3.3.7 APPENDIX A

ADDITIONAL REFERENCES

VALUE OF USGS WATER-SUPPLY PAPER 1525 TO CURRENT ESPANOLA BASIN GEOHYDROLOGY STUDIES

(References noted "(see CES web site)" have been posted in <environmentalsafeguards.com>)
(References noted "(see LASG.org web site)")
(References noted "(see NMED.gov web site
http://www.nmenv.state.nm.us/gwb/GWQ%20Atlas/Santa_Fe_County.html)"
http://www.nmenv.state.nm.us/gwb/GWQ%20Atlas/Santa_Fe_County.html)
(References noted LAHDRA"(see http://www.shonka.com/ReConstructionZone/default.htm.web site)
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[Text blames high Rio Grande discharges for most of the flood damages

in the Albuquerque area in 1941-2, but fold-out longitudinal profiles of the river from Cochiti to the head of Elephant Butte Lake prove that the lake waters, beginning in 1915, caused the formation of a huge delta which propagated upstream rapidly, causing flooding of the lands and houses of San Marcial, waterlogging or flooding of many nearby lands, and the destruction of a railway bridge (ATSF) near San Marcial in the 1920’s (see above references SPI (1978), Spiegel (1961, 1963a, 1978-9)). A (1910?) document, previously suppressed, obtained from the Library of Congress by an expert witness for Intel Corp. in a water rights hearing in Socorro showed that Federal engineers knew that Elephant Butte Dam would cause flooding upstream, but thought that property owners there would ascribe flooding to natural causes. Profiles in the report also show that wedges of sediment had also accumulated upstream of irrigation diversion dams (at San Acacia, Isleta, and Cochiti) built by the U.S. Bureau of Reclamation (USBR) in 1927-8, from which it can be concluded that much, if not all, of the flood damages near Albuquerque during the 1941-2 floods were caused by Isleta diversion dam, not just by natural causes.]

Appendix A

3.3.3. TABLE B.

Domestic wells Source Data by Township and Range from the OSE website <http://iwaters.ose.state.nm.us>

Township	Range	Domestic wells
T 14 N	8E	446
	9E	219
T 15 N	7 E	32
	8E	693
	9E	232
	10E	199
T 16 N	6E	85
	7E	4
	8E	999
	9E	909
	10E	605
T 17 N	5E	7
	6E	0

	7E	3
	8E	231
	9E	1245
	10E	185
	11E	10
T 18 N	5E	6
	6E	0
	7E	3
	8E	26
	9E	292
	10E	446
	11E	6
T 19 N	5E	1
	6E	1
	7E	4
	8E	641
	9E	977
	10E	43
	11E	0
T 20 N	5E	1
	6E	1
	7E	8
	8E	1505
	9E	897
	10E	7
	11E	2
	12E	3
Sheet 1	Subtotal	10973

TABLE B CONTINUED.
Domestic wells Source Data by Township and Range from the OSE website

Township	Range	Domestic well
T 21N	5E	4
	6E	1
	7 E	65
	8E	1180
	9E	506
	10E	130
	11E	19
	12E	1
	13E	3
T21 N	5E	3
	6E	1
	7E	65
	8E	1180

	9E	506
	10E	130
	11E	19
	12E	1
	13E	3
	14E	4
T 22 N	5E	3
	6E	1
	7E	182
	8E	169
	9E	248
	10E	3
	11E	78
	12E	83
	13E	13
	14E	14
T 23 N	5E	19
	6E	35
	7E	80
	8E	55
	9E	35
	10E	289
	11E	29
	12E	68
	13E	4
T 24 N	5E	6
	6E	0
Table B	Subtotal	5235
Table B	Continued	4
Township	Range	Domestic well
		Domestic wells
T 24 N	7E	48
	8E	19
	9E	35
	10E	5
	11E	113
T 25 N	6E	7
	7 E	35
	8E	29
	9E	25
	10E	5
T26 N	6E	
	7E	
	8E	33
	9E	25

	10E	6
T 27 N	6E	
	7E	
	8E	2
	9E	4
	10E	10
T 28 N	6E	3
	7E	
	8E	2
	9E	7
	10E	25
T 29 N	6E	10
	7E	1
	8E	4
	9E	9
	10E	0
T 30 N	8E	
	9E	1
		688

Sub-Totals	SHEET 1	688
	SHEET 2	5235
	SHEET 3	10973
Grand total		16973

Table B.

Appendix B

APPENDIX B

NUMERICAL SIMULATION MODELS OF SANTA FE AREA AND LCVASSAS

Akin Model: Shortly after the extension of the RGUWB into the Santa Fe area (1968), the late P.D. Akin, then Chief of the Hydrology Section of NMSEO, programmed a small HP desk-top computer to calculate time-delayed drawdown effects of a well in the Ancha/Tesuque aquifer system on a central point along the spring-discharge line on the east side of La Cienega valley. For most of the cases in which this was used ("transferred-to" wells located a great distance away from the spring area) the Akin Model, which took into account some aquifer-edge boundaries (by use of standard image theory) to the south and east of the spring area, was probably satisfactory, However, for a well located near the spring area, considerable error in calculation would be expected unless the water supply (spring or baseflow reach) for the "transferred-from" right was actually at or very near the point-of-calculation.

