BW - 4

ANNUAL REPORT

2019

From: Kautz, Paul, EMNRD
To: Chavez, Carl J, EMNRD; Bratcher, Mike, EMNRD
Subject: RE: BW-4 AOR 1/4 Mile Nearby Wells Not Cemented Through Salt
Date: Friday, May 29, 2020 10:07:09 AM

Hi Carl,

I do not believe follow up is required on 30-025-35678 NORTH VACUUM ABO NORTH UNIT #062 for the following reasons:

1. Top of salt is at a depth of greater than 1900'
   Base of salt is at approximately 2850'
2. Intermediate casing 8 5/8 set at 5020' TOC at 1740 by temperature survey. Top of cement is at least 160 feet above top of salt. Salt is covered by cement.
3. A hole in the 8 5/8 casing was repaired on 11/19/2001 by pumping 330 sxs cement down 4 ½ x 8 5/8 annulus out hole at 700 feet and up 11 ¾ x 8 5/8 annulus to the surface.

Paul Kautz
Hobbs District Geologist
Energy Minerals Natural Resources Dept.
Oil Conservation Division
1625 N. French Dr.
Hobbs, NM 88240
575-393-6161 ext. 104

From: Chavez, Carl J, EMNRD <CarlJ.Chavez@state.nm.us>
Sent: Thursday, May 28, 2020 4:44 PM
To: Kautz, Paul, EMNRD <paul.kautz@state.nm.us>
Subject: BW-4 AOR 1/4 Mile Nearby Wells Not Cemented Through Salt

Paul:

Good afternoon. Should there be corrective action to well API# 30-025-35678?

Just wanted to make sure OCD is following up on uncemented wells near the Wasserhund Eidson No. 1 Brine Well.

Thank you.

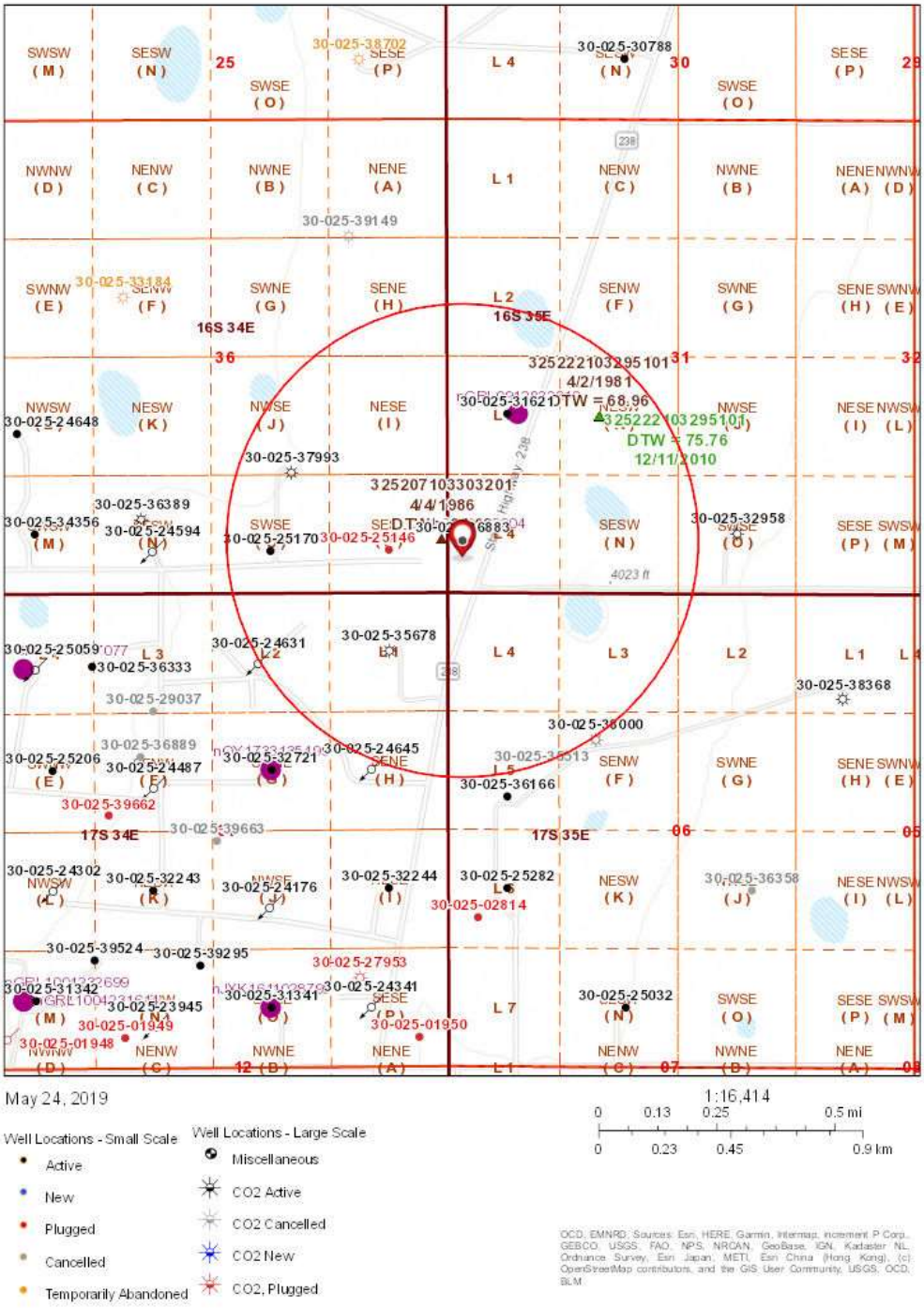
Mr. Carl J. Chavez, CHMM (#13099)
New Mexico Oil Conservation Division (Albuquerque Office)
Energy Minerals and Natural Resources Department
5200 Oakland Avenue, NE
Albuquerque, New Mexico 87113
Ph. (505) 660-7923

E-mail: CarlJ.Chavez@state.nm.us
“Why not prevent pollution, minimize waste to reduce operating costs, reuse or recycle, and move forward with the rest of the Nation?” (To see how, go to:
http://www.emnrd.state.nm.us/OCD **and see “Publications”)**

Screening Report

Area of Interest (AOI) Information

Area : 501.9 acres



Summary

Name	Count	Area (acres)	Length (mi)
Oil and Gas Wells	7	N/A	N/A

Oil and Gas Wells

#	API	wellname	Well Type	Well Status
1	30-025-25146	NORTH VACUUM ABO NORTH UNIT #001	Oil	Plugged (Site Released
2	30-025-25170	NORTH VACUUM ABO NORTH UNIT #002	Oil	Active
3	30-025-26883	EIDSON STATE #001	Miscellaneous	Active
4	30-025-31621	VACUUM 9205 JV-P #001H	Oil	Active
5	30-025-35678	NORTH VACUUM ABO NORTH UNIT #062	Gas	Active
6	30-025-37018	NORTH VACUUM ABO NORTH UNIT #123H	Oil	Active
7	30-025-37993	ENCORE 36 STATE #001	Gas	Active

