

# **DE BEQUE WATER STATION OPERATING PLAN**

## **OVERVIEW**

The De Beque Water Station will be designed for the collection of produced water from surrounding oil and gas operations along with raw water from the Colorado River. The proposed facility is located approximately 2.2 miles southwest of De Beque, Colorado in the SE ¼ of the SW ¼ of Section 29, Township 8 South, Range 97 West, 6<sup>th</sup> P.M.

The De Beque Water Station facility will consist of three lined reservoirs for the storage of produced water and raw water, a pump station, a lay down yard and an office building. A layout of the facility is shown on Exhibit 1. Pond 1 is designated as a produced and raw water pond while Ponds 2 and 3 are designated as produced water only. This gives the operator more flexibility for water storage.

The project will be split into several components. The first component is Pond 1, which is covered in this operating plan. Ponds 2 and 3 will be another component and will be submitted for review at a later date as part of the Form 28 permit.

## **OPERATING PLAN CRITERIA**

The criteria used for the operating plan of Pond 1 were based on the COGCC 900 Series Rules under Section 908.B.

## **WATER SOURCE, TREATMENT AND FLOW RATES**

Three natural gas fields will be the sources of produced water to be stored in proposed ponds. These fields are named Winter Flats, Homer Deep, and Horseshoe Canyon. The fields can be seen on Exhibit 2. Pipelines have been constructed to connect each field to the De Beque pump station building. Produced water will be pre-treated at each wellhead via an oil/water separator prior to transport to the De Beque Water Station. All produced flow back water will enter the pump station building and flow through an oil skimming system before being pumped to Pond 1 for storage. Any produced water that is delivered to the site via truck will also be pumped through the oil skimming system and then to Pond 1.

To determine the anticipated flow rates of the return flow at the De Beque Water Station, flow back data from Well Number: DHS3C-19 D17998 (Well C19) and DHS3C-20 D17998 (Well C20) was reviewed. From 12/5/2013 to 2/26/2014, Well C19 had 79 days of return water flow. During this time, the well averaged approximately 519 bbls/day of water with a minimum of 2 bbls/day and a maximum of 3,270 bbls/day. Well C20 had 34 days of return water flow from 1/21/2014 to 2/26/2014. During this time, the

well averaged 229 bbls/day of water with a minimum of 0 bbls/day and maximum of 2096 bbls/day. For the purpose of estimating the design flow back, a peak daily flow of 3,270 bbls/day will be used. Tables with flow back data for Wells C19 and C20 are located in Attachment A.

Oil/water ratios were estimated by comparing typical oil production values to the quantity of return water flow for each day. It was noted that the data supplied for these wells was taken at a sampling point corresponding to a flow back separator, which is estimated to remove 90% of the hydrocarbons present in the flow back water. Based on these estimates, an average oil removal of 5.8 gallons per hour (gph) will be required with a peak removal of 15.2 gph.

Flow back water will flow through an oil skimming system to remove hydrocarbons prior to being pumped to Pond 1 for storage. The oil removal system will consist of a two part system. First, a gravity separation tank will be required to reduce the kinetic energy of the influent and to provide sufficient detention time to allow the oil and water to separate. Effluent will be allowed to leave the bottom of the gravity separation tank, via a sump pump, leaving the lighter oils at the surface of the tank. Second, an oil skimmer will be required to remove the separated oil from the tank.

#### **DUST AND MOISTURE CONTROL**

The main access road into the site and to the lay down yard and pump station building will be a gravel surface that will be sprayed with magnesium chloride to provide dust suppression. The maintenance road along the Pond 1 berm will be a graveled surface. If dust becomes an issue on these roads or any other areas on-site, the raw water supplied from the Colorado River will be used for dust suppression.

During large rainfall events, conveyance ditches will be constructed around the perimeter of the site to route storm water runoff. This runoff water will be conveyed to an on-site detention pond and an existing drainage ditch.

#### **SAMPLING**

Three groundwater monitoring wells have been installed around the perimeter of the site with each well 100 feet deep. These wells were drilled in February of 2014 and have been monitored monthly since their installation. The groundwater level has remained greater than 100 feet since the monitoring wells were installed as no water has been detected in any well. Due to this depth of groundwater, no groundwater samples will be required for this project.