Effects on springs at Cieneguilla and San Marcos Arroyo were apparently not taken into account at all, possibly in part because by that time the original Cieneguilla springs were overwhelmed by sewage effluent, and the San Marcos Arroyo diversion was underground, without known measurement or metering and the ownership of the springs was being disputed.

Wasiolek Model: For a few years, a more sophisticated, but more defective, model, created by M. Wasiolek, another employee of the NMSEO, was used for similar water rights transfers from the La Cienega area. This model was based on a grid of nodes in a finite block, but the boundary conditions near the spring area were improperly chosen, so that any nearly any calculation made with this model would require improper "adjustments" in aquifer parameters to simulate any historic period even approximately, and probably only within certain time limits.

USGS (Hearne) Models: These models were originally developed by Hearne (1985, 1985a), using some results from an early version of Theis (1993) to take into account the known anisotropy of the Tesuque Formation in the Pojoaque-Tesuque area. They were later generalized for use elsewhere, including the Santa Fe area. As noted in the text narrative (Sec. 3.3.4 ( ), the presence of local saturation in overlying, nearly horizontal Ancha Formation complicated (in part "short-circuited") flow in the generally less permeable and westerly dipping Tesuque Formation. As in other numeric models, some boundary conditions and simplifying assumptions introduce the possibility that predictions for some locations and/or time periods may be erroneous.

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Akin Model: Shortly after the extension of the RGUWB into the Santa Fe area (1968), the late P.D. Akin, then Chief of the Hydrology Section of NMSEO, programmed a small HP desk-top computer to calculate time-delayed drawdown effects of a well in the Ancha/Tesuque aquifer system on a central point along the spring-discharge line on the east side of La Cienega valley. For most of the cases in which this was used ("transferred-to" wells located a great distance away from the spring area) the Akin Model, which took into account some aquifer-edge boundaries (by use of standard image theory) to the south and east of the spring area, was probably satisfactory, However, for a well located near the spring area, considerable error in calculation would be expected unless the water supply (spring or baseflow reach) for the "transferred-from" right was actually at or very near the point-of-calculation.

Effects on springs at Cieneguilla and San Marcos Arroyo were apparently not taken into account at all, possibly in part because by that time the original Cieneguilla springs were overwhelmed by sewage effluent, and the San Marcos Arroyo diversion was underground, without known measurement or metering and the ownership of the springs was being disputed.

Wasiolek Model: For a few years, a more sophisticated, but more defective, model, created by M. Wasiolek, another employee of the NMSEO, was used for similar water rights transfers from the La Cienega area. This model was based on a grid of nodes in a finite block, but the boundary conditions near the spring area were improperly chosen, so that any nearly any calculation made with this model would require improper "adjustments" in aquifer parameters to simulate any historic period even approximately, and probably only within certain time limits.

USGS (Hearne) Models: These models were originally developed by Hearne (1985, 1985a), using some results from an early version of Theis (1993) to take into account the known anisotropy of the Tesuque Formation in the Pojoaque-Tesuque area. They were later generalized for use elsewhere, including the Santa Fe area. As noted in the text narrative (Sec. 3.3.4 ( ), the presence of local saturation in overlying, nearly horizontal Ancha Formation complicated (in part "short-circuited") flow in the generally less permeable and westerly dipping Tesuque Formation. As in other numeric models, some boundary conditions and simplifying assumptions introduce the possibility that predictions for some locations and/or time periods may be erroneous.

of Theis' work to create his groundwater models for aquifer test analysis and regional aquifer flow, respectively.

Wilson, Lee, and D.N. Jenkins, 1979, Ground-Water resources of Santa Fe Country. *in* NM Geol. Soc. Guidebook, 30th Field Conference, Santa Fe Country, p.293-298.

Summarizes revised interpretation of La Cienega area springs in Spiegel (1975); problems of anisotropic and two-aquifer conditions in the Pojoaque-Tesuque area and modeling conditions near Buckman and Pojoaque-Tesuque (see Reference list for Numerical Modeling, in App.B herein; corrects obvious conceptual error of Shoemaker (1974, 1975) in relation of the Rio Grande to aquifers near Buckman (Rio Grande receives aquifer discharge rather than providing recharge). [Resolution offered is in recognizing, with concepts and terminology from Spiegel (1954, 1955,1967, 1982), that naturally the aquifer discharged to the Rio Grande and tributaries by upward leakage, including fracture paths, and lateral flow (along the strike) to broadly disseminated and remote discharge areas, and that the combined drawdown cones of Buckman and Los Alamos wells eventually will have expanded and deepened sufficiently to allow (1) initially, reduction in upward leakage to rivers, and eventually, (2) reversal of the head gradients so that **induced recharge or induced inflow occurs from shallow aquifers and associated rivers, providing the link of wells and senior water rights correctly (at least conceptually) adopted by the NM State Engineer Office (see references by Akin and others in this list).]**

Wilson, Lee, 1984, Water Supplies for the Santa Fe Area, New Mexico, a Status Report. Hydrological Support Document prepared for the Metropolitan Water Board. Lee Wilson and Associates, Nov. 220, 1984, 22 p.+ 4 Appendices.

Appendices contain a useful chronological reference list and an author-alphabetized summary (one or more paragraphs per report) of each of 76 references