

Table 3.1-7 Disposal Water Balance (Marsland Expansion Area), Crow Butte Resources, Inc., Crawford, NE

Year	2015				2016				2017				2018			
Elapsed Time (Quarters)	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Prod Flow	1100	1700	2100	2100	2100	2700	3400	3600	3500	3900	4500	4700	4500	4800	5300	5400
Prod Bleed 1.2%	13	20	25	25	25	32	41	43	42	47	54	56	54	58	64	65
IX Bleed 2.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU1 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU2 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU3 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU4 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU5 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUA RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUB RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUC RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUD RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUE RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUF RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Production bleed capacity needed (gpm)	13	20	25	25	25	32	41	43	42	47	54	56	54	58	64	65
Restoration capacity needed (gpm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total disposal capacity needed (gpm)	13	20	25	25	25	32	41	43	42	47	54	56	54	58	64	65
Disposal Option(s)	DDW1	DDW1	DDW1	DDW1	DDW1	DDW1	DDW1	DDW1	DDW1	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾

Notes:
 (1) Additional deep disposal wells will be installed as needed
 Assumed start date = 1Q 2015
 gpm - gallons per minute
 hr - hours
 DDW1 - Deep Disposal Well 1
 DDW2 - Deep Disposal Well 2
 Assumed sustainable DDW injection rates = 45 gpm
 Storage Tanks Capacity = 100,000 gallons

Table 3.1-7 Disposal Water Balance (Marsland Expansion Area), Crow Butte Resources, Inc., Crawford, NE

Year	2019				2020				2021				2022			
Elapsed Time (Quarters)	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Prod Flow	5100	5300	5300	5300	4500	4500	4200	4100	4100	4600	4500	4300	4300	4800	4800	4500
Prod Bleed 1.2%	61	64	64	64	54	54	50	49	49	55	54	52	52	58	58	54
IX Bleed 2.0%	0	0	0	0	0	16	16	16	4	16	16	16	8	16	16	16
MU1 RO Bleed (30%)	0	0	0	0	0	0	0	0	150	150	150	150	150	150	150	150
MU2 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	75	75	75	75
MU3 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU4 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU5 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUA RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUB RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUC RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUD RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUE RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUF RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Production bleed capacity needed (gpm)	61	64	64	64	54	54	50	49	49	55	54	52	52	58	58	54
Restoration capacity needed (gpm)	0	0	0	0	0	16	16	16	154	166	166	166	233	241	241	241
Total disposal capacity needed (gpm)	61	64	64	64	54	70	66	65	203	221	220	218	285	299	299	295
Disposal Option(s)	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾

Notes:

(1) Additional deep disposal wells will be installed as needed

Assumed start date = 1Q 2015

gpm - gallons per minute

hr - hours

DDW1 - Deep Disposal Well 1

DDW2 - Deep Disposal Well 2

Assumed sustainable DDW injection rates = 45 gpm

Storage Tanks Capacity = 100,000 gallons

Table 3.1-7 Disposal Water Balance (Marsland Expansion Area), Crow Butte Resources, Inc., Crawford, NE

Year	2023				2024				2025				2026			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Elapsed Time (Quarters)																
Prod Flow	4500	5000	5100	4800	4800	5300	5400	5100	5300	5300	5200	4700	4300	3700	3900	3600
Prod Bleed 1.2%	54	60	61	58	58	64	65	61	64	64	62	56	52	44	47	43
IX Bleed 2.0%	16	8	8	8	8	16	16	16	8	8	8	8	8	8	8	8
MU1 RO Bleed (30%)	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU2 RO Bleed (30%)	75	150	150	150	150	150	150	150	0	0	0	0	0	0	0	0
MU3 RO Bleed (30%)	0	75	75	75	75	75	75	75	150	150	150	150	150	150	0	0
MU4 RO Bleed (30%)	0	0	0	0	0	0	0	0	75	75	75	75	75	75	150	150
MU5 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	75	75
MUA RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUB RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUC RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUD RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUE RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUF RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Production bleed capacity needed (gpm)	54	60	61	58	58	64	65	61	64	64	62	56	52	44	47	43
Restoration capacity needed (gpm)	241	233	233	233	233	241	241	241	233	233	233	233	233	233	233	233
Total disposal capacity needed (gpm)	295	293	294	291	291	305	306	302	297	297	295	289	285	277	280	276
Disposal Option(s)	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾

Notes:

(1) Additional deep disposal wells will be installed as needed

Assumed start date = 1Q 2015

gpm - gallons per minute

hr - hours

DDW1 - Deep Disposal Well 1

DDW2 - Deep Disposal Well 2

Assumed sustainable DDW injection rates = 45 gpm

Storage Tanks Capacity = 100,000 gallons

Table 3.1-7 Disposal Water Balance (Marland Expansion Area), Crow Butte Resources, Inc., Crawford, NE

