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HYDROGEOLOGIC INVESTIGATION REPORT

City of Jal Water Rights Appropriation Project
Jal, Lea County, New Mexico

Prepared For:

The City of Jal, New Mexico
309 Main Street
Jal, NM 88252

April, 2015

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Souder, Miller & Associates
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April 21, 2015 #1C23766

Mr. Robert Gallagher, City Manager
City of Jal
309 S. Main Street
P.O. Drawer 340
Jal, NM 88252

Subject: Hydrogeologic Investigation Report, City of Jal, NM

Dear Mr. Gallagher:

Souder, Miller, & Associates (SMA) is pleased to submit this Hydrogeologic Investigation Report for the City of Jal, New Mexico. The report summarizes the hydrology in the Jal area and proposes recommendations for the location of future Capitan Underground Basin supply wells.

SMA will be available to discuss the results of the report at your convenience, and can present the investigation results at a meeting with City of Jal staff.

SMA appreciates the opportunity to provide Engineering Services to the City of Jal. If you have any questions or comments concerning the report, please feel free to call me at 505.299.0942 or to email me at scott.mckitrick@soudermiller.com.

Sincerely,
SOUDER, MILLER & ASSOCIATES

Scott A. McKitrick, P.G.
Senior Scientist/Environmental Services Manager

Enclosure: Hydrogeologic Investigation Report

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HYDROGEOLOGIC INVESTIGATION REPORT
City of Jal Water Rights Appropriation Project
Jal, Lea County, New Mexico

April 17, 2015

1.0 INTRODUCTION AND BACKGROUND

The City of Jal contracted with SMA to conduct this hydrogeologic investigation in response to recent concerns over the long-term viability of the Pecos Valley Alluvial Aquifer, which is the source of water for the Westfield Facility wells in the Jal Underground Basin. This hydrogeologic report details alternative water supplies for the City of Jal to allow for a reliable, longer-term supply of drinking water.

The City of Jal has a population of 2,047 as indicated by the 2010 United States Census. Projections prepared by the University of New Mexico (UNM) Bureau of Business and Economic Research (BBER) estimates that Jal will experience a 1.2 percent growth rate relative to the 2010 Census in the early 2010s. Extending this growth rate to the next twenty years, Jal would have a 2034 population of approximately 2,720 people. The current water use in the City of Jal is 238 gallons per capita per day, utilizing the 2010 US Census population of 2,047.

Assuming the institution of water conservation efforts proposed in the Jal Water Production and Transmission Study prepared by SMA and dated November, 2014, the City of Jal will require a total of 854 acre-feet of water per year by year 2034 to meet the demands of the community (SMA, 2014).

1.1 City Water System Overview

The City of Jal has five wells that are currently included in their water rights (see Figure 1). Four primary production wells (Wells No. 1, 3, 4 and 5) located within the Jal Underground Basin southwest of Jal (Westfield Facility) supply drinking water to the City and nearby town of Bennett. The City of Jal also has a 50 acre-feet per year water right from the El Paso Natural Gas Well No. 1. Table 1 is a summary of the Westfield supply wells, including historic and current production rates.

Water from the four production wells is supplied to the City's storage and distribution system by a booster pump station and through approximately eight miles of a 16-inch (nominal) polyethylene pipeline. A six-inch pipeline supplies water to Bennett.

The current estimated production capacity of the Westfield Facility is 1,145 acre-feet per

year. According to the *Water System Preliminary Engineering Report* (SEC, 2014a), the Westfield Facility Wells produced 329 million gallons (1,010 acre-feet), from June 2011 to May 2012, or an average of 901,326 gallons per day (gpd). The usage (metered flow) is 488,058 gpd or 178,140,000 gallons per year. The 1,010 acre-feet of metered production accounts for approximately 62% of the total City of Jal appropriated water right of 1,636 acre-feet per year (including Well No 1, 3, 4, 5 and the portion of the El Paso Natural Gas Well (EPNG)). As mentioned above, the City of Jal has a 50 acre-feet per year water right from the EPNG well, although the well itself is owned by El Paso Natural Gas. Wells No 1, 3, 4 and 5 have total water rights of 1,586-acre feet per year.

In addition to the Jal Underground Basin water rights that have been in place for several decades, the City of Jal has also recently acquired rights to 100 acre-feet of water per year from the Capitan Underground Basin near the City of Jal. This right will allow for the installation of four supply wells to provide water to irrigate parks and supply water to Jal Lake. Figure 2 is an aerial photo with the approved locations of the four supply wells.

1.2 Statement of Problem

Water levels in the Westfield wells through 2004 have been declining at a rate of one foot per year, and projections of draw-down are three feet per year if Jal were to pump all water available under their existing water right (Shomaker, 2005). As there is over 350 feet of saturated sediment in the Westfield area, the existing wells are predicted to be capable of sustaining the City of Jal for the next several decades at the predicted draw-down of three feet per year.

In late 2013, the T-Bar Ranch well field approximately four miles south of the Westfield Facility in Winkler County, Texas became operational and began producing water for Midland, Texas. This well field contains 41 12-inch diameter wells with the same or greater production capacity as each of the five existing City of Jal Westfield wellsIf the well field is pumped at its maximum design capacity of 20 million gallons per day, the T-Bar Ranch field has the potential to greatly increase draw-down in the Pecos Valley Alluvium and affect the longer-term quantity of water available to the City of Jal.

2.0 PROJECT APPROACH

SMA initiated the project by reviewing available literature and documents from previously completed wells and hydrologic investigations near the City of Jal. Information that was compiled and reviewed included geologic maps and data, oil field well records and maps, New Mexico Office of the State Engineer well records data and personnel interviews and New Mexico Bureau of Geology and United States Geological Survey (USGS) publications. Local water well drillers were also contacted to gain first-hand information on aquifer characteristics, water well production, depth, and locations. This information is summarized below with recommendations for additional work and water rights appropriation.

3.0 GEOLOGY AND SITE SETTING

3.1 Regional Geology

The City of Jal is located within the southern region of the Great Plains Physiographic Province of the United States. This province is characterized by the relatively flat landscape that has not seen significant tectonic activity or deformation. The Great Plains Province extends from eastern New Mexico through much of the Midwest until reaching the Central Lowlands Province near Iowa. Within the Great Plains Province, the Jal area is situated on the boundary of two large, regional geologic features. Underlying the City of Jal itself and extending to the east is the Central Basin Platform, a geologic feature characterized by uplifted Paleozoic-aged sedimentary units extending into western Texas.

To the west of Jal lies the Monument Draw Trough, a northwest to southeast trending feature formed by collapse structures within the underlying Paleozoic sediments. The collapse structures allowed for the accumulation of additional sediments in the trough, resulting in much thicker alluvial sediments than what is present in other portions of the region. Figure 3 illustrates the location of the Monument Draw Trough relative to the Westfield Facility and the City of Jal.

3.2 Site Setting and Local Geology

The City of Jal is located within the Southern Desertic Basin Rangeland area (Allison and Ashcroft, 2011) at an elevation of 3,000 feet above sea level. Much of the region is covered by red sand dunes which are generally stabilized by vegetation. Vegetation in the Jal area consists of southern desert fauna, including Creosote and Mesquite

bushes, various cacti, and Black Gramma and Dropseed native grasses (Allison and Ashcroft, 2011).

Data from the Western Regional Climate Center (WRCC, 2015) indicates that the Jal, New Mexico Co-Op station receives an average of 12.6 inches of precipitation per year, with the wettest months occurring during the southwest monsoon season from July to October. Evaporation from the region, as measured at the Avalon Lake station near Carlsbad, is approximately 110 inches per year. The average annual high temperature in the area is 80°F, and the average low temperature is 48°F (WRCC, 2015).

The local surface geology of the Jal area was mapped at a 1:250,000 scale by Barnes et al. in 1976 as part of the Geologic Altas of Texas. As the area has little topographic relief and sedimentary units are relatively flat, the surface geology of the area is relatively uniform and dominated by recent Quaternary-aged sediments and the Tertiary-aged Ogallala Formation (Barnes et al., 1976). The majority of the geologic mapping in the area has occurred in the subsurface using oil and gas well borings. A portion of the geologic map of the area as compiled by the New Mexico Bureau of Geology and Mineral Resources (2003) is included as Figure 4, and cross sections of the subsurface units adapted from Meyers et al, (2012) are included as Figures 5 and 5a.

A summary of the predominant geological formations found near the City of Jal is included below. The descriptions are organized by the age of the units (youngest to oldest), and are summarized graphically by the stratigraphic column included as Figure 6. The thickness indicated in the section is estimated and reflects approximate depths of each unit as indicated in several borings advanced in the area.

3.2.1 Cenozoic Units

The recent, exposed Quaternary and Tertiary-aged alluvial sediments in the southeastern New Mexico area are categorized as the Pecos Valley Alluvium, and range in thickness from 100 to over 1,500 feet. The Pecos Valley Alluvium consists of unconsolidated Cenozoic-aged sands, silts, and clays that in-filled depressions related to the dissolution and collapse of the older underlying strata. The high variability of the collapse features resulted in a variety of different depositional environments, and caused the composition of the sediments to vary greatly over relatively short distances. The Pecos Valley Alluvium contains the Pecos Valley Aquifer in the Jal area.

To the north and east of the City of Jal, there are several exposures of the Pliocene-aged Ogallala Formation. This unit consists of semi-consolidated fine sands with some minor clay and silts, and can have thicknesses up to 300 feet (Nicholson & Clebsch,

1961). The Ogallala Formation is a major source of groundwater for much of eastern New Mexico and Western Texas north of the Jal area.

3.2.2 Mesozoic Units

Mesozoic Units within the City of Jal area consist primarily of Triassic-aged redbed units. The units of the Dockum Group unconformably underlie alluvial sediments in the Jal area, and are present from depths ranging from 80 feet below the City of Jal to over 650 feet in the Monument Draw Trough near the Westfield Facility. The Dockum Group is a large geologic package that is often broken out into several smaller formations. Each of these formations are described below.

The upper portion of the Dockum Group is composed of the Triassic Chinle Formation. The Chinle consists of red shales and siltstones, and has a thickness in southeast New Mexico ranging from less than 10 to over 1,000 feet. This unit is located at a depth of approximately 80 to 100 feet near the City of Jal, and utilizing well records from the NMOSE, extends to approximately 400 to500 feet below ground surface. The Chinle is a minor aquifer in southeast New Mexico, typically has low production, and is often utilized for livestock wells.

