4.5 GROUNDWATER HYDROLOGY IN THE VICINITY OF THE PROPOSED INJECTION WELL

Groundwater in the area of the well site is found in shallow, unconfined aquifers hosted by the Quaternary alluvial and aeolian surficial deposits, and the Tertiary Ogallala Formation. Groundwater may also occur in local, confined sandstone beds in the deeper "red beds" of the Triassic Dockum Group.

A review of the New Mexico State Engineer's database identified 18 water wells within one mile of the Linam AGI #1and the proposed location for the AGI #2. Data on these water wells are summarized in Table 3 below, and located in Figure 7. All of these wells are completed in very shallow units, at total depths ranging from 60 to 270 feet below ground surface in either the alluvium and/or the Ogallala Aquifer. Due to their distal locations and shallow completions, there are no potential impacts from the Linam AGI #1 and AGI #2 wells.

Table 3: Identified Water Wells within One Mile of Proposed Linam AGI #2

Owner	Type	UTME	UTMN	Distance (miles)	DepthWell	DepthWater
XCEL ENERGY	MON	659878	3621567	0.2525	60	50
JAMES L EVANS	IRR	659586	3621580	0.3575	185	70
MARKWEST PINNACLE LP	CPS	659398	3621041	0.38375	270	120
OLIN LYNCH	DOM	660108	3620475	0.44625	150	57
XCEL ENERGY	MON	659118	3621119	0.54938	68	50
NOBLE DRILLING COMPANY	P&A	659606	3620371	0.56125	120	65
MARCUM DRILLING COMPANY	PRO	659196	3620767	0.5625	103	45
SOUTHWESTERN PUBLIC SERVICE CO	EXP	659078	3621289	0.5775	80	60
XCEL ENERGY - MADDOX STATION	SAN	659067	3620842	0.6175	200	63
XCEL ENERGY	MON	659035	3621493	0.63125	60	50
SOUTHWESTERN PUBLIC SERVICE	IND	658994	3620960	0.64125	206	84
JIMMIE B. COOPER	IRR	661101	3621097	0.6925	166	35
AMERADA PETROLEUM CORPORATION	PRO	660016	3619973	0.755	108	35
CONTINENTAL OIL COMPANY	PRO	658779	3621565	0.7975	125	60
C/O A. H. VIESCAS EL PASO NATURAL GAS COMPANY	IND	659309	3620060	0.82125	181	70
XCEL ENERGY	MON	658677	3620972	0.83438	62	50
OSCAR BOURG DRLG. CO.	PRO	660229	3619765	0.89688	140	70
XCEL ENERGY	MON	658752	3622142	0.9825	60	50

5.0 OIL, GAS AND AGI WELLS IN THE LINAM AGI #2 AREA OF REVIEW AND VICINITY

There are 22 recorded oil/gas wells within one mile of the proposed Linam AGI #2, of which 3 are active oil wells and one of which is an active AGI well (Linam AGI #1). Eighteen are listed as plugged and abandoned. These wells are shown in Figure 8.

A review of the available NMOCD data regarding the wells within one mile of the proposed Linam AGI #2 well shows that of the 22 total wells, only 3 intersect and/or penetrate the proposed injection zone in the Lower Bone Springs. Of the total 22 wells, 19 (86%) are less than 8,500 feet deep. These wells are or were targeted into the San Andres/Grayburg, Glorieta and Paddock zones. The total depth of all these wells is well above the Lower Bone Springs injection reservoir, which lies from 8,710 to 9, 137 feet in this area.

5.1 STATUS OF LOWER BONE SPRINGS-PENETRATING WELLS WITHIN ONE MILE OF THE PROPOSED LINAM AGI #2

As shown in the Table 4 below and in Figure 8 three wells penetrate the Lower Bone Springs in the one mile area of review. Information on the wells in the one mile area of review (see Table 4 below) includes their total depth, production or injection interval and current status. A review of the available data on these wells indicates that Goodwin #3 and Conoco-State #1 were dry holes and were plugged and abandoned (Appendix A). The third well that penetrates the Lower Bone Springs is our Linam AGI #1 and it has been cased and cemented throughout, above and below the Lower Bone Springs perforated interval, effectively sealing that formation and preventing any migration of injected fluids to deeper or shallower units (Figure 3 and Appendix A).

Table 4: Summary of Wells Penetrating Lower Bone Springs within One Mile of Proposed Linam AGI #2

API #	OPERATOR	SPUD DATE	PLUG DATE	TOTAL DEPTH	WELL NAME	WELL TYPE	STATUS	Producing/Target/ Production/Injection Zone	Miles From AGI #2
3002503976	CONTINENTAL OIL	2-Jan-00	2-Jan-00	8,582	GOODWIN 003	O	Plugged	Goodwin Drinkard	0.855
3002521832	PENNZENERGY EXPLORATION AND PRODUCTION LLC	2-Jan-00	2-Jan-00	11,675	CONOCO-State #1	O	Plugged	Goodwin Drinkard	0.703
3002538576	DCP Midstream, LP	21-Oct-07	N/A	9,213	Linam AGI #1	AGI	Active	Lower Bone Springs	0.047

5.2 CEMENTING, COMPLETION AND PLUGGING

The details of the completion and/or plugging design and construction of the three wells that penetrate the Lower Bone Springs are summarized below in Table 5. The final well design for the Linam AGI #1 and the plugging diagrams for Goodwin #3 and CONOCO-State #1 are included in Appendix A.