTROL - RADIOCHEMISTRY

Project: 265743
Pace Project No.: 30216038

QC Batch: 255497 Analysis Method: EPA 901.1
QC Batch Method: EPA 901.1 Analysis Description: 901.1 Gamma Spec
Associated Lab Samples: 30216038001, 30216038002, 30216038003

METHOD BLANK: 1258651 Matrix: Water
Associated Lab Samples: 30216038001, 30216038002, 30216038003

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Bismuth-212	0.000 ± 15.492 (71.680) C:NA T:NA	pCi/L	04/17/17 12:10	
Bismuth-214	6.097 ± 5.947 (12.140) C:NA T:NA	pCi/L	04/17/17 12:10	
Lead-212	2.314 ± 7.344 (8.978) C:NA T:NA	pCi/L	04/17/17 12:10	
Lead-214	0.000 ± 4.170 (10.510) C:NA T:NA	pCi/L	04/17/17 12:10	
Potassium-40	10.855 ± 44.170 (54.910) C:NA T:NA	pCi/L	04/17/17 12:10	
Radium-226	0.000 ± 63.151 (129.200) C:NA T:NA	pCi/L	04/17/17 12:10	
Radium-228	0.000 ± 3.671 (23.390) C:NA T:NA	pCi/L	04/17/17 12:10	
Thallium-208	1.081 ± 3.881 (4.683) C:NA T:NA	pCi/L	04/17/17 12:10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

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QUALIFIERS

Project: 265743
Pace Project No.: 30216038

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval).

Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

REPORT OF LABORATORY ANALYSIS

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RELIANCE LABORATORIES, INC.

CHAIN OF CUSTODY RECORD

2044 MEADOWBROOK ROAD
 POST OFFICE BOX 4657
 BRIDGEPORT, WV 26330
 TEL. (304) 842-5285 • FAX (304) 842-5351
 E-MAIL reliancelabs@wvdsi.net
 INTERNET www.RelianceLabs.net

RIDGEFIELD BUSINESS CENTER
 25 CRIMSON CIRCLE
 MARTINSBURG, WV 25403
 TEL. (304) 596-2084 • FAX (304) 596-2086

30216038

*CLIENT NAME Reliance Laboratories
 *ADDRESS _____
 CUSTOMER # _____ *TEL.# _____ FAX# _____
 *SAMPLER(S) A Wilson E-MAIL _____

NORM	

SHEET NO. 1 OF 1

*PROJECT/REMARKS

LABORATORY #	*DATE	*TIME	CO.	CP.	MATRIX W, DW, S, O, M	TEMP. $\leq 4^{\circ}\text{C}$ Yes No	*# OF CONTAIN.	HN03	H2SO4	HCL	NaOH	BAC-T	NO PRES.		
	4/12/17	11:30			W		1	Cope						X	265743-2017-W
	4/12/17	11:30			W		1	Cope						X	265744-2017-W
	4/12/17	11:30			W		1	Cope						X	265745-2017-W

WO#: 30216038

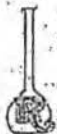


SAMPLES DO DO NOT _____ MEET USEPA GUIDELINES FOR HOLDING TIMES
 SAMPLES DO DO NOT _____ MEET USEPA GUIDELINES FOR CHEMICAL PRESERVATIVES
 SAMPLES DO DO NOT _____ MEET USEPA GUIDELINES FOR SAMPLE CONTAINERS
 SAMPLES ARE _____ ARE NOT _____ FOR REGULATORY COMPLIANCE PURPOSES

REMARKS: _____
 PWS# _____

*RELINQUISHED BY: PRINT: <u>C. Grand</u> SIGN: _____	*DATE/TIME DATE: <u>4/12/2017</u> TIME: <u>5:55</u>	*RECEIVED BY: PRINT: <u>FedEx</u> SIGN: _____
*RELINQUISHED BY: PRINT: <u>FedEx</u> SIGN: _____	*DATE/TIME DATE: _____ TIME: _____	*RECEIVED BY: PRINT: <u>Delmar Michone</u> SIGN: _____
*RELINQUISHED BY: PRINT: _____ SIGN: _____	*DATE/TIME DATE: _____ TIME: _____	*RECEIVED BY: PRINT: <u>4/13/17</u> SIGN: _____
*COURIER: TRACKING #: _____	*DATE/TIME DATE: _____ TIME: _____	*RECEIVED BY: PRINT: _____ SIGN: _____

WEATHER/TEMPERATURE: _____
 RUSH STATUS (INITIAL ACCEPTANCE EG, 3 Day)
 *** ADDITIONAL LABORATORY FEES MAY APPLY ***
EXTENT OF LIABILITY
 SHOULD RELIANCE LABORATORIES, INC. BE AT FAULT AND ANY DISPUTE ARISE REGARDING ANALYTICAL DATA GENERATED BY THE LABORATORY, THE EXTENT OF THE LIABILITY TO RELIANCE WILL BE A DUPLICATE ANALYSIS OF THAT SAMPLE (PROVIDING ADEQUATE SAMPLE REMAINS) OR REFUND OF THE ANALYTICAL FEE. IN NO EVENT WILL RELIANCE LABORATORIES BE LIABLE FOR DAMAGES INCLUDING BUT NOT LIMITED TO DIRECT, INDIRECT OR CONSEQUENTIAL DAMAGES ARISING FROM SUCH DISPUTE.
 NOTE: TYPICAL SAMPLE TURN AROUND FOR ROUTINE SAMPLES IS 5 TO 10 WORKING DAYS. THIS IS NOT A GUARANTEE THAT SAMPLES WILL BE COMPLETED IN THIS TIME FRAME, HOWEVER. NON-ROUTINE SAMPLES MAY REQUIRE ADDITIONAL TIME.
NOT TO BE COMPLETED BY CLIENT
 ORIGINAL CHAIN OF CUSTODY DOCUMENT MUST BE EXECUTED IN INK



RELIANCE LABORATORIES, INC.

ENVIRONMENTAL ANALYSTS AND CONSULTANTS

302 160 388

BRIDGEPORT, WV

www.RelianceLabs.net

MARTINSBURG, WV

Certifications: WV Department of Health #: 00354, 00433 | WV Department of Environmental Protection #: 158, 181
MD Department of Environment #: 336, 337 | US Environmental Protection Agency #: WV00042, WV00901

Wednesday, April 12, 2017

Pace Analytical Services
1638 Roseytown Road
Suites 2,3,4
Greensburg, PA 15601

Please analyze the following sample for: **NORM**

Please identify as:

265743-2017-W

Date/Time Sampled: 4/12/2017 11:30

265744-2017-W

Date/Time Sampled: 4/12/2017 11:30

265745-2017-W

Date/Time Sampled: 4/12/2017 11:30

Sampled by: A. Wilson

*****3 DAY RUSH*****

PLEASE SEND RESULTS & INVOICE TO:

RELIANCE LABORATORIES, INC.
ATTN: TENLEY MILLER
P.O. BOX 4657
BRIDGEPORT, WV 26330
tmiller@wvdsi.net

Thank You

Sample Condition Upon Receipt Pittsburgh

RTB



Client Name: Reliance Project # 30216038

Courier: Fed Ex UPS USPS Client Commercial Face Other _____

Tracking #: 778899239405

Custody Seal on Cooler/Box Present: yes no Seals Intact: yes no

Thermometer Used N/A Type of Ice: Wet Blue None

Cooler Temperature Observed Temp _____ °C Correction Factor: _____ °C Final Temp: _____ °C

Temp should be above freezing to 6°C

Date and Initials of person examining contents: ARM 4/13/17

Comments:	Yes	No	N/A	
Chain of Custody Present:	/			1.
Chain of Custody Filled Out:	/			2.
Chain of Custody Relinquished:	/			3.
Sampler Name & Signature on COC:	/			4.
Sample Labels match COC:	/			5.
-Includes date/time/ID Matrix: <u>WT</u>				
Samples Arrived within Hold Time:	/			6.
Short Hold Time Analysis (<72hr remaining):	/			7.
Rush Turn Around Time Requested:	/			8.
Sufficient Volume:	/			9.
Correct Containers Used:	/			10.
-Face Containers Used:	/			
Containers Intact:	/			11.
Orthophosphate field filtered			/	12.
Organic Samples checked for dechlorination:	/			13.
Filtered volume received for Dissolved tests	/			14.
All containers have been checked for preservation.	/			15.
All containers needing preservation are found to be in compliance with EPA recommendation.	/			<u>PHL2</u>
exceptions: VOA, coliform, TOC, O&G, Phenolics				Initial when completed: <u>ARM</u> Date/time of preservation: _____
				Lot # of added preservative: _____
Headspace in VOA Vials (>6mm):			/	16.
Trip Blank Present:			/	17.
Trip Blank Custody Seals Present			/	
Rad Aqueous Samples Screened > 0.5 mrem/hr	/			Initial when completed: <u>ARM</u> Date: <u>4/10/17</u>

Client Notification/ Resolution:

Person Contacted: _____ Date/Time: _____ Contacted By: _____

Comments/ Resolution: _____

A check in this box indicates that additional information has been stored in reports.

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)

*PM review is documented electronically in LIMS. When the Project Manager closes the SRF Review schedule in LIMS. The review is in the Status section of the Workorder Edit Screen.



CLEARWATER
Engineered Chemistry

Material Safety Data Sheet
ALPHA 3207

HEALTH	2
FLAMMABILITY	4
REACTIVITY	0
PERSONAL PROTECTION	G

24 hr. Emergency Contact (CHEMTREC) US Tel: 1-800-424-9300 - Int'l. Tel. 703-527-3887

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

SUPPLIER: CLEARWATER INTERNATIONAL L.L.C.
515 POST OAK BLVD., SUITE 600
HOUSTON, TX 77027

MANUFACTURER: CLEARWATER INTERNATIONAL L.L.C.
4420 SOUTH FLORES RD
ELMENDORF, TEXAS 78112

PRODUCT NAME: ALPHA 3207
PRODUCT CODE: XFP0477B
PRODUCT USE/CLASS: CORROSION INHIBITOR

MSDS REVISION DATE: 06/15/04 PREPARER: MJW PHONE: 724-318-1050

2. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT	EXPOSURE LIMITS	CAS#	% BY WEIGHT
ISOPROPANOL	ACGIH TLV - 400 ppm TWA, 500 ppm STEL OSHA PEL - 400 ppm TWA,	67-63-0	10-30 %

3. HAZARD IDENTIFICATION

EYE: Liquid, aerosols and vapors of this product may be irritating and can cause pain, tearing, reddening and swelling accompanied by a stinging sensation and/or a feeling like that of fine dust in the eyes.

SKIN: May cause skin irritation. Allergic reactions are possible.

INGESTION: This material may be harmful if swallowed. May be irritating to mouth, throat, and stomach.

INHALATION: Prolonged inhalation may be harmful and can cause headaches, dizziness, nausea, anesthesia, narcosis, decreased blood pressure, changes in heart rate and cyanosis. May be irritating to mucous membranes and lung tissue.

CHRONIC INFORMATION: None Known

PRIMARY ROUTE(S) OF ENTRY: Inhalation, Ingestion

4. FIRST-AID MEASURES

EYE CONTACT: Immediately flush eyes with plenty of water for at least 15 minutes while holding eyelids open. Get medical attention, if irritation persists.

SKIN CONTACT: Wash with soap and water. Get medical attention if irritation develops or persists.

INHALATION: Remove victim to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get immediate medical attention.

INGESTION: Place victim on left side with head down to prevent aspiration into lungs. Induce vomiting as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately.

5. FIRE FIGHTING MEASURES

FLASH POINT: 70 F
(TAGLIABUE CLOSED CUP)

LOWER EXPLOSIVE LIMIT: N.D.
UPPER EXPLOSIVE LIMIT: N.D.

Material Safety Data Sheet
ALPHA 3207

AUTOIGNITION TEMPERATURE: N.D.

EXTINGUISHING MEDIA: ALCOHOL FOAM CO2 DRY CHEMICAL

UNUSUAL FIRE AND EXPLOSION HAZARDS: Can release vapors that form explosive mixtures at temperatures at or above the flash point. Empty containers retain product residue (liquid and/or vapor) and can be dangerous.

SPECIAL FIRE FIGHTING PROCEDURES: Containers can build up pressure if exposed to heat (fire). As in any fire, wear a self-contained breathing apparatus pressure-demand (MSHA/NIOSH approved or equivalent) and full protective gear. Apply alcohol-type foam or all purpose foam by manufacturers recommended techniques for large fires. Use carbon dioxide or dry chemical for small fires. Use water spray to keep containers cool.

5 ACCIDENTAL RELEASE MEASURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Extinguish any possible ignition source until the area is determined to be free from fire or explosion hazard. Absorb spill with inert material (e.g. dry sand or earth), then place in a chemical waste container. (See exposure controls / personal protection section) Spilled material should be disposed of according to applicable regulations.

7 HANDLING AND STORAGE

HANDLING: Handle all chemicals with care. Ground and bond containers when transferring materials.

STORAGE: Keep away from heat, sparks, and flames. Keep container closed when not in use. Store in a cool, dry, well ventilated place away from incompatible materials.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING CONTROLS: Local exhaust ventilation may be necessary to control any air contaminants to within their exposure limits.

RESPIRATORY PROTECTION: No protection needed under normal use and conditions. Use a NIOSH/MSHA approved air purifying respirator with an organic vapor cartridge when airborne concentrations are expected to exceed exposure limits. Protection by air purifying respirators is limited.

SKIN PROTECTION: When contact is likely wear chemical resistant gloves and boots.

EYE PROTECTION: Wear safety glasses with side shields or goggles.

OTHER PROTECTIVE EQUIPMENT: Emergency eye wash stations and deluge showers should be available in the work area.

HYGIENIC PRACTICES: Wash hands before eating. Use only with adequate ventilation. Remove contaminated clothing and wash before reuse. Ground and bond containers when transferring material.

9 PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Dark amber

ODOR: Sl alcohol

BOILING POINT (RANGE): N.D.

FREEZE POINT: N.D.

VAPOR DENSITY: Heavier than air

VAPOR PRESSURE: N.D.

PHYSICAL STATE: Liquid

SOLUBILITY IN WATER: Soluble

PH (AS IS): 4.5-6.0

SPECIFIC GRAVITY: 0.94-1.00

10 STABILITY AND REACTIVITY DATA

CONDITIONS TO AVOID: Avoid temperature extremes. Excessive heat causes the vapor pressure to increase rapidly.

Material Safety Data Sheet
ALPHA 3207

INCOMPATIBILITY: Avoid contact with strong oxidizers.

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of carbon and nitrogen.

HAZARDOUS POLYMERIZATION: Will not occur under normal use and storage conditions.

CHEMICAL STABILITY: This product is stable under normal storage conditions.

11. TOXICOLOGICAL INFORMATION

ORAL: No product information is available.

DERMAL: No product information is available.

INHALATION: No product information is available.

12. ECOLOGICAL INFORMATION

ECOTOXICITY: No product information is available.

CHEMICAL FATE INFORMATION: No product information is available.

13. DISPOSAL CONSIDERATIONS

WASTE DISPOSAL: Consult local, state, or federal regulatory agencies for acceptable disposal procedures and disposal locations. Disposal in streams or sewers may be prohibited by federal, state, and local regulations.

RCRA STATUS: D001 - Characteristic of ignitability

14. TRANSPORTATION INFORMATION

(NON-BULK SHIPMENTS)

D.O.T. PROPER SHIPPING NAME: Isopropanol Solution

D.O.T. TECHNICAL NAME:

D.O.T. HAZARD CLASS: 3

D.O.T. UN NUMBER: UN1219

HAZARD SUBCLASS: N/A

PACKING GROUP: II

RESP. GUIDE PAGE: 129

(BULK SHIPMENTS)

D.O.T. PROPER SHIPPING NAME: Isopropanol Solution

D.O.T. TECHNICAL NAME:

D.O.T. HAZARD CLASS: 3

D.O.T. UN NUMBER: UN1219

HAZARD SUBCLASS: N/A

PACKING GROUP: II

RESP. GUIDE PAGE: 129

T.D.G. PROPER SHIPPING NAME: Isopropanol Solution

T.D.G. TECHNICAL NAME:

T.D.G. HAZARD CLASS: 3

T.D.G. UN NUMBER: UN1219

HAZARD SUBCLASS: N/A

PACKING GROUP: II

RESP. GUIDE PAGE: 129

IMDG PROPER SHIPPING NAME: Isopropanol Solution

IMDG TECHNICAL NAME:

IMDG HAZARD CLASS: 3.2

IMDG UN NUMBER: UN1219

HAZARD SUBCLASS: N/A

PACKING GROUP: II

EmS No: F-E, S-C

15. REGULATORY INFORMATION

CERCLA - SARA HAZARD CATEGORY:

Material Safety Data Sheet
ALPHA 3207

SECTION 311/312: This product has been reviewed according to the EPA 'Hazard Categories' promulgated under Sections 311 and 312 of the Superfund Amendments and Reauthorization Act of 1986 (SARA Title III) and is considered, under applicable definitions, to meet the following categories:

IMMEDIATE HEALTH HAZARD FIRE HAZARD

SARA SECTION 313: This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372:

COMPONENT	CAS#	% BY WEIGHT
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TSCA STATUS:

All components of this product are listed on the Toxic Substance Control Act Inventory or are excluded from the listing requirements.

INTERNATIONAL REGULATIONS:

CANADIAN WHMIS: This MSDS has been prepared in compliance with Controlled Product Regulations except for the use of the 16 headings.

CANADIAN WHMIS CLASS: B-2, D-2B

CANADIAN ENVIRONMENTAL PROTECTION ACT:

All components of this product are listed on the Canadian Domestic Substance List (DSL).

SECTION 16: OTHER INFORMATION

HMIS RATING - HEALTH: 2 FLAMMABILITY: 4 REACTIVITY: 0 PERSONAL PROTECTIVE RATING: G

LEGEND: N.A. - NOT APPLICABLE, N.E. - NOT ESTABLISHED, N.D. - NOT DETERMINED

THIS PRODUCT'S HEALTH AND SAFETY INFORMATION IS PROVIDED TO ASSIST OUR CUSTOMERS IN ASSESSING COMPLIANCE WITH HEALTH, SAFETY AND ENVIRONMENTAL REGULATIONS. THE INFORMATION CONTAINED HEREIN IS BASED ON DATA AVAILABLE TO US, AND IS BELIEVED TO BE ACCURATE, ALTHOUGH NO GUARANTEE OR WARRANTY IS PROVIDED OR IMPLIED BY THE COMPANY IN THIS RESPECT. SINCE THE USE OF THIS PRODUCT IS WITHIN THE EXCLUSIVE CONTROL OF THE USER, IT IS THE USER'S RESPONSIBILITY TO DETERMINE THE CONDITIONS OF SAFE USE. SUCH CONDITIONS MUST COMPLY WITH ALL GOVERNMENTAL REGULATIONS.

ATTACHMENT "I"
Formation Testing Program

ATTACHMENT “J”
Stimulation Program



December 7, 2015

Mr. Marc Jacobs, Jr.
Senior Vice President
Penneco
6608 Route 22
Delmont, PA 15626

Re: Sedat #3A (Murrysville) – Reservoir and Fracture Characterization

Dear Marc,

The following summarizes the reservoir and fracture characterization for the Murrysville formation in the Sedat #3A located in Plum Borough, Allegheny County, Pennsylvania.

A series of tests were designed and conducted at the Sedat #3A to gain a better understanding of the reservoir and fracture characteristics of the Murrysville formation which underlies a sizeable portion of Penneco's proximate lease acreage.

The tests were comprised of (1) formation breakdown, (2) DFIT (diagnostic fluid injection test) to determine closure stress, reservoir pressure, and reservoir transmissibility (kH/mu), (3) Step Rate to determine the fracture extension pressure, and (4) Rate Stepdown to determine the near wellbore friction which includes perforation friction and friction caused by near wellbore tortuosity.

Table 1 shows the timeline of the work performed on the Sedat #3A.

Several high level observations from the work performed was that (1) the well goes on vacuum very quickly after injection stops (i.e., pressure goes to zero on the surface) and (2) the surface treating pressures were excessively high given the depth of the well and the closure stress.