Underlying the Chinle is the Santa Rosa Sandstone, which occurs relatively continuously through much of eastern and northeastern New Mexico. The Santa Rosa Formation consists of white to gray-red sandstone, and often includes a coarse-grained or conglomeritic unit near the basal portion of the unit (Bradley and Kalasward, 2003). Drilling logs from the NMOSE and USGS (Tables 3 and 4) suggest the Santa Rosa Formation is present at a depth between 400 to 500 feet below ground surface near the City of Jal. However, based on an extensive literature review of drilling logs and aquifer studies conducted by the Texas Water Development Board in west Texas, it appears that the highly productive coarse sandstone/conglomerate layer may be present as deep as 800 feet below ground surface. The Santa Rosa is used extensively as an aquifer in the Jal area.

3.2.3 Paleozoic Units

The Mesozoic Dockum Group is unconformably underlain by the Permian-aged Dewey Lake Formation. This unit is similar in composition to the Chinle and upper Santa Rosa Formations, and is often not segregated from the Dockum Group in subsurface logs due to the inability to recognize the unit contacts (Myers, personal communication, 2015). The Dewey Lake Formation is composed of redbed sandstone, siltstones, and shales deposited in environments similar to the Dockum Group. The Dewey Lake formation is typically not water-bearing (Meyer et al., 2012).

The Dewey Lake Formation is underlain by the Permian-aged Rustler Formation. This unit consists primarily of carbonaceous limestones, dolomite, and mudstone. The unit contains several gypsiferous layers, and ranges in thickness from 40-600 feet (Boghici & Broekhoven, 2001). The Rustler formation is considered a minor aquifer in West Texas (Meyer et al., 2012). Oil and gas borings advanced approximately two miles west of Jal indicate that the top of the Rustler Formation is present at a depth of approximately 1,200 feet (Reed, 1962); however, two oil and gas well logs near Jal Lake suggest the Rustler may be present as shallow as 1,000 feet. Near the Westfield Facility wells the top of the Rustler is present at a depth of approximately 1,700 feet below ground surface (Reed, 1962).

The Rustler Formation is underlain by the Permian-aged Salado and Castile Formations These units are composed of evaporite deposits with minor fine-grained clastic beds. The Salado Formation consists of thick evaporite salt beds, and is the formation housing the storage area of the Waste Isolation Pilot Plant (WIPP) northwest of Jal near Carlsbad. This unit can have thicknesses of up to 2,000 feet, and can contain saturated intervals containing highly saline brines (Chaturvedi, 1993). The Castile formation underling the Salado consists of carbonate and sulfate-rich evaporite beds interbedded with salt. The Castile formation has a maximum thickness of 1,500 feet, and is subject to karstification (sink hole formation caused by dissolution) in the area. The karstic development allows for some limited water storage in the formation; however, water from the unit is typically high in sulfate and total dissolved solids (Stafford, 2013). Near the City of Jal, the top of the Salado and Castile Formations is present at a depth of approximately 1,500 feet (Meyer et al., 2012). The poor water quality and low hydraulic conductivities of the Salado and Castile Formations limit their use as aquifer units in the area.

The evaporite salt beds of the Castille Formation are underlain by the Capitan Reef Formation. This is a Permian-aged unit that is present as a narrow lateral band throughout southeast New Mexico and western Texas. The Capitan Reef is a limestone unit with a thickness up to 2,000 feet formed during the Permian in a shallow-sea environment. The carbonate composition of the reef allows for the development of karst structures, making it a productive aquifer in the region (Uliana, 2001). Near the City of Jal, the top of the Capitan Reef Formation is present at a depth of approximately 3,000 feet (Meyer et al., 2012).

3.3 Geological Structure

The project area is located in an area of relatively stable and continuous geology. As mentioned above, the geology exposed on the surface in the area is relatively uniform,

and does not have significant variations. Structure related to deformation is relatively small scale and not extensive. Geologic units within the subsurface are generally continuous with a gentle 5 to 10 degree dip to the southeast.

The most significant structural features in the area are related to collapse structures formed by dissolution of bedrock and karstification. As detailed in Section 3.1, the Monument Draw Trough, located west of the City of Jal, is a prominent geologic feature that has allowed for the accumulation of much thicker alluvial sediments that act as the aquifer for the Jal Westfield Facility.

4.0 HYDROLOGY

Extensive literature review of the Jal area was conducted as well as a search of the New Mexico Office of the State Engineer (NMOSE) WATERS online database and the United States Geological Survey well database to determine depth to water, well completion and well production information from wells in the region. As described previously, drillers in the Hobbs and Jal area were interviewed as well. Potential aquifer units identified in the literature review and existing water sources commonly utilized in the area are summarized below.

4.1 Potential Aquifers

The NMOSE Waters and USGS databases were utilized to obtain information on existing wells and potential aquifers in and near the project area. Aerial photos showing the project site location and surrounding wells on file with the NMOSE and USGS (labeled by their file number) are included as Figures 8 and 9. Information from near-by wells, including depth to water, total depth, and each well's target aquifers is summarized in Table 1. Potential and primary aquifers near the project area are described below.

4.1.1 Pecos Valley Alluvium Aquifer

The City of Jal Westfield Facility is completed within the Monument Draw Trough of the Pecos Valley Alluvium aquifer. As described in Section 3.0, the Monument Draw Trough is a result of collapse structures, allowing for the accumulation of alluvial sediments with thicknesses in excess of 1,500 feet (Meyer et al., 2012) south of Jal in Winkler County, Texas. In the Westfield Facility area, the Monument Draw Trough alluvial package has a total thickness of approximately 650-700 feet and a saturated (water bearing) thickness of approximately 350 feet. A map showing the Monument Draw Trough is included in Figure 3.

The saturated zone is unconfined and perched atop the Dockum Group Redbeds, which act as an aquitard (barrier to flow). Recharge to the aquifer is thought to occur from infiltration from precipitation and losses from ephemeral streams and irrigation canals (Ashworth, 1990). Static water levels measured in the Jal production wells range from 240 to 300 feet below ground surface, and appears to be declining at a rate of approximately 1 foot per year. Figure 7 is a hydrograph of water levels measured in Jal Well No. 1 from 1960 to the present. The trendline indicates a declining slope of 0.95 feet drawdown/year within the well. Regional groundwater flow within the sediments is generally to the south but has a significant westerly flow in areas southeast of the City of Jal (Nicholson & Clebsch, 1961).

In 2014, SMA performed a well draw-down and aquifer investigation study for the Westfield Facility wells. The results of the study, detailed in the *Water Production and Transmission Study Report*, finalized and submitted to the City of Jal in April 2015, indicates that in the smaller scale area around the Westfield Facility, the Pecos Valley Aquifer is more productive in the northern portions of the well field. Aquifer transmissivity measured in Well No. 1 in the northern portion of the field is greater than those of Wells No. 4 and No. 5 in the southern portion of the field. The difference in transmissivity could be related to the distribution of sediments within the aquifer; the northern portions may be composed of sandier sediments capable of yielding additional water, whereas the southern wells may be completed in finer-grained sediments with less permeability.

Groundwater quality in the Pecos Valley Alluvial Aquifer is variable. Total dissolved solids (TDS) concentration varies between approximately 300 milligrams per liter (mg/l) to greater than 5,000 mg/l. Groundwater quality is generally better in the Monument Draw Trough portion of the aquifer than in the Pecos Trough, located to the west of the Monument Draw Trough. Groundwater quality in the vicinity of the City of Jal well field is generally good, with TDS of approximately 735 mg/l (Shomaker, 2005). However, it appears that water quality decreases as the thickness of the aquifer increases to the south of the Westfield Facility in Texas. Preliminary data from the Midland T-Bar Ranch well field indicates groundwater with high TDS (ranging from 870 to 4,100 mg/L), which exceed the U.S. Environmental Protection Agency (EPA) secondary drinking water standard of 500 mg/L, and elevated arsenic concentrations (7 to 11 micrograms per liter (µg/L)) which are near or exceed the primary EPA drinking water standard of 10 µg/L.

The shallower Pecos Valley Alluvium underlying the City of Jal itself can also constitute a potential aquifer in the area. However, as discussed in Section 4.2.1.2 below, the shallow sediments near the City of Jal are relatively low production, and should not be

considered a reliable, long-term source of municipal water.

4.1.2 Dockum Group Aquifer – Chinle and Santa Rosa Sandstone

The Dockum Group Aquifer, consisting of the Chinle Formation and Santa Rosa Sandstone, is utilized widely as an aquifer in the Jal region (Goetz, personal communication, 2014). The formations are laterally extensive, and are continuous throughout the majority of southern Lea County. Accessible groundwater in the Dockum Aquifer is limited to relatively isolated sandy units within the red bed shales and siltstones that dominate the Dockum Group. With the exception of a continuous sandstone unit (Santa Rosa Sandstone) near the base of the aquifer, these lenses are relatively isolated, resulting in highly variable water production and quality. Regional groundwater flow within the sediments is generally to the south but has a significant westerly flow in areas southeast of the City of Jal (Nicholson & Clebsch, 1961). Recharge to the aquifer is thought to occur through precipitation infiltrating the unit in higher portions of southeastern New Mexico, and it is estimated that the unit contains over 100 million acre-feet of water with total dissolved solid concentrations less than 5,000 mg/L (Bradley and Kalaswad, 2003). This large quantity of stored water suggests the aquifer will be capable of production well into the future.

Water quality within the aquifer is variable, ranging from groundwater that is acceptable for use as drinking water without treatment (TDS of less than 1,000 mg/l), to highly saline brines with total dissolved solids in excess of 10,000 mg/L (Bradley and Kalaswad, 2003). Groundwater quality data measured in two wells northwest of the City of Jal in the 1950s indicate good quality water with total dissolved solids ranging from 750 to 825 parts per million (ppm) (Nicholson and Clebsch, 1961).

Yield within the formation also varies significantly; several wells in the City of Jal area have intercepted zones of moderate water production within the Chinle and Santa Rosa at depths ranging from 400-500 feet below ground surface. These wells have production ranging from 10 to 35 gallons per minute. However, some areas in Winkler County Texas report production in excess of 400 gallons per minute from the Dockum. These areas of higher production are often associated with areas of increased fracturing (Meyers et al. 2012).