The water in Pond 1 will be sampled on a regular basis and analyzed for the constituents listed in Table 910-1 in the COGCC regulations. Initially water samples will

be collected on a monthly basis and can be adjusted to a more frequent basis if conditions warrant.

## INSPECTION AND MAINTENANCE

The anticipated inspection, operation and maintenance of Pond 1 tasks that Black Hills will perform are listed below:

- Black Hills operators will be at Pond 1 on a daily basis and will do a basic visual observation of the pond for any apparent problems. This will include watching for leaks in any equipment, damage to any fencing, and orientation of floating cover;
- Black Hills will provide operators with an inspection check list to be used during inspections conducted once per week;
- Black Hills operators will ensure all facility monitoring systems are operating correctly and reporting critical information in real-time;
- Black Hills operators will be responsible for ensuring all equipment and system components are inspected and serviced per the manufacturer's instructions;
- Maintenance will be done on the facility as recommended by the manufacturer of the liners and as needed based on weekly inspections;
- All reporting requirements will be imposed per the COGCC standard;
- Pond 1 has been designed with a leak detection system between the primary and secondary liners. The leak detection system will be monitored regularly for water accumulation between these two liners. The leak detection system will be inspected weekly when water is being stored in the pond.

## EMERGENCY RESPONSE

All incidents that occur on the facility shall be reported to the facility supervisor with Black Hills. The contact information for the facility supervisor is listed below.

Brett Hurlbut  
1515 Wynkoop St., Suite 500  
Denver, CO 80202  
(303) 566-3491 (office)  
(303) 828-7816 (cell)

In the event of an emergency that requires immediate medical attention, personnel shall call 9-1-1 emergency services. The closest nearest hospital is located in Grand Junction and is the Community Hospital. The Community Hospital is located approximately 35 miles south of the facility, and the contact information is listed below.

Grand Junction Community Hospital  
2021 N. 12<sup>th</sup> St.  
Grand Junction, CO 81501  
(970) 242-09220

The produced water that will be pumped into Pond 1 from the producing natural gas wells will contain a very low percentage of hydrocarbons as it will go through a flow back separator at the well site and an additional oil skimming chamber in the pump station building. The produced water in the pond will also be mixed with raw water from the Colorado River, further reducing the hydrocarbon percentage. The low hydrocarbon content of the pond water reduces the risk of fire in the pits. In case of a fire occurring at the facility, the contact information for the De Beque Fire Protection Division is listed below.

De Beque Fire Protection Division  
380 Curtis Ave.  
De Beque, CO 81630  
(970) 283-8632

In the event that law enforcement officials may be contacted, the Colorado State Police and De Beque Town Marshall's Office contact information is given below.

Colorado State Police  
202 Centennial St.  
Glenwood Springs, CO 81601  
(970) 945-6198 (business hours)  
(970) 824-6501 (dispatch)

De Beque Town Marshall/Police Chief's Office  
381 Minter Ave.  
De Beque, CO 81630  
(970) 283-5475

Operational emergencies including large amounts of spilled fluids or complete embankment failure, the Mesa County Office of Emergency Management may be contacted. The contact information for this office is given below.

Mesa County Office of  
Emergency Management  
215 Rice Street  
Grand Junction, CO 81501  
Office: (970) 244-1763

In the case of a medical emergency, injury, fire, or facility operational emergency, personnel shall notify the facility supervisor immediately after contacting the appropriate emergency personnel. In the case of a fire or unauthorized release, the Colorado Oil

and Gas Conservation Commission (COGCC) shall be notified. The contact information for the COGCC is given below.

Colorado Oil and Gas Conservation Commission (district office)  
796 Megan Ave., Suite 201  
Rifle, CO 81650  
Office: (970) 625-2497

Colorado Oil and Gas Conservation Commission (main office)  
1120 Lincoln St., Suite 801  
Denver, CO 80203  
Office: (303) 894-2100

## **RECORD-KEEPING**

The offices of Black Hills will handle record keeping for the facility. The facility supervisor will be responsible for ensuring the accuracy and completeness of the records showing volumes of water stored in the facility. Record-keeping will be composed of the following elements: date water was transported, method of transportation (truck or pipeline), approximate volume of water, and source of water. All records will be available for the COGCC upon request.