On September 1, 2015 a DFIT was pumped to determine the closure stress, reservoir pressure, and reservoir transmissibility (kH/mu). The DFIT was pumped at 4 bpm for 1500 gals. Bottomhole pressure was recorded with a bottomhole gauge set 1910 ft. The results from the DFIT using the Nolte G function gave a bottomhole closure stress of 553 psi which gives a closure stress gradient of 0.29 psi/ft.

The pressure decline data after closure (ACA) was analyzed with the Nolte FR function to determine reservoir transmissibility. Based on the pressure response it appears that pseudoradial flow was reached. The reservoir transmissibility was 88 mD-ft/cP assuming a reservoir fluid viscosity of 1 cP. The actual results will vary based on the actual reservoir fluid viscosity. The formation capacity (kH) was 88 mD-ft. Assuming a height of 50 ft gives a reservoir permeability of 1.8 mD.

Following the DFIT, an attempt was made on September 29, 2015 to breakdown additional perforations with 500 gals of 15 percent HCL acid and small concentrations of sand pumped in a 20 lb/1000 gal linear gel. The surface pressure was reduced when the acid entered the perforations but quickly increased as low concentration (0.25 lb/gal) of 40/70 sand entered the perforations. The sand was cut and the well flushed.

On October 1, 2015 a Step Rate was pumped to determine the fracture extension pressure. The initial rate was 0.25 bpm and increased to 1.0 bpm in increments of 0.25 bpm. The rate was then increased to 4 bpm in increments of 0.50 bpm. The injection time for each rate was four hours.

The results from the Step Rate gave a fracture extension pressure of 1.70 psi/ft which is abnormally high and cannot be used for formation evaluation. The cause of the excessively high fracture extension pressure was near wellbore friction comprised of perforation friction and friction caused by tortuosity (i.e., a poor connection between the wellbore and the created hydraulic fracture).

Based on the results from the Step Rate another attempt was made to reduce the near wellbore friction with additional acid and higher injection rates. On November 17, 2015 several injections were performed to reduce near wellbore friction. The first injection consisted of 1500 gals 7.5 percent HCl acid and the second injection used 750 gals 15 percent HCl acid. Following the second acid injection the injection rate was 26 bpm and the surface pressure was 2980 psi.

A Stepdown was performed after the second acid injection to quantify the amount of near wellbore friction and break out the perforation friction and friction caused by tortuosity. Perforation friction varies with the flow rate squared and tortuosity varies with the square root of the flow rate. The results from the Stepdown show a total near wellbore friction of 2011 psi at 26 bpm of which 1300 psi is perforation friction and 711 psi is friction caused by tortuosity. The number of open perforations was 5 assuming a discharge coefficient of 0.60.

The perforation efficiency is very low with only 5 out of 41 perforations open.

The ISIP at the end of the last injection was 1446 psi giving a F.G (fracture gradient) of 1.23 psi/ft suggesting a possible horizontal component to the created fracture. The high fracture gradient could also be the result of near to mid-field fracture complexity. As with the other injections the surface pressure quickly fell to zero. This rapid pressure decrease following the rate shutdown is a common response for mid-field fracture complexity (i.e., restriction away from the wellbore).

The results from the tests on the Sedat #3A are shown in Table 2.

In summary the Murrysville formation in the Sedat #3A is characterized by low reservoir pressure, 232 psi, low closure stress, 0.29 psi/ft., and higher than anticipated pumping pressures because of complex near or mid-field fracture complexity. Low perforation efficiency also contributed to the higher than expected pumping pressures.

Thank you for the opportunity to work on the Sedat #3A project with Penneco. If you have any questions or comments let me know.

Sincerely,

Henry Jacot
H-Frac Consulting Services, LLC

Table 1 – Timeline

Activity	Date
Perforate	August 7, 2015
Spot Acid and Pull Tubing	August 28, 2015
Break Formation and Pump DFIT	September 1, 2015
Perforation Cleanup	September 29, 2015
Step Rate	October 1, 2015
Perforation Breakdown	November 17, 2015

Table 2 - Results

Parameter	Value
Breakdown Pressure	3115 psi
Bottomhole Closure Stress	553 psi
Closure Stress Gradient	0.29 psi/ft
Surface ISIP	1446 psi
Fracture Gradient	1.23 psi/ft
Reservoir Pressure	232 psi
Reservoir Transmissibility (kH/mu)	88 mD-ft/cP
Formation Capacity (kH)	88 mD-ft
Reservoir Permeability	1.8 mD
Fracture Extension Pressure	N/A

PENNECO
SEDAT #3A
PLUM BOROUGH
ALLEGHENY COUNTY, PA

December 7, 2015



TEST OBJECTIVES

- ✓ Formation Breakdown Pressure
- ✓ Closure Stress
- ✓ Fracture Gradient (F.G.)
- ✓ Reservoir Pressure
- ✓ Reservoir Transmissibility (kH/mu)
- ~~x Fracture Extension Pressure~~



TIME LINE

Activity	Date
Perforate	August 7, 2015
Spot Acid and Pull Tubing	August 28, 2015
Break Formation/Pump DFIT	September 1, 2015
Perforation Cleanup	September 29, 2015
Step Rate	October 1, 2015
Perforation Breakdown	November 17, 2015



TEST RESULTS

Parameter	Value
Breakdown Pressure	3115 psi
Closure Stress	553 psi
Closure Stress Gradient	0.29 psi/ft
ISIP	1446 psi
Fracture Gradient	1.23 psi/ft
Reservoir Pressure	232 psi
Reservoir Transmissibility (kH/mu)	88 mD-ft/cP
Formation Capacity (kH)	88 mD-ft
Reservoir Permeability	1.8 mD
Fracture Extension Pressure	N/A

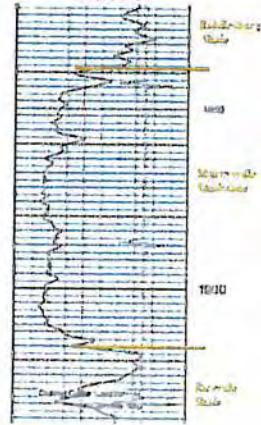


MURRYSVILLE LOGS

Sedat #3A



Snyder
Unit #3

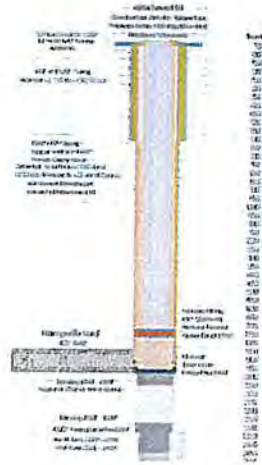


Watt #3



Murrsville type logs.

SEDAT #3A WELLBORE SCHEMATIC



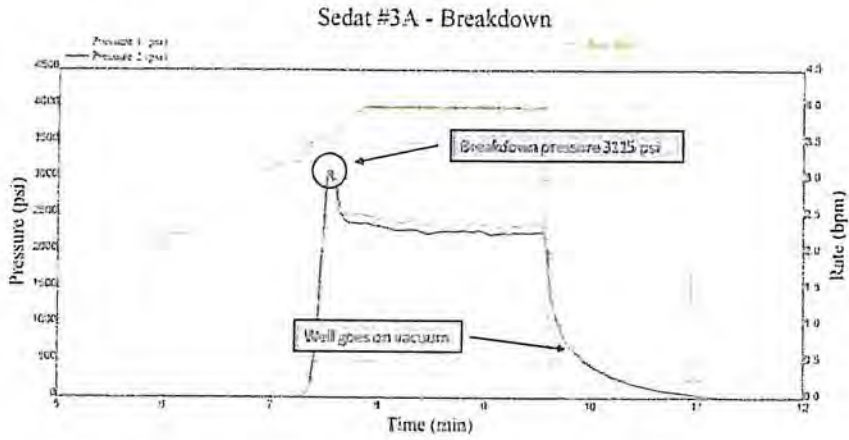
PERFORATION DATA

Description	Value
Entry Hole Diameter	0.58"
Phasing	60 degree
Type	EHC
Charge	25 grams
Depth	1896 ft to 1939 ft
Perforations	41 ea



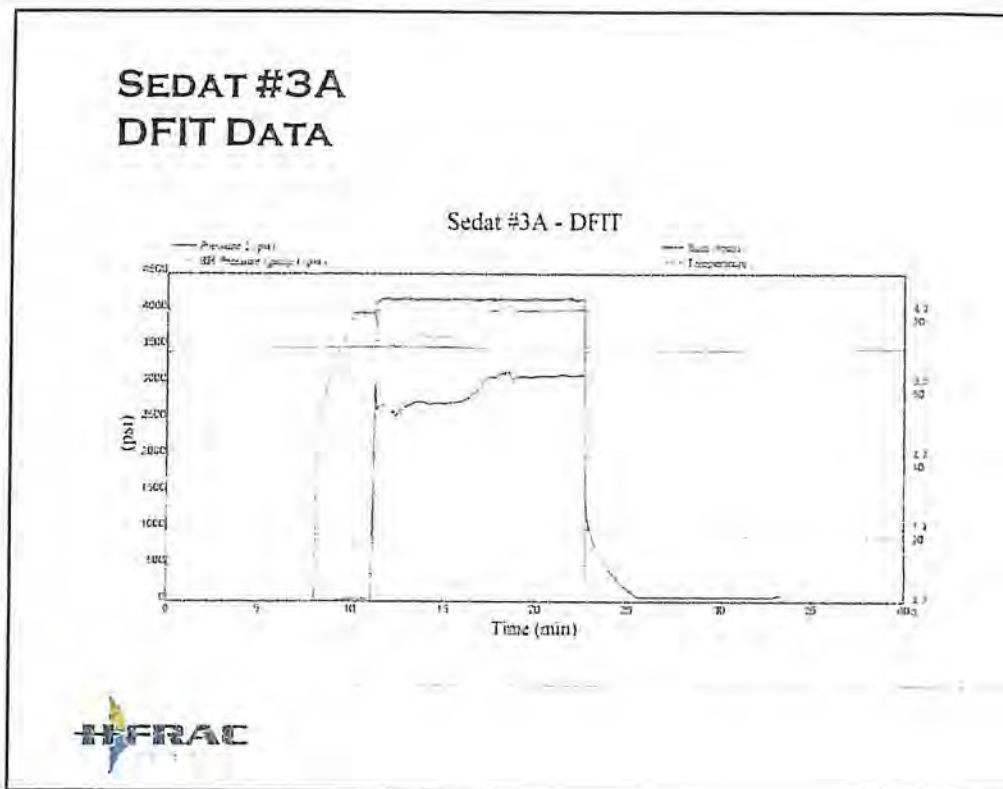
The Sedat #3A was perforated in the Murrysville from 1896 ft to 1939 ft with 41 0.58 in entry hole perforations. Perforation phasing was 60 degrees and the charge was 25 grams.

SEDAT #3A BREAKDOWN



The Murrysville formation in the Sedat #3A was broke down on September 1, 2015. The breakdown pressure was 3115 psi. Following the breakdown the acid was displaced at 4 bpm. The well was on vacuum after shutdown with the pressure decreasing to zero in less than two minutes.

SEDAT #3A DFIT DATA

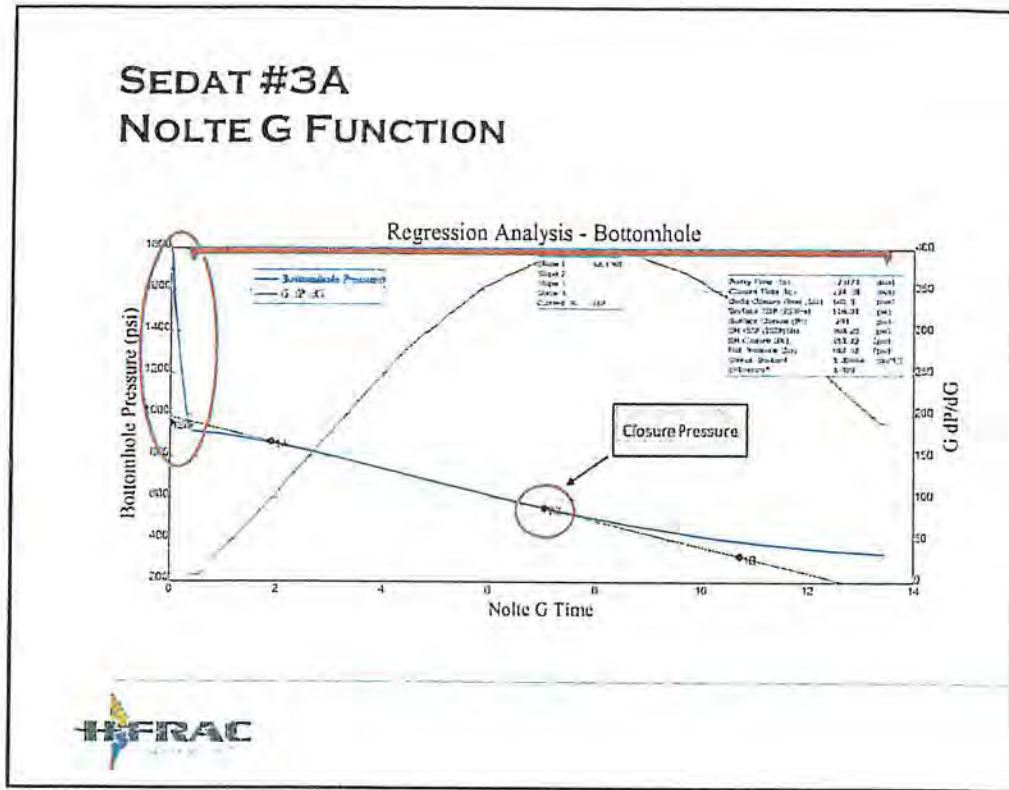


Following the formation breakdown a DFIT (diagnostic fluid injection test) was pumped in the Murrysville to determine closure stress, reservoir pressure, and reservoir transmissibility (kh/mu). Prior to starting the DFIT the whole was loaded with water. After the hole was loaded 1500 gals of water was pumped at 4.1 bpm. The average surface treating pressure was 2902 psi and the average bottomhole treating pressure was 3816 psi.

During the injection the surface pressure increased from 2700 psi to 3100 psi with a constant rate indication some type of restriction.

After the rate went to zero the surface pressure declined rapidly and went to zero. The bottomhole pressure was recorded with a bottomhole pressure gauge at 1910 ft.

SEDAT #3A NOLTE G FUNCTION



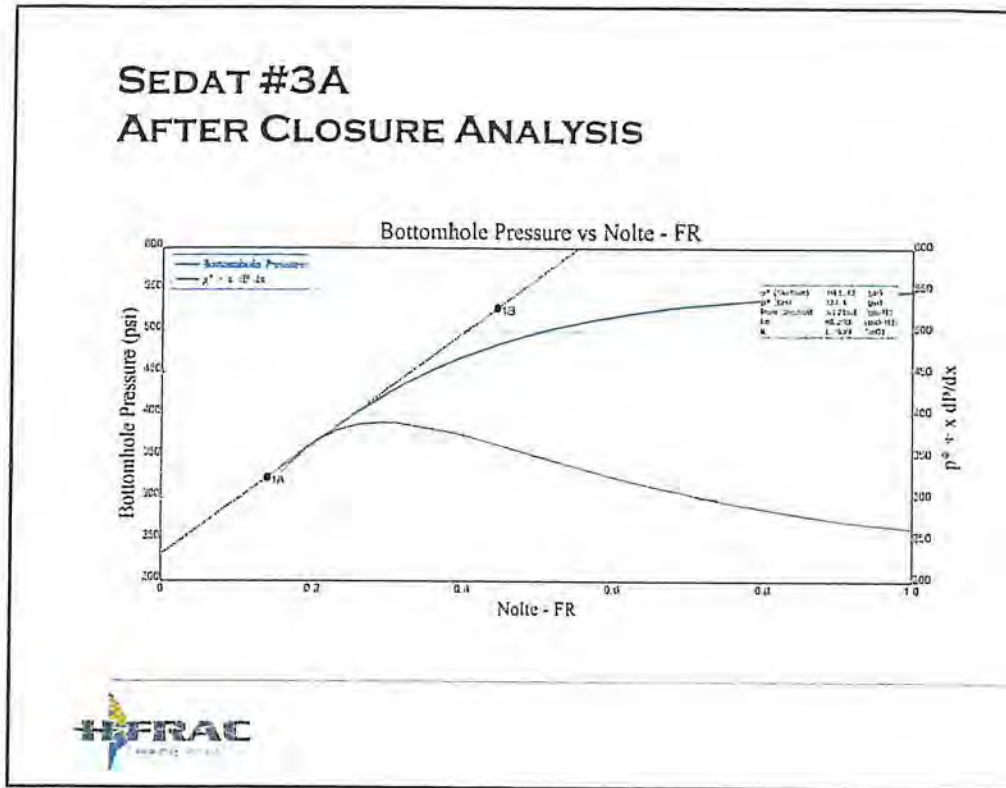
The bottomhole pressure from the DFIT was analyzed with the Nolte G function to determine the closure pressure and closure stress gradient.

Following the injection the pressure declined rapidly. The rapid pressure decline is most likely caused by fracture complexity and low closure stress and not leakoff into the formation.

The estimated bottomhole ISIP is 960 psi resulting in a fracture gradient of 0.50 psi/ft.

Closure occurred at a Nolte G time of 7.2 giving a bottomhole closure of 553 psi. The closure stress gradient is 0.29 psi. The net pressure was 407 psi and the fluid efficiency was 79 percent.

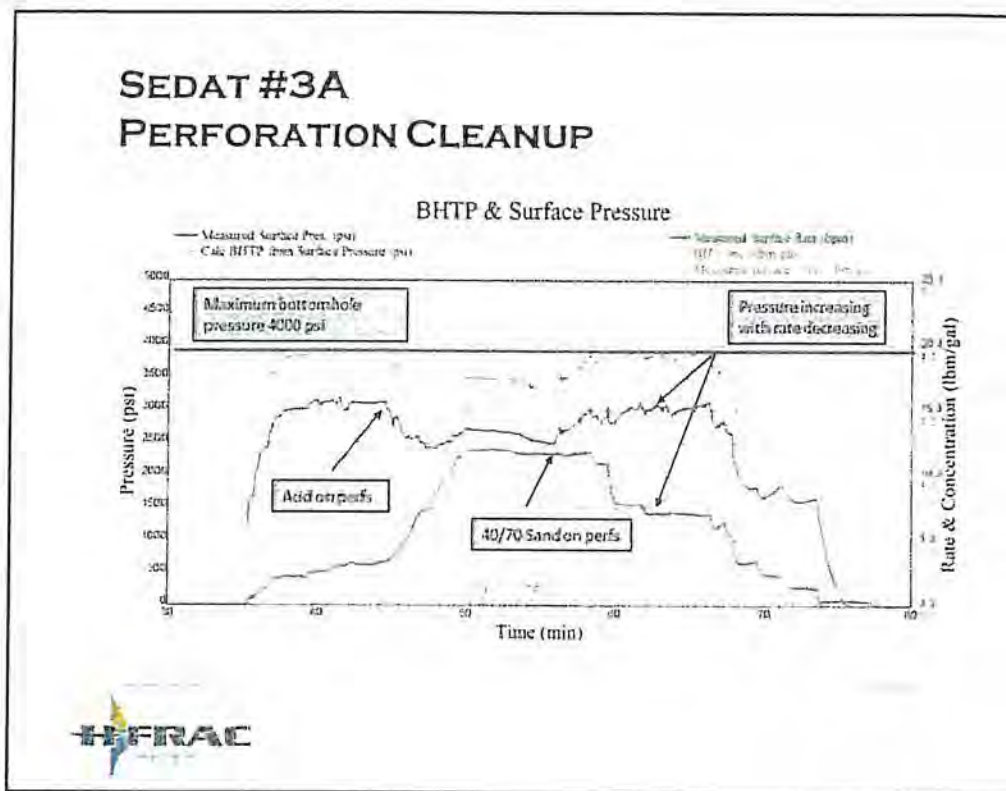
SEDAT #3A AFTER CLOSURE ANALYSIS



The bottomhole pressure after closure was analyzed using the Nolte FR function. If the late time data reaches pseudoradial flow estimates of reservoir transmissibility (kh/μ) and reservoir pressure can be determined.

The results from the Nolte FR function show that pseudoradial flow was reached. P^* was 232 psi. The formation capacity (kH) was 88 mD-ft assuming a reservoir fluid viscosity of 1 cP. Using a formation height of 50 ft the reservoir permeability is 1.8 mD.