The depth to the top of the Dockum group near Jal ranges from 80 feet below ground surface near the City of Jal to 700 feet near the Westfield Facility area. It is estimated that a well near the City of Jal would have to be advanced to up to 800 feet to intercept the higher production basal sandstone, and a well in the Westfield Facility area would need to be advanced to a depth between 1,200 and 1,500 feet to intercept this zone.

4.1.3 Rustler Formation Aquifer

The Rustler Formation has been widely used in western Texas for irrigation and livestock purposes. The unit can be highly productive, with well productions up to 1,000 gallons per minute being reported in areas of Reeves County, Texas in the 1960s. However, more recent production from these wells is typically lower (Boghici & Broekhoven, 2001). Recharge to the aquifer is thought to be from cross-formational sources, as water within the formation typically has longer residence times. Water quality in the unit is typically poor and brackish, with the majority of water samples collected from the formation from southern New Mexico and Texas having total dissolved solid concentrations in excess of 3,000 mg/L (Boghici & Broekhoven, 2001). SMA believes that water produced from this aquifer will most likely require treatment prior to use as a municipal supply. Well logs near the City of Jal vary on the depth to the Rustler formation, but SMA estimates a well would need to be advanced to approximately 1,100 to 1,200 feet to intercept the Rustler aquifer.

4.1.4 Capitan Reef Aquifer

The Capitan Reef Aquifer is a productive aquifer in the southeastern New Mexico and western Texas region, but has highly variable water quality. The aquifer is thought to contain significant quantities of water, with available water within Winkler, Loving, Ward, Reeves, Crane, and Pecos counties (Texas Water Management Area 3) estimated to be over 4,000 acre-feet per year (Bradley, 2011). Recharge to the Capitan Reef is thought to result from the Pecos River system and from precipitation entering exposures of the formation within the Guadalupe and Glass Mountain ranges.

Water quality within the unit is highly variable; areas near recharge sources such as Carlsbad have good water quality, which can be used as a municipal source of water. However, further to the south and east, water quality within the formation is much poorer, with average total dissolved solid concentrations in excess of 3,000 mg/L (Uliana, 2001). SMA was unable to locate water quality data from the Capitan Reef near the City of Jal; however, wells installed south of Jal in Winkler County, Texas produced brine and cannot be used for municipal water source without significant treatment. The potential for poor water quality as well as the extreme depth to the formation in the area will limit the use of this formation as a municipal supply.

4.2 Existing Water Sources and Water Quality

As discussed previously, SMA utilized the NMOSE WATERS database and information from the USGS well database to compile drilling logs from existing wells in the area. These logs provided information on well depth and aquifer production in the region.

Figure 8 is a map plotting NMOSE Database wells with total well depth near the City of Jal. Figure 9 includes USGS wells within the area organized by aquifer type. The location of the existing Westfield Facility Wells relative to the City of Jal is included as Figure 3. Tables 2 and 3 are summaries of NMOSE and USGS wells. NMOSE Well Logs are included in Appendix A.

4.2.1 Pecos Alluvium Wells

4.2.1.1 Westfield Facility

The City of Jal Westfield Facility wells are completed within the Pecos Valley Alluvium aquifer approximately 6 miles west of the City of Jal. As previously discussed, the alluvium in the Westfield area is much thicker than alluvium near the City of Jal, and is highly productive, allowing for relatively high production from the existing City of Jal wells. Table 1 includes a summary of historical and current production from the wells. A search from the NMOSE database indicates that the City of Jal Westfield Facility wells and the El Paso Natural Gas well are the only large supply wells completed in the portion of the aquifer managed by the NMOSE. However, several smaller wells have been recently installed to the south of the Westfield Facility, and are now producing limited quantities of water utilizing a water right of 33 acre-feet per year.

4.2.1.2 Shallow Alluvial Wells near Jal, NM

The City of Jal is outside of the Monument Draw Trough aquifer, and in this area the alluvium overlying the Paleozoic Red Beds is relatively thin. The majority of wells reported on the NMOSE and USGS Well Database (Figures 9-10) are completed within the shallow alluvial sediments near the City of Jal. These wells have total depths ranging from 60-100 feet below ground surface, and are completed within sands and gravels overlying the Triassic Chinle redbeds. Water quality from these wells is reported as generally good, and from discussions with local drillers, production from the wells can be in excess of 100 gallons per minute (Bentle, personal communication, 2015). However, the majority of wells documented in the NMOSE database exhibit lower productivity, with productions ranging from 10 to 40 gallons per minute (NMOSE, 2015).

SMA believes the shallow alluvium could potentially be a water supply option for the City of Jal, but does not recommend the shallow sediments as a primary source of water. Shallow alluvial aquifers are more susceptible to contamination from septic tank systems and surface activities, including leaking petroleum storage tanks or pipelines. Contamination from these sources can result in elevated bacteria and nitrate concentrations, and can also result in hydrocarbon constituents such as benzene, toluene, ethylbenzene, and total xylenes entering the water supply. The shallow aquifer

is also much more susceptible to short-term climatic changes such as drought, and may not always function as a reliable water source.

4.2.1.3 City of Midland, Texas T-Bar Ranch Wells

The City of Midland, Texas, located approximately 60 miles east of the City of Jal, has recently begun withdrawing groundwater from the Pecos Valley Aquifer near the City of Jal Westfield Facility (see Figure 3). The well field located on the T-Bar Ranch consists of 41 water supply wells and is located immediately south of the Texas and New Mexico border, approximately four miles from the City of Jal's Westfield Facility. This well field intercepts the same Monument Draw Trough portion of the Pecos Valley Aquifer as the Westfield Facility.

Until recently, the City of Midland's water supply has relied upon surface water reservoirs under the jurisdiction of the Colorado River Municipal Water District (CRMWD). Dry conditions over the past several years have greatly diminished surface water availability, and in 2010, Midland began development of the T-Bar Ranch well field. Midland originally purchased the T-Bar Ranch in 1965 and began development of the water supply system in the summer of 2012 with installation of the 67-mile long and four-foot diameter water pipeline and storage tanks capable of delivering a maximum well field production of up to 20 million gallons per day (MGD) to the City of Midland. The system was completed in June, 2013 at a cost of $200 million (Midland Reporter-Telegram, 2013).

Based on a review of online information, Midland currently has seven wells functioning with approval from the Texas Commission on Environmental Quality (TCEQ). Another 34 wells have "Interim Approval" for use and the TCEQ on-line database shows them as "Pending" with regards to whether they are active or inactive. SMA could not verify the accuracy of this information.

The most recent planning report indicates that the available supply to Midland from the T-Bar Ranch well field is approximately 650,000 acre-feet and has a life of approximately 60 years (Freese and Nichols, 2010). Planning level estimates assume withdrawal of approximately 13,600 acre-feet per year. Assuming continuous pumping, this equates to an average flow of approximately 12 million gallons per day. The voluntary water use survey provided by the Texas Water Development Board (TWDB) for 2014 shows that the Midland Utilities Department purchased over 2 billion gallons (6,800 acre-feet) of "Pecos Aquifer" water from the Midland Fresh Water Supply District (MFWSD) No. 1 (the operator of the T-Bar Ranch well field) during 2014. It is not known if this entire amount was obtained from the T-Bar Ranch, however, the CRMWD also operates the Winkler Well field in the Pecos Alluvium and supplies water to the

FWSD.

Based on the TWDB Water Use Survey, pumping from the MFWSD peaked during the summer months at a rate of acre-feet per day. The 2014 MFWSD pumping rates result in an average of approximately 6 million gallons of water per day, or approximately 30% of the T-Bar Ranch Water system design maximum and 50% of the planning withdrawal estimate. During 2014, the City of Midland utilized the MFWSD for an average of 26% of the City's total water needs, sourced from the T-Bar Ranch and Winkler Well field. As discussed in Section 4.1.3, water quality in the T-Bar Ranch well field appears to be generally poorer than the Westfield Facility. A copy of the City of Midland Water Use Survey for 2014, as well as a spreadsheet with water use calculations and graphs, is included in Appendix D.

4.2.1 Dockum Group (Santa Rosa Formation) Wells

The NMOSE and USGS well databases indicate several supply wells within the Santa Rosa Sandstone of the Dockum Group aquifer near the City of Jal. These wells are typically completed to depths of 350 to 500 feet, and produce up to 40 gallons per minute. Jal currently has a water right of 100 acre feet per year and approved locations for four supply wells near Jal Lake that will intercept the Dockum Group formation to provide water to parks and Jal Lake.

Further south of Jal within Winkler County, Texas, several Santa Rosa Formation wells report very high production, with well yields averaging over 400 gallons per minute. Water quality from the wells is generally good, with total dissolved solid concentrations ranging from 200 to 1,400 mg/L (Bradley and Kalaswad, 2003). Several communities in western Texas, including Kermit and Pecos, utilize the Dockum group for municipal sources of water.

4.3 Depth to Ground Water and Flow Direction

As mentioned above, depth to groundwater and groundwater flow varies in the area and is dependent upon the aquifer. Groundwater in the thin alluvial sediments near the City of Jal is typically encountered between 40 and 60 feet below ground surface. Groundwater within the Monument Draw Trough near the Westfield Facility is much deeper, and encountered at approximately 250 feet below ground surface. Groundwater flow is variable, but generally appears to flow to the west near the City of Jal and to the south in the Westfield Facility. Figure 10 is an aerial photo with depth to water measured in NMOSE well records from the alluvial and Dockum aquifers. Figure 11 is a hydrograph of a USGS monitoring well located to the south of the Westfield Facility near the Texas State Line. Depth to groundwater in this monitoring well has declined significantly over the past two years at a rate much steeper than the past

several decades. The sharp groundwater elevation decline is most likely a result of increased regional pumping in the area.

Information from NMOSE well logs and literature suggest groundwater within the Dockum Group Aquifer is typically encountered at 250 feet below ground surface, and has a regional flow to the east.

5.0 RECOMMENDATIONS

SMA recommends that the City of Jal pursue the acquisition of additional water rights in the NMOSE Capitan Underground Management Basin. The Capitan Underground Basin is currently open, and contains water rights still available for appropriation. SMA believes that groundwater located within the Dockum Group, particularly the Santa Rosa Formation, is a feasible production well target for the City of Jal within the Capitan Basin. This unit is present at a depth from approximately 400-600 feet in the City of Jal area as indicated by existing wells, and wells within the unit typically produce up to 50 gallons per minute, with a maximum proposed production of 100 gallons per minute (NMOSE, 2015). SMA believes the most productive interval, which is located at the base of the unit, will be intercepted at a depth between 500 to 800 feet below ground surface. Groundwater quality from wells near the City of Jal sampled in the 1950s and 1960s indicate relatively good water quality within the unit that should not require treatment for use as a municipal water source.