#	Count
1	1
2	1
3	1
4	1
5	1
6	1
7	1

Appendix “C” Area of Review

- AOR Well Status List
- AOR Plot Plan

2019 BW-04 AOR Review- Well Status List

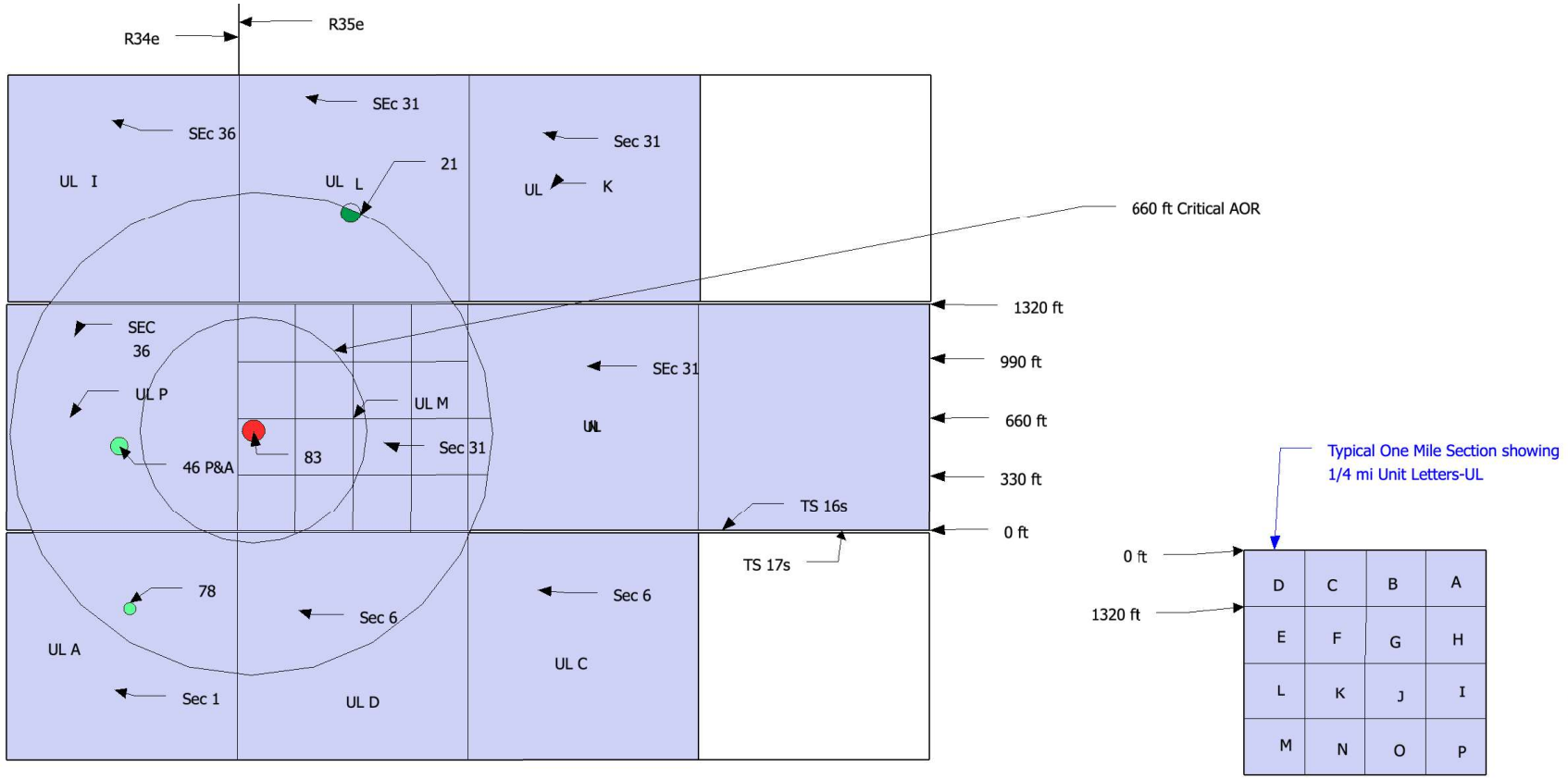
up-dated May 20, 2020

	API#	Well Name	UL	Section	Ts	Rg	Footage	Within 1/4 mi AOR * within 660 ft or Critical AOR	Casing Program Checked	Cased/Cemented across salt section	Corrective Action Required
0	***30-025-26883***	***Wasserhund Eidson #1***	***M***	***31***	***16s***	***35e***	***567 FSL & 162 FWL***	NA	NA	NA	NA
1	30-025-25146	LimeRock-N Vacumm ABO #1	P	36	16s	34e	460 FSL & 660 FEL	yes*	yes	yes	NO-P&A
1	30-025-35678	Uniflex O&G NVAboN #62	A	1	17s	34e	660 FNL & 660 FEL	yes*	yes	no	Re-Completion OCD Approved No Action Required
1	30-025-31621	BTA Oil Producers	L	31	16s	35e	1980 FSL & 660 FWL	Yes*	yes	yes	no

2 2

3 Total # of wells in adjacent quarter-sections
3 Total # of wells in 1/4 mile AOR
3 Total # of wells that are within 660 ft or have become within the Critical AOR of the outside radius of the brine well and casing program will be checked Annually.

Notes:
*** Means the well is within 660 ft or Critical AOR (1500-1600 ft) of the outside radius of the brine well and casing program will be checked annually.**



Brine Well Area of Review (AOR) UL Plot Plan	Well API#: 30-025-26883	Note: Wells are identified by the last 2 digits of the well's API#. API #'s are listed in the well status list.
Operator Name: Wasserhund INC	Permit # BW-04	
AOR Year: 2019	Location: UL M-Sec 31-Ts16s-R35e	

Discharge Permit, or any well plugging, abandonment or decommissioning of any equipment associated with its Class III well.

3. **Environmental Monitoring:** The Permittee shall ensure that any environmental sampling and analytical laboratory data collected meets the standards specified in 20.6.2.3107B NMAC or EPA QA/QC Standards. The Permittee shall ensure that all environmental samples are analyzed by an accredited "National Environmental Laboratory Accreditation Conference" (NELAC) Laboratory. The Permittee shall submit environmental sampling data summary tables, all raw analytical data, and laboratory QA/QC.

   a. A monitor well shall be installed hydrogeologically downgradient from the Brine Well and sampled in accordance with Section 2.A.1.

2.I. BONDING OR FINANCIAL ASSURANCE: Pursuant to 20.6.2.5210B(17) NMAC, the Permittee shall maintain financial assurance, at a minimum, in the amount that Permittee shall estimate and the Director shall approve, in accordance with Permit Conditions 2.D and 5.B, to cover potential costs associated with plugging and abandonment of the Class III well, surface restoration, environmental groundwater monitoring (if applicable), pipeline abandonment, along with three years of surface subsidence monitoring thereafter. OCD may require additional financial assurance to ensure adequate funding is available to plug and abandon the well and/or for any required environmental related corrective actions. The Permittee's cost estimate shall be based on third person estimates.

Acceptable financial assurance mechanisms include: (1) a surety bond; (2) a trust fund with a New Mexico bank in the name of the State of New Mexico, with the State as Beneficiary; (3) a non-renewable letter of credit made out to the State of New Mexico; (4) liability insurance specifically covering the contingencies listed in this paragraph; or (5) a performance bond, generally in conjunction with another type of financial assurance. If an adequate bond is posted by the Permittee to a federal or another state agency, and this bond covers all of the measures specified above, the OCD Director shall consider this bond as satisfying the bonding requirements of Sections 20.6.2.5000 through 20.6.2.5399 NMAC wholly or in part, depending upon the extent to which such bond is adequate to ensure that the Permittee will fully perform the measures required herein above.

2.J. ANNUAL REPORT: The Permittee shall submit its annual report pursuant to 20.6.2.3107 NMAC to OCD's Environmental Bureau by June 1st of the following year. The annual report shall include the following:

- Cover sheet marked as "Annual Class III Well Report, Name of Permittee, Discharge Permit Number, API number of well(s), date of report, and person submitting report;
- Summary of Class III well operations for the year including a description and reason for any remedial or major work on the well with a copy of form C-103;
- Monthly fluid injection and brine production volume, including the cumulative total carried over each year;
- Semi-annual monitor well analytical data results;
- Injection pressure data;
- Pipeline hydrostatic test results;
- Pipeline visual leak inspection monitoring results at joints;
- A copy of the quarterly chemical analyses shall be included with data summary and all QA/QC information;
- Copy of any mechanical integrity test chart, including the type of test, i.e., duration, gauge pressure, etc.;
- Brief explanation describing deviations from the normal operations;
- Results of any leaks and spill corrective action reports;
- An Area of Review (AOR) update summary;
- A summary with interpretation of MITs, surface subsidence surveys, estimated cavern size and shape, cavern volume and geometry measurements with conclusion(s) and recommendation(s);
- A summary of the ratio of the monthly volume of injected fluids to the volume of produced brine;
- A summary of all major Facility activities or events, which occurred during the year with any conclusions and recommendations;
- Annual Surface Subsidence Monitoring Plan data results in accordance with Permit Condition 2.B.1;
- Annual Solution Cavern Characterization data results in accordance with Permit Condition 2.B.2;
- Annual certification in accordance with Permit Condition 2.B.3; and

- The Permittee shall file its Annual Report in an electronic format with a hard copy submittal to OCD's Environmental Bureau.