SEDAT #3A PERFORATION CLEANUP



On September 29, 2015 an attempt was made to remove excess friction seen on the DFIT. 500 gals of 15% HCL was pumped. A decrease on the surface treating pressure was seen when the acid was on the perforations. The surface pressure decreased and the injection rate was increased to 12 bpm. The surface pressure continued to decrease to 2500 psi.

Low concentration (0.25 lb/gal) of 40/70 sand was pumped in an effort to remove the excess friction. The surface pressure initially decreased with the 40/70 sand on the perforations but increased rapidly to over 3000 psi on the surface. The maximum pressure on the packer was 4000 psi so the injection was decreased to 11 bpm then to 7 bpm.

The calculated bottomhole pressure remained close to 4000 psi and was erratic.

The rate was reduced and the pressure declined to zero in less than two minutes.

SEDAT #3A STEP RATE TEST

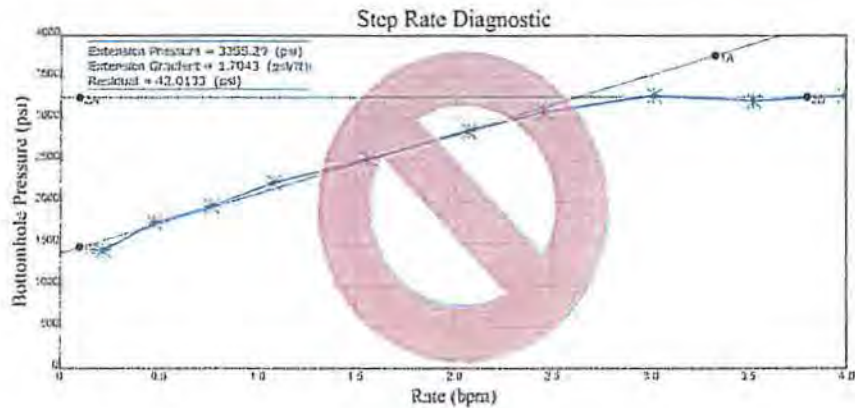


A Step Rate Test was pumped on October 1, 2015 to determine the fracture extension pressure. The initial rate was 0.25 bpm and increased in 0.25 bpm increments until 1 bpm where it was increased to 4 bpm in 0.5 bpm increments. Injection period for each rate stage was 4 hours.

Following the rate increases the rate was decreased from 4 bpm in 1 bpm increments until the rate reached zero.

Total injected volume was 4292 bbls.

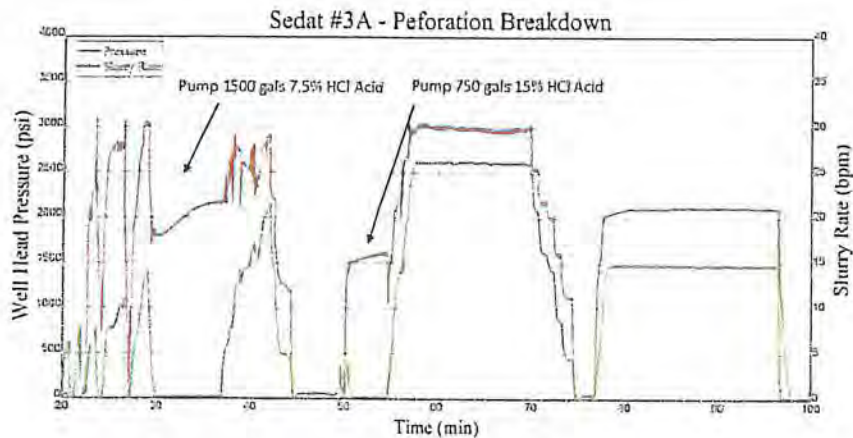
SEDAT #3A STEP RATE



Analysis of the Step Rate gave a fracture extension pressure of 3255 psi and fracture extension gradient of 1.70 psi/ft. This high of extension pressure gradient is unrealistic and cannot be used.

The high fracture extension pressure gradient is a result of excess near wellbore friction as evidenced by the sudden pressure increase with each rate increase (slide 13).

SEDAT #3A PERFORATION BREAKDOWN



On November 17, 2015 additional acid was pumped in an attempt to breakdown additional perforations and remove excess near wellbore friction to establish better communication between the wellbore and created hydraulic fracture.

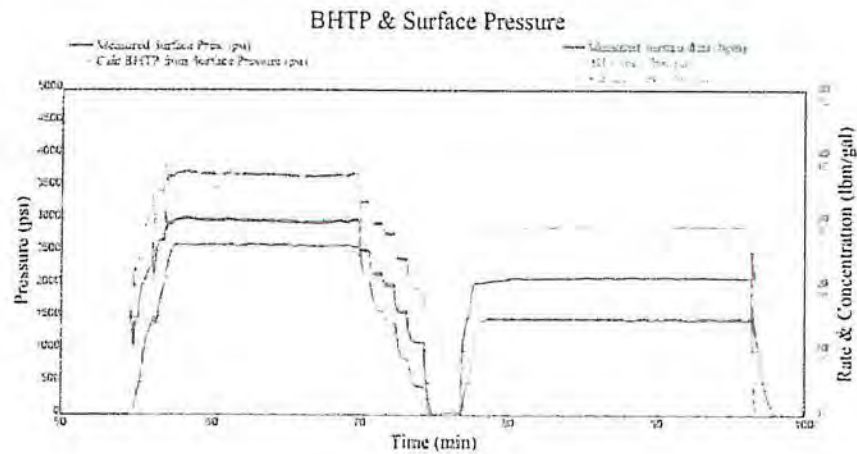
The first acid injection consisted of 1500 gals 7.5% HCl and the second acid injection was 750 gals 15% HCl acid.

Following the acid injections the maximum rate was 26 bpm at an average surface pressure of 2980 psi.

A rate stepdown was performed at the end of the acid breakdown. An additional injection was pumped at 15 bpm to establish an ISIP.

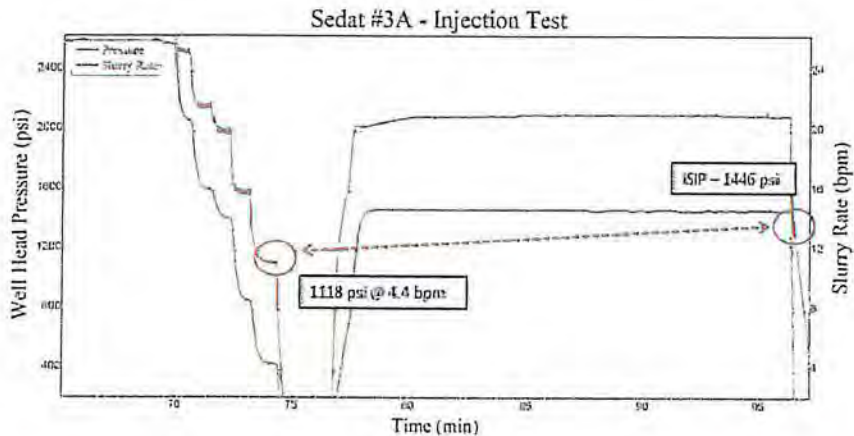
The ISIP was 1441 psi.

SEDAT #3A SURFACE & CALC'D BH PRESSURE



This plot shows the calculated bottomhole pressure from the acid breakdown.

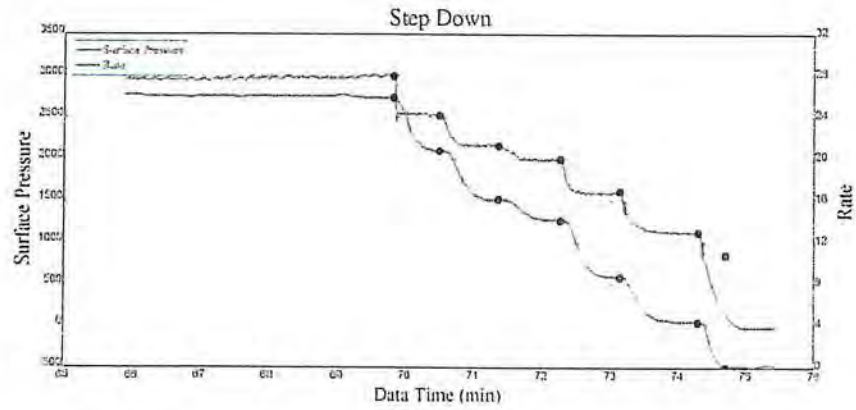
SEDAT #3A INJECTION TEST (ZOOMED)



This plot zooms in on the rate stepdown and final injection. The final rate on the stepdown was 4.4 bpm and the pressure was 1118 psi. The final ISIP was 1446 psi giving a fracture gradient of 1.23 psi/ft

This high of fracture gradient may be caused by either a horizontal fracture or excess fracture complexity.

SEDAT #3A STEPPDOWN POINT SELECTION



A Stepdown Analysis was conducted to determine the cause of the excess near wellbore friction.

SEDAT #3A STEPDOWN TABLE

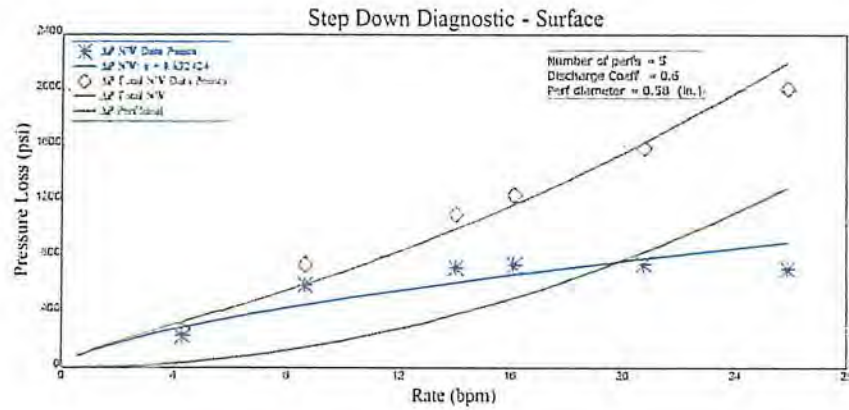
The screenshot shows a software window titled 'SEDAT #3A STEPDOWN TABLE'. It contains a table with the following columns: Flow (GPM), Rate (ft/min), Surface Distance (mi), Area (Acres), SP Frac (psi), SP Frac (psi), Change SP Frac (psi), SP Frac (psi), SP Frac (psi), SP Frac (psi), SP Frac (psi), and Approx. Number of Stages. The table has 7 rows of data, with the first row highlighted in blue.

Flow (GPM)	Rate (ft/min)	Surface Distance (mi)	Area (Acres)	SP Frac (psi)	SP Frac (psi)	Change SP Frac (psi)	SP Frac (psi)	SP Frac (psi)	SP Frac (psi)	SP Frac (psi)	Approx. Number of Stages
1000	100	1.0	1.0	100	100	0	100	100	100	100	1
1000	100	1.0	1.0	100	100	0	100	100	100	100	2
1000	100	1.0	1.0	100	100	0	100	100	100	100	3
1000	100	1.0	1.0	100	100	0	100	100	100	100	4
1000	100	1.0	1.0	100	100	0	100	100	100	100	5
1000	100	1.0	1.0	100	100	0	100	100	100	100	6
1000	100	1.0	1.0	100	100	0	100	100	100	100	7



Stepdown Table showing the point selection and friction values.

SEDAT #3A STEPDOWN ANALYSIS



The Stepdown Analysis gives a total near wellbore friction of 2011 psi at 26 bpm. Of which 1300 psi is perforation friction and 711 is near wellbore tortuosity. The resulting number of perforations is 5 assuming a discharge coefficient of 0.60.

SEDAT #3A SUMMARY

- A series of injections were pumped on the Sedat #3A to determine closure stress, fracture gradient, reservoir pressure, reservoir transmissibility (permeability), and breakdown pressure.
- During the injection tests excess friction existed either because of limited number of perforations open or near wellbore fracture complexity.
- Attempts were made to reduce the excess friction with acid, higher rates, and low concentrations of 40/70 sand. Acid and higher injection rates removed some of the excess friction but the high excess pressures still existed.
- The rate stepdown analysis showed total near wellbore friction of 2000 psi comprised of 1300 psi of perforation friction and 700 psi of near wellbore tortuosity of fracture complexity.



SEDAT #3A SUMMARY (CONT.)

- The rate stepdown shows only 5 perforations open out of 41 perforations.
- After each injection the pressure quickly fell to zero at the surface because of the low closure stress of the Murrysville.
- The closure stress determined from the DFIT was 553 psi giving a closure stress gradient of 0.29 psi/ft. The Murrysville in the Sedat #3A cannot support a column of water.
- The DFIT reached pseudoradial flow. The After Closure Analysis with the Nolte FR function gave a reservoir transmissibility (kH/μ) of 88 mD-ft/cP assuming a reservoir fluid viscosity of 1 cP. Assuming a height of 50 ft the reservoir permeability is 1.76 mD.



SEDAT #3A SUMMARY (CONT.)

- The ISIP at the end of the last injection was 1446 psi giving a fracture gradient of 1.23 psi/ft suggesting a possible horizontal fracture. The high fracture gradient could also be the result of near or mid-field fracture complexity.



APPENDIX



COMPLEX FRACTURE PROPAGATION HORIZONTAL WELLBORE

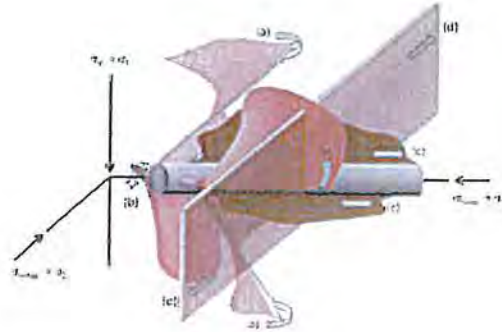


Figure 10. Fracture propagation from a horizontal wellbore.



AFTER CLOSURE ANALYSIS

- The reservoir transmissibility (kh/μ) can be calculated by analyzing the pressure decline data after closure; if the late time pressure data reaches pseudo-radial flow.
- Similar to a Horner analysis with the reservoir transmissibility calculated from the slope of the late time data.
- The pressure data when plotted on log-log scale will exhibit a slope of unity when pseudo-radial flow has developed.



RADIAL FLOW TIME FUNCTION

$$F_R(t, t_c) = \frac{1}{4} \ln \left(1 + \frac{\chi t_c}{t - t_c} \right)$$

where

$$\chi = 16 \pi^2$$

t_c = time to closure, min

t = time, min

F_R = radial flow function

15 April 2014



AFTER CLOSURE ANALYSIS

$$kh / \mu = 251,000 \left(\frac{V_i}{m_R t_c} \right)$$

where

k = reservoir permeability, mD

h = net pay, ft

μ = reservoir fluid viscosity, cP

V_i = volume injected, bbl

m_R = slope

t_c = time to closure, min

SL-1007-01-0074



API Permit #: 37-003-21223

Customer: PENNECO

Case and Well Name: SEDAT #3A

A.F.E. #: N/A



Job Type: MISC. PUMP PTA

Cement Operator: LANCE SHIREY

Date Cemented: 8/28/2015

Drilling Contractor: SERVICE RIG

Cement Slurry Information

Table with 7 columns: No. of Sacks, Cement Blend Composition, Yield (ft³/sk), Mix Water (gal/sk), Density (lb/gal), (bbl) Mix Water, (ft³) Of Slurry, (bbl) Of Slurry. Includes a Totals row.

Wellbore Information

Table with 10 columns: New/Used, Diameter (In), Weight (lb/ft), Top (ft), Bottom (ft), Collapse/Burst Pressures (psi), Requested TOC (ft), SURFACE, TVD (ft), N/A, Displacement Depth (ft), Displacement (bbl).

Pumping Returns

Cement Slurry Temperature Record (°F)

Fluid Information

Summary table for Pumping Returns, Cement Slurry Temperature Record, and Fluid Information.

Main log table with 5 columns: Time, Rate (bpm), Volume (bbl), Pressure (psi), Event or Stage Description.

Comments:

Thank You for your Business

LWS Cement Operator Signature:

LANCE SHIREY

Customer Representative Signature:

API Permit #: 3700321273

Customer: PENNECO OIL COMPANY

Lease and Well Name: SEDAT 3A

A.F.E.#: N/A



Job Type: DFT

Cement Operator: JAMES CAMPBELL

Date Cemented: 10/1/2015

Drilling Contractor: N/A

Cement Slurry Information

No. of Sacks	Cement Blend Composition	Yield (m ³ /sack)	Mix Water (gal/sack)	Density (lb/gal)	(bbl) Mix Water	(ft ³) Of Slurry	(bbl) Of Slurry
Totals							

Wellbore Information

	New/Used	Diameter (in)	Weight (lb/ft)	Top (ft)	Bottom (ft)	Collapse/Burst Pressure (psi)	Requested TOC (ft)
Casing	USED	4 1/2	10.5	SURFACE	1,930		
Previous Casing							TVD (ft)
Tubing or Drillpipe							Displacement Depth (ft)
Open Hole							Displacement (bbl)
Open Hole							

Pumping Returns

Cement Slurry Temperature Record (°F)

Fluid Information

Spacer or Gel Sweep Returns Seen At Surface	Cement Blend	Reading 1	Reading 2	Reading 3	Average	Mix Water Temp (°F)
Cement Returns Seen at Surface	Blend 1					Displacement Fluid Type
Amount of Cement Returns (BBL)	Blend 2					Displacement Fluid Temp (°F)
	Blend 3					Displacement Fluid Density (lb/gal)

Time	Rate (bpm)	Volume (bbl)	Pressure (psi)	Event or Stage Description
0730				ARRIVE ON LOCATION, HOLD JSEA
0745				SPOT TRUCKS, MAKE HOOKUPS, WAIT ON RIG
				HOLD SAFETY MEETING
0827	.1-1	1	0-3300	LOAD LINES, PSI TEST
0932	.3-2	14	0-100	PUMP WATER TO LOAD HOLE
0944	.25	2.7	0-450	PUMP WATER TO START DFIT
0955	0	0	0	SHUTDOWN, RELEASE PRESSURE, UNHOOK
				WELL HEAD FLANGE NEEDS TIGHTENED
1005	.25	60	0-700	PUMP WATER TO START DFIT
1405	.5	120	450-825	RATE CHANGE TO .5 BBL/MIN
1805	.75	180	825-1075	RATE CHANGE TO .75 BBL/MIN
2206	1	240	1075-1330	RATE CHANGE TO 1 BBL/MIN
0205	1.5	360	1330-1770	RATE CHANGE TO 1.5 BBL/MIN
0605	2	480	1770-2004	RATE CHANGE TO 2 BBL/MIN
1005	2.5	600	2004-2162	RATE CHANGE TO 2.5 BBL/MIN
1406	3	720	2162-2400	RATE CHANGE TO 3 BBL/MIN
1800	3.5	840	2300-2600	RATE CHANGE TO 3.5 BBL/MIN
2205	4	512	2450-2500	RATE CHANGE TO 4 BBL/MIN
0011	3	90	2200-2250	RATE CHANGE TO 3 BBL/MIN
0041	2	60	2025-2050	RATE CHANGE TO 2 BBL/MIN
0111	1	30	1400-1450	RATE CHANGE TO 1 BBL/MIN
0141	0	0	1427-0	SHUTDOWN, MONITOR PRESSURE 10 MIN.
0155				RELEASE PRESSURE, UNHOOK
0200				RACKUP
0230				JOB COMPLETE, LEAVE LOCATION

Comments:

WELL WENT ON VACUUM WHEN PUMPS WERE SHUT DOWN TO MONITOR THE WELL.

"THANK YOU!"

Customer Representative Signature:

TREATMENT SUMMARY

Customer Name:	Penneco Oil Co	Acid Breakdown	Date:	11/17/15
Well Name:	Sedat #3A			

PRESSURES IN PSI

CLEAN VOLUMES IN GAL

BREAKDOWN	3114	TOP PERF MD	1896	TOP PERF TVD	1896	PAD	
AVERAGE	2506	BTM PERF MD	1936	BTM PERF TVD	1936	DISPL	1270
INSTANT		5-MIN	0	10-MIN	0	TREATMENT	27888
						TTL VOL	36750

HYDRAULIC HORSEPOWER

RATES IN B.P.M.