Figure 12 is an aerial photo of the City of Jal area with several potential well locations that would allow for the interception of the Dockum Group Aquifer. SMA recommends the installation of wells west of the City of Jal where well density is relatively low and at locations that are near to existing City of Jal water distribution infrastructure. SMA's primary proposed well installation location is immediately adjacent to the existing one million-gallon City of Jal water storage tank, which should prevent the need to purchase or gain easements to privately owned land.

SMA believes wells advanced to the west of the City of Jal will result in the lowest possible interference with currently existing wells within the Dockum Aquifer. As calculated and presented in the *Water Production and Transmission Study Report* prepared for the City of Jal in November, 2014, SMA estimates the City of Jal will require 854 acre feet of water annual to meet the City's future water demands. Assuming production of 100 gallons per minute (gpm) from wells advanced into the Dockum Group and a maximum pumping time of 60%, SMA estimates that at least nine (9) supply wells would be required to attain the 854 acre-feet requirement.

In order to determine the potential effects of these wells on the aquifer, SMA utilized a Theis model similar to what is utilized by the NMOSE to determine draw-down in nearby wells. This model determines the draw-down that will be seen in existing supply wells as a result of the increased groundwater diversion from the installation of an additional supply well. Using the Theis equation, SMA predicts that up to 300 acre-feet of diversion could occur from a single point at the one-million gallon storage tank without adversely affecting existing wells to the east. By distributing the total groundwater

diversion over a larger area to the west of the City of Jal, SMA believes a 900 acre-feet allocation could potentially be obtained from the Santa Rosa. Figure 12 is an aerial photo with potential future well locations. SMA recommends the installation of several wells with diversions of less than 100 acre feet per year at a minimum horizontal spacing of 1,000 feet to reduce the risks of excessive groundwater draw-down in the City of Jal area and to increase the potential of approval by the NMOSE Hydrology Department. Calculations of proposed draw-down utilizing the Theis equation are included in Appendix B. A conceptual well design diagram for the proposed wells is included in Appendix C.

The 100 acre-feet appropriation obtained by the City of Jal in 2014 and the proposed wells near Jal Lake (Figure 2) will intercept the upper portions of the Dockum aquifer, and provide a much better understanding of the local subsurface geology, local aquifer yields, and water quality when completed. This information can then be used to better calculate and predict the number and required spacing of additional municipal supply wells for the City of Jal.

6.0 CONCLUSIONS

The City of Jal Westfield Facility will provide a reliable source of Jal for the next several decades, and the City should begin pursuing the installation of additional supply wells in the Westfield area as recommended in the *Water Production and Transmission Study Report* dated November, 2014. In addition to the development of existing facilities, it is recommended that the City pursue additional groundwater rights in the Capitan Undergound Basin near the City proper. The Dockum Aquifer, which is much more regionally extensive than the Pecos Valley Alluvium, will provide a longer-term source of water for the City that will be less impacted by recent increases in regional pumping. The Dockum Aquifer is not as productive as the alluvium within the Westfield Facility, and will therefore require the development of a much larger well field, consisting of numerous supply wells to meet the projected future demands of the City of Jal. The saturated interval of the Dockum Aquifer is also much thinner than the Pecos Valley Alluvium at the Westfield Facility, and as there is significantly more diversion from the aquifer in the area. These wells would need to have significant horizontal separation to prevent interference from pumping and to prevent excessive draw-down of the aquifer in the area.

Table 4 on the next page is a summary of the potential aquifers near the City of Jal, with expected production, water quality, and long-term reliability of the aquifer.

Table 4. Potential Aquifers near the City of Jal

Aquifer	Required Well Depth	Expected Productivity	Water Quality	Long-Term Reliability
Monument Draw Trough (Current Westfield Aquifer)	650 ft	300 gpm	Good	Moderate (Depends on Draw-down of T-Bar Ranch)
Alluvium near Jal	100 ft.	Less than 50 gpm	Moderate	Poor – Susceptible to Seasonal Variation & Contamination
Santa Rosa Formation	600-800 ft.	Less than 100 gpm	Moderate	Good – Large Storage, Regional Extent
Rustler Formation	~1,200 ft.	100-200 gpm	Poor – will require treatment	Good – Large Storage, Regional Extent
Capitan Formation	> 2,500 ft.	Greater than 400 gpm	Poor – will require treatment	Good – Very Large Storage, Regional Extent

It is recommended that the City of Jal meet with District II NMOSE office to discuss appropriation of water rights within the Capitan Basin and begin the appropriation process.

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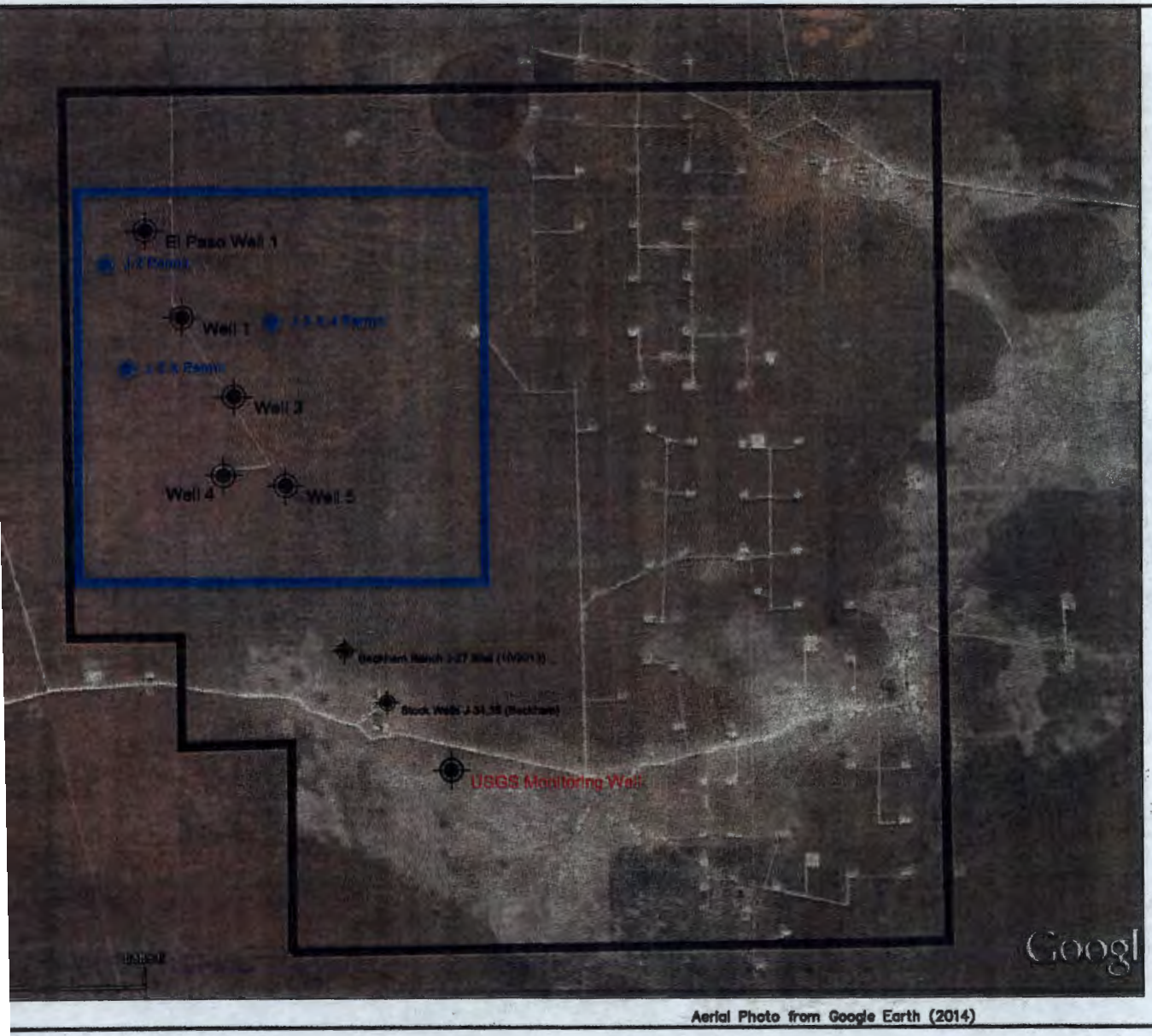
FIGURES



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Well 1 Supply Well

J-2-X Future Well Permit Location

Jal Underground Basin Outline

JAL UNDERGROUND BASIN WITH WESTFIELD WELLS
CITY OF JAL HYDROGEOLOGIC INVESTIGATION
JAL, LEA COUNTY, NEW MEXICO

Drawn: MAE | Checked: SAM | Approved: SAM
Date: OCTOBER, 2014
Scale: Horiz=None Vert.
Project No: 08323275
Sheet: FIGURE 1

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Albuquerque, NM 87107

SMA

P:\1-Jal Hydrogeo and NWDSE Apps\ACAD2015-03 Basin Map with CP NWDSE Well Locations.dwg, 4/2/2015 2:04:58 PM, mas

Aerial Photo from Google Earth (2014)

Aerial Photo from Google Earth (2015)

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SCALE: 1" = 200'