3. CLASS III WELL OPERATIONS:

Owner/Operator Commitments. Once a permit is issued, the owner/operator must ensure all operations are consistent with the terms and conditions of the permit and in conformance with all pertinent rules and regulations under both the Water Quality Act. The owner/operator shall abide by all commitments submitted in its discharge permit application including any attachments and/or amendments along with these approval conditions. Applications which reference previously approved plans on file with the OCD shall be incorporated into this permit and the owner/operator shall abide by all commitments of such plans.

3.A. OPERATING REQUIREMENTS: The Permittee shall comply with the operating requirements specified in 20.6.2.5206A NMAC and 20.6.2.5206A NMAC to ensure that:

1. **Brine Production Method:** During the daily brine production, a "normal flow" configuration consisting of fresh water injection shall occur through the 2-3/8 in. tubing at approximately 2,460 ft. bgl, and brine production through the 5-1/2 in. flush joint casing annulus directed through and within a whipstock window in 7 in. casing offset at an approximate depth of 1,734 ft. bgl to a depth of 2,100 ft. bgl, which is approximately 100 ft. below the top of the Salado "Salt" Formation at approximately 2,000 ft. bgl. Injection and production flow may temporarily be reversed as required periodically to clean the tubing and annulus. However, a "normal flow" regime is required during daily injection and production operations and shall only occur within the intended solution mining interval.

2. **Injection Out of Zone:** Injection between the outermost casing and the well bore is prohibited in a zone other than the authorized injection zone. If the Permittee determines that its Class III well is discharging or suspects that it is discharging fluids into a zone or zones other than the permitted injection zone specified in Permit Condition 3.B.1., then the Permittee shall within 24 hours notify OCD's Environmental Bureau and Hobbs District Office of the circumstances and action(s) taken. The Permittee shall cease operations until proper repairs are made and it has received approval from OCD to re-start injection operations.

3. **Pipeline:** Hydrostatic testing of brine pipeline is required after repair for any pipeline pressure loss, leakage, etc. The hydrostatic test report with "as-built" pipeline transect, and associated construction information shall be submitted to OCD for approval within 3 months of permit issuance. Mandatory Hydrostatic Testing of the pipeline is required after leakage and/or before the expiration date of the Permit. Daily pipeline inspection and monitoring is required at a minimum for the first week of permit issuance and each time the pipeline is brought back into service after shut-down, service work, etc. The pipeline shall be inspected within 8-hours of pipeline pressure loss, upset, etc. Weekly inspection and monitoring at a minimum is required thereafter. Inspection record keeping is required and shall include the date and time of each inspection, inspectors name and contact information, weather conditions with inspection summary, any conclusion on pipeline condition with any recommendations. Spills or release locations shall include NAD83 GPS Coordinates and be handled in accordance with Permit Condition 2.G Release Reporting herein.

3.B. INJECTION OPERATIONS:

1. **Well Injection Pressure Limit:** The Permittee shall ensure that the maximum wellhead or surface injection pressure of 400 psig on its Class III well shall not exceed the fracture pressure in the injection salt formation and will not cause new fractures or propagate any existing fractures or cause damage to the system and underground source of drinking water.

2. **Pressure Limiting Device:** The Permittee shall equip and operate its Class III well or system with a pressure limiting device which shall, at all times, limit surface injection pressure to the maximum allowable pressure of 400 psig for its Class III well. The Permittee shall monitor the pressure-limiting device daily and shall report all pressure exceedances within 24 hours of detecting an exceedance to OCD's Environmental Bureau.

Wasserhund Inc.
P.O. Box 2140
575-396-0522
FAX 575-396-0797
Lovington, New Mexico 88260

ANNUAL CLASS III WELL REPORT FOR 2019

Wasserhund Inc.

Buckeye Brine Station

OCD Permit BW-04

API No. 30-025-26883 Eidson #1

Unit Letter M-Section 31-Ts 16s – R35e

May 19, 2020

Submitted By: Price LLC on behalf of Wasserhund Inc Principal Mr. Jon Gandy.

Wayne Price-LLC

Mr. Jon Gandy

Bullet Point 2- Summary of Operations:

(Permit Condition 2.J.2 Annual Report: "Summary of Class III well operations for the year including a description and reason for any remedial or major work on the well with a copy of C-103.") Permit Expires November 08, 2018.

During the 2019 year there was no major remedial work on the brine well. General housekeeping was routinely performed and inspections were conducted for awareness of the BW-04 permit conditions.

Bullet Point 3- Production Volumes:

(Permit condition 2.J.3 "Monthly fluid injection and brine production volume, including the cumulative total carried over each year"

Monthly, Yearly and Lifetime Injection and Production Volumes:

Enclosed in ***Appendix "A"*** is the injection and production and a comparison chart of injected water to produced.

Bullet Point 4- "Injection Pressure Data."

(Permit condition 2.J.4 "Injection Pressure Data"

Maximum and Average Injection Pressure:

The average injection pressure as noted by Wasserhund Inc.'s personnel is approximately 260-280 psig. This reading is taken from a pressure gauge mounted on the pump outlet.

Wasserhund Inc. has set the maximum pump pressure for injection into the tubing at 340 psig. If pumping down the casing the maximum pressure shall not exceed 315 psig.

Bullet Point 5- Chemical Analysis:

(Permit condition 2.J.5 "A copy of the quarterly chemical analysis shall be included with data summary and all QA/QC information.")

Please find attached in ***Appendix "B"*** the latest chemical analysis and chain-of-custody of the brine and fresh water injection water samples collected during the 2019 year. The sampling process and laboratory used common approved EPA methods to collect, analyze and reporting.

The injection water was collected from the fresh water tank load line that is connected directly to the fresh water storage tank. The fresh water is supplied by a fresh-water well located just west of the site.

The brine water was collected from the brine water tank load line that is connected directly to the brine water storage tanks. This sample point is representative of the brine water at the station.

Wasserhund routinely performs field-testing to ensure brine well quality. This testing generally shows close to 10 lb brine using the field method.

Bullet Point 6- Mechanical Integrity:

(Permit condition 2.J.6 "Copy of any mechanical integrity test chart, including the type of test, i.e., duration, gauge pressure, etc;")

A 4-hour Cavern Mechanical Integrity Test (MIT) was successfully ran and passed on November 28, 2016 and subsequently approved by OCD.

Pursuant to the permit conditions this test was not due until 2018. Therefore, the next five-year test will be scheduled for November of 2021, unless otherwise required by OCD for good cause shown or permit condition requirement.

Bullet Point 7- Deviations from Normal Production Methods:

(Permit condition 2.J.7 "Brief explanation describing deviations from normal operations.")

Wasserhund operates the brine well using "conventional flow" i.e. fresh water down the tubing and producing brine up the casing annulus and only reverses for maintenance only. There were no deviations from normal operation in 2019.

Bullet Point 8- Leak and Spill Reports:

(Permit condition 2.J.8 "Results of any leaks and spill reports;")

There were no reportable leaks and spills in 2019.

The loading areas are concrete with spill containers under the hose connections that are designed to catch de-minimus drips from hose connections. Drivers routinely suck out the spill containers, for re-cycling.

The entire facility is bermed to prevent run-on or run-off and all reportable or non-reportable spills are cleaned up pursuant to OCD rules and guidance.

Bullet Point 9- Area of Review Update Summary:

(Permit condition 2.J.9 "An Area of Review (AOR) update summary;")

Key's approach on the AOR update has been to research OCD well files and perform site surveillance yearly. All existing and new wells within ¼ mile are logged and reviewed for casing program status, casing/cementing status, and if corrective actions required.

Key utilizes a critical zone method by using the current estimated radius of the brine well and applying a 10:1 safety factor. As the brine well grows, the critical AOR is expanded and new wells are added for yearly review.