USED	1130	AVG TREATING	18.4	MAXIMUM	26.3
------	------	--------------	------	---------	------

DESCRIPTION OF JOB Slickwater Fracture

Time	Rate (bpm)	Slurry Volume (bbl)	Pressure (psi)	Description of Stage or Event
5:00				Arrive on location, rig up
7:06				Hold Safety Meeting
7:31			4160	Test Lines
7:33				Fix Leak
7:37			4665	Re-Test Lines, Good Test
8:09				Open Well
8:17	2.7	0	1766	Pump Water
8:19				Shutdown, Re-Prime Pump
8:21	2.7			Pump Water
8:23				Shutdown, Replace Hose
8:27				Re-Prime Pump, Inspect Pump
8:52	5	32	2320	Pump Water
8:55	7.2	40	3114	Break Formation
8:57	10.7	55	3058	Pump Tripped Out, Resume Pumping
8:58	14.1	68	3031	Establish Rate
8:59	4.0	75	1815	Pump Acid
9:07	6.4	110	2167	Displace Acid
9:09	14.1	126	2733	Acid to Perfs
9:12	20.1	171	2802	Establish Rate
9:13	16.0	183	2236	Stepdown Rate
9:14	5.1	198	1279	Stepdown Rate
9:15	0.0	203	261	Shut Down
9:21	3.7	204	1401	Pump Water
9:21	4.0	204	1520	Pump Acid
9:25	4.0	239	1385	Displace Acid
9:28	26.0	284	3005	Establish Rate
9:41	20.8	609	2541	Stepdown Rate - 20 BPM
9:41	16.1	620	2164	Stepdown Rate - 15 BPM
9:42	14.2	636	2006	Stepdown Rate - 14 BPM
9:43	8.6	650	1387	Stepdown Rate - 10 BPM
9:45	4.4	656	1117	Stepdown Rate - 5 BPM
9:46	0.0	664	0	Shut Down
Totals				

Totals				
Chemicals	Product	Volume	Units	
	Unigel 5F	0	Lbs	
	LEB 10X Breaker	0	Qts	
	FRP 121	110	Lbs	
Acid	15% HCL	750	Gals	
	7.5% HCL	1,500	Gals	





CWM Environmental
101 Parkview Drive Ext.
Kittanning, Pennsylvania 16201
724-543-3011
Lab # 03-457

Lab Analysis Report

Sample Number: 07163702

Customer: Penneco Oil Co., Inc.	Collection Date: 07/29/16 13:00
Site: Gas Well	Received Date: 07/29/16 15:43
Monitoring Pt: DeSimone #3	Matrix: Non Potable Water (NPW)
Source Type: Discharge	Collection Method: Grab

07163702	Result	Reporting Limit	Method	Analysis Date	Analyst
Specific Gravity	1.1027 grams/ml	grams/ml	ASTM D1429	8/3/16 0:00	33-325
Total Dissolved Solids	140958 mg/L	5 mg/L	SM 2540 C	8/3/16 8:12	PLP
pH	5.78 SU	SU	SM4500 H+B	8/1/16 13:00	EJK

Sample Comments:

pH: The pH result measured @ temperature of 25 deg C pH: The pH was analyzed outside of the 15 minutes holding time.

Bryan C. Shafer, Vice President of Operations

Analyst Reference: 33-325 - G & C Laboratory

HFRAC Report – Page 33



CWM Environmental
11931 State Route 85
Kittanning, Pennsylvania 16201
724-543-3011
Lab # 03-457
Lab Analysis Report

Sample Number: 09150657

Customer: Penneco Oil Co., Inc.	Collection Date: 08/28/15 08:00
Site: Sedat #3A	Received Date: 09/04/15 16:17
Monitoring Pt: Tank Water	Matrix: Non Potable Water (NPW)
Source Type: Discharge	Collection Method: Grab

09150657	Result	Reporting Limit	Method	Analysis Date	Analyst
Specific Gravity	11084 gr/ml	0 gr/ml	ASTM D-1298	9/9/15 0:00	33-325
pH	4.69 SU	SU	SM4500 H+B	9/9/15 13:30	JRD
Total Dissolved Solids	155476 mg/L	5 mg/L	SM 2540 C	9/8/15 16:03	ARB

Sample Comments:

pH: The pH result measured @ temperature of 25 deg C. pH: The pH was analyzed outside of the 15 minutes holding time.

Ryan C Shafer, Vice President of Operations **HFRAC Report – Page 34**

Analyst Reference: 33-325 - G & C Laboratory

Analyste names in bold are listed under the laboratory's current NELAP scope of accreditation.

Universal Well Services, Inc.
 Chemical Technology
 13549 S. Mosiertown Road
 Meadville, PA
 814-373-3107



Laboratory Water Analysis

Sample Information

Company	Penneco
Well Name	Sedat 3a
Sample ID	Frac Water
Formation	
Date Sampled	9/23/2015
Date Analyzed	9/23/2015
Analyst	Bilich

Analysis Results

Sample 1 Sample 2

	Sample 1	Sample 2
pH	4.90	5.10
Temperature	74.4	74.3 °F
Specific Gravity	1.110	1.132
Fluid Density	9.26	9.44 lb/gal
Chlorides (titrated)	100,000	120,000 mg/L
Total Dissolved Solids	159,500	191,400 mg/L
Total Suspended Solids	N/A	N/A mg/L
Approximate Salt Percentage	14.4	16.9 %
Total Hardness	67,000	70,000 mg/L
Ca Hardness	63,000	60,000 mg/L
Ca ²⁺	25,200	24,000 mg/L
Mg Hardness	4,000	10,000 mg/L
Mg ²⁺	971	2,428 mg/L
Total Iron (titrated)	437	319 mg/L
Sulfates	39	10 mg/L
Hydroxide Alkalinity as CaCO ₃	0	0 mg/L
Carbonate Alkalinity as CaCO ₃	0	0 mg/L
Bicarbonate Alkalinity as CaCO ₃	0	0 mg/L
Total Alkalinity as CaCO ₃	0	0 mg/L
Tannin/ Lignin	N/A	N/A mg/L
Barium/ Strontium PS	<1	<1 mg/L
Specific Conductance	172,500	193,200 umhos/cm

The Fracture Gradient (F.G.) 1.23 psi/ft was calculated using the ISIP (instantaneous shut-in pressure) of 1446 psi and fluid S.G. of 1.10 psi/ft. The mid-perforation depth was 1917.5 ft (1896 ft – 1939 ft).

$$F.G. = \frac{ISIP + HydrostaticHead}{Depth}$$

$$F.G. = \frac{1446 + 913}{1917.5} = 1.23$$

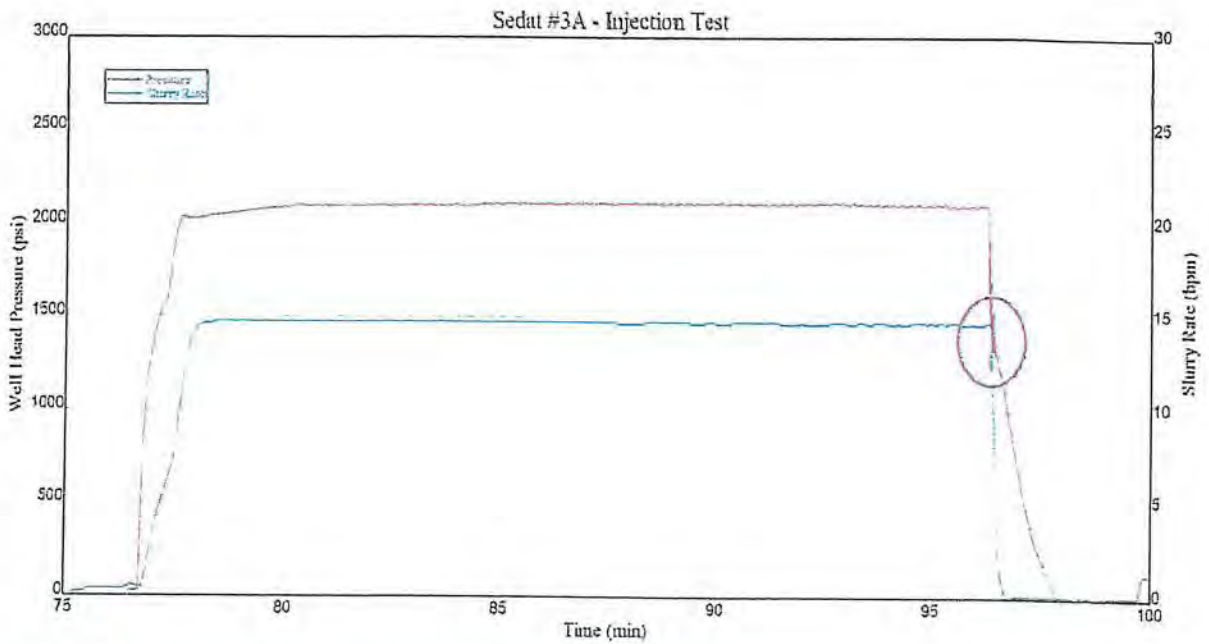


Figure 1 - Sedat 3A Injection Test pumped on November 17, 2013. ISIP 1446 psi

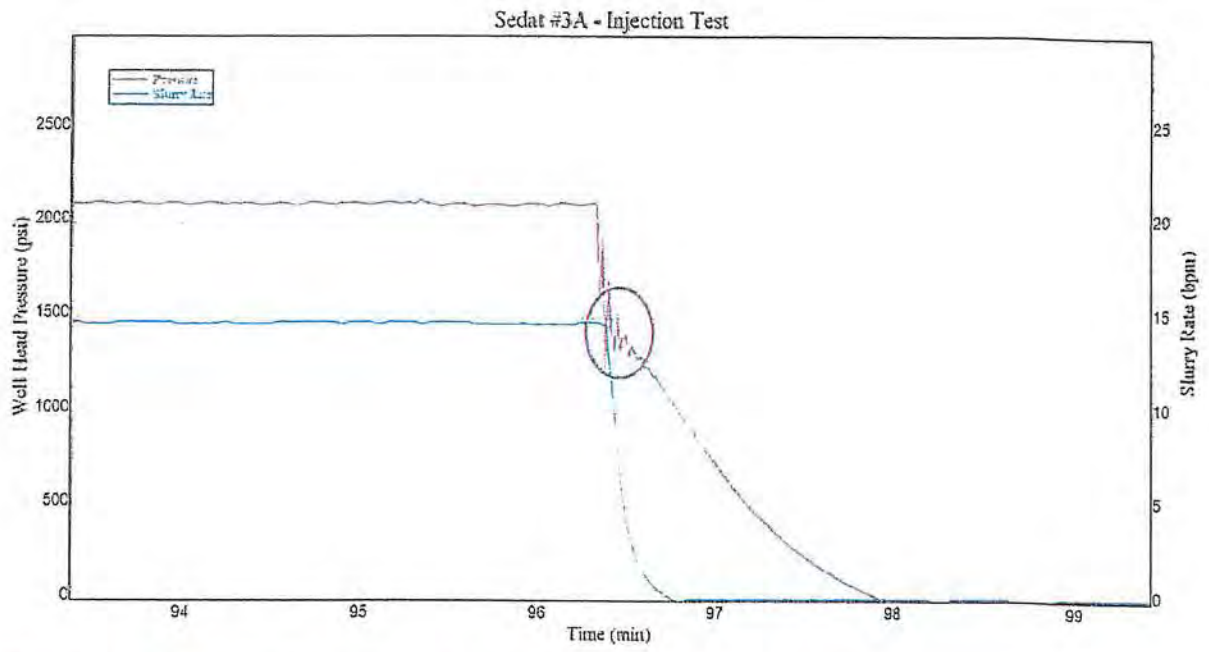


Figure 2 - Sedat #3A Injection Test pumped on November 17, 2015 (zoomed) ISIP 1445 psi

The reservoir permeability of 1.80 mD was an average permeability using a formation height of 50 ft. Using a reservoir permeability of 1.8 mD and formation height of 50 ft the formation capacity (kH) was 90 mD/ft.

The bottomhole pressure after closure was analyzed using the Nolte FR function. If the late time data reaches pseudoradial flow estimates of reservoir transmissibility (kh/mu) and reservoir pressure can be determined.

The results from the Nolte FR function show that pseudoradial flow was reached. P^* was 232 psi. The formation capacity (kH) was 90 mD-ft assuming a reservoir fluid viscosity of 1 cP. Using a formation height of 50 ft the reservoir permeability is 1.8 mD.

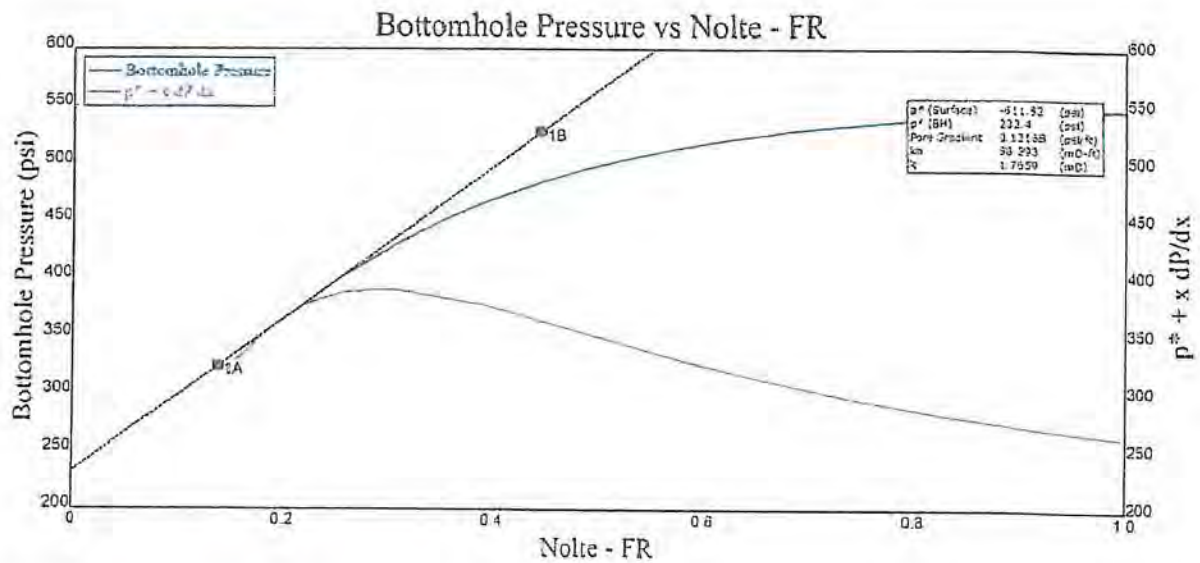


Figure 3 - Sedor #1A After Closure Analysis / 4C4

$$kh / \mu = 251,000 \left(\frac{V_i}{m_R t_c} \right)$$

where

k = reservoir permeability, mD

h = net pay, ft

μ = reservoir fluid viscosity, cP

V_i = volume injected, bbl

m_R = slope

t_c = time to closure, min

**Attachment J
Stimulation Program
Sedat #4A Injection Well**

Stimulation Program for Sedat #4A Injection Well

There are currently no plans to stimulate the Sedat #4A Injection Well.

ATTACHMENT "K"
Injection Procedures

Attachment K
Injection Procedures
Sedat #4A Well

Injection Procedures:

Injection fluid will be delivered by trucks. Company personnel will measure the specific gravity of the sample with a hydrometer or some other appropriate method. Using the permitted maximum surface injection pressure and specific gravity values as a baseline, automation will throttle the MASIP in response to the actual Sg of the injectate to maintain the measured bottom hole pressure without regard to friction pressure, of 2332 Bottom Hole Injection pressure (BHIP). The produced fluids will be processed through a series of storage tanks and filters and treated with a scale inhibitor, bleach, and/or biocide additives as required.

The fluid will be pulled from the off loading tanks through a 20 micron filter to remove large suspended solids and transported through connecting pipes to additional tanks to hold the filter fluid until injection. From the tanks holding the filtered water the fluid will be transported by pipeline to high pressure pumps for transportation to the injection point where the rate of injection and pressure will be monitored and regulated so as not to exceed the maximum allowable surface injection pressure (MASIP) associated with the Sg being injected, and rate stated in the permit. The fluids will be pumped through a checkvalve at the wellhead down the 4 ½" injection string to the Murrysville injection zone not to exceed 2332 PSI Bottom Hole Injection Pressure (BHIP) ignoring friction loss.

The specific gravity will be continuously monitored by a mass flow meter. Should the specific gravity exceed the value set by permit at the well head P-max will be automatically adjusted to a lower P-max by installed logic controls to compensate for the change in specific gravity or if unable to compensate for the change in specific gravity, automatically shut in the injection well until the specific gravity of the fluid can be adjusted or the P-max is adjusted.

The injection string casing annulus pressures will be monitored and recorded by the Programmable Logic Controller (PLC). Should the annular pressure monitor equipment realize a dramatic, instantaneous increase or begin a steady, inexplicable climb, the EPA will be notified and their guidance followed.

Fluid levels will be checked in all monitoring wells on a quarterly schedule or more frequently if required by permit by either running a wireline or an Echometer fluid shot. Results will be reported to the EPA quarterly or as required by permit.

ATTACHMENT "L"
Construction Procedures

Attachment L
Construction Procedures
Sedat #4A Injection Well

Construction Details For:

Well Name: Sedat #4A
Location: Plum Boro, Allegheny Co, PA
(See AOR Map for Well Location)

The Sedat #4A injection well will be a repurposed depleted natural gas well that was drilled through the Upper Devonian Bradford Sands to a total casing depth of 3,886' and will be plugged back to 1,850' to just below the Murrysville injection zone.

The Sedat #4A was rotary air drilled with drilling operations starting on 6/21/2004 and finishing on 6/24/2004 reaching a Total Drilled Depth of 3,925'. The company installed 31' of 16" casing as conductor pipe which was sanded in, 302' of 13 $\frac{3}{8}$ " casing cemented to surface, 564' of 9 $\frac{5}{8}$ " casing cement-balanced through the mine and grouted to surface, 1,906' of 7" casing cemented to surface, and 3,886' of 4 $\frac{1}{2}$ " casing cemented to 2,400 \pm '. Four sand formations were hydrofracked and the well was produced until 2018 through the 4 $\frac{1}{2}$ " casing. The company plans to plug back the Sedat #4A to a depth of 1,850' in accordance with Pennsylvania Department of Environmental Protection regulations. The uncemented portion of the 4 $\frac{1}{2}$ " casing will be removed and three cement plugs placed through and above the produced formations. A 7" cast iron solid bridge plug will be set at 1,850' in the 7" casing just below the Murrysville injection zone. A string of 4 $\frac{1}{2}$ " casing will be installed to a depth of approximately 1,680' and cemented to surface. The injection string will be made up of 2 $\frac{7}{8}$ " 6.5# L80 tubing on a WOS AS1-X Packer set on tension around 1,650' with a tail extended below the 4 $\frac{1}{2}$ " casing shoe. See original well record and completion report, wellbore diagram showing the wellbore configuration, and the casing cement data chart at the end of this Attachment.

The annulus between the 2 $\frac{7}{8}$ " injection tubing and the 4 $\frac{1}{2}$ " casing will be filled with fresh water mixed with a small amount of corrosion inhibitor and bacteria growth preventer and monitored for injection component integrity.