CP-1256 # 1 Future Capitan Underground Basin Supply Well Location

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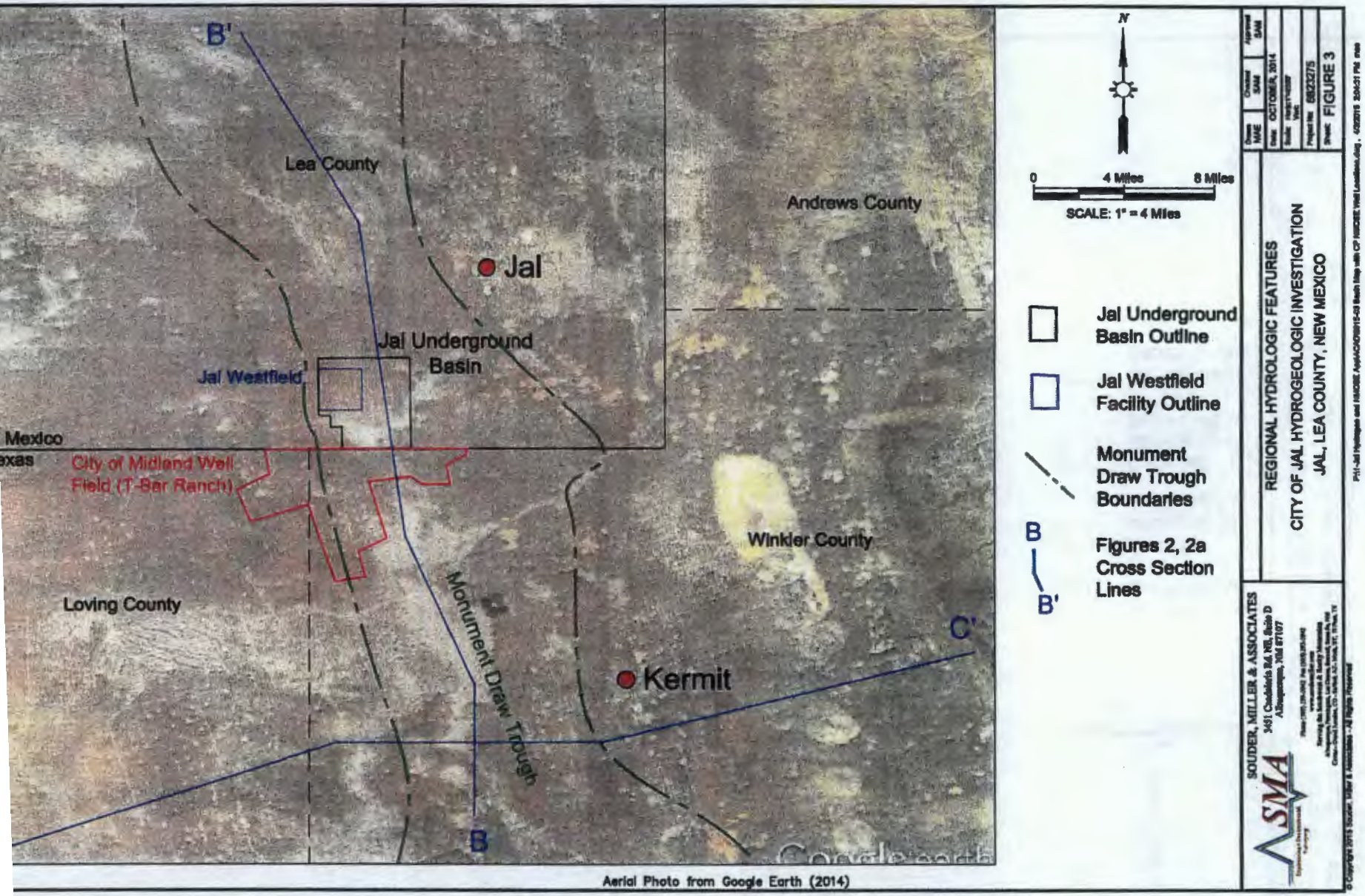
APPROVED CAPITAN UNDERGROUND BASIN WELL LOCATIONS
CITY OF JAL HYDROGEOLOGIC INVESTIGATION
JAL, LEA COUNTY, NEW MEXICO

Drawn: MAE | Checked: SAM | Approved: SAM
Date: MARCH, 2015
Project No: 68223275
Sheet: FIGURE 2



Aerial Photo from Google Earth (2014)

REGIONAL HYDROLOGIC FEATURES
CITY OF JAL HYDROGEOLOGIC INVESTIGATION
JAL, LEA COUNTY, NEW MEXICO

Drawn: MAE | Checked: SAM | Approved: SAM
Date: OCTOBER, 2014
Project No: 682/275
Sheet: FIGURE 3

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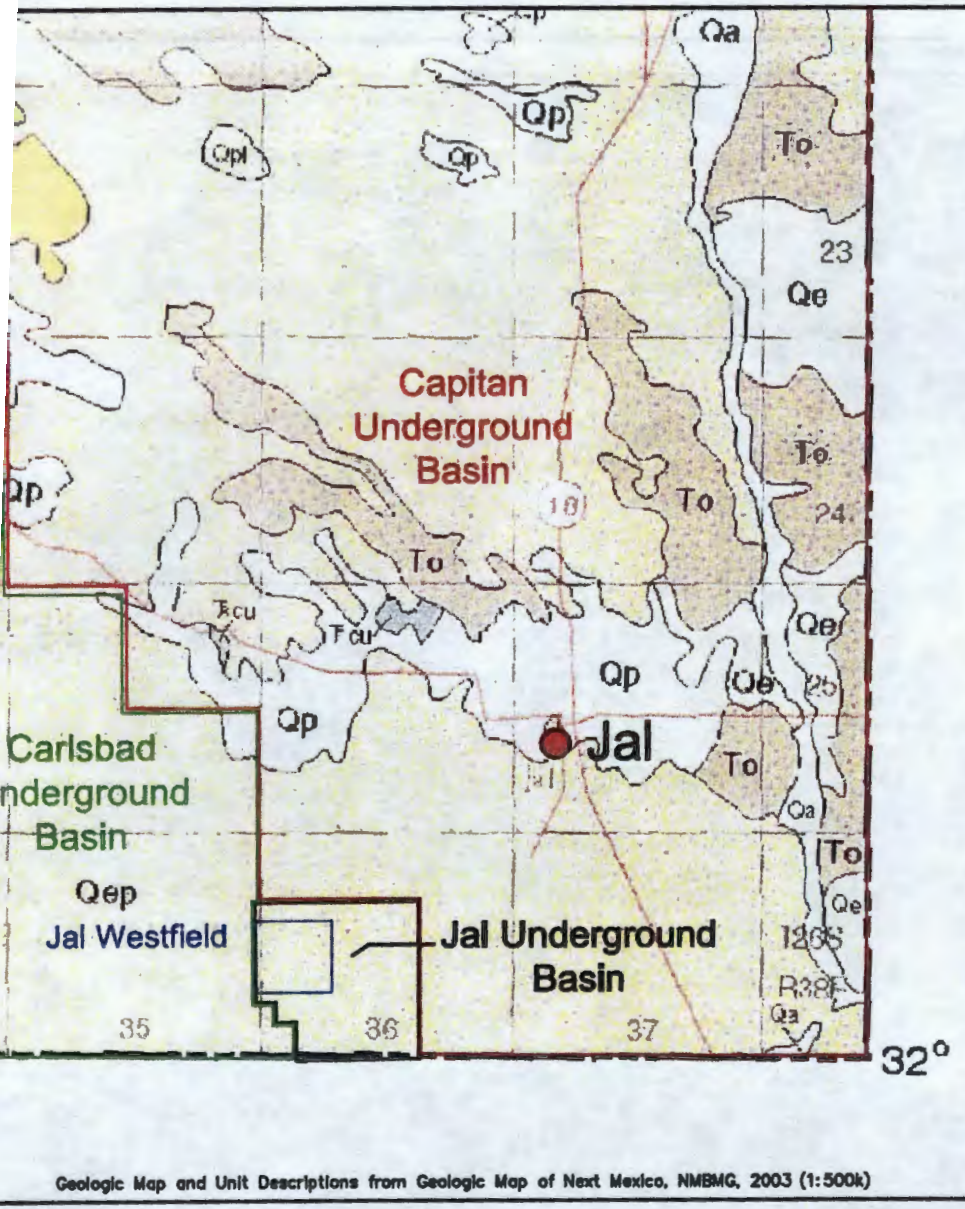
Albuquerque, NM 87107

SMA



Geologic Map and Unit Descriptions from Geologic Map of Next Mexico, NMBMG, 2003 (1:500k)

DESCRIPTION OF MAP UNITS

QUATERNARY

- Qa — Alluvium (Holocene to upper Pleistocene)
- Ql — Landslide deposits and colluvium (Holocene to Pleistocene) Landslide deposits on western flanks of Socorro Mountains not shown for clarity
- Qpl — Lacustrine and playa deposits (Holocene—Includes associated alluvial and eolian deposits of major late basins
- Qp — Piedmont alluvial deposits (Holocene to lower Pleistocene) Includes deposits of higher gradient tributaries bordering major stream valleys, alluvial veneers of the piedmont slopes, and alluvial fans. May locally include uppermost Pliocene deposits
- Qe — Eolian deposits (Holocene to middle Pleistocene)
- Qeg — Gypsiferous eolian deposits (Holocene to middle Pleistocene)
- Qep — Eolian and piedmont deposits (Holocene to middle Pleistocene)—Interbedded sands and piedmont-slope deposits along the eastern flank of the Pecos River valley, primarily between Roswell and Carlsbad. Typically capped by thin eolian deposits
- Qd — Glacial deposits; till and outwash (upper to middle Pleistocene)
- Qoa — Older alluvial deposits of upland plains and piedmont areas, and caliche soils and eolian cover sediments of High Plains region (middle to lower Pleistocene)—Includes scattered playa, lake, and alluvial deposits of the Tahoka, Double Tanks, Tule, Blackwater Draw and Gatuña Formations, the latter of which may be Pliocene or basal Holocene, however, are basically of Quaternary deposits
- Qb — Basaltic to andesitic lava flows (Holocene to middle Pleistocene) Flows east of Cerro Alto west of Carlsbad are Holocene. Includes minor vent deposits
- Qv — Basaltic tephra and lava vents (upper to middle Pleistocene)—Tuff rings, maars, cinder cones, and minor associated lava flows near Kilbourne Hole and Zuni Salt Lake
- Qbo — Basaltic to andesitic lava flows (middle to lower Pleistocene)—Includes vent deposits
- Qvc — Ring-fracture rhyolitic lava domes of the Valles caldera (uppermost to lower Pleistocene)—Upper members of the Valles Rhyolite, erupted Modernos, Banco Bonito, Battleship Rock, and El Cajete members on south margin of caldera
- Qbf — Older tuffaceous lavas and early volcaniclastic sedimentary fill deposits of the Valles caldera (lower Pleistocene)—Units are associated with resurgent dome formation and filling of the caldera. Includes minor middle Pleistocene tuffs of the upper Valles Rhyolite on north side of caldera
- Tbt — Basaltic Tuff (lower Pleistocene)—Includes large blocks of older andesite in a yellow-colored tuffaceous matrix locally exposed on resurgent dome of the Valles caldera