Appendix C contains a comprehensive list of all wells within adjacent quarter sections of the BW-04 location. The list includes API#, Operator well name, UL, Section, Township and Range, and footages, wells within the critical radius and ¼-mile radius from the brine well.

The only change from 2018 was a change of operator for well #62 API# 30-025-35678.

Bullet Point 10- Subsidence/Cavern Volumes/Geometric Measurements

(Permit condition 2.J.10. "A summary with interpretations of MIT's, surface subsidence surveys, cavern volume and geometric measurements with conclusion(s) and recommendation(s);")

Since the use of sonar tests in other wells has not provided adequate information, the continued use of sonar may be in question until the validity of using sonar test is resolved.

The last cavern survey (2008) for this well did not provide any useful information pertaining to the size and shape of this particular cavern. An alternate method has been discussed with Jim Griswold-OCD and it was mutually decided that an estimated worst-case diameter is to be determined in order to provide maximum protection and ensure the permit conditions are being met.

The Solution Mining Research Institute (SMRI), other state agencies, OCD work-group, along with various studies conducted during the permitting of the WIPP site, has concluded that failures, such as "catastrophic collapses", have a higher probability when the roof diameter of the cavern exceeds a certain value compared to the actual depth of the cavern.

This number is typically called D/H where "D" is the diameter of the cavity and "H" is the depth from surface to the casing shoe. Various reports seem to conclude that when a ratio of D/H reaches or exceeds .66 then the probably of collapse increases to a point that the well may be considered un-safe, thus closing procedures such as proper plugging and abandonment, and possible long term subsidence monitoring should be instituted.

The alternate method mentioned above involves calculating the maximum diameter of the cavern by using a worst-case scenario of an "***inverted cone" i.e. base located at the top.*** The volume of the cavern is calculated using the lifetime brine production volumes and using a *"rule of thumb"* conversion factor to determine the volumetric size of the cavern. The rule of thumb conversion factor was taken from the 1982 Wilson Report and equates that every barrel of brine produced will create approximately one cubic foot of cavity.

Please find attached in ***Appendix "D"***, a wellbore sketch, and the calculations for the brine well, and the lifetime brine production tally of approximately 9.90million barrels of brine produced as of December 2019. The maximum diameter was calculated to be approximately 324 feet with a corresponding D/H ratio of .154 updated for the 2019 year.

Comparing the current D/H ratio of .154 to the .66 value mentioned above, it can be concluded that the current brine well status meets and exceeds the recommended safety value by approximately four times.

Permit Condition 2.B. SOLUTION CAVERN MONITORING PROGRAM:

1. Surface Subsidence Monitoring Plan: The Permittee shall submit a Surface *Subsidence Monitoring Plan to OCD within 180 days of the effective data of this permit. The Surface Subsidence Monitoring Plan shall specify that the Permittee will install at least three survey monuments and shall include a proposal to monitor the elevation of the monuments at least semiannually.*

The Permittee shall survey each benchmark at least semiannually to monitor for possible surface subsidence and shall tie each survey to the nearest USGS benchmark. The Permittee shall employ a licensed professional surveyor to conduct the subsidence-monitoring program. The Permittee shall submit the results of all subsidence surveys to OCD within 15 days of the survey. If the monitored surface subsidence at any measuring point reaches 0.10 feet compared to its baseline elevation, then the Permittee shall suspend operation of the Class III well . If the Permittee cannot demonstrate the integrity of the cavern and well to the satisfaction of OCD, then it shall cease all brine production and submit a corrective action plan to mitigate the subsidence.

Wasserhund is scheduled to install monitors in 2020.

2. Solution Cavern Characterization Program: *The Permittee shall submit a Solution Cavern Characterization Plan to characterize the size and shape of the solution cavern using geophysical methods within 180 days of the effective date of this permit. The Permittee shall characterize the size and shape of the solution cavern using a*

geophysical methods approved by OCD at least once before November 8, 2018. The Permittee shall demonstrate that at least 90% of the calculated volume of salt removed based upon injection and production volumes has been accounted for by the approved geophysical method(s) for such testing to be considered truly representative.

Solution Cavern Characterization Plan:

Since the BW-04 well never had any logs run, a well log was obtained from a nearby well and annotated to reflect the geophysical characterization of the area lithology. In addition a well bore schematic is included for reference and a mass balance has been calculated and the results are included in **Appendix 'D".**

The mass balance compares the measured salt removed to the calculated salt removed. The comparison was within 2%, which satisfies permit condition 2.

Bullet Point #11- Ratio of Injected/Produced Fluids

(Permit condition 2.J.11 "A summary of the ratio of the volume of injected fluids to the volume of produced brine;")

*See Bullet Point #3 and **Appendix "A"** for comparison chart numbers.*

Bullet Point #12- Summary of Activities

(Permit condition 2.J.12 "A summary of all major Facility activities or events, which occurred during the year with any conclusions and recommendations;)

The following upgrades were implemented in 2019:

1. Installed new above ground piping between wellhead and brine tanks.
2. Installed new flow meters.

Bullet Point #13- Annual Certification

*(Permit condition 2.J.13 "Annual Certification in accordance with Permit Condition 2.B.3. **"2.B.3. Annual Certification:** The Permittee shall certify annually that continued salt solution mining will not cause cavern collapse, surface subsidence, property damage, or otherwise threaten public health and the environment, based on geologic and engineering data.")*

Operator Response: Based on all current information and actual on-site observance, the operator of record hereby certifies that the current operations pose no threat to public health and the environment at the submission of this report. If any substantial event that, has or may cause, this current certification to change, then the operator will notify OCD and take the necessary actions to protect the public and environment.

By signing the cover sheet of Bullet Point 1 of permit condition 2.J.1, the operator hereby certifies this condition of the permit.

Bullet Point 14- Groundwater Monitoring:
(Permit condition 2.J.14 "A summary of any new discoveries of ground water contamination with all leaks, spills and releases and corrective actions taken;")

The BW-04 Wasserhund Inc. Buckeye facility currently does not have groundwater monitoring at this site.

Bullet Point 15- Annual Reporting

(Permit condition 2.J.15 "The Permittee shall file its Annual Report in an electronic format with a hard copy submitted to OCD's Environmental Bureau.")

The operator hereby submits a PDF file on flash drive and a hard copy can be supplied upon request.

Appendix "A"

- Injection and Production Volumes/Comparison Charts

	2019	**Wasserhund Inc OCD BW-04 Annual Production Data & Comparision Chart**										
			Fresh IN		Brine Out		Ratio FW/BW					
	Jan		29950		29757		101%					
	Feb		27096		26981		100%					
	Mar		14537		14422		101%					
	Apr		10478		10450		100%					
	May		6103		6075		100%					
	Jun		3836		3826		100%					
	Jul		3879		3840		101%					
	Aug		5071		4996		102%					
	Sept		2460		2446		101%					
	Oct		8887		8799		101%					
	Nov		8217		8192		100%					
	Dec		8122		8079		101%					
	Total		128,636		127,863		101%	FW/BW				
	Total Fresh Water and Brine Production Carry Over from Years Past	2018	9,817,512	bbls***	9,766,847	bbls	100.52%	FW/BW				
	Total Life Time Production Year Ending	2019	9,946,148	bbls	9,894,710	bbls	100.52%	FW/BW				

Appendix “B”

- Chemical Analysis

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

February 13, 2019

WAYNE PRICE

WASSERHUND INC.