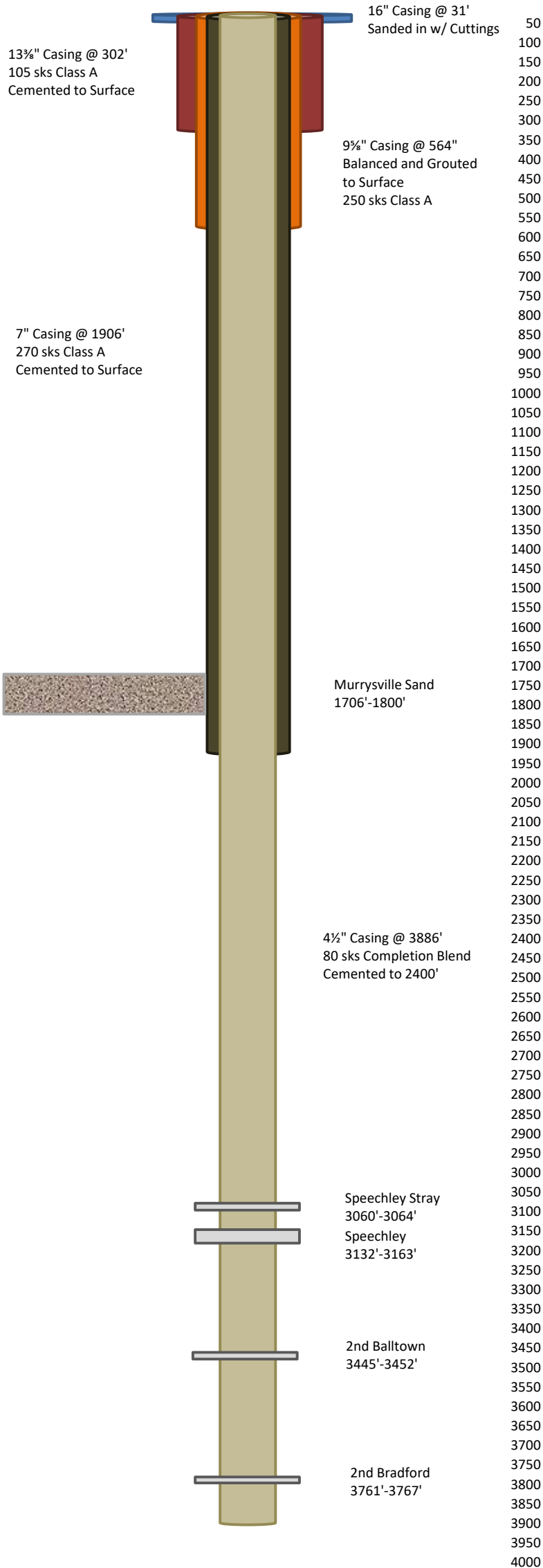
Logging Program:

The following open hole well logs were run: Gamma Ray, Compensated Density, Neutron, Dual Induction, Temperature and Caliper. The logs were run from TD to the bottom of the 7" with the Gamma Ray run to surface.

Cement bond logs will be run on the existing 7" casing and the new 4 $\frac{1}{2}$ " casing to verify a good cement bond to surface.

Penneco Oil Company

Sedat #4A 003-21644





Client Id

Sub-facility Id

WELL RECORD AND COMPLETION REPORT

Well Operator Penneco Oil Company, Inc.		DEP ID# 7674	Well API # (Permit / Reg) 37-003-21644-00	Project Number	Acres 69.54
Address 200 Rt. 22, PO Box 300			Well Farm Name Sedat	Well # 4A	Serial # PS-748
City Delmont	State PA	Zip Code 15626	County Allegheny	Municipality Plum Borough	
Phone 724-468-8232	Fax 724-468-8230	USGS 7.5 min. quadrangle map New Kensington East			

AUG 20 2004

Check all that apply: Original Well Record Original Completion Report Amended Well Record Amended Completion Report

WELL RECORD Also complete log of Formations on back (page 2)

Well Type	<input checked="" type="checkbox"/> Gas <input type="checkbox"/> Oil <input type="checkbox"/> Combination Oil & Gas <input type="checkbox"/> Injection <input type="checkbox"/> Storage <input type="checkbox"/> Disposal								
Drilling Method	<input checked="" type="checkbox"/> Rotary - Air <input type="checkbox"/> Rotary - Mud <input type="checkbox"/> Cable Tool								
Date Drilling Started 06/21/04	Date Drilling Completed 06/24/04	Surface Elevation 1068 ft.	Total Depth - Driller 3925 ft.	Total Depth - Logger 3925 ft.					
Casing and Tubing					Cement returned on surface casing? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Cement returned on coal protective casing? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A				
Hole Size	Pipe Size	Wt.	Thread Weld	Amount in Well (ft)	Material Behind Pipe Type and Amount	Packer / Hardware / Centralizers Type	Size	Depth	Date Run
17"	16"	N/A	N/A	31	sanded in with cuttings	N/A	N/A	31	6/21/04
15"	13 3/8"	48#	thread	302	105 sks Class A Regular	Float Shoe	13 3/8"	302	6/21/04
12"	9 5/8"	29.3#	thread	564	100 sks Class A Regular	Float Shoe	9 5/8"	564	6/22/04
3/4"	7"	19.41#	thread	1906	130 sks Class A Regular	Float Shoe	7"	1906	6/24/04
1/4"	4 1/2"	9.5#	thread	3886	80 sks Completion Blend Cement	Float Shoe	4 1/2"	3886	6/24/04

COMPLETION REPORT

Perforation Record			Stimulation Record						
Date	Interval Perforated From	To	Date	Interval Treated	Fluid Type	Amount	Propping Agent Type	Amount	Average Injection Rate
7/19/04	3054	3767	7/19/04	3054-3767	Water	11,634 gal	Sand	10,000#	28.4
7/19/04	3445	3452	7/19/04	3445-3452	Water	15,918 gal	Sand	11,000#	28.4
7/19/04	3132	3163	7/19/04	3132-3163	Water	36,456 gal	Sand	50,200#	26.7
7/19/04	3054	3064	7/19/04	3054-3064	Water	15,246 gal	Sand	15,200#	27.7
DEP, SOUTHWEST REGION JUL 29 2008									
Natural Open Flow	Not Taken			Natural Rock Pressure	Not Taken			72 Hours Days	
After Treatment Open Flow	581 MCFPD			After Treatment Rock Pressure	500 PSI			72 Hours Days	

Well Service Companies -- Provide the name, address, and phone number of all well service companies involved.

Name Hill Drilling Address P.O. Box 309 City - State - Zip Bradford, PA 16701 Phone 814-368-3831	Name BJ Services Company Address Route 2, Box 506 City - State - Zip Clarksburg, WV 26301 Phone 304-624-9802	Name Address City - State - Zip Phone
---	---	--

LOG OF FORMATIONS

Well API#: 37-003-21644

Formation Name or Type	Top (feet)	Bottom (feet)	Gas at (feet)	Oil at (feet)	Water at (fresh / brine; ft.)	Source of Data
Clay	0	6				Drillers Log
Shale - R bed	6	30				
Sand	30	34				
Sand & Shale	34	50				
Sand & Shale	50	100			Damp @ 100	
Shale & Sand	100	330				
Shale & Sand	330	440			1" @ 440	
Shale	440	510			3" @ 510	
Mine	510	520				
Shale & Sand	520	577				
Shale	577	760				
Sand & Shale	760	940				
Shale	940	1030				
Sand	1030	1150				
Sand & Shale	1150	1775				
Murrysville	1775	1870			2" @ 1789'	
Shale	1870	1900				
100'	1900	1922				
Sand 100'	1922	1935				
Sand & Shale	1935	2240				
Sand	2240	2245				
Shale & Sand	2245	2300				
5 th Sand	2300	2330				
Shale	2330	2700	Show @ 2335			
Shale	2700	3000				
Sand & Shale	3000	3925				

Please delete empty rows if necessary to make all of page 2 fit on one page.

Well Operator's Signature		DEP USE ONLY	
Title: <u>ice President</u>	Reviewed by: <u>MA</u> Date: <u>1/24/08</u>		
Date: <u>8/19/04</u>	Comments:		



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil and Gas Management Program
WELL LOCATION PLAT

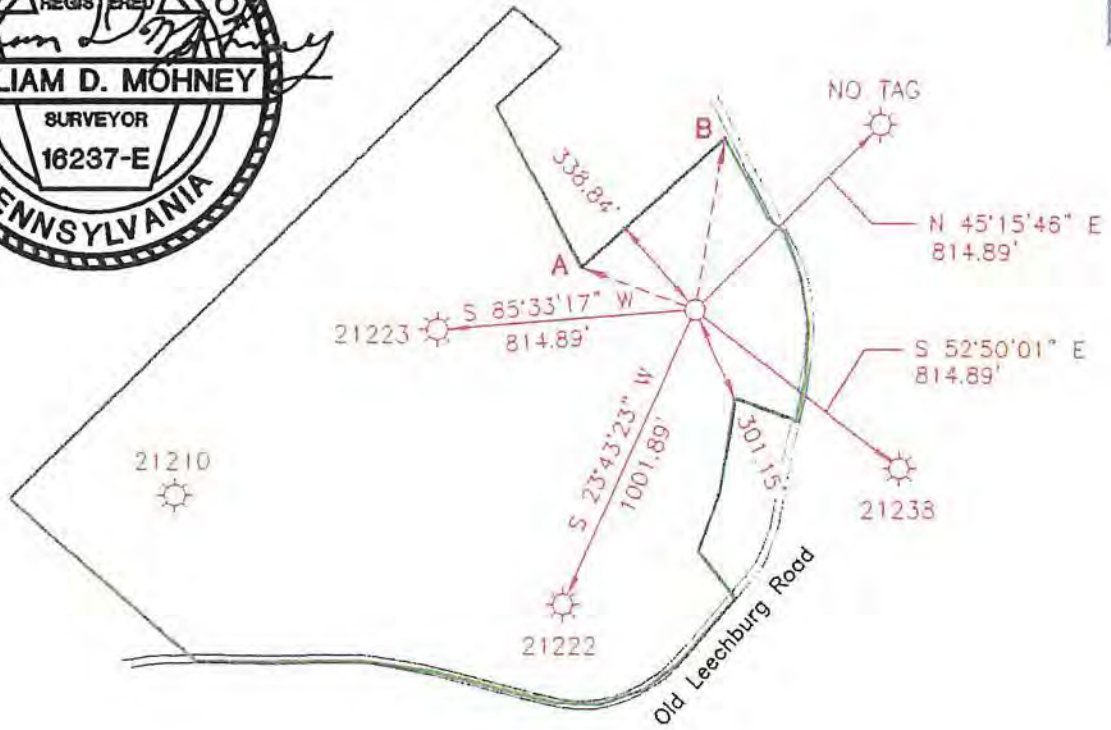
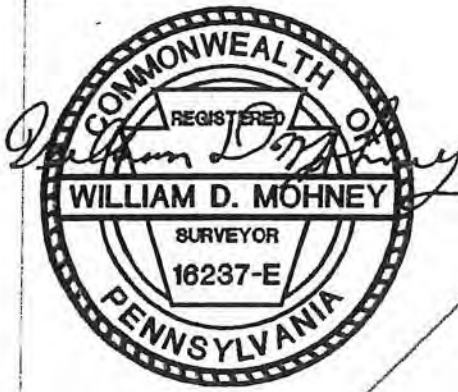
DEP USE ONLY	DEP Application Tracking #	G
	Permit #	
	Project #	C

Well is located on topo map 5366.42 feet south of latitude 40 . 32 , 30 "

	Denotes location of well on topo map.
True Latitude NORTH	
<u>40</u> ° <u>31</u> ' <u>36.9</u> "	
True Longitude WEST	
<u>79</u> ° <u>42</u> ' <u>39.7</u> "	

Loc-A N 70°03'58" W 384.91'
Loc-B N 09°11'04" E 537.62'
A-B N 48°15'12" E 600.00'

- Proposed Well Location
- Existing Well
- Plugged Well
- Lease Line
- Property Line
- Roads
- Streams/Water



Well is located on topo map 749.80 feet west of longitude 79 . 42 , 30 "

Surveyor or Engineer	W.D. Mohney & Associates	Dwg #	sedatplum	Date	December 15, 2003	Scale	1" = 600'	Traut Acreage	69.54 Acres
Applicant / Well Operator Name	Penneco Oil Company, Inc.	DEP ID	7674	Well (Farm) Name	SEDAT	Well #	4 A	Serial #	PS-748
Address	P.O. Box 300, 200 US Route 22, Delmont PA 15626		County - Code	Allegheny - 65		Municipality	Plum Borough		
Surface Owner	Sedat Inc.		USGS 7 1/2 Quadrangle Map Name	New Kensington East, PA		Map Section	7		
Surface Lessee	n/a		Angle & Course of Deviation (Drilling)	None		Surface Elevation	1068 ±	Anticipated Total Depth	3800' ±
Surface Owner or Water Purveyor with a Water Supply within 1000'	See Attached Sheet		Approximate Course and Distance to Water Supply	Noncoal Area		Owner, Lessee, or Operator of Workable Coal Seam	Name of Coal Seam Owned, Leased, or Operated		
							N/A		

Reliable and Effective

The Workover Solutions AS1-X Packer is designed for applications where a high pressure production packer is needed. The packer is designed for operations in 7" casing. The packer is rated for pressures of up to 7,000 psi. The packer features a large internal by-pass that reduces swabbing when running and retrieving.

The WOS AS1-X Production Packer can be set in tension or compression. It holds pressure from both above and below allowing casing to be isolated and protected during the production of the well. Secondly, the WOS Multi-set Production Packer is used for long term zonal isolation and pressure integrity for the production of oil and gas wells. The WOS Production Multi-set packer can be set and reset multiple times for leak detection.



Applications / Features

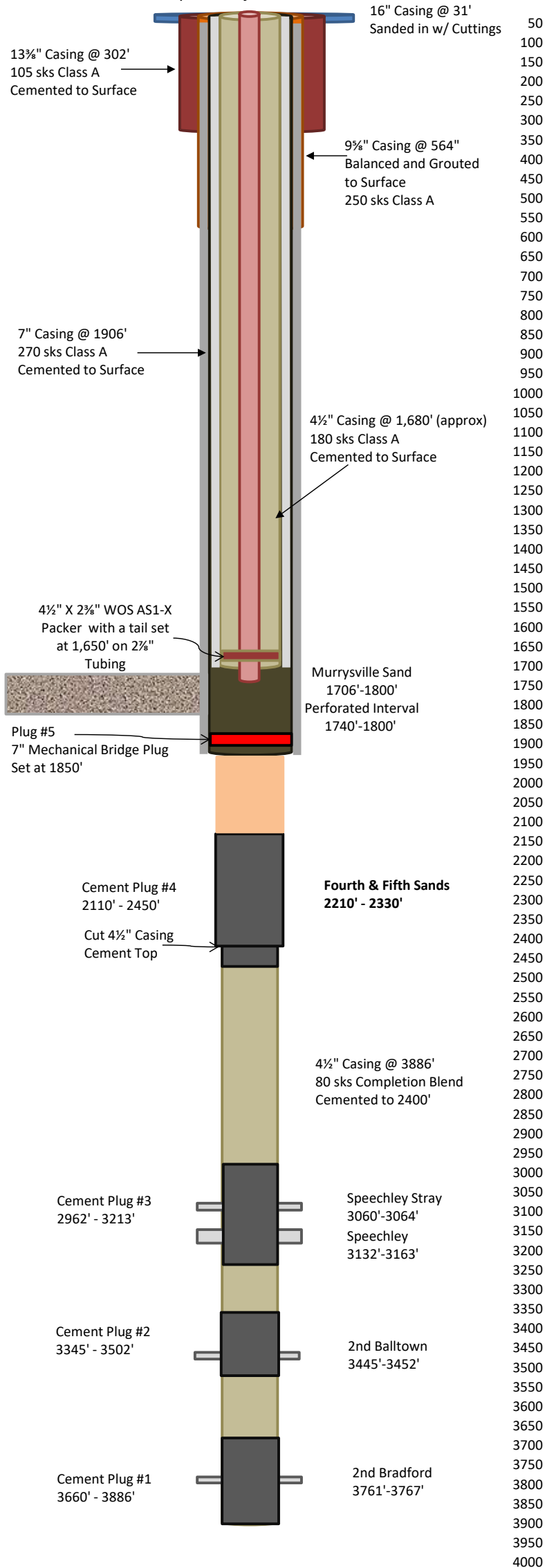
- » Production packer
- » Zonal isolation
- » Protection of casing during production
- » Internal bypass to reduce swabbing when running and retrieving
- » Available in 7" casing

Benefits

- » Rated for up to 7,000 psi
- » Holds pressure from above or below
- » Can set tubing in compression or tension neutral
- » Right hand set and right hand release

OD	Weight lbs / ft	Recommended Hole Size	Max OD of Tool
7"	17.0 – 26.0	6.276 – 6.538	6.125
7"	26.0 – 32.0	6.094 – 6.276	5.875
7"	35.0	6.004	5.812

Penneco Oil Company
 Sedat #4A 003-21644
 Proposed Injection Schematic



ATTACHMENT "M"
Construction Details

**Attachment M
Casing and Cement Data
Penneco Sedat #4A Injection Well**

Casing	Size Inches	Type	Weight Lbs/Ft	Grade	Set Depth Feet	Internal Yield Pressure PSI	Collapse Pressure PSI	Joint Yield Lbs	Body Yield Lbs
Conductor	16"	N/A	N/A	N/A	31	N/A	N/A	N/A	N/A
Surface	13 ³ / ₈ "	LS	48	H-40	302	1730	740	322000	541000
Mine String	9 ⁵ / ₈ "	ST&C	26	H-40	564	2270	1370	254000	365000
Intermediate String	7"	LT&C	20	J-55	1906	3740	2270	257000	316000
Integrity Buffer String	4 ¹ / ₂ "	LT&C	10.5	J-55	1680	4790	4010	203000	166000
Injection String	2 ⁷ / ₈ "	EUE	6.5	L-80	1750	9660	8000	145000	114000

Cement Data

Casing	Size Inches	Class	Amount Sacks	Volume BBLs	Top of Cement
Conductor	16	Sanded in			
Surface	13 ³ / ₈ "	Class A	105	47.4	Surface
Mine String	9 ⁵ / ₈ "	Class A	250	Balance/Grout	Surface
Intermediate String	7"	Class A	270	78.5	Surface
Integrity Buffer String	4 ¹ / ₂ "	Class A	180	80	Surface
Injection String	2 ⁷ / ₈ "				

Attachment M
Formation Tops and Bottoms
Penneco Sedat #4A Injection Well

Formation	Top	Bottom	Thickness
Riddlesburg Shale	1505'	1705'	200'
Murrysville Sand	1706'	1800'	94'
Riceville/Oswayo Shale	1801'	1883'	82'
Hundred Foot (Venango)	1884'	1978'	94'

*The top of the Riddlesburg is difficult to determine from the well log, so the 200' interval of low permeability shale/slit section from 1,505' to 1,705' shown on the gamma ray log is included as part of the upper confining zone.

ATTACHMENT "O"
Plan for Well Failures

Attachment O
Plans for Well Failures
Sedat #4A Injection Well

Plans for Well Failures for Sedat #4A Injection Well

If there is a well failure that involves equipment the well will be shut-in until the faulty equipment is repaired or replaced. If the failure poses no environmental or operational hazard, and the well has been returned to a safe operating condition, the well will be placed back into operation and nothing further will be done.

If there is a casing leak or some other major failure the well will be immediately shut-in and the Pennsylvania DEP and the EPA notified of the problem. Depending on the condition, the corrective action may include squeezing off the leak with cement or running an additional string of casing. The well will not be placed into service until it has been determined that the problem has been corrected and approval is received from the EPA to resume operation. Any fluid produced during the shut-in will be stored on site or disposed of at another approved facility.

ATTACHMENT "P"
Monitoring Program

Attachment P
Monitoring Program
Sedat #4A Injection Well

Monitoring Program for Sedat #4A Injection Well

The Sedat #4A injection well will be monitored for the well's entire life in compliance with all EPA monitoring guidelines and reporting requirements.

The injection site is located so that the facilities cannot be seen from public roads or public or private properties adjacent to the site. The access road is gated and will be locked when the site is not operating.

There will be a second monitoring well on the lease, identified by its Pennsylvania issued permit number, 003-21222, converted in addition to the monitoring well (003-21210) permitted for observation of the Sedat #3A injection well. This is a depleted gas well that will be adapted for use as an observation well and is 1,002' to the south west of the Sedat #4A, see well plat map at end of Attachment. The well has satisfactory spacing and placement to provide adequate sampling area without having to drill a well or wells for the specific propose of sampling. A monitoring string set on a packer immediately above the Murrysville Sand will be installed to isolate the Murrysville injection zone. Penneco will sample, monitor, and record the fluid level in the Sedat #2A monitoring well as required by permit. The results will be reported as required by permit or according to EPA guidelines. Should the fluid level rise to within 100' of the base of the USDW, Penneco will stop disposal operations immediately, notify the EPA, and wait for instructions on how to precede.

Pressure and rate monitoring will be at the well site (wellhead); both injection pressure and the pressure on the 7" by 4 ½" annulus will be monitored. The company will also conduct quarterly mechanical integrity testing as required by Pennsylvania Oil and Gas regulations. Pressure will be measured by use of a continuously recording pressure gage and the injection rate by a continuously recording flow meter. Results will be reported to the EPA as required by the injection permit or according to EPA guidelines, but not less than annually.