QUATERNARY and TERTIARY

- QTt — Tesuque Fm (Holocene to Pliocene)—Includes some pedogenic carbonate south of Sierra Ladrones
- QTp — Older piedmont alluvial deposits and shallow basin fill (middle Pleistocene to uppermost Pliocene) Includes [illegible]
- QTs — Undivided Santa Fe Group (middle Pleistocene to uppermost Miocene)—Includes Camp Rice, Fort Hancock, Palomas, Sierra Ladrones, Arroyo Ojito, Ancha, Paye, and Atarnosa Formations
- QTsf — Santa Fe Group, undivided (middle Pleistocene to uppermost Oligocene) Basin fill of the Rio Grande rift. Locally represents upper Miocene formations of the middle Santa Fe Group in the northern Albuquerque Basin
- QTg — Gila Group, Formation, or Conglomerate (middle Pliocene to uppermost Oligocene) Includes Hayner Ranch and several informal units in southwestern basins
- QTb — Basaltic to andesitic lava flows (upper Pliocene to lower Miocene)—Includes minor vent deposits

TERTIARY

- Tus — Upper Tertiary sedimentary units (Pliocene to upper Oligocene)—Includes Bidahochi Formation (Pliocene to upper Miocene), Popotosa Formation, (Miocene to Oligocene), Las Vegas Formation (Pliocene), Ives Gila Group units in the southwest, and undivided Pliocene units in northwestern Socorro County
- Tpf — Ogallala Formation (lower Pliocene to middle Miocene)—Alluvial and eolian deposits, and paleosols associated with the southern High Plains. Locally includes Qoa
- Tu — Upper Chinle Group, Garita Creek through Redonda Formations, undivided

N

0 3 Miles 6 Miles

SCALE: 1" = 3 Miles

- Jal Underground Basin Outline
- Capitan Underground Basin Outline
- Carlsbad Underground Basin Outline
- Jal Westfield Facility Outline

GEOLOGIC MAP OF JAL AREA
CITY OF JAL HYDROGEOLOGIC INVESTIGATION
JAL, LEA COUNTY, NEW MEXICO

Drawn: MAE | Checked: SAM | Approved: SAM
Date: OCTOBER, 2014
Scale: Horizontal / Vertical
Project No: 08022275
Sheet: FIGURE 4

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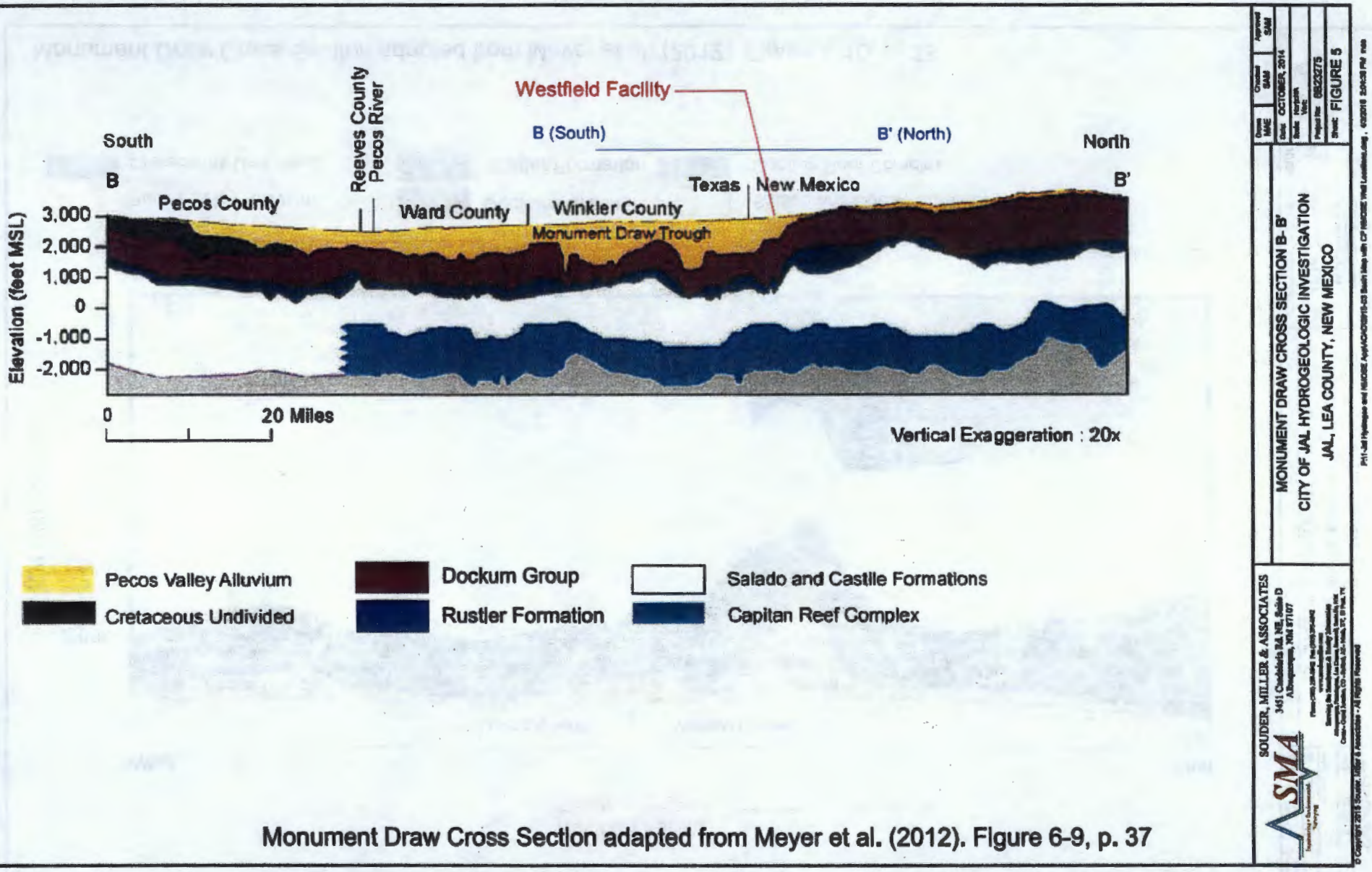
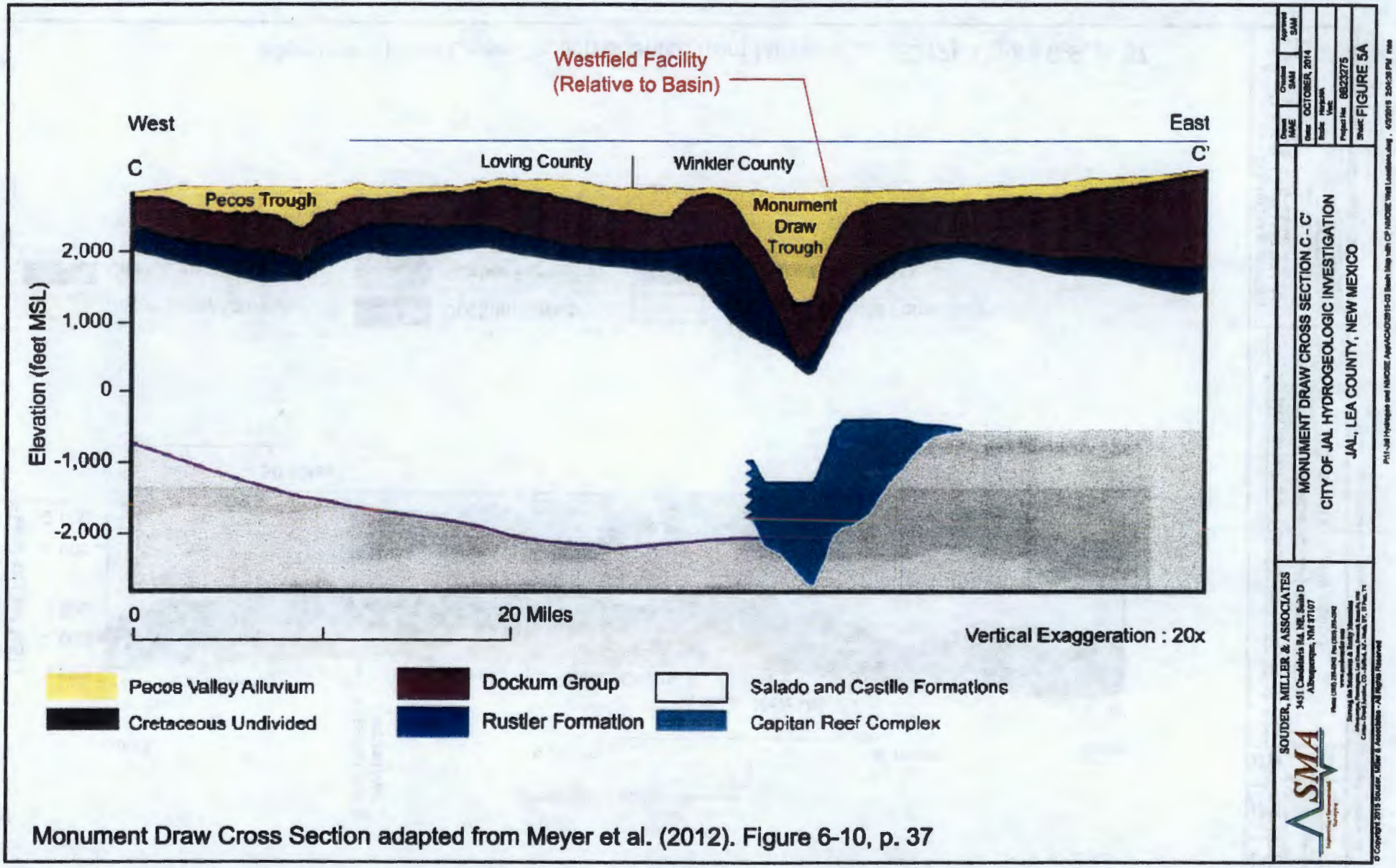
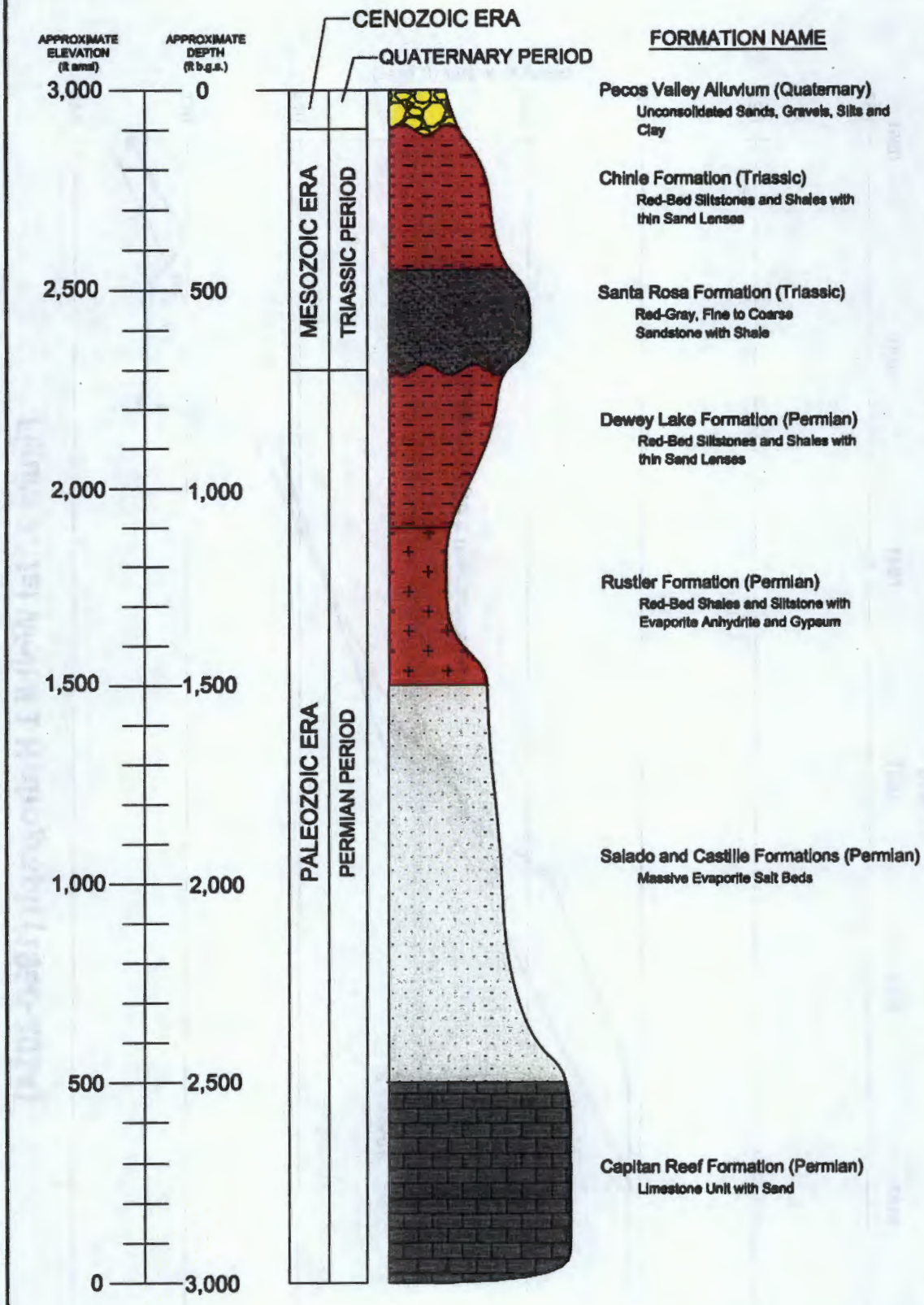
SMA