P.O. BOX 2140

LOVINGTON, NM 88260

RE: BUCKEYE BRINE STATION BW-04

Enclosed are the results of analyses for samples received by the laboratory on 02/01/19 9:10.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Total Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 13-Feb-19 13:21

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FRESH WATER TANK	H900374-01	Water	28-Jan-19 17:00	01-Feb-19 09:10
BRINE WATER TANK	H900374-02	Water	28-Jan-19 17:10	01-Feb-19 09:10

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 13-Feb-19 13:21

FRESH WATER TANK

H900374-01 (Water)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
Cardinal Laboratories										
Inorganic Compounds										
Chloride*	**160**		4.00	mg/L	1	9020111	AC	06-Feb-19	4500-Cl-B	
pH*	**8.16**		0.100	pH Units	1	9020107	AC	01-Feb-19	150.1	
Specific Gravity @ 60° F	**1.006**		0.000	[blank]	1	9020112	AC	01-Feb-19	SM 2710F	
TDS*	**518**		5.00	mg/L	1	9013005	AC	05-Feb-19	160.1	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 13-Feb-19 13:21

BRINE WATER TANK

H900374-02 (Water)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
Cardinal Laboratories										
Inorganic Compounds										
Chloride*	**89000**		4.00	mg/L	1	9020111	AC	06-Feb-19	4500-Cl-B	
pH*	**7.10**		0.100	pH Units	1	9020107	AC	01-Feb-19	150.1	
Specific Gravity @ 60° F	**1.109**		0.000	[blank]	1	9020112	AC	01-Feb-19	SM 2710F	
TDS*	**147000**		5.00	mg/L	1	9013005	AC	05-Feb-19	160.1	
Green Analytical Laboratories										
Total Recoverable Metals by ICP (E200.7)										
Sodium*	**50500**		250	mg/L	250	B902063	AES	11-Feb-19	EPA200.7	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 13-Feb-19 13:21

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9013005 - Filtration										
Blank (9013005-BLK1)				Prepared: 30-Jan-19 Analyzed: 01-Feb-19						
TDS	ND	5.00	mg/L							
LCS (9013005-BS1)				Prepared: 30-Jan-19 Analyzed: 05-Feb-19						
TDS	191		mg/L	204		93.6	80-120			
Duplicate (9013005-DUP1)		**Source: H900304-07**		Prepared: 30-Jan-19 Analyzed: 01-Feb-19						
TDS	474	5.00	mg/L		394			18.4	20	
Batch 9020107 - General Prep - Wet Chem										
LCS (9020107-BS1)				Prepared & Analyzed: 01-Feb-19						
pH	7.03		pH Units	7.00		100	90-110			
Duplicate (9020107-DUP1)		**Source: H900359-01**		Prepared & Analyzed: 01-Feb-19						
pH	11.8	0.100	pH Units		11.9			0.931	20	
Batch 9020111 - General Prep - Wet Chem										
Blank (9020111-BLK1)				Prepared & Analyzed: 01-Feb-19						
Chloride	ND	4.00	mg/L							
LCS (9020111-BS1)				Prepared & Analyzed: 01-Feb-19						
Chloride	104	4.00	mg/L	100		104	80-120			
LCS Dup (9020111-BSD1)				Prepared: 01-Feb-19 Analyzed: 06-Feb-19						
Chloride	104	4.00	mg/L	100		104	80-120	0.00	20	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 13-Feb-19 13:21

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9020112 - General Prep - Wet Chem										
Duplicate (9020112-DUP1)		**Source: H900369-01**		Prepared & Analyzed: 01-Feb-19						
Specific Gravity @ 60° F	1.004	0.000	[blank]		1.004			0.0359	20	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 13-Feb-19 13:21

Total Recoverable Metals by ICP (E200.7) - Quality Control

Green Analytical Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B902063 - Total Rec. 200.7/200.8/200.2										
Blank (B902063-BLK1)				Prepared & Analyzed: 11-Feb-19						
Sodium	ND	1.00	mg/L							
LCS (B902063-BS1)				Prepared & Analyzed: 11-Feb-19						
Sodium	3.18	1.00	mg/L	3.24		98.0	85-115			
LCS Dup (B902063-BSD1)				Prepared & Analyzed: 11-Feb-19						
Sodium	3.18	1.00	mg/L	3.24		98.2	85-115	0.171	20	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Send Results to wayneprice@q.com

Company Name:	Wasserhund Inc	BILL TO	
Project Manager:	Wayne Price-Price LLC	P.O. #:	
Address:	PO 2140	Company:	Wasserhund Inc
City:	Lovington State: NM Zip: 88260	Attn:	Jon Gandy
Phone #:	575-396-0522 Fax #:	Address:	Same
Project #:	2018-19 4th qtr Project Owner: Wasserhund Inc	City:	Same
Project Name:	Wasserhund Inc Buckeye Brine Station BW-04	State: NM Zip:	Same
Project Location:	SW/4 SW/4 Section 31 Township 16S Range 35E	Phone #:	
Sampler Name:	W.Price-PriceLLC 505-715-2809 wayneprice@q.com	Fax #:	

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST											
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER : Water	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides TDS, SG, Ph	Chlorides TDS, SG, Ph + Na										
H900374																										
1	Fresh Water Tank	G	1						✓		✓		1-28-19	5 pm	✓											
2	Brine Water Tank	G	1						✓		✓		1-28-19	5:10 pm		✓										

Relinquished By: wayne Price-Price LLC	Date: 2-1-19	Received By: Tamara Oldaker	Phone Result: ☐ Yes ☐ No Add'l Phone #:
	Time: 0910		Fax Result: ☐ Yes ☐ No Add'l Fax #:
Relinquished By:	Date:	Received By:	REMARKS: Send results to wayneprice@q.com
	Time:		

Delivered By: (Circle One)	Sample Condition	CHECKED BY:
Sampler - UPS - Bus - Other: -0.4°C #97	Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	(Initials) T.O.

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

August 27, 2019

This was the 2nd qtr of 2019- COC was mismarked-Corrected by Price LLC

WAYNE PRICE

WASSERHUND INC.

P.O. BOX 2140

LOVINGTON, NM 88260

RE: BUCKEYE BRINE STATION BW-04

Enclosed are the results of analyses for samples received by the laboratory on 08/08/19 12:10.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Total Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 27-Aug-19 15:39

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FRESH WATER TANK	H902723-01	Water	06-Aug-19 17:05	08-Aug-19 12:10
BRINE WATER TANK	H902723-02	Water	06-Aug-19 17:15	08-Aug-19 12:10

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: ~~2018-19 4TH QTR~~ 2 nd qtr Project Manager: WAYNE PRICE Fax To:	Reported: 27-Aug-19 15:39

FRESH WATER TANK

H902723-01 (Water)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
Cardinal Laboratories										
Inorganic Compounds										
Chloride*	**100**		4.00	mg/L	1	9080707	AC	09-Aug-19	4500-Cl-B	
pH*	**7.77**		0.100	pH Units	1	9080908	AC	09-Aug-19	150.1	
Specific Gravity @ 60° F	**0.9977**		0.000	[blank]	1	9080907	AC	09-Aug-19	SM 2710F	
TDS*	**454**		5.00	mg/L	1	9080706	AC	09-Aug-19	160.1	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 27-Aug-19 15:39

2 nd qtr

BRINE WATER TANK

H902723-02 (Water)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
Cardinal Laboratories										
Inorganic Compounds										
Chloride*	**134000**		4.00	mg/L	1	9080707	AC	09-Aug-19	4500-Cl-B	
pH*	**6.69**		0.100	pH Units	1	9080908	AC	09-Aug-19	150.1	
Specific Gravity @ 60° F	**1.134**		0.000	[blank]	1	9080907	AC	09-Aug-19	SM 2710F	
TDS*	**208000**		5.00	mg/L	1	9080706	AC	09-Aug-19	160.1	
Green Analytical Laboratories										
Total Recoverable Metals by ICP (E200.7)										
Sodium*	**63200**		500	mg/L	500	B908128	AES	20-Aug-19	EPA200.7	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2019 19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 27-Aug-19 15:39

2 nd qtr

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9080706 - Filtration										
Blank (9080706-BLK1)				Prepared: 08-Aug-19 Analyzed: 09-Aug-19						
TDS	ND	5.00	mg/L							
LCS (9080706-BS1)				Prepared: 08-Aug-19 Analyzed: 09-Aug-19						
TDS	425		mg/L	527		80.6	80-120			
Duplicate (9080706-DUP1)		**Source: H902700-02**		Prepared: 08-Aug-19 Analyzed: 09-Aug-19						
TDS	7880	5.00	mg/L		7770			1.41	20	
Batch 9080707 - General Prep - Wet Chem										
Blank (9080707-BLK1)				Prepared & Analyzed: 07-Aug-19						
Chloride	ND	4.00	mg/L							
LCS (9080707-BS1)				Prepared & Analyzed: 07-Aug-19						
Chloride	100	4.00	mg/L	100		100	80-120			
LCS Dup (9080707-BSD1)				Prepared & Analyzed: 07-Aug-19						
Chloride	104	4.00	mg/L	100		104	80-120	3.92	20	
Batch 9080907 - General Prep - Wet Chem										
Duplicate (9080907-DUP1)		**Source: H902723-01**		Prepared & Analyzed: 09-Aug-19						
Specific Gravity @ 60° F	0.9978	0.000	[blank]		0.9977			0.0110	20	
Batch 9080908 - General Prep - Wet Chem										
LCS (9080908-BS1)				Prepared & Analyzed: 09-Aug-19						
pH	7.06		pH Units	7.00		101	90-110			