The specific gravity of each truck load will be monitored to ensure the specific gravity of the fluid to be injected does not exceed the allowed value.

Injection fluids will be sampled and analyzed quarterly with the sample taken at the injection site (wellhead). The results will be reported as required by the permit or according to EPA guidelines.

The company will also be prepared to conduct any other monitoring or sampling as required by the permit.

6190 S 40° 32' 30"
 1040 W 74° 42' 40"
 (G)

RE

DFF 39254
 39255

NEW KENSINGTON EAST

3-4: Rev. 6/84

COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF ENVIRONMENTAL RESOURCES
 BUREAU OF OIL AND GAS REGULATION
 PITTSBURGH, PENNSYLVANIA 15206-2988

21222

WELL RECORD

Office Use Only
 003-21222

PERMIT NO. 37-003-21222-00 PROJECT NO. [] TYPE OF WELL Gas and Oil
 RENTON FIELD DEV

WELL OPERATOR Penneco Energy Corporation TELEPHONE NO. 412-468-8232
 ADDRESS 200 Route 22, Delmont, PA ZIP 15626

FARM NAME Sedat #2A FARM NO. SERIAL NO. PS-8 ACRES 70

TOWNSHIP Plum Borough COUNTY Allegheny

DRILLING COMMENCED 1-12-89 DRILLING COMPLETED 1-19-89

ELEVATION 1162' QUADRANGLE New Kensington East 7 1/2' 15'

CASING AND TUBING RECORD

PIPE SIZE	AMOUNT IN WELL	MATERIAL BEHIND PIPE		PACKER		DEPTH	DATE RUN
		CEMENT (SKS.)	GEL (SKS.)	TYPE	SIZE		
13-3/8"	16	Cuttings	None	N/A	N/A	16	1-12-89
9-5/8"	653	225	5	Float Shoe	9-5/8"	663	1-13-89
7"	1,985	280	11	Float Shoe	7"	1,995	1-17-89

T.D.	D.D.	D.P.I.	Class	O G	Lease
4323		2375	D	111	

PERFORATION RECORD

STIMULATION RECORD

DATE	INTERVAL PERFORATED FROM TO	DATE	INTERVAL TREATED	AMOUNT FLUID	AMOUNT SAND	INJECTION RATE

NATURAL OPEN FLOW 294 MCF NATURAL ROCK PRESSURE 50# 72 HRS. DAYS
 AFTER TREATMENT OPEN FLOW N/A AFTER TREATMENT ROCK PRESSURE N/A HRS. DAYS

REMARKS:

Good cement returned to surface after setting 9-5/8" casing and 7" casing. No water encountered in Renton Mine. Well is to be produced naturally.

RECEIVED

PRODFM - Bradford

FMTP - BRALLIER

JUN 2 1989

PA GEOLOGICAL SURVEY
 (Oil & Gas Geology Division)

(FORMATION ON REVERSE SIDE)

11.25
 4.20.89

FORMATIONS						
NAME	TOP	BOTTOM	GAS AT	OIL AT	WATER AT (FRESH OR SALT WATER)	SOURCE OF DATA
Clay and Shale	0	10				Driller's Log
Shale and Sand	10	16				
Sand and Shale	16	105			Damp @ 60'	
Sand and Shale	105	460				
Sand and Shale	460	495				
Sandy Shale	495	611				
Shale	611	621				
Shale	621	669				
Sand and Shale	669	865			1/2" @ 700'	
Shale	865	940				
Sand and Shale	940	1040				
Sand	1040	1219				
Sand and Shale	1219	1490				
Sand and Shale	1490	1950				
Sand	1950	2029				
Sand and Shale	2029	2210				
Red Rock	2210	2330				
Sand	2330	2445	2375'			
Sand and Shale	2445	2485				
Shale	2485	2600				
Sand and Shale	2600	3140				
Shale and Sand	3140	3800				
Shale	3800	4323				
t.D.	4323					
<div style="border: 1px solid black; padding: 5px; display: inline-block;"> <p>APPROVED BY _____ DATE _____</p> <p>GEOPHYSICAL LOG DATA</p> </div>						
					2334-2351	
					2391-2426	
					3170-3188	
					3250-3286	
					3561-3570	
					3874-3884	
Fourth						
Fifth						
Speechley Stray						
Speechley						
2nd Balltown						
2nd Bradford						

March 22, 1989
 DATE
 APPROVED BY _____
 Vice-President
 TITLE

CORRELATED LOGS - DO NOT REMOVE
 SEDAT 2A - PS-8

FCO

ALLEGHENY

PENNECO OIL COMPANY, INC.

NUCLEAR

SEDAT #2A PS-8

SURVEYS INC.

APPALACHIAN SUITE

LOCATION PLUM BORO
 PRVNC/CO. ALLEGHENY
 FIELD PLUM BORO
 WELL SEDAT #2A PS-8
 COMPANY: PENNECO OIL COMPANY INC.

COMPANY PENNECO OIL COMPANY INC.
 WELL SEDAT #2A PS-8
 FIELD PLUM BORO
 PROVINCE/COUNTY ALLEGHENY
 COUNTRY/STATE USA / PA
 PERMIT NUMBER 37-003-21222

LOCATION PLUM BORO			
LSD	SEC	TWP	RCE

OTHER SERVICES
 ANALYSIS

PERMANENT DATUM GROUND LEVEL ELEVATION 1162 FT.
 LOG MEASURED FROM K.B., 10 FT. ABOVE PERMANENT DATUM
 DRILLING MEASURED FROM K.B.

ELEVATIONS
 KB 1172 FT.
 DF 1172 FT.
 CL 1162 FT.

DATE	19-JAN-89			
RUN NUMBER	ONE			
DEPTH-DRILLER	4316 FT.			
DEPTH-LOGGER	4323 FT.			
FIRST READING	4323 FT.			
LAST READING	0			
CASING-DRILLER	1993 FT.			
CASING-LOGGER	1998 FT.			
BIT SIZE	6 1/4 IN.			
HOLE FLUID TYPE	AIR DRILLED			
DENS./VISC.				
PH/FLUID LOSS				
SAMPLE SOURCE				
RM @ MEAS TEMP				
RMF @ MEAS TEMP				
RMC @ MEAS TEMP				
SOURCE: RMF/RMC				
RM @ BHT				
TIME SINCE CIRC	3 HRS.			
MAX REC TEMP				
EQUIPMENT/BASE	"262" ELD.			
RECORDED BY	M. RIGGLEMAN			
WITNESSED BY	D. TATLOCK			
WITNESSED BY	T. JACOBS			

1800

1842

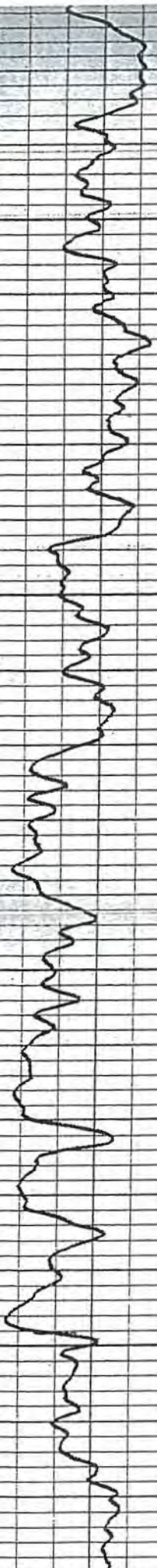
1850

1900

1948

1950

MURPHY'S
L L E

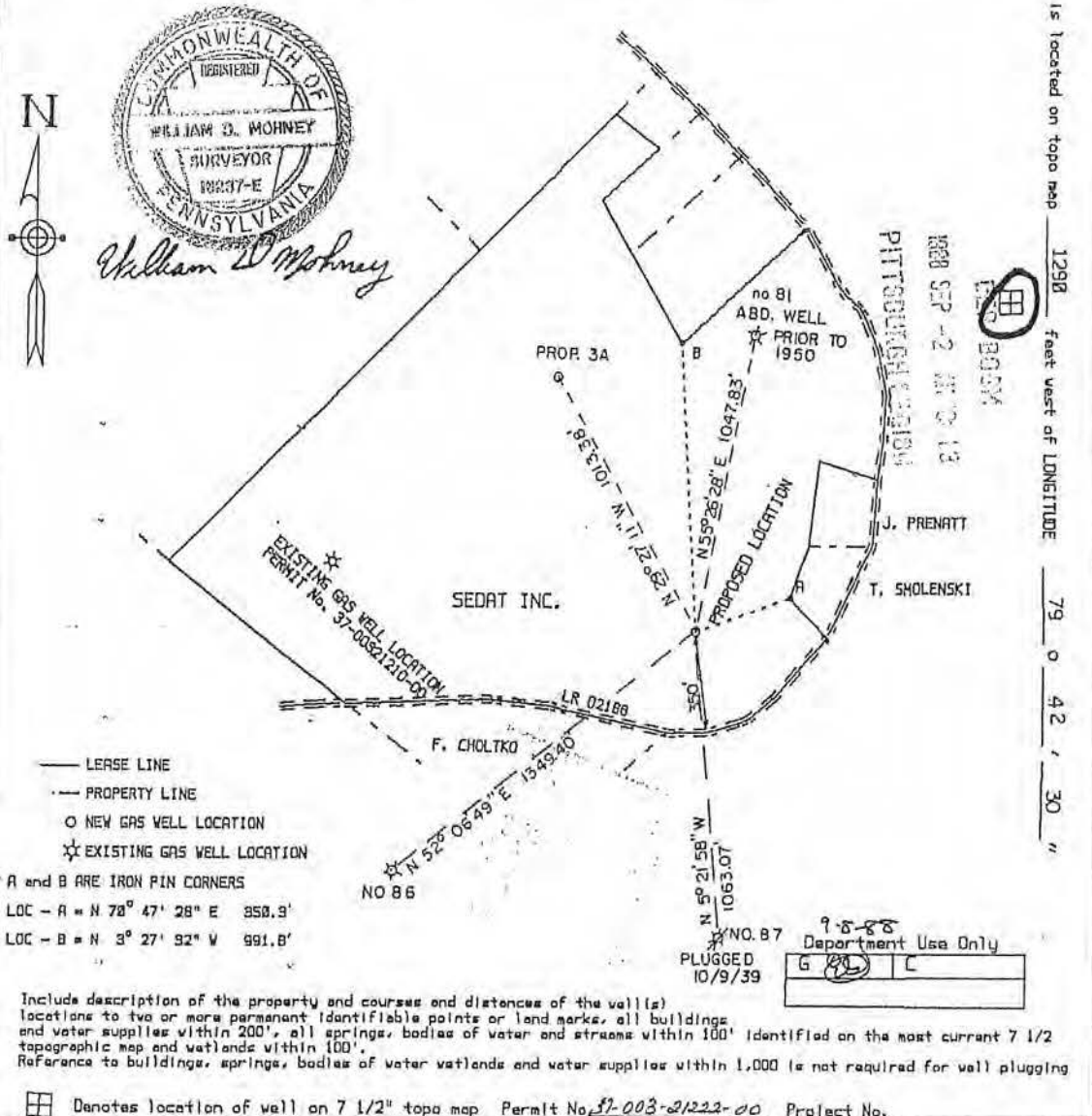


WELL LOCATION PLAT

Well is located on topo map 6190 feet south of LATITUDE 40 ° 32 ' 30 "

NOTE: The locations of the abandoned gas wells No. 80, 81, 86 and 87 have been located on the maps from the old Renton Mine maps due to the absence of any evidence in the field.

Well is located on topo map 1298 feet east of LONGITUDE 79 ° 42 ' 30 "



William D. Mohney

- LEASE LINE
- - - PROPERTY LINE
- NEW GAS WELL LOCATION
- ★ EXISTING GAS WELL LOCATION

* A and B ARE IRON PIN CORNERS
 LOC - A = N 78° 47' 28" E 350.3'
 LOC - B = N 3° 27' 32" W 991.8'

Include description of the property and courses and distances of the well(s) locations to two or more permanent identifiable points or land marks, all buildings and water supplies within 200', all springs, bodies of water and streams within 100' identified on the most current 7 1/2 topographic map and wetlands within 100'. Reference to buildings, springs, bodies of water wetlands and water supplies within 1,000 (is not required for well plugging)

☒ Denotes location of well on 7 1/2" topo map Permit No. 57-003-21223-00 Project No. _____

PENNECO OIL COMPANY INC. Well Permittee/Registrant 200 U.S. ROUTE 22 Address DELMONT PA 15626		Revision <input type="checkbox"/> Alteration <input type="checkbox"/> Storage Recondition <input type="checkbox"/> New Location <input checked="" type="checkbox"/> Drill Deeper <input type="checkbox"/> Abandonment <input type="checkbox"/> Registration <input type="checkbox"/> Plugging <input type="checkbox"/>	W. D. MOHNEY Surveyor/Engineer 16237-E 5-2A Drawing Number 7-12-88, B-29-88 Date 1" = 500' Scale
SEDAT INC. Surface Owner N/A Surface Lessor (if any) SEDAT Form Name 2A PS - B		Surface landowner and water purveyor with water supply within 1,000' J. PRENATT T. SHOLENSKI F. CHOLTKO	Approximate course and distance to water supply N 86° E 825' N 81° E 995' S 49° W 594'
Well No. 89.5	Tract 1162	Serial No. 3400'	RECEIVED SEP 26 1988
Acres NONE	Ground Elevation 3400'	Anticipated TD HENY PLUM BORO	
Name of Deviation (Drilling) HENY		Municipality KENSINGTON EAST	Owner/Operator/Lessee VILLA COAL COMPANY SEDAT INC. CONSOLIDATION COAL CO.
Topo Quadrangle Section		Workable Coal Seams None of Seam	Name of Seam UPPER FRONTOZ ALL OTHERS UPPER FRONTOZ



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
Oil and Gas Management Program
WELL LOCATION PLAT

DEP USE ONLY	DEP Application Tracking #	0
	Permit #	
	Project #	0

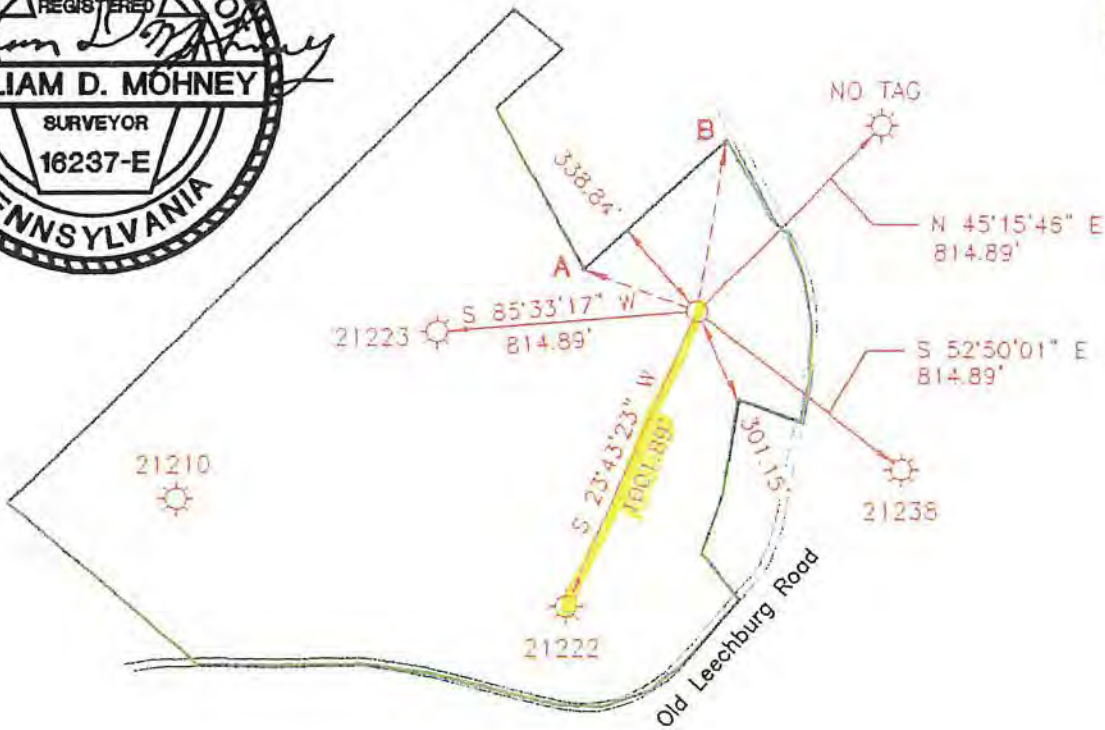
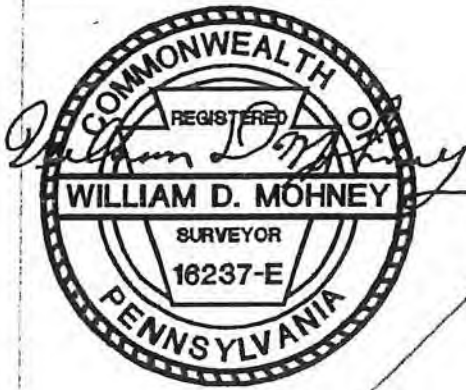
Well is located on topo map 5366.42 feet south of latitude 40 . 32 . 30 "

	Denotes location of well on topo map.
True Latitude: NORTH	
<u>40</u> ° <u>31</u> ' <u>36.8</u> "	
True Longitude: WEST	
<u>79</u> ° <u>42</u> ' <u>39.7</u> "	

Loc-A N 70°03'58" W 384.91'
Loc-B N 09°11'04" E 537.62'
A-B N 48°15'12" E 600.00'

- Proposed Well Location
- Existing Well
- Plugged Well

- Lease Line
- Property Line
- Roads
- Streams/Water



Well is located on topo map 749.80 feet west of longitude 79 . 42 . 30 "

Surveyor or Engineer	W.D. Mohney & Associates	Scale	1" = 600'	Tract acreage	69.54 Acres
Applicant	Penneco Oil Company, Inc.	DEP ID#	7674	Lease Form Name	SEDAT
Address	P.O. Box 300, 200 US Route 22, Delmont PA 15626	County - Zone	Allegheny - 65	Municipality	Plum Borough
Surface Owner	Sedat Inc.	503 T1 - Quadrangle Map Name	New Kensington East, PA	Map Section	7
Surface Lessee	n/a	Angle & Course of Deviation (Drilling)	None	Surface Elevation	1068 ft
				Anticipated Total Depth	3800'
Surface Owner or Water Purveyor with a Water Supply within 1000'	Approximate Course and Distance to Water Supply	Owner, Lessee, or Operator of Workable Coal Seam	Name of Coal Seam Owned, Leased, or Operated		
See Attached Sheet		Noncoal Area	N/A		



Titanium Environmental Services, LLC

P.O. Box 4029
Longview, Texas 75606-4029

Phone (903) 234-8443
Fax (903) 234-1641

September 28, 2016

Mr. Marc Jacobs
Penneco Environmental Solutions, LLC
6608 Route 22
Delmont, Pa 15626-2408

RE: Proposal for a Surface Facility for your proposed Sedat #3 SWD

Dear Mr. Jacobs,

Titanium Environmental Services, LLC (TES) is pleased to present the draft drawings and process flow for Penneco Environmental Solutions, LLC (PES) Sedat #3 Salt Water Disposal (SWD) well surface facility. As previously discussed, PES and TES agree that safe and environmentally sound design and operations are paramount to meeting PES's expectations for their operation.

In that vein, TES has proposed a facility that would be acceptable for Resource Conservation and Recovery Act (RCRA) waste operations. TES believes that ultimately the requirements for wells and surface facilities that manage class II waste related to exploration and production will be raised to match those presently applicable to class 1 non-hazardous well and facility operations. Some of these requirements will be very expensive or even impossible to incorporate into existing wells and surface structures. As the cost to construct the well(s) and surface equipment with the safeguards that will be regulatory mandates is not significant, if incorporated with the construction design, we recommend and have incorporated these protective components into our plans.

The entire surface facility will be built atop a multilayered secondary containment system/structure. The facility will begin with a base layer of clay, felt liner, 60 mil High Density Polyethylene (HDPE) liner, and another felt liner, perforated liquid collection pipe system covered by pea gravel, concrete containment floor and walls. The edge of the HDPE liner will be folded up against the containment walls to keep rainwater from entering the system. The liquid collection system piping will be extended from under the containment to allow for inspection or liquid (condensation) removal and as the last mechanical containment to intercept a leak.