Year	2027				2028				2029				2030			
Elapsed Time (Quarters)	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Prod Flow	3400	3700	3900	3500	3200	2900	2600	2400	2200	1800	1600	1500	1400	1300	1200	900
Prod Bleed 1.2%	41	44	47	42	38	35	31	29	26	22	19	18	17	16	14	11
IX Bleed 2.0%	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
MU1 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU2 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU3 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU4 RO Bleed (30%)	150	150	150	150	0	0	0	0	0	0	0	0	0	0	0	0
MU5 RO Bleed (30%)	75	75	75	75	150	150	150	150	150	150	0	0	0	0	0	0
MUA RO Bleed (30%)	0	0	0	0	75	75	75	75	75	75	150	150	150	150	150	150
MUB RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	75	75	75	75	75	75
MUC RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUD RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUE RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUF RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Production bleed capacity needed (gpm)	41	44	47	42	38	35	31	29	26	22	19	18	17	16	14	11
Restoration capacity needed (gpm)	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
Total disposal capacity needed (gpm)	274	277	280	275	271	268	264	262	259	255	252	251	250	249	247	244
Disposal Option(s)	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾

Notes:

(1) Additional deep disposal wells will be installed as needed

Assumed start date = 1Q 2015

gpm - gallons per minute

hr - hours

DDW1 - Deep Disposal Well 1

DDW2 - Deep Disposal Well 2

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Storage Tanks Capacity = 100,000 gallons

Table 3.1-7 Disposal Water Balance (Marsland Expansion Area), Crow Butte Resources, Inc., Crawford, NE

Year	2031				2032				2033				2034			
	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Elapsed Time (Quarters)																
Prod Flow	800	700	600	500	400	200	200	200	200	200	200	0	0	0	0	0
Prod Bleed 1.2%	10	8	7	6	5	2	2	2	2	2	2	0	0	0	0	0
IX Bleed 2.0%	8	8	8	8	8	8	8	8	8	8	8	0	0	0	0	0
MU1 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU2 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU3 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU4 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU5 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUA RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUB RO Bleed (30%)	150	150	150	150	150	150	0	0	0	0	0	0	0	0	0	0
MUC RO Bleed (30%)	75	75	75	75	75	75	150	150	150	150	150	150	0	0	0	0
MUD RO Bleed (30%)	0	0	0	0	0	0	75	75	75	75	75	75	150	150	150	150
MUE RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	75	75	75	75
MUF RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Production bleed capacity needed (gpm)	10	8	7	6	5	2	2	2	2	2	2	0	0	0	0	0
Restoration capacity needed (gpm)	233	233	233	233	233	233	233	233	233	233	233	225	225	225	225	225
Total disposal capacity needed (gpm)	243	241	240	239	238	235	235	235	235	235	235	225	225	225	225	225
Disposal Option(s)	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾

Notes:

(1) Additional deep disposal wells will be installed as needed

Assumed start date = 1Q 2015

gpm - gallons per minute

hr - hours

DDW1 - Deep Disposal Well 1

DDW2 - Deep Disposal Well 2

Assumed sustainable DDW injection rates = 45 gpm

Storage Tanks Capacity = 100,000 gallons

Table 3.1-7 Disposal Water Balance (Marsland Expansion Area), Crow Butte Resources, Inc., Crawford, NE

Year	2035				2036				2037				2038				2039	
Elapsed Time (Quarters)	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Prod Flow	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Prod Bleed 1.2%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
IX Bleed 2.0%	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU1 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU2 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU3 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU4 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MU5 RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUA RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUB RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUC RO Bleed (30%)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUD RO Bleed (30%)	150	150	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MUE RO Bleed (30%)	75	75	150	150	150	150	150	150	0	0	0	0	0	0	0	0	0	0
MUF RO Bleed (30%)	0	0	75	75	75	75	75	75	225	225	225	225	0	0	0	0	0	0
Production bleed capacity needed (gpm)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Restoration capacity needed (gpm)	225	225	225	225	225	225	225	225	225	225	225	225	0	0	0	0	0	0
Total disposal capacity needed (gpm)	225	225	225	225	225	225	225	225	225	225	225	225	0	0	0	0	0	0
Disposal Option(s)	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	DDW1, DDW2 ⁽¹⁾	--	--	--	--	--	--

Notes:

(1) Additional deep disposal wells will be installed as needed

Assumed start date = 1Q 2015

gpm - gallons per minute

hr - hours

DDW1 - Deep Disposal Well 1

DDW2 - Deep Disposal Well 2

Assumed sustainable DDW injection rates = 45 gpm

Storage Tanks Capacity = 100,000 gallons