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 27-Aug-19 15:39

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9080908 - General Prep - Wet Chem										
Duplicate (9080908-DUP1)		**Source: H902723-01**		Prepared & Analyzed: 09-Aug-19						
pH	7.80	0.100	pH Units		7.77			0.385	20	

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 2018-19 4TH QTR Project Manager: WAYNE PRICE Fax To:	Reported: 27-Aug-19 15:39

Total Recoverable Metals by ICP (E200.7) - Quality Control

Green Analytical Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B908128 - Total Rec. 200.7/200.8/200.2										
Blank (B908128-BLK1)				Prepared: 14-Aug-19 Analyzed: 20-Aug-19						
Sodium	ND	1.00	mg/L							
LCS (B908128-BS1)				Prepared: 14-Aug-19 Analyzed: 20-Aug-19						
Sodium	3.27	1.00	mg/L	3.24		101	85-115			
LCS Dup (B908128-BSD1)				Prepared: 14-Aug-19 Analyzed: 20-Aug-19						
Sodium	3.22	1.00	mg/L	3.24		99.5	85-115	1.30	20	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Corrected 2nd QTR

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Send Results to wayneprice@q.com

Company Name:	Wasserhund Inc	**BILL TO**	
Project Manager:	Wayne Price-Price LLC	P.O. #:	
Address:	PO 2140	Company:	Wasserhund Inc
City:	Lovington State: NM Zip: 88260	Attn:	Jon Gandy
Phone #:	575-396-0522 Fax #:	Address:	Same
Project #:	2018-19 4th qtr Project Owner: Wasserhund Inc	City:	Same
Project Name:	Wasserhund Inc Buckeye Brine Station BW-04	State: NM Zip:	Same
Project Location:	SW/4 SW/4 Section 31 Township 16S Range 35E	Phone #:	
Sampler Name:	W.Price-PriceLLC 505-715-2809 wayneprice@q.com	Fax #:	

FOR LAB USE ONLY				MATRIX						PRESERV.			SAMPLING		ANALYSIS REQUEST												
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER : Water	ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides TDS, SG, Ph	Chlorides TDS, SG, Ph + Na											
H902773																											
1	Fresh Water Tank	G	1						✓		✓		8-6-19	5:05 pm	✓												
2	Brine Water Tank	G	1						✓		✓		11	5:15 pm		✓											

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequental damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Relinquished By: wayne Price-Price LLC	Date: 8-8-19 Time: 12:10	Received By: Tamara Oldaker	Phone Result: ☐ Yes ☐ No Add'l Phone #:
Relinquished By:	Date: Time:	Received By:	Fax Result: ☐ Yes ☐ No Add'l Fax #:
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	4.8° #97 Corrected 5.2°	Sample Condition Cool: ☑ Yes ☐ No Intact: ☑ Yes ☐ No	CHECKED BY: (Initials) T.O.

REMARKS:

Send results to wayneprice@q.com

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2326

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

December 05, 2019

WAYNE PRICE

WASSERHUND INC.

P.O. BOX 2140

LOVINGTON, NM 88260

RE: BUCKEYE BRINE STATION BW-04

Enclosed are the results of analyses for samples received by the laboratory on 11/22/19 8:30.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-19-12. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (*). For a complete list of accredited analytes and matrices visit the TCEQ website at www.tceq.texas.gov/field/qa/lab_accred_certif.html.

Cardinal Laboratories is accreditated through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Total Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Celey D. Keene

Celey D. Keene

Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 3RD QTR 2019 Project Manager: WAYNE PRICE Fax To:	Reported: 05-Dec-19 13:43

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
FRESH WATER TANK	H903971-01	Water	20-Nov-19 15:00	22-Nov-19 08:30
BRINE WATER TANK	H903971-02	Water	20-Nov-19 15:05	22-Nov-19 08:30

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 3RD QTR 2019 Project Manager: WAYNE PRICE Fax To:	Reported: 05-Dec-19 13:43

FRESH WATER TANK

H903971-01 (Water)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
Cardinal Laboratories										
Inorganic Compounds										
Chloride*	**92.0**		4.00	mg/L	1	9112202	AC	22-Nov-19	4500-Cl-B	
pH*	**7.77**		0.100	pH Units	1	9112503	AC	25-Nov-19	150.1	
Specific Gravity @ 60° F	**1.001**		0.000	[blank]	1	9112213	AC	22-Nov-19	SM 2710F	
TDS*	**356**		5.00	mg/L	1	9112504	AC	27-Nov-19	160.1	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 3RD QTR 2019 Project Manager: WAYNE PRICE Fax To:	Reported: 05-Dec-19 13:43

BRINE WATER TANK

H903971-02 (Water)

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
Cardinal Laboratories										
Inorganic Compounds										
Chloride*	**154000**		4.00	mg/L	1	9112202	AC	22-Nov-19	4500-Cl-B	
pH*	**6.64**		0.100	pH Units	1	9112503	AC	25-Nov-19	150.1	
Specific Gravity @ 60° F	**1.163**		0.000	[blank]	1	9112213	AC	22-Nov-19	SM 2710F	
TDS*	**232000**		5.00	mg/L	1	9112504	AC	27-Nov-19	160.1	
Green Analytical Laboratories										
Total Recoverable Metals by ICP (E200.7)										
Sodium*	**90000**		250	mg/L	250	B911262	AES	02-Dec-19	EPA200.7	

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 3RD QTR 2019 Project Manager: WAYNE PRICE Fax To:	Reported: 05-Dec-19 13:43

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9112202 - General Prep - Wet Chem										
Blank (9112202-BLK1)				Prepared & Analyzed: 22-Nov-19						
Chloride	ND	4.00	mg/L							
LCS (9112202-BS1)				Prepared & Analyzed: 22-Nov-19						
Chloride	104	4.00	mg/L	100		104	80-120			
LCS Dup (9112202-BSD1)				Prepared & Analyzed: 22-Nov-19						
Chloride	104	4.00	mg/L	100		104	80-120	0.00	20	
Batch 9112213 - General Prep - Wet Chem										
Duplicate (9112213-DUP1)		**Source: H903955-01**		Prepared & Analyzed: 22-Nov-19						
Specific Gravity @ 60° F	1.003	0.000	[blank]		1.003			0.0179	20	
Batch 9112503 - General Prep - Wet Chem										
LCS (9112503-BS1)				Prepared & Analyzed: 25-Nov-19						
pH	7.08		pH Units	7.00		101	90-110			
Duplicate (9112503-DUP1)		**Source: H903971-01**		Prepared & Analyzed: 25-Nov-19						
pH	7.78	0.100	pH Units		7.77			0.129	20	
Batch 9112504 - Filtration										
Blank (9112504-BLK1)				Prepared: 25-Nov-19 Analyzed: 27-Nov-19						
TDS	ND	5.00	mg/L							

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 3RD QTR 2019 Project Manager: WAYNE PRICE Fax To:	Reported: 05-Dec-19 13:43

Inorganic Compounds - Quality Control

Cardinal Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 9112504 - Filtration										
LCS (9112504-BS1)				Prepared: 25-Nov-19 Analyzed: 27-Nov-19						
TDS	515		mg/L	527		97.7	80-120			
Duplicate (9112504-DUP1)		**Source: H903953-02**		Prepared: 25-Nov-19 Analyzed: 27-Nov-19						
TDS	349	5.00	mg/L		407			15.3	20	

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Analytical Results For:

WASSERHUND INC. P.O. BOX 2140 LOVINGTON NM, 88260	Project: BUCKEYE BRINE STATION BW-04 Project Number: 3RD QTR 2019 Project Manager: WAYNE PRICE Fax To:	Reported: 05-Dec-19 13:43

Total Recoverable Metals by ICP (E200.7) - Quality Control

Green Analytical Laboratories

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B911262 - Total Rec. 200.7/200.8/200.2										
Blank (B911262-BLK1)				Prepared: 27-Nov-19 Analyzed: 02-Dec-19						
Sodium	ND	1.00	mg/L							
LCS (B911262-BS1)				Prepared: 27-Nov-19 Analyzed: 02-Dec-19						
Sodium	3.26	1.00	mg/L	3.24		101	85-115			
LCS Dup (B911262-BSD1)				Prepared: 27-Nov-19 Analyzed: 02-Dec-19						
Sodium	3.23	1.00	mg/L	3.24		99.7	85-115	0.819	20	

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Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

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Notes and Definitions

ND	Analyte NOT DETECTED at or above the reporting limit
RPD	Relative Percent Difference
**	Samples not received at proper temperature of 6°C or below.
***	Insufficient time to reach temperature.
-	Chloride by SM4500Cl-B does not require samples be received at or below 6°C
	Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

*=Accredited Analyte

Celey D. Keene, Lab Director/Quality Manager

CARDINAL Laboratories

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

101 East Marland, Hobbs, NM 88240
(575) 393-2326 FAX (575) 393-2476

Send Results to wayneprice@q.com

Company Name:	Wasserhund Inc	BILL TO	
Project Manager:	Wayne Price-Price LLC	P.O. #:	
Address:	PO 2140	Company:	Wasserhund Inc
City:	Lovington State: NM Zip: 88260	Attn:	Jon Gandy
Phone #:	575-396-0522 Fax #:	Address:	Same
Project #:	3 rd QTR 2019 Project Owner: Wasserhund Inc	City:	Same
Project Name:	Wasserhund Inc Buckeye Brine Station BW-04	State: NM Zip:	Same
Project Location:	SW/4 SW/4 Section 31 Township 16S Range 35E	Phone #:	
Sampler Name:	W.Price-PriceLLC 505-715-2809 wayneprice@q.com	Fax #:	

FOR LAB USE ONLY				MATRIX							PRESERV.			SAMPLING		ANALYSIS REQUEST										
Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER : Water		ACID/BASE:	ICE / COOL	OTHER :	DATE	TIME	Chlorides TDS, SG, Ph	Chlorides TDS, SG, Ph + Na										
H903971																										
1	Fresh Water Tank	G	1						✓			✓		11-20-19	3:00 pm	✓											
2	Brine Water Tank	G	1						✓			✓		11-20-19	3:05 pm		✓										

Relinquished By: wayne Price-Price LLC	Date: 11/22/19 Time: 8:30 AM	Received By: Jodi Henson	
Relinquished By:	Date: Time:	Received By:	
Delivered By: (Circle One)	+.4 correction	Sample Condition Cool ☑ Yes ☐ No / Intact ☑ Yes ☐ No	CHECKED BY: (Initials)
Sampler - UPS - Bus - Other:	3.8°c / 4.2°c #97		

Phone Result:	☐ Yes	☐ No	Add'l Phone #:
Fax Result:	☐ Yes	☐ No	Add'l Fax #:
REMARKS:			

Send results to wayneprice@q.com

† Cardinal cannot accept verbal changes. Please fax written changes to (575) 393-2826

Appendix “C” Area of Review

- AOR Well Status List
- AOR Plot Plan

2019 BW-04 AOR Review- Well Status List

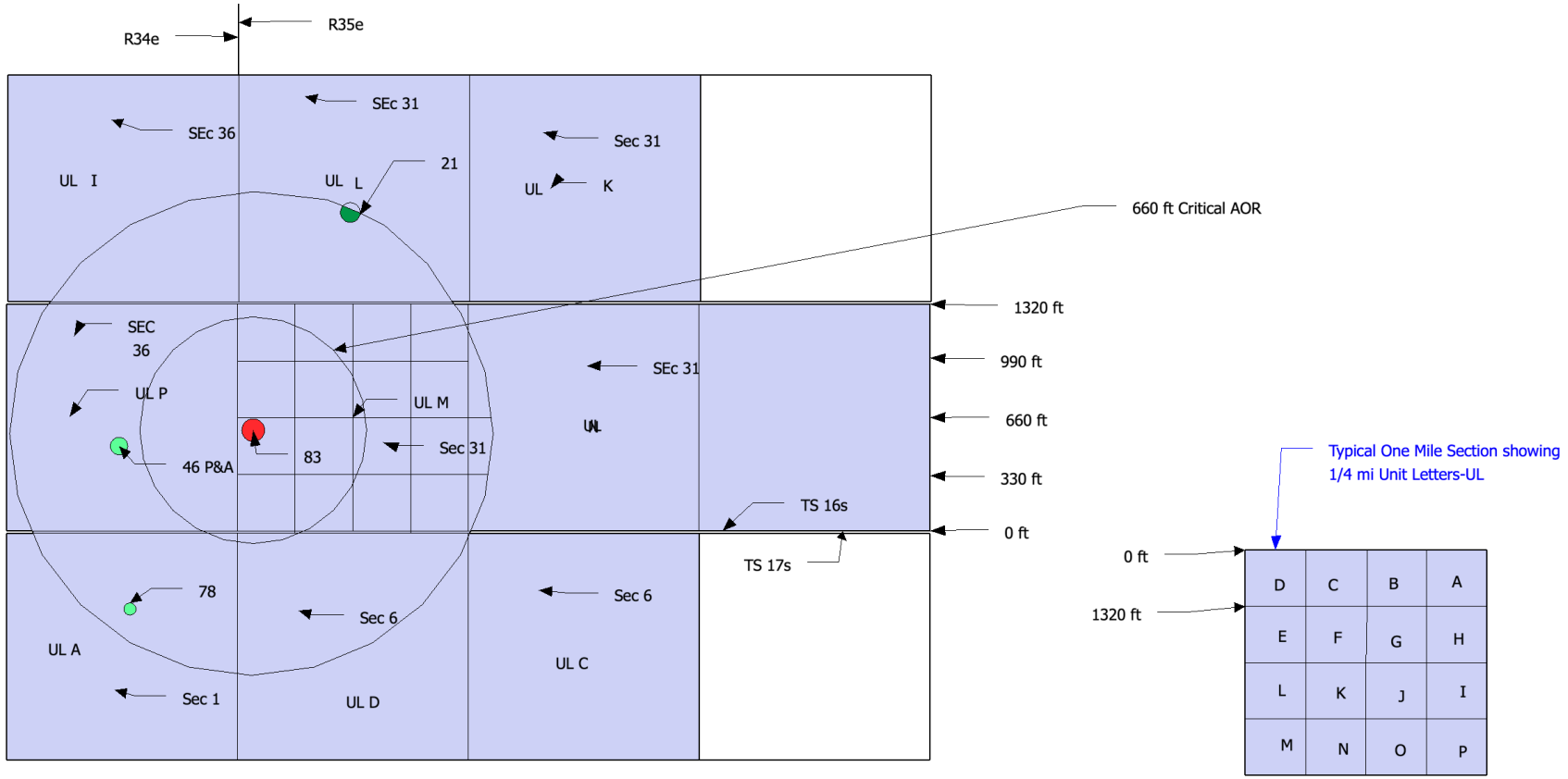
up-dated May 20, 2020

	API#	Well Name	UL	Section	Ts	Rg	Footage	Within 1/4 mi AOR * within 660 ft or Critical AOR	Casing Program Checked	Cased/Cemented across salt section	Corrective Action Required
0	***30-025-26883***	***Wasserhund Eidson #1***	***M***	***31***	***16s***	***35e***	***567 FSL & 162 FWL***	NA	NA	NA	NA
1	30-025-25146	LimeRock-N Vacumm ABO #1	P	36	16s	34e	460 FSL & 660 FEL	yes*	yes	yes	NO-P&A
1	30-025-35678	Uniflex O&G NVAboN #62	A	1	17s	34e	660 FNL & 660 FEL	yes*	yes	no	Re-Completion OCD Approved No Action Required
1	30-025-31621	BTA Oil Producers	L	31	16s	35e	1980 FSL & 660 FWL	Yes*	yes	yes	no

2 2

3 Total # of wells in adjacent quarter-sections
3 Total # of wells in 1/4 mile AOR
3 Total # of wells that are within 660 ft or have become within the Critical AOR of the outside radius of the brine well and casing program will be checked Annually.