## **SITE SECURITY**

The site is secured with a 7 feet high industrial strength chain link fence with 3 strands of barbed wire along the top. The fence is designed to keep livestock, wildlife and unauthorized personnel from entering the site. The fence completely surrounds the facility. A 7 feet high automated gate will be installed at the site entrance adjacent to county road V 2/10. The gate will only open via an electronic card reader on the unsecured side of the gate. The gate will automatically close once the vehicle has entered the facility. The pump station building will be locked at all times and can be accessed with a card reader. The facility will be manned during all pumping operations.

## **HOURS OF OPERATION**

Water may be flowing into and out of Pond 1, 24 hours per day, 7 days per week. The facility will be manned as needed during normal daylight hours and will be manned at all times during pumping operations.

## **NOISE AND ODOR MITIGATION**

Low noise levels are anticipated. The pumps that supply water for fracing operations are located within an enclosed pump station building. The building will be insulated which will help mitigate noise pollution. Odor mitigation will be accomplished by installing a floating cover on the water surface of Pond 1. As the water level fluctuates, the cover will raise or lower with the water level. This cover will also deter birds from landing on the pond surface.

## FINAL DISPOSITION OF WASTE

The only anticipated waste from the facility will be hydrocarbons removed from the oil skimming system and motor oil used in the pumps. These waste products will be collected on a regular basis and disposed of at a certified disposal site.

# EXHIBITS





# **APPENDIX A**

## **EXISTING WELL FLOW BACK DATA**



COMPANY: **Blackhills**

WELL: **Well C20**

FIELD:

Day Lead: **wes bybee**

Day Tech: **robert willams**

Night Lead: **russ rowe**

Night Tech: **Bryan Schmidt**

FIELD REP: **Michael Durham**

Phone # **307-371-9519**

Phone # **970-217-0791**

Phone # **303-709-1266**

Phone # **970-556-5789**

Phone # **505 220 2865**

DATE **02/26/14**

PACKER @

PERF:

WELL HEAD DATA					GAS VOLUME DATA										WATER DATA					REMARKS																								
TIME	CHOKE SIZE	WELLHEAD PRESS (psi)	WELLHEAD TEMP	CSG PRESS	ORIFICE READINGS				ORIFICE PLATE	SALES LINE PRES	58332	6785	66822.75	SALES MMCF/D	OIL (BBL/SHR)	OIL (BBL/DAY)	729	CORIOLIS READING	WATER (BBL/SHR)	WATER (BBL/D)	6788	531131	SALINITY (PPM)	SAND	PH																			
					METER RUN	DIFF	PRESS	TEMP			SALES GAS	FLARE GAS	SCANNER 2000				TOTAL OIL BBL/S				TOTAL WATER	WATER LEFT TO RECOVER						COMMENTS																
7:00	20/64	1875	74	0	3.826	17	202	56	2.500	182	89	0	89	2136	1	24	730	0	3	72	6791	531128																						
8:00	20/64	1925	72	0	3.826	8	201	62	2.500	175	85	0	85	2040	3	72	733	0	1	24	6792	531127																						
9:00	20/64	1900	82	0	3.826	32	197	66	2.500	179	90	0	90	2160	4	96	737	0	3	72	6795	531124																						
10:00	20/64	1925	80	0	3.826	23	199	57	2.500	181	115	0	115	2760	3	72	740	0	6	144	6801	531118																						
11:00	22/64	1950	83	0	3.826	23	200	59	2.500	184	86	0	86	2064	4	96	744	0	3	72	6804	531115																						
12:00	22/64	1950	90	0	3.826	26	209	71	2.500	190	108	0	108	2592	0	0	744	0	0	0	6804	531115																						
13:00	22/64	1950	82	0	3.826	20	212	54	2.500	196	121	0	121	2904	4	96	748	0	3	72	6807	531112																						
14:00	22/64	1950	82	0	3.826	22	215	61	2.500	199	81	0	81	1944	0	0	748	0	2	48	6809	531110																						
15:00	20/64	1950	81	0	3.826	20	209	62	2.500	201	95	0	95	2280	1	24	749	0	3	72	6812	531107																						
16:00	18/64	1975	80	0	3.826	15	211	59	2.500	197	79.75	1.25	81	1914	0	0	749	0	3	72	6815	531104				16:45 went to full flare because static on sales line reached 211																		
17:00	16/64	1925	80	0	3.826	24	186	58	2.500	207	60	24	84	1440	1	24	750	0	1	24	6816	531103																						
18:00	16/64	1900	79	0	3.826	20	176	60	2.500	190	0	85	85	0	1	24	751	0	1	24	6817	531102																						
19:00	16/64	1875	77	0	3.826	18	161	57	2.500	151	0	85	85	0	0	0	751	0	1	24	6818	531101				19:05 static on sales line dropped, opened sales																		
20:00	18/64	1900	74	0	3.826	19	160	56	2.500	139	42	42	84	1008	1	24	752	0	2	48	6820	531099				20:00 closed flare																		
21:00	18/64	1900	77	0	3.826	25	178	61	2.500	158	100.75	1.25	102	2418	1	24	753	0	3	72	6823	531096																						
22:00	18/64	1925	77	0	3.826	28	185	60	2.500	166	101.75	1.25	103	2442	2	48	755	0	2	48	6825	531094																						
23:00	18/64	1925	75	0	3.826	24	186	61	2.500	170	104.75	1.25	106	2514	2	48	757	0	2	48	6827	531092																						
0:00	18/64	1925	76	0	3.826	23	188	58	2.500	171	103.75	1.25	105	2490	1	24	758	0	3	72	6830	531089																						
1:00	18/64	1925	76	0	3.826	24	192	60	2.500	174	102.75	1.25	104	2466	2	48	760	0	2	48	6832	531087																						
2:00	18/64	1925	78	0	3.826	23	196	57	2.500	179	104.75	1.25	106	2514	2	48	762	0	3	72	6835	531084																						
3:00	18/64	1925	78	0	3.826	24	200	62	2.500	182	100.75	1.25	102	2418	1	24	763	0	3	72	6838	531081																						
4:00	18/64	1925	80	0	3.826	23	200	60	2.500	183	98.75	1.25	100	2370	1	24	764	0	2	48	6840	531079																						
5:00	18/64	1925	80	0	3.826	24	200	61	2.500	186	95	0	95	2280	0	0	764	0	2	48	6842	531077																						
6:00	18/64	1925	81	0	3.826	22	209	59	2.500	191	83	0	83	1992	1	24	765	0	1	24	6843	531076																						
GAS PROD (MCF/D):					2295					ACCUM PROD GAS(MCF) SCANNER 2000					69117.75					OIL PROD (BBL/DAY):					55					CHLORIDES (PPM):														
SALES GAS(MCF/D):					2047.75					ACCUM SALES GAS(MCF) TOTAL FLOW					60379.75					OIL RECOVERED (BBL/S)					765					H2O RECOVERED (BBL/S):					6843									
FLARE GAS(MCF/D):					247.25					ACCUM FLARE GAS(MCF)					7032					BLWTR:					531.076					H2O % Recovered:					1.29%					CO2 (%):				
SALES MMCF/D AVERAGE:					85.32																																							