Monument Draw Cross Section adapted from Meyer et al. (2012). Figure 6-9, p. 37



Monument Draw Cross Section adapted from Meyer et al. (2012). Figure 6-10, p. 37



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STRATIGRAPHIC SECTION NEAR JAL, NM
CITY OF JAL HYDROGEOLOGIC INVESTIGATION
JAL, LEA COUNTY, NEW MEXICO

Drawn	Checked	Approved
MAE	SAM	SAM

Date: OCTOBER, 2014
Scale: Horizontal: 1" = 1,000' Vertical: 1" = 1,000'
Project No: 6823275
Sheet: FIGURE 6

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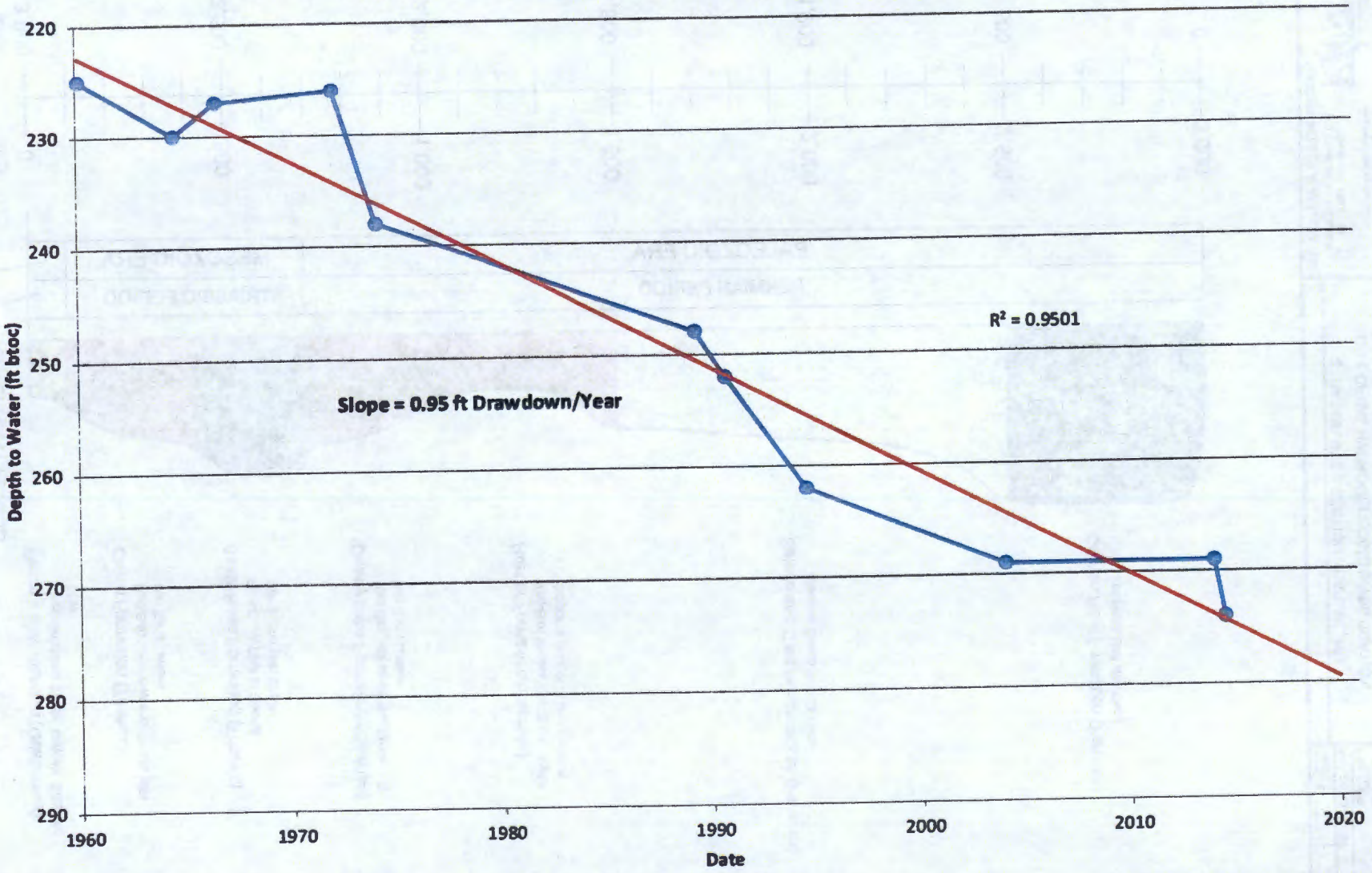
Figure 7. Jal Well # 1 Hydrograph (1960-2014)



WELLS WITHIN CAPITAN U.G. BASIN NEAR CITY OF JAL

CITY OF JAL HYDROGEOLOGIC INVESTIGATION

JAL, LEA COUNTY, NEW MEXICO

Drawn: MWE | Checked: SAM | Approved: SAM

Date: FEBRUARY 2015

Scale: As Noted

Project No: 0823275

Sheet: FIGURE 8

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Albuquerque, NM 87107

SMA

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SCALE: 1" = 3000'
123
55
Well in USGS Database with Well # and Total Depth
12
Alluvial Aquifer
145
Chinle Aquifer
50
Santa Rosa Aquifer
75
Rustler Aquifer
City of Jal
Aerial Photo from Google Earth (2014)
SOUDER, MILLER & ASSOCIATES
3451 Citadella Rd. NE, Suite D
Albuquerque, NM 87107
USGS WELLS WITHIN CAPITAN U.G. BASIN NEAR CITY OF JAL
CITY OF JAL HYDROGEOLOGIC INVESTIGATION
JAL, LEA COUNTY, NEW MEXICO
Drawn MAE
Checked SAM
Approved SAM
Date FEBRUARY 2015
Project No. 0822075
Sheet FIGURE 9
P:\1-Jal Hydrogeo and NMOSE Apps\ACAD\2015-03 Basin Map with CP NMOSE Well Locations.dwg, 4/7/2015 2:24:41 PM mas
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DEPTH TO GROUNDWATER WITHIN CAPITAN U.G. BASIN
CITY OF JAL HYDROGEOLOGIC INVESTIGATION
JAL, LEA COUNTY, NEW MEXICO

Drawn: MAE | Checked: SAM | Approved: SAM
Date: FEBRUARY 2015
Project No: 8823275
Sheet: FIGURE 10