Notice the truck unloading pad is built to prevent rainwater run on and all rainwater or truck leakage will be collected by the truck bay collection system which empties into the solids settling tank containment which can hold all the trucks that could be in the truck bays. All sump pumps automatically empty the sumps without human intervention. If the receiving tanks can't hold the trucks trying to unload (Level transmitters) the system closes all unloading lines until there is sufficient room to

continue unloading. Further if there is insufficient room in the storage tanks, the system will not let the transfer pumps move fluid from the receiving/settling tanks to the storage tanks. Thus the unloading valves won't open nor will the transfer pumps transfer fluid into tanks that are already full. The water filtering pumps will transfer filtered water into the pre-injection tanks (Filtered Water) as long as the fluid level in the filtered water tanks does not exceed the upper limit established by the operator. The injection pumps will inject water into the well as long as there is sufficient filtered water to inject and all control parameters for the well are within preset value ranges.

All liquid unloading at the facility will enter tanks that are equipped with internal piping that allows fluids to be introduced under the liquid level in the tanks (submerged loading). Submerged loading is a recognized method of reducing emissions. All liquid transfer systems are connected together by a vent header to vapor balance the exchange between the receiving and transferring tanks. All used filters and tank cleanout solids are collected and disposed of to a permitted facility.

TES suggest Standard Operating Procedures (SOP) and daily facility inspections which would not be addendums to the Permit as they will have to be modified over time and could be "Permit Modifications" if they were addendums. All waste should have an approved profile to be accepted at the facility. All trucks would be unloaded through Mass Flow Meters recording density and volume. Likewise Mass Flow Meters would be used for injection measurement for reporting of density and volume.

Simplicity in design with many passive controls that don't require human attention or maintenance is TES's design goal. The design also reduces the number of incidents/accidents caused by operator error or inattention. Tanks that might fail, can be valved out of operation and bypassed with no effect on the operation. There is one transfer pump (plus one standby), one filter pump (plus one standby), one charge pump (plus one standby) and one injection pump (plus one standby). Three unloading bays and only one or two required. Since the PLC logic instructs the continuous filtration and injection of water, the only operator interaction is changing the filters when required and making sure inbound trucks/loads are approved into the facility and then enabling the specific unloading valve. All sump pumps activate automatically and are freeze protected as is the transfer pump. All containments have a fluid level alarm to detect leaks and have reduced height walls between them that together can contain 110% of any of the tank systems plus a twenty-five year 24 hour rainfall event.

If you have any questions about this letter or any of the drawings or process flow diagram please call TES' Special Projects Manager, Lynn Goldston – 903-235-1477.

**Penneco Environmental Solutions
Pa. FACILITY
SECONDARY CONTAINMENT CALCULATIONS**

Containment and Spill Calculations

NOTE:			
Total Volume of Primary Containments (Tanks)	7,120	BBL	
Total Storage inside Secondary Containment (Minus Tank Pads)	6512	BBL	
Because (4) decimal places were used in calculations there may be minuscule rounding differences!			
1 cuft =	7.4805	Gallons	
1 BBL=	42	Gallons	

Spill Calculations

	Tanks		BBL		
Tank #1	1	Gun Barrels #1 = 1x500	NA	500	
Tank #2	1	Gun Barrels #2 = 1x500	NA	500	
Tank #15	1	Oil Tank = 1x300	NA	300	
Note: No Tank Pads Required	2	WEIR tanks = (2x255) = 510	NA	510	
Note: No Tank Pads Required	2	WEIR tanks = (2x255) = 510	NA	510	
Tanks #3 thru #12 Manifoldd Together	10	Storage Tanks = 10x400	4,000	168,000	MAX Spill
Tanks #13 & #14 Manifoldd Together	2	Filtered H2O Tanks = 2x400	800	33,600	Second Worst
	5"	Rainfall on 13,332 sqft	989	41,105	
Maximum Worst Case Spill (67% of all tanks) + 100 yr. 24 hr. Rainfall (5") to contain =			5,789		5789/6512=89%

Total Storage inside Secondary Containment Walls - Minus Tank Pads	-5,789		
	6,512	(6786 - 274 (pads))	
	723	723/6512=11%	
	BBL	Gallons	Cubic Feet
Excess capacity =	723	30,366	4,059

SEE Calculations on Page 2

Measurements based on Drawing File Name : Penneco - Sheet 1 - 6 - 7 - 2018

Penneco Environmental Solutions
Pa. FACILITY
SECONDARY CONTAINMENT CALCULATIONS

NOTE: Based on all tanks full and power off because of 100 year 24 hour Rainfall Event (tanks can't actually be filled completely ~90%).

See "Sheet With Areas"	AREA	L (ft)	W (ft)	H (ft)	Surface Area (ft ²)	Capacity (ft ³)	Capacity (GAL)	Capacity (BBL)
Weir Settling Tank Containment	W	119.25	24	3	2,862	8,586	64,228	1,529
Oil Tank Containment	X	24	24	3	576	1,728	12,926	308
Gun Barrel & Water Storage Tank Containment	Y	144	46	3	6,624	19,872	148,652	3,539
Unloading Pad with slope considered	U	59	53		3,127			
trough 'CuFt		(59x3x1.91)/2				169	1,260	30
Side 1 CuFt		(59x25x.667)/2				492	3,680	88
Side 2 CuFt		(59x25x.667)/2				492	3,680	88
Area above wall between containment W & X (24x.667)		24	0.667	1	16	16	120	3
Area above wall between containment W + X and Y (144x.667)		144	0.667	1	96	96	718	17
Area above wall between containment Y & Z (46x.667)		46	0.667	1	31	31	232	6
						31,482	235,497	5,607
						31,482	235,497	5,607
Unroofed area open to collect rainfall					13,332			
Less 100 year 24 hour Rainfall event = 5"x144x13,332= 9,599,040 / 1728 = 5,555 CuFt					13,332	(5,555)	(41,554)	(989)
Pump Area Containment with Roof	Z	48	46	3	2,208	6,624	49,551	1,180
Not Subject to Rainfall accumulation								
Total SQFT of ALL Containment Areas					15,540			
CuFt Available After Rainfall						32,551		
Capacity available in Gallons after Rainfall event							243,494	5,797
Capacity in Barrels after Rainfall event Calculated on gallons as test							5,797	5,797
Total Secondary Containment volume =					38,106 CuFt		6786 BBL	
See Detail below	MAX spill - 10 manifolded 400 BBI tanks (#3 thru #12) = 4,000 BBI							(4,000)
	Instead of 10% or largest use Largest 2 Tank System =800 BBL Filtered water tanks							(800)
							Subtotal	997
Containment Capacity After 100 yr. 24 hour Rainfall + worst case spill + 2nd largest tank system								997
Minus Housekeeping pads (15 pads x18.26 BBL = 274 BBL)								(274)
							Excess Capacity	723

PA Containment Calculations

Per direct conversation between Penneco design consultant, Lynn Goldston and DEP permit application reviewer, Kevin Maskol, Penneco submits the enclosed containment calculation that represents a model of calculation that is more consistent with current expectations across the Pennsylvania oil and gas industry spectrum.

Containment and Spill Calculations

Summary										
Total Volume of Primary Containments (Tanks)	7,120		BBL							
Total Storage inside Secondary Containment	6787		BBL							
Total Storage inside Secondary Containment (Minus Tank Pads)	6513		BBL							
Worst Case Spill by Pennsylvania DEP Rule Plus 10% Precipitation	4400		BBL							
Remaining Capacity after Worst Case Spill and Precipitation by PaDEP Spill Rule	1480		BBL							
Remaining Capacity After 100 year - 24 hour Rainfall Event on un-covered area	491		BBL							
<table style="width: 100%; border: none;"> <tr> <td style="border: 1px solid black; padding: 2px;">1 CuFt =</td> <td style="border: none; padding: 2px;">7.4805</td> <td style="border: 1px solid black; padding: 2px;">Gallons</td> <td style="border: none; padding: 2px;">1 BBL=</td> <td style="border: none; padding: 2px;">42</td> <td style="border: 1px solid black; padding: 2px;">Gallons</td> <td style="border: none; padding: 2px;">.1781 BBL per ft³</td> </tr> </table>				1 CuFt =	7.4805	Gallons	1 BBL=	42	Gallons	.1781 BBL per ft ³
1 CuFt =	7.4805	Gallons	1 BBL=	42	Gallons	.1781 BBL per ft ³				

Primary Containment (Tanks)

	Tanks			BBL	
Tank #1	1	Gun Barrels #1 = 1x500	NA	500	
Tank #2	1	Gun Barrels #2 = 1x500	NA	500	
Tank #15	1	Oil Tank = 1x300	NA	300	
Note: No Tank Pads Required	2	WEIR tanks = (2x255) = 510	NA	510	
Note: No Tank Pads Required	2	WEIR tanks = (2x255) = 510	NA	510	Gallons
Tanks #3 thru #12 Manifolde	10	Storage Tanks = 10x400		4,000	168,000 MAXIMUM Spill
Tanks #13 & #14 Manifolde	2	Filtered H2O Tanks = 2x400		800	
Total Primary Containment				7120	

SEE Containment Calculations on Page 2

Measurements based on Drawing File Name : Penneco - Sheet 1 - 6 - 7 - 2018

Because (4) decimal places were used in calculations there may be minuscule rounding differences!

NOTE: Based on all tanks full and power off because of 100 year 24 hour Rainfall Event (tanks can't actually be filled completely ~90%).

See "Sheet With Areas"	AREA	L (ft)	W (ft)	H (ft)	Surface Area (ft ²)	Capacity (ft ³)	Capacity (GAL)	Capacity (BBL)
Weir Settling Tank Containment	W	119.25	24	3	2,862	8,586	64,228	1,529
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Unloading Pad with slope considered	U	59	53		3,127			
trough 'CuFt		(59x3x1.91)/2				169	1,260	30
Side 1 CuFt		(59x25x.667)/2				492	3,680	88
Side 2 CuFt		(59x25x.667)/2				492	3,680	88
Area above wall between containment W & X (24x.667)		24	0.667	1	16	16	120	3
Area above wall between containment W + X and Y (144x.667)		144	0.667	1	96	96	718	17
Area above wall between containment Y & Z (46x.667)		46	0.667	1	31	31	232	6
Pump Area Containment with Roof	Z	48	46	3	2,208	6,624	49,551	1,180
Total Volume of ALL Containment Areas					15,540	38,106	285,048	6,787
Minus Housekeeping pads for 15 tanks on 13' diameter octagonal pads (15 pads x18.26 BBL = 274 BBL)								(274)
Note: No housekeeping pads under solids settling tanks- open 8" I-Beam support = no volume								-
							Subtotal	6,513
Pacode	§78a.64a.(d) Secondary Containment							
	Largest primary containment - 10 manifolded 400 BBL tanks (#3 thru #12)= 10 x400 BBL=							(4,000)
	plus an additional 10% of volume for precipitation							(400)
							Subtotal	2,113
Minus 'the footprint of remaining tanks not part of Largest group of 10 - 5ea 12' diameter tanks on pad = 5x2.33'x20 BBL/ft=								(233)
Minus the footprint of the four settling tanks - 8' "W"x2.33' "T"x 30' "L"= 559 ft ³ x .1781 BBL/CuFt=100 BBLx4 Tanks=								(400)
Remaining containment capacity calculated by Pennsylvania DEP rule= BBL								1,480
However the unroofed portion of the Penneco facility is 13,332 ft² (15540-2208) and PES has prepared for the very worst case:								
Less 100 year 24 hour Rainfall event 5"= (5"x144 in²/ft²)x13,332 ft²= 9,599,040 in³ / 1728 in³/ft³ = 5555 ft³ x .1781 BBL/ft³= 989 BBL								(989)
Remaining containment capacity by Penneco's environmental conscience = BBL								491

ATTACHMENT "Q"
Plugging and Abandonment Plan

Attachment Q
Plugging and Abandonment Plan
Sedat #4A Injection Well

Plugging and Abandonment Plan:

The company will plug the Sedat #4A in accordance with the Pennsylvania Bureau of Oil and Gas Management and the EPA regulations in place at the time of abandonment. The following actions will be taken:

- * Move in service rig
- * Set 4½" Cast Iron Bridge Plug at approximately 1,680'
- * Run 2 7/8" tubing to 1,680'
- * Spot solid plug from CIBP to Surface
- * Retrieve and lay down tubing string
- * Rig down and move out
- * Haul tubing to storage or disposal
- * Install monument with requisite detail

Form 7520-19 and cost estimate is attached.

United States Environmental Protection Agency



WELL REWORK RECORD, PLUGGING AND ABANDONMENT PLAN, OR PLUGGING AND ABANDONMENT AFFIDAVIT

Name and Address, Phone Number and/or Email of Permittee

Penneco Environmental Solutions, LLC
6608 Route 22
Delmont, PA 15626
724-468-8232
dmarcj@penneco.com

Permit or EPA ID Number

API Number

Full Well Name

37-003-21644

Sedat #4A

State

County

Pennsylvania

Allegheny

Locate well in two directions from nearest lines of quarter section and drilling unit

Latitude 40.526916

Surface Location

1/4 of 1/4 of Section Township Range

Longitude -79.711027

ft. from (N/S) Line of quarter section

ft. from (E/W) Line of quarter section.

Well Class

Timing of Action (pick one)

Type of Action (pick one)

- Class I
- Class II
- Class III
- Class V

Notice Prior to Work

Date Expected to Commence Future Date

Report After Work

Date Work Ended

Well Rework

Plugging and Abandonment

Conversion to a Non-Injection Well

Provide a narrative description of the work planned to be performed, or that was performed. Use additional pages as necessary. See instructions.

Upon the determination that the Sedat #4A well is no longer suitable for brine disposal, the well will be plugged starting with a 4½" Cast Iron Bridge Plug at approximately 1,680' (4½" casing seat depth) followed by 130 sks of Type 1 Cement from the CIBP to surface.

Certification

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR § 144.32)

Name and Official Title (Please type or print)

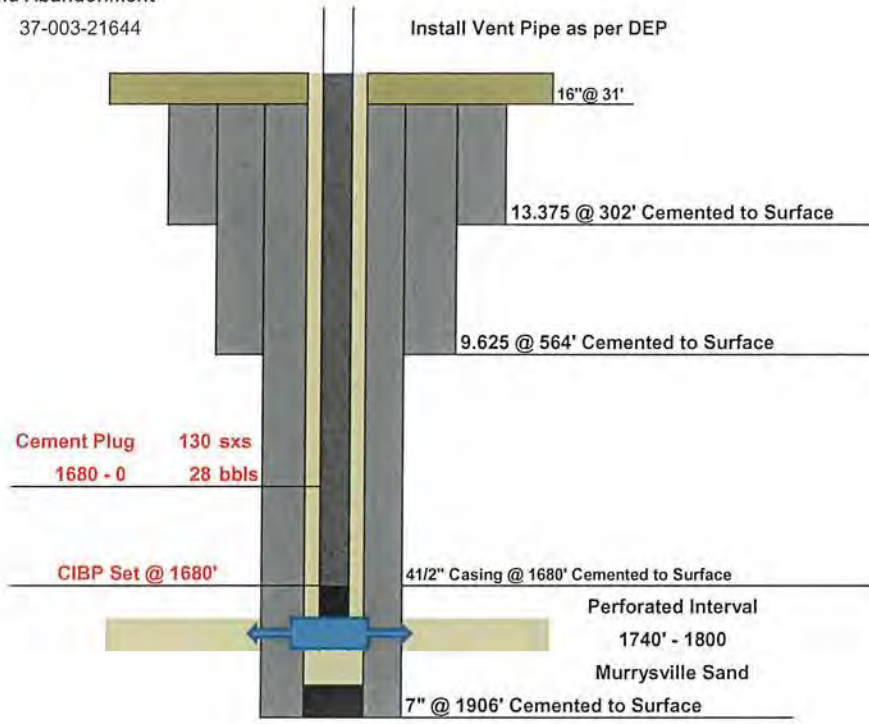
D. Marc Jacobs, Jr.
Senior Vice President

Signature

Date Signed

2/17/22

Penneco Oil Co
Sedat #4A
Plug and Abandonment
P/N 37-003-21644



ATTACHMENT "R"
Necessary Resources

STANDBY TRUST AGREEMENT

U.S. Environmental Protection Agency
Underground Injection Control
Financial Responsibility Requirement

THIS TRUST AGREEMENT (the "Agreement") is entered into as of the 23 day of MARCH, 2016, by and between **PENNECO ENVIRONMENTAL SOLUTIONS, LLC**, owner or operator, a Pennsylvania limited liability company of 6608 State Route 22 Delmont, PA 15626 (the "Grantor"), and **FIRST COMMONWEALTH BANK**, of 600 Philadelphia Street, Indiana, Pennsylvania 15701, a Pennsylvania business corporation (the "Trustee").

WHEREAS, the United States Environmental Protection Agency ("EPA"), an agency of the United States Government, has established certain regulations applicable to the Grantor, requiring that an owner or operator of an injection well shall provide assurance that funds will be available when needed for plugging and abandonment of the injection well or wells; and

WHEREAS, the Grantor has elected to establish a trust to provide all of part of such financial assurance for the facility or facilities identified herein; and

WHEREAS, the Grantor, acting through its duly authorized officers, has selected the Trustee to be the trustee under this Agreement, and the Trustee is willing to act as trustee.

NOW THEREFORE, the Grantor and the Trustee agree as follows:

Section 1. Definitions. As used in this Agreement: (a) The term "Grantor" means the owner or operator who enters into this Agreement and any successors or assigns of the Grantor; (b) The term "Trustee" means the Trustee who enters into this Agreement and any successor Trustee; and (c) Facility or activity means any "underground injection well" or any other facility or activity that is subject to regulation under the Underground Injection Control Program.

Section 2. Identification of Facilities and Cost Estimates. This Agreement pertains to the facilities and cost estimates identified on attached Schedule A.

Section 3. Establishment of Fund. The Grantor and the Trustee hereby establish a trust fund (the "Fund") for the purpose of assuring compliance with the plugging and abandonment requirements established by EPA for the facilities identified on Schedule A. The Underground Injection Control regulations which govern the authorization to inject include a requirement for such financial assurance that the well or wells shall be plugged and abandoned at the time designated by EPA. The Grantor and the Trustee acknowledge that the Fund and all expenditures from the Fund shall be to fulfill the legal obligations of the Grantor under such regulations, and not any obligation of EPA. The Grantor and the Trustee intend that no third party have access to the Fund except as herein provided. The Fund is established initially as consisting of the property, which is acceptable to the Trustee, described in Schedule B attached hereto. Such property and any other property subsequently transferred to the Trustee is referred to as the Fund, together with all earnings and profits thereon, less any payments or distributions made by the Trustee pursuant to this Agreement. The Fund shall be held by the Trustee, IN TRUST, as hereinafter provided. The Trustee shall not be responsible, nor shall it undertake any responsibility, for the amount or adequacy of any additional payments necessary to discharge any liabilities of the Grantor established by EPA, nor shall the Trustee have any duty to collect such additional amounts from the Grantor.

Section 4. Payment for Plugging and Abandonment. The Trustee shall make payments from the Fund only for the costs of plugging and abandonment ("P&A") of the injection wells covered by this Agreement and the associated P&A Plan, only after EPA has advised the Trustee that work has been completed under the P&A Plan that complies with 40 C.F.R. § 144.28 and/or § 144.52. The Trustee shall not refund to the Grantor any amounts from the Fund unless and until EPA has advised the Trustee that the P&A Plan has been successfully completed. The Trustee shall not release any funds to the Grantor that are necessary to cover liability for any injection wells covered by this Agreement that remain unplugged.

Section 5. Payments Comprising the Fund. Payments made to the Trustee for the Fund shall consist of cash or securities acceptable to the Trustee.