COMPANY: Blackhills

WELL: Well C19

FIELD: \_\_\_\_\_

Day Lead: Wes Bybee

Day Tech: Robert Williams

Night Lead: Russ Rowe

Night Tech: Bryan Schmidt

FIELD REP: Michael Durham

Phone # 307-371-9519

Phone # \_\_\_\_\_

Phone # 307-389-0668

Phone # 970-556-5789

Phone # 505 220 2865

DATE 02/26/14

PACKER @ \_\_\_\_\_

PERF: \_\_\_\_\_

WELL HEAD DATA					GAS VOLUME DATA										WATER DATA														REMARKS	
TIME	CHOKE SIZE	WELLHEAD PRESS (psi)	WELLHEAD TEMP	CSG PRESS	ORIFICE READINGS				ORIFICE PLATE	SALES LINE PRESS	21700	262855	343831	SALES MMCF/D	OIL (BBL/S/HR)	OIL (BBLS/DAY)	2548	CORIOLIS READING	WATER (BBL/S/HR)	WATER (BBLS/D)	35782	429,230	SALINITY (PPM)	SAND	PH			COMMENTS		
					METER RUN	DIFF	PRESS	TEMP			SALES GAS	FLARE GAS	SCANNER 2000				TOTAL OIL BBLS				TOTAL WATER	WATER LEFT TO RECOVER								
7:00	24/64	1200	59	0	3.826	13	198	76	2.500	182	89	0	89	2136	1	24	2549	0	0	0	35782	429230								
8:00	24/64	1200	73	0	3.826	13	190	76	2.500	175	85	0	85	2040	2	48	2551	0	1	24	35783	429229								
9:00	24/64	1200	72	0	3.826	21	195	71	2.500	179	90	0	90	2160	1	24	2552	0	1	24	35784	429228								
10:00	26/64	1100	79	0	3.826	20	198	75	2.500	181	115	0	115	2760	1	24	2553	0	1	24	35785	429227								
11:00	26/64	950	82	0	3.826	23	202	74	2.500	184	86	0	86	2064	1	24	2554	0	3	72	35788	429224								
12:00	26/64	1000	94	0	3.826	24	200	73	2.500	190	108	0	108	2592	0	0	2554	0	2	48	35790	429222								
13:00	26/64	1000	85	0	3.826	20	212	73	2.500	196	121	0	121	2904	1	24	2555	0	3	72	35793	429219								
14:00	26/64	1000	82	0	3.826	19	215	73	2.500	199	81	0	81	1944	0	0	2555	0	2	48	35795	429217								
15:00	24/64	1000	77	0	3.826	20	212	74	2.500	201	95	0	95	2280	1	24	2556	0	0	0	35795	429217								
16:00	24/64	950	75	0	3.826	10	211	75	2.500	197	81	0	81	1944	0	0	2556	0	0	0	35795	429217					16:45 went to full flare because static on sales line reached 211			
17:00	20/64	950	76	0	3.826	14	186	72	2.500	207	60	24	84	1440	0	0	2556	0	0	0	35795	429217								
18:00	20/64	925	75	0	3.826	14	175	74	2.500	190	0	85	85	0	0	0	2556	0	3	72	35798	429214								
19:00	20/64	900	74	0	3.826	13	156	72	2.500	151	0	85	85	0	0	0	2556	0	2	48	35800	429212					19:05 static on sales line dropped, opened sales			
20:00	24/64	900	68	0	3.826	14	159	76	2.500	139	42	42	84	1008	1	24	2557	0	3	72	35803	429209					20:00 closed flare			
21:00	24/64	925	81	0	3.826	26	178	77	2.500	158	102	0	102	2448	2	48	2559	0	2	48	35805	429207								
22:00	24/64	1000	78	0	3.826	22	185	76	2.500	166	103	0	103	2472	1	24	2560	0	2	48	35807	429205								
23:00	24/64	1000	70	0	3.826	21	187	77	2.500	170	106	0	106	2544	1	24	2561	0	1	24	35808	429204								
0:00	24/64	950	71	0	3.826	19	188	78	2.500	171	105	0	105	2520	1	24	2562	0	1	24	35809	429203								
1:00	24/64	925	68	0	3.826	18	191	75	2.500	174	104	0	104	2496	1	24	2563	0	0	0	35809	429203								
2:00	24/64	900	71	0	3.826	17	196	75	2.500	179	106	0	106	2544	1	24	2564	0	1	24	35810	429202								
3:00	24/64	900	71	0	3.826	16	199	75	2.500	182	102	0	102	2448	2	48	2566	0	0	0	35810	429202								
4:00	24/64	900	74	0	3.826	15	199	75	2.500	183	100	0	100	2400	2	48	2568	0	1	24	35811	429201								
5:00	24/64	900	72	0	3.826	18	204	74	2.500	186	95	0	95	2280	0	0	2568	0	0	0	35811	429201								
6:00	24/64	900	73	0	3.826	18	208	76	2.500	191	83	0	83	1992	1	24	2569	0	0	0	35811	429201								
GAS PROD (MCF/D): 2295					ACCUM PROD GAS(MCF) SCANNER 2000 346126					OIL PROD (BBL/S/DAY) 21					H2O PROD (BBL/S/DAY): 29					CHLORIDES (PPM):										
SALES GAS(MCF/D): 2059					ACCUM SALES GAS(MCF) TOTAL FLOW 23759					OIL RECOVERED (BBL/S) 2.569					H2O RECOVERED (BBL/S): 35811					H2S (PPM): 0										
FLARE GAS(MCF/D): 236					ACCUM FLARE GAS(MCF) 263091					BLWTR: 429,201					H2O % Recovered: 8.34%					CO2 (%):										
SALES MMCF/D AVERAGE: 85.79																														