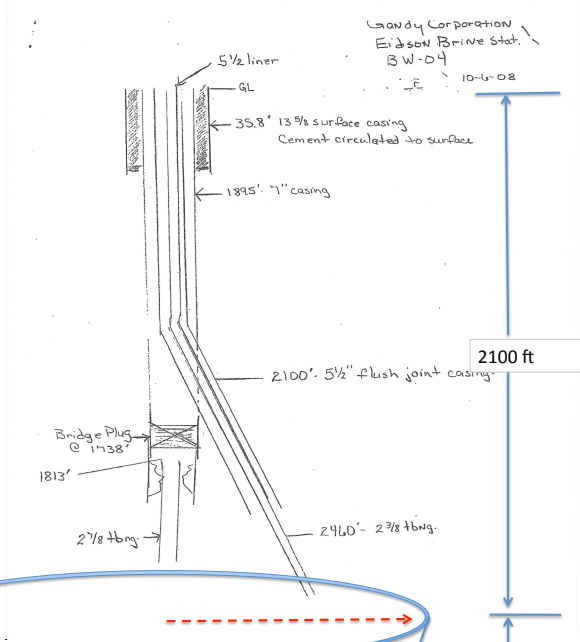
Notes:
*** Means the well is within 660 ft or Critical AOR (1500-1600 ft) of the outside radius of the brine well and casing program will be checked annually.**



Brine Well Area of Review (AOR) UL Plot Plan	Well API#: 30-025-26883	Note: Wells are identified by the last 2 digits of the well's API#. API #'s are listed in the well status list.
Operator Name: Wasserhund INC	Permit # BW-04	
AOR Year: 2019	Location: UL M-Sec 31-Ts16s-R35e	

Appendix “D”

- Updated Cone Calculations with Radius and D/H values
- Wellbore Sketch with Log
- Cavern Characterization mass balance updated.



2100 ft

R= 162.0 ft

Radius = SQRT of (Vol * 3)/(3.14*Height of Cavern)

Not to scale

2460 ft - 2100ft = 360 ft

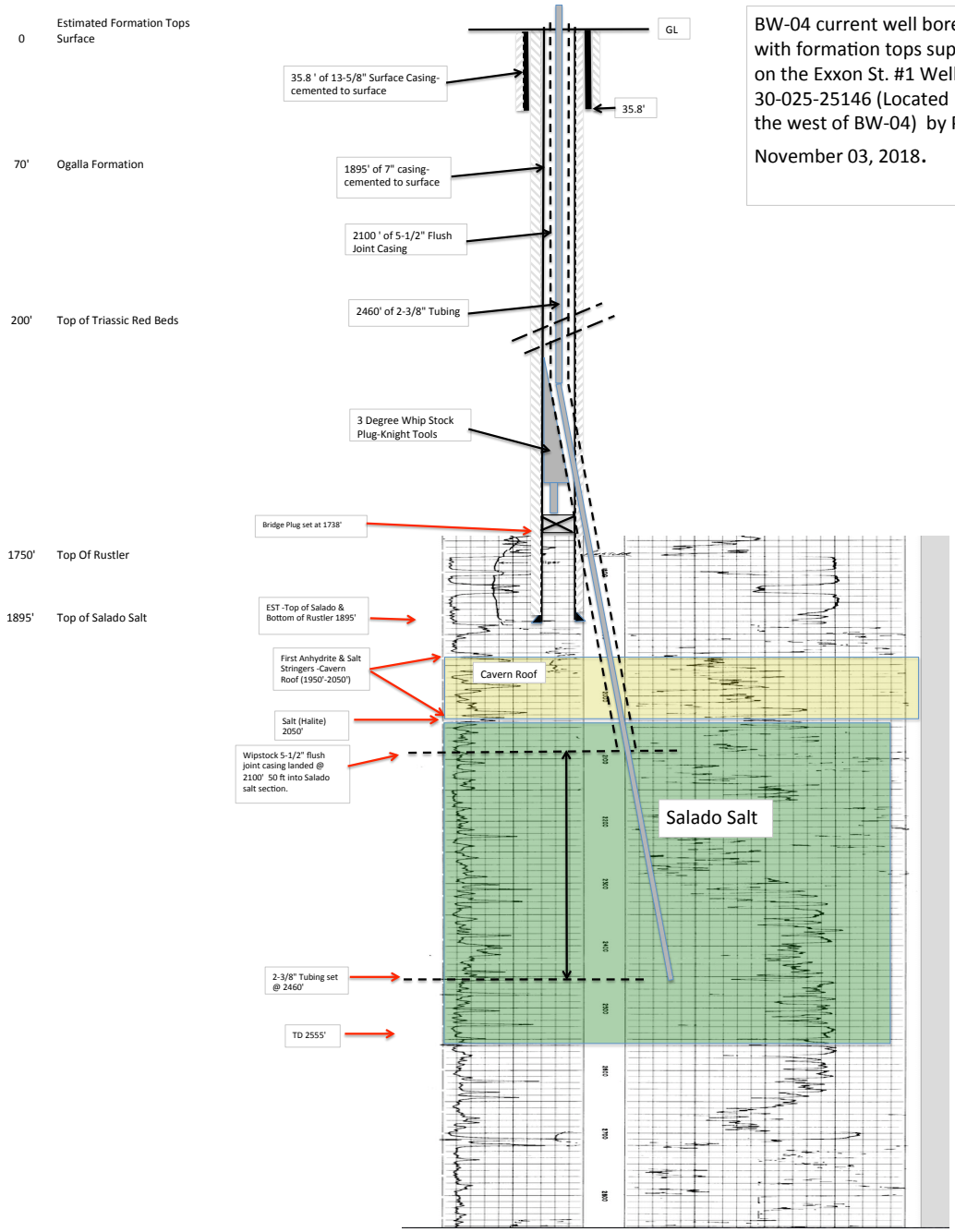
2019 Calculations

r=SqRtV(V*3/π*D)

V	Volume	=		9,894,710 bbls
D	Depth	=		360 ft
H	Height	=		2100 ft
Kf	ft3 salt/bbl		162.0	1 est
	r	=		162.0 ft
	Diameter			324.10 ft
	D/H=			0.154

BW-04 current well bore diagram with formation tops superimposed on the Exxon St. #1 Well Log API# 30-025-25146 (Located 1/4 mile to the west of BW-04) by Price LLC

November 03, 2018.



BW-04 Mass Balance

Measured Salt Removed vs Calculated Salt Removed

Independent Inputs

Formulas — Dependent Variables

2019 year End total Production Volume	9,894,710	BBls	Independent variable
Average Density #/gal produced water measured	9.8	lbs/gal	Independent variable — Seven year Average
Average Salt Density-Est	80	lbs/ft3	Independent variable — Used OCD number for salt density
FT3/bbl	7.35	ft3/bbl	Independent variable
LBs of salt per gal	1.466	Lbs/gal	Dependent Variable
LBs of Salt per BBL	80.63	Lbs/bbl	Dependent Variable
Total LBs of Salt Removed	797,810,467	LBS	Dependent Variable
Ft3 of salt removed	9,972,631	Ft3	Estimated Cavern Size calculated from Production Numbers

Geo-Physical Worst Case Cone Calculation

V= ∏R2h / 3

Radius	Radius	161 ft	Dependent Variable
	Height from Log	360 ft	Independent Variable
Volume of Worst Case Cone		9,767,033 Ft3	Calculated using "Worst Case Cone"

2% Within 10 % Passes

" Plus % = Means Cone Calulation is less than measured salt removed

" Neg % = Means Cone Calculaton is more than measured salt remove