Section 6. Trustee Management. The Trustee shall invest and reinvest the principal and income of the Fund and keep the Fund invested as a single fund, without distinction between principal and income, in accordance with general investment policies and guidelines which the Grantor may communicate in writing to the Trustee from time to time, subject, however, to the provisions of this Section. In investing, reinvesting, exchanging, selling, and managing the Fund, the Trustee shall discharge his duties with respect to the trust fund solely in the interest of the beneficiary and with the care, skill, prudence, and diligence under the circumstances then prevailing which persons of prudence, acting in a like capacity and familiar with such matters, would use in the conduct of an enterprise of a like character and with like aims; *except that:* (i) Securities or other obligations of the Grantor, or any other owner or operator of the facilities, or any of their affiliates as defined in the Investment Company Act of 1940, as amended, 15 U.S.C. 80a-2.(a), shall not be acquired or held, unless they are securities or other obligations of the Federal or a State government; (ii) The Trustee is authorized to invest the Fund in time or demand deposits of the Trustee, to the extent insured by an agency of the Federal or State government; and (iii) The Trustee is authorized to hold cash awaiting investment or distribution uninvested for a reasonable time and without liability for the payment of interest thereon.

Section 7. Commingling and Investment. The Trustee is expressly authorized in its discretion: (a) To transfer from time to time any or all of the assets of the Fund to any common, commingled, or collective trust fund created by the Trustee in which the Fund is eligible to participate, subject to all of the provisions thereof, to be commingled with the assets of other trusts participating therein; and (b) To purchase shares in any investment company registered under the Investment Company Act of 1940, 15 U.S.C. 80a-I *et seq.*, including one which may be created, managed, underwritten, or to which investment advice is rendered or the shares of which are sold by the Trustee. The Trustee may vote shares in its discretion.

Section 8. Express Powers of Trustee. Without in any way limiting the powers and discretions conferred upon the Trustee by the other provisions of this Agreement or by law, the Trustee is expressly authorized and empowered: (a) To sell, exchange, convey, transfer, or otherwise dispose of any property held by it, by public or private sale. No person dealing with the Trustee shall be bound to see to the application of the purchase money or to inquire into the validity or expediency of any such sale or other disposition; (b) To make, execute, acknowledge, and deliver any and all documents of transfer and conveyance and any and all other instruments that may be necessary or appropriate to carry out the powers herein granted; (c) To register any securities held in the Fund in its own name or in the name of a nominee and to hold any security in bearer form or in book entry, or to combine certificates representing such securities with certificates of the same issue held by the Trustee in other fiduciary capacities, or to deposit or arrange for the deposit of such securities in a qualified central depository even though, when so deposited, such securities may be merged and held in bulk in the name of the nominee of such depository with other securities deposited therein by another person, or to deposit or arrange for the deposit of any securities issued by the United States Government, or any agency or instrumentality thereof, with a Federal Reserve bank, but the books and records of the Trustee shall at all times show that all such securities are part of

the Fund; (d) To deposit any cash in the Fund in interest-bearing accounts maintained or savings certificates issued by the Trustee, in its separate corporate capacity, or in any other banking institution affiliated with the Trustee, to the extent insured by an agency of the Federal or State government; and (e) To compromise or otherwise adjust all claims in favor of or against the Fund.

Section 9. Taxes and Expenses. All taxes of any kind that may be assessed or levied against or in respect of the Fund and all brokerage commissions incurred by the Fund shall be paid from the Fund. All other expenses incurred by the Trustee in connection with the administration of this Trust, including fees for legal services rendered to the Trustee, the compensation of the Trustee to the extent not paid directly by the Grantor, and all other proper charges and disbursements of the Trustee shall be paid from the Fund.

Section 10. Annual Valuation. The Trustee shall annually, at least 30 days prior to the anniversary date of establishment of the Fund, furnish to the Grantor and to the appropriate EPA Regional Administrator a statement confirming the value of the Trust. Any securities in the Fund shall be valued at market value as of no more than 60 days prior to the anniversary date of establishment of the Fund. The failure of the Grantor to object in writing to the Trustee within 90 days after the statement has been furnished to the Grantor and the EPA Regional Administrator shall constitute a conclusively binding assent by the Grantor, barring the Grantor from asserting any claim or liability against the Trustee with respect to matters disclosed in the statement.

Section 11. Advice of Counsel. The Trustee may from time to time consult with counsel, who may be counsel to the Grantor, with respect to any question arising as to the construction of this Agreement of any action to be taken hereunder. The Trustee shall be fully protected, to the extent permitted by law, in acting upon the advice of counsel.

Section 12. Trustee Compensation. The Trustee shall be entitled to reasonable compensation for its services as agreed upon in writing from time to time with the Grantor.

Section 13. Successor Trustee. The Trustee may resign or the Grantor may replace the Trustee, but such resignation or replacement shall not be effective until the Grantor has appointed a successor trustee and this successor accepts the appointment. The successor trustee shall have the same powers and duties as those conferred upon the Trustee hereunder. Upon the successor trustee's acceptance of the appointment, the Trustee shall assign, transfer, and pay over to the successor trustee the funds and properties then constituting the Fund. If for any reason the Grantor cannot or does not act in the event of the resignation of the Trustee, the Trustee may apply to a court of competent jurisdiction for the appointment of a successor trustee or for instructions. The successor trustee shall specify the date on which it assumes administration of the trust in a writing sent to the Grantor, the EPA Regional Administrator, and the present Trustee by certified mail 10 days before such change becomes effective. Any expenses incurred by the Trustee as a result of any of the acts contemplated by this Section shall be paid as provided in Section 9.

Section 14. Instructions to the Trustee. All orders, requests, and instructions by the Grantor to the Trustee shall be in writing, signed by such persons as are designated in the attached Exhibit A or such other designees as the Grantor may designate by amendment to Exhibit A. The Trustee shall be fully protected in acting without inquiry in accordance with the Grantor's orders, requests, and instructions. All orders, requests, and instructions by the EPA Regional Administrator to the Trustee shall be in writing, signed by the EPA Regional Administrators of the Regions in which the facilities are located, or their designees, and the Trustee shall act and shall be fully protected in acting in accordance with such orders, requests, and instructions. The Trustee shall have the right to assume, in the absence of written notice to the contrary, that no event constituting a change or a termination of the authority of any person to act on behalf of the

Grantor or EPA hereunder has occurred. The Trustee shall have no duty to act in the absence of such orders, requests, and instructions from the Grantor and/or EPA, except as provided for herein.

Section 15. Notice of Nonpayment. The Trustee shall notify the Grantor and the appropriate EPA Regional Administrator, by certified mail within 10 days following the expiration of the 30-day period after the anniversary of the establishment of the Trust, if no payment is received from the Grantor during that period. After the pay-in period is completed, the Trustee shall not be required to send a notice of nonpayment.

Section 16. Amendment of Agreement. This Agreement may be amended by an instrument in writing executed by the Grantor, the Trustee, and the appropriate EPA Regional Administrator, or by the Trustee and the appropriate EPA Regional Administrator if the Grantor ceases to exist.

Section 17. Irrevocability and Termination. Subject to the right of the parties to amend this Agreement as provided in Section 16, this Trust shall be irrevocable and shall continue until terminated at the written agreement of the Grantor, the Trustee, and the EPA Regional Administrator, or by the Trustee and the EPA Regional Administrator if the Grantor ceases to exist. Upon termination of the Trust, all remaining trust property, less final trust administration expenses, shall be delivered to the Grantor.

Section 18. Immunity and Indemnification. The Trustee shall not incur personal liability of any nature in connection with any act or omission, made in good faith, in the administration of this Trust, or in carrying out any directions by the Grantor or the EPA Regional Administrator issued in accordance with this Agreement. The Trustee shall be indemnified and saved harmless by the Grantor or from the Trust Fund, or both, from and against any personal liability to which the Trustee may be subjected by reason of any act or conduct in its official capacity, including all expenses reasonably incurred in its defense in the event the Grantor fails to provide such defense.

Section 19. Choice of Law. This Agreement shall be administered, construed, and enforced according to the laws of the Commonwealth of Pennsylvania.

Section 20. Interpretation. As used in this Agreement, words in the singular include the plural and words in the plural include the singular. The descriptive headings for each Section of this Agreement shall not affect the interpretation or the legal efficacy of this Agreement.

[The remainder of this page is intentionally left blank. Signatures follow.]

SCHEDULE A

Identification of Facilities and Cost Estimates

Schedule A is referenced in the standby trust agreement dated March 23, 2016 by and between PENNECO ENVIRONMENTAL SOLUTIONS, LLC, the Grantor and
(Name of owner or operator)

FIRST COMMONWEALTH BANK, the Trustee.
(Name of trustee)

EPA identification number	<u>PAS2D701BALL</u>
Name of facility	<u>Sedat 3A Injection Well</u>
Address of facility	<u>1800 Old Leechburg Road</u> <u>Pittsburgh, PA 15239</u>
Current plugging and abandonment cost estimate	<u>\$13,397.10</u>
Date of estimate	<u>02/17/2022</u>
EPA identification number	<u>PAS2D702BALL</u>
Name of facility	<u>Sedat 4A Injection Well</u>
Address of facility	<u>1800 Old Leechburg Road</u> <u>Pittsburgh, PA 15239</u>
Current plugging and abandonment cost estimate	<u>\$13,397.10</u>
Date of estimate	<u>02/17/2022</u>

SCHEDULE B

Description of Property / Financial Instrument

[Surety, Letter of Credit, etc.]

Schedule B is referenced in the Standby Trust Agreement (Section 3) dated 02/22/2022
by and between PENNECO ENVIRONMENTAL SOLUTIONS, LLC, the "Grantor,"
(name of owner or operator)
and FIRST COMMONWEALTH BANK, the "Trustee."
(name of the trustee)

The fund consists of: (Check one and provide identification number)

- Irrevocable Letter of Credit No. 491R1397 (Sedat 3A)
- Surety Performance Bond No. _____
- Other (Describe) _____

SCHEDULE B

Description of Property / Financial Instrument

[Surety, Letter of Credit, etc.]

Schedule B is referenced in the Standby Trust Agreement (Section 3) dated 02/22/2022
by and between PENNECO ENVIRONMENTAL SOLUTIONS, LLC, the "Grantor,"
(name of owner or operator)
and FIRST COMMONWEALTH BANK, the "Trustee."
(name of the trustee)

The fund consists of: (Check one and provide identification number)

- Irrevocable Letter of Credit No. 491R1398 (Sedat 4A)
- Surety Performance Bond No. _____
- Other (Describe) _____

IN WITNESS WHEREOF the parties below have caused this Agreement to be executed by their respective representatives duly authorized and their seals to be hereunto affixed and attested as of the date first above written.

GRANTOR:
PENNECO ENVIRONMENTAL SOLUTIONS, LLC

By: [Signature]
Name: Terrence S. Jacobs
Title: President

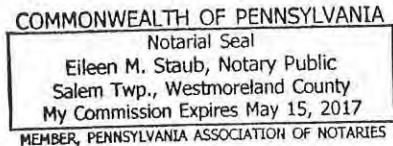
TRUSTEE:
FIRST COMMONWEALTH BANK

By: [Signature]
Name: Douglas I. Sako
Title: Senior Vice President

Before me came the individual whose identity I confirmed as Terrence S. Jacobs and whose true signature is set forth above; wherefore have I set my hand and seal this 18th day of MARCH, 2016.

Eileen M. Staub
Notary Public

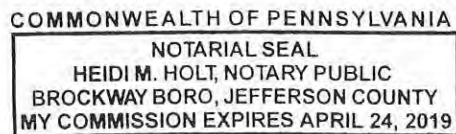
[Seal]



Before me came the individual whose identity I confirmed as Douglas I. Sako and whose true signature is set forth above; wherefore have I set my hand and seal this 23rd day of March, 2016.

Heidi M. Holt
Notary Public

[Seal]



() This bank/institution has the authority to act as trustee and its trust activities are examined and regulated by a State or Federal agency.

**CERTIFICATE OF ACKNOWLEDGMENT
FOR
STANDBY TRUST FUND AGREEMENT**

STATE OF Pennsylvania)
) SS:
COUNTY OF Jefferson)

On this, the 23rd day of March, 2016, before me personally came
Douglas I Sako, to me known, who, being by me duly sworn, did depose
and say that he/she resides at 654 Philadelphia St. Indiana, PA 15701
(Address)

that he/she is the Senior Vice President of FIRST COMMONWEALTH BANK
(Title) (Corporation)

the corporation described in and which executed the above instrument; that he/she knows the seal of said corporation; that the seal affixed to such instrument in such corporate seal; that it was so affixed by order of the Board of Directors of said corporation, and that he/she signed his/her name thereto by like order.

Heidi Molt
(Notary Public)

(Seal)

COMMONWEALTH OF PENNSYLVANIA NOTARIAL SEAL HEIDI M. HOLT, NOTARY PUBLIC BROCKWAY BORO, JEFFERSON COUNTY MY COMMISSION EXPIRES APRIL 24, 2019
--

IN WITNESS WHEREOF the parties below have caused this Agreement to be executed by their respective representatives duly authorized and their seals to be hereunto affixed and attested as of the date first above written.

GRANTOR:
PENNECO ENVIRONMENTAL
SOLUTIONS, LLC

TRUSTEE:
FIRST COMMONWEALTH BANK

By: _____
Name: _____
Title: _____

By: *Danny Diveley*
Name: Danny Diveley
Title: Trust Officer

Before me came the individual whose identity I confirmed as _____ and whose true signature is set forth above; wherefore have I set my hand and seal this _____ day of _____, 2016.

Before me came the individual whose identity I confirmed as Danny Diveley and whose true signature is set forth above; wherefore have I set my hand and seal this 24th day of March, 2016.

Notary Public
[Seal]

Kelly Perney
Notary Public
[Seal]

COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
KELLY PERNEY, NOTARY PUBLIC
CITY OF GREENSBURG, WESTMORELAND CO.
MY COMMISSION EXPIRES NOV. 25, 2018

This bank/institution has the authority to act as trustee and its trust activities are examined and regulated by a State or Federal agency.



First Commonwealth Bank
Central Offices:
Philadelphia and Sixth Streets
P.O. Box 400
Indiana, PA 15701-0400
800.711.2265
fcbanking.com

IRREVOCABLE STANDBY LETTER OF CREDIT # 491R1398

Issue Date: February 23, 2022

Beneficiary:

Department of Environmental Protection Agency
Regional Administration, Region III
1650 Arch Street
Philadelphia, PA 19103

Applicant:

Penneco Environmental Solutions LLC
6608 State Route 66
Delmont, PA 15626

Dear Beneficiary:

We hereby establish our Irrevocable Standby Letter of Credit No. 491R1398 in your favor as Beneficiary, at the request and for the account of the Applicant, Penneco Environmental Solutions LLC, for drawings up to Thirteen Thousand Four Hundred U.S. Dollars (13,400.00). We hereby authorize you to draw at sight, on First Commonwealth Bank at our office located at 654 Philadelphia Street, P.O. Box 400, Indiana, PA 15701 and expires with our close of business on February 23, 2023.

Funds under this credit are available to you against presentation of your sight draft(s) marked "Drawn under Irrevocable Standby Letter of Credit # 491R1398 dated February 23, 2022" and accompanied by:

1. your statement purportedly signed by an authorized representative of Department of Environmental Protection Agency, stating that "Penneco Environmental Solutions LLC have not performed their obligations required by Department of Environmental Protection Agency and are hereby responsible for payment of 13,400.00

AND

2. this original letter of credit and any amendments hereafter.

Partial draws are permitted.


It is a condition of this letter of credit that it shall be automatically renewable for additional terms of one year from the present or each future expiration date unless we give you and Penneco Environmental Solutions LLC at least ninety (90) days prior to said expiration date written notice by certified mail, return receipt requested, that we elect to terminate this credit at the end of its then current term.



Page 2
February 23, 2022
Letter of Credit No. 491R1398

This Letter of Credit is subject to and shall be governed in accordance with the terms of the Uniform Commercial Code, Article 5, Letters of Credit, 13 Pa.C.S.A. § 5101 *et seq.* ("Article 5"); and shall not be subject to or governed by the provisions of the Uniform Customs and Practice for Documentary Credit (2007 Revision) International Chamber of Commerce Publication No. 600 (the "UCP 600") or International Standby Practices Publication No. 590 (1998 Edition) (the "ISP 98"), except that where Article 5 is silent as to any issue which is addressed by the UCP 600, then the UCP 600 shall govern as to that issue only.

Sincerely,
First Commonwealth Bank

By: 
Name: Jason Colinet
Title: Vice President



LETTER OF CREDIT AGREEMENT

ISSUE DATE: February 23, 2022
LETTER OF CREDIT NO.: 491R1398
AMOUNT: 13,400.00

ISSUING BANK ("BANK")
FIRST COMMONWEALTH BANK
P. O. BOX 400
INDIANA, PA 15701

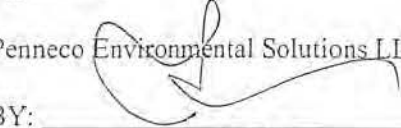
NAME OF CUSTOMER ("ACCOUNT PARTY")
Penneco Environmental Solutions LLC
6608 State Route 66
Delmont, PA 15626

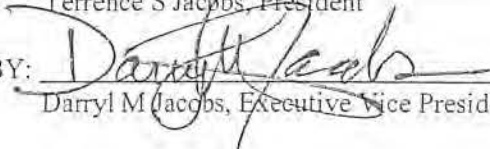
Account Party hereby directs Bank to fund drafts issued under this letter of credit by drawing against 8900020823 dated February 23, 2022 for the amount of said drafts.

In consideration of the issuance by Bank of the Letter, Account Party hereby:

1. Agrees to reimburse Bank for any charges or commissions incurred by Bank for processing of any drafts presented for payment under the Letter, and authorizes Bank to charge any of Account Party's deposit accounts for payment of said charges.
2. Authorizes Bank to honor any request for payment which is made under and in compliance with the terms of the Letter without regard to, and without any duty on Bank's part to inquire into the existence of any disputes or controversies between Account Party, the beneficiary of the Letter, or any other person, firm, or corporation, or the respective rights, duties or liabilities of any of term or whether any facts or occurrences represented in any of the documents presented under the Letter are true or correct.
3. Affirms that Bank's sole obligation shall be limited to honoring requests for payment under and in compliance with the terms of the Letter, and that this obligation shall remain limited even if Bank has assisted in the wording or preparation of the Letter and any associated documents or may be otherwise aware of the underlying transaction giving rise to the request for the Letter.
4. Assumes all risks of the acts or omissions of the users of the Letter, and releases Bank or responsibility for the validity, sufficiency, genuineness or effect of any documents associated with the Letter, even if such documents should in fact prove to be in any or all respects invalid, insufficient, fraudulent, or forged.
5. Agrees that any extension or modification of the original Letter will be subject to the terms of this Agreement.

Penneco Environmental Solutions LLC

BY: 
Terrence S Jacobs, President

BY: 
Darryl M Jacobs, Executive Vice President

SUREFIRE WIRELINE, LLC.**PRICE ESTIMATE**

Customer/Operator: Penneco Oil Company
 Representative: Marc Jacobs
 Well/Lease/Project Name: Sedat #4A (P&A)
 Prepared By: Gary Violi
 Date: Thursday, February 17, 2022
 Job Type: CIBP Set - 4.5"



GENERAL PRICING		Unit Price	Quantity	Total Price
Mileage Heavy Vehicle	per mile , one way from service point.	6.10	30	183.00
Mobilization / Service Charge				
Service Charge	per job (6 hours on location).....	1,440.00	1	1,440.00
Wireline Bridge Plugs / Frac Plugs				
Plug Setting				
Depth Charge	minimum.....	520.00	1	520.00
4 1/2" Cast Iron	each.....	760.00	1	760.00
Powder Charge/Igniter	each.....	220.00	1	220.00
Gross Price Subtotal				3,123.00
Discount				0.00
Net Price Subtotal				3,123.00
Miscellaneous Charges				
Total Net Price				3,123.00

Note: The above is an estimate only. Actual charges may differ as job parameters and exact services are requested or necessary at the time the work is performed. The Discount and consequently the Net Price are applicable only if payment is made within 30 days of the receipt of the invoice. After 30 days the full Gross Price and any Miscellaneous Charges will apply. Any invoices unpaid after 60 days will be subject to a Finance Charge and any and all Expenses to collect such unpaid invoices will be paid by the customer.

ATTACHMENT "U"
Description of Business

Attachment U
Description of Business
Sedat #4A Injection Well

Business Description for Sedat #4A Injection Well

The Company's business is the treatment and disposal of oil and gas well produced fluids by injection of the fluid into an underground formation via an injection well constructed by the company for this purpose.