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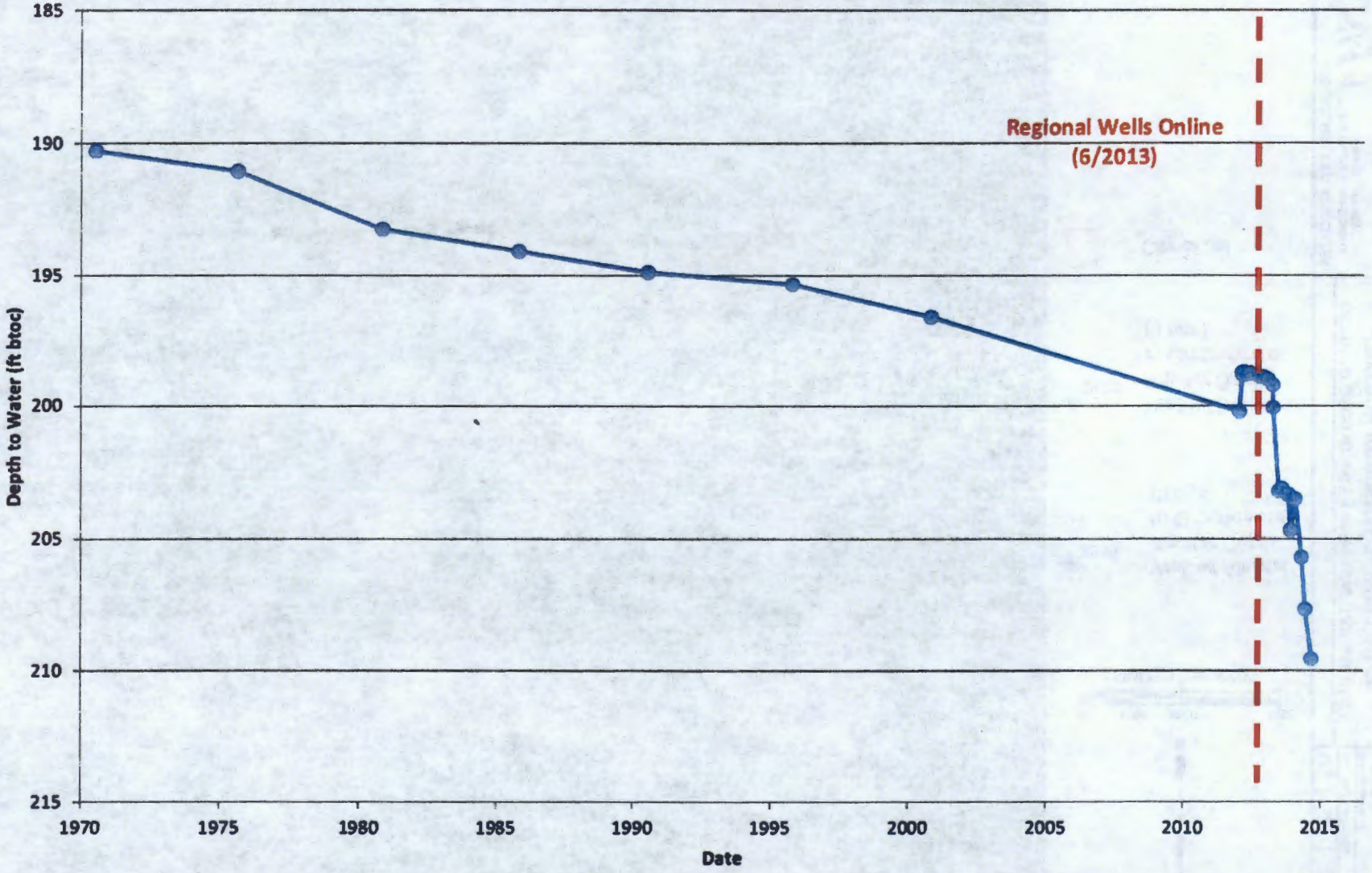
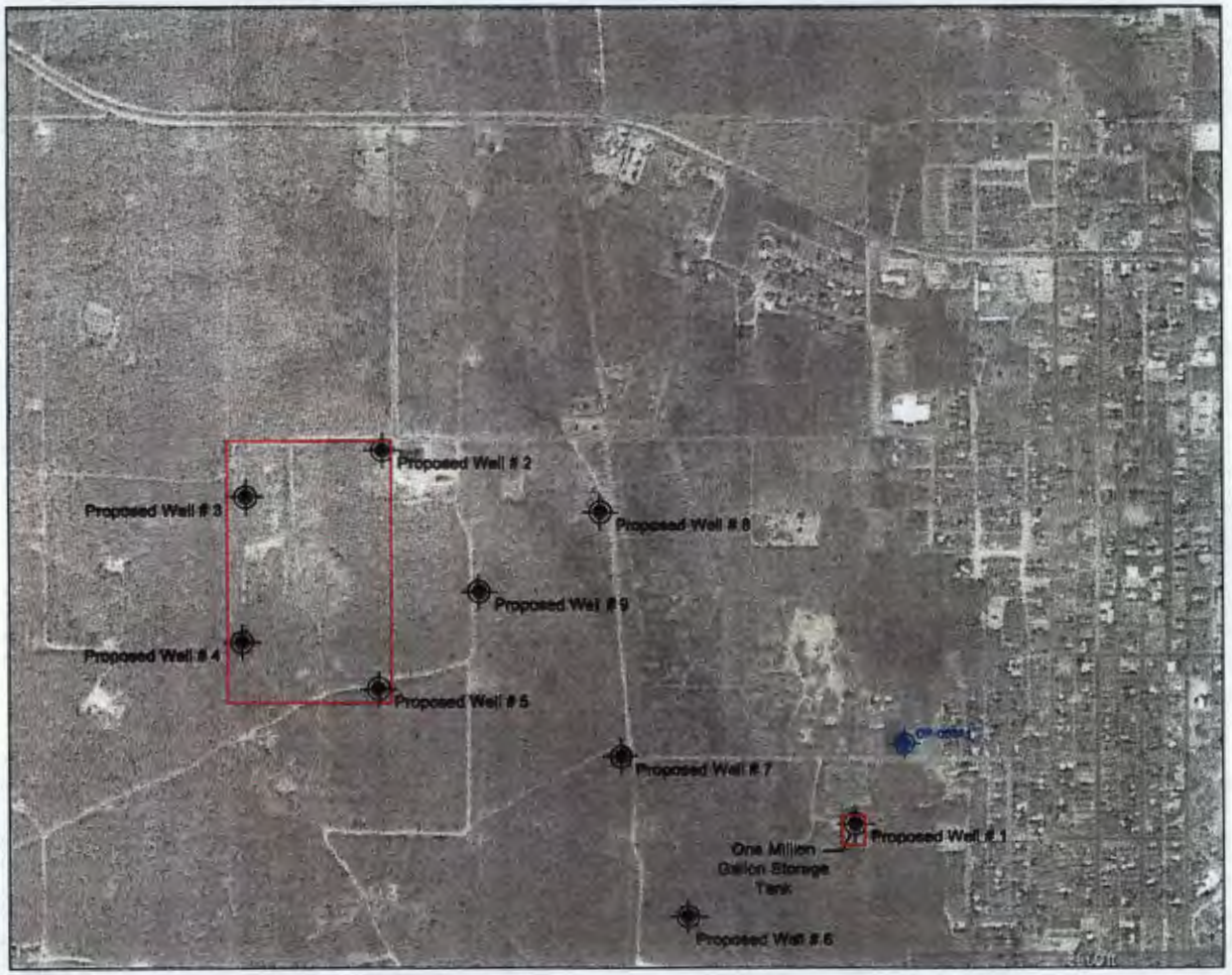
Figure 11. USGS Well 362714103071201 Hydrograph





Aerial Photo from Google Earth (2014)

N

0 500 1000 2000

SCALE: 1" = 1000'

Well # 1 — Preliminary Proposed Capitan Underground Basin Supply Well Location

CP-33334 — Existing Capitan Underground Basin Supply Well Location (Completed within Dockum Aquifer)

Property Owned by City of Jal

CONCEPTUAL DOCKUM AQUIFER WELL LOCATIONS
CITY OF JAL HYDROGEOLOGIC INVESTIGATION
JAL, LEA COUNTY, NEW MEXICO

Drawn: MNE | Checked: SAM | Approved: SAM
Date: MARCH, 2015
Scale: Horizontal / Vert.
Project No: 88222275
Sheet: FIGURE 12

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Albuquerque, NM 87107

TABLES

Table 1. Westfield Facility Wells Completion and Production Information
City of Jal Hydrogeologic Report
Jal, Lea County, New Mexico

Well Number	NMOSE File #	Year Installed	Total Depth	Static Water Level	Casing Diameter and Construction	Screen Interval	Historical Pump Rate (GPM)	Current Pump Rate (GPM)
1	J-1	1960	~450 550 @ install	225 in 1960 237 in 1974 262 in 1994 270 in 2014	12.75 inch steel, recompleted with 8" mil-slot casing in 2014	275-330 400-465 500-535	310	180
2	J-1	1960	700	229 in 1960 240 in 1980	12.75 inch steel	270-280 479-550 600-670 680-700	N/A	N/A
3	J-2-X2	1969	554 650 @ install	242 in 1978 230 in 1980 252 in 2003 260 in 2014	12.75 inch steel, recompleted with 8" screen in past 10-20 years	456-554	350	210
4	J-2-X3	1980	710 710 @ install	218.5 in 1980 242 in 1994 255 in 2014	14 inch steel casing, recompleted with 10" mil-slot casing	460-690	350	270
5	J-1-X	2002	610 630 @ install	288 in 2004 283 in 2014	10 inch steel casing	480-630	120	110

Table 2. Summary of Well Data from NMOSE Database

City of Jal Hydrogeologic Report

Jal, Lea County, New Mexico

NMOSE File Number	Northing	Easting	Date of Log Filing	Total Well Depth	Depth to Water	Surface Elevation	Groundwater Elevation	Aquifer	Estimated Yield (gpm)
CP 00387	403142.051	897624.485	05/01/1968	305	250	3020	2770	Dockum	12
CP 00426	407716.95	896947.336	03/31/1967	235	70	3040	2970	Dockum	--
CP 00428	409047.671	895590.593	03/02/1978	90	60	3040	2980	Alluvium	--
CP 00429	409021.345	892952.343	04/21/1967	142	37	3080	3043	Dockum	--
CP 00444	409696.588	893593.076	12/04/1967	101	50	3080	3030	Alluvium	--
CP 00460	409355.726	891940.52	03/26/1969	128	63	3090	3027	Alluvium	--
CP 00487	404446.378	896290.545	06/01/1973	421	250	3030	2780	Dockum	50
CP 00506	403797.466	898288.061	07/19/1972	425	200	3020	2820	Dockum	--
CP 00507	423928.692	897054.294	10/09/1973	4900	--	3200	--	Capitan	--
CP 00509	404127.786	897932.454	01/29/1973	300	275	3020	2745	Dockum	--
CP 00515	408048.115	893274.44	06/18/1973	72	42	3070	3028	Alluvium	15
CP 00524	410007.882	892600.798	04/20/1983	86	68	3080	3012	Alluvium	15
CP 00533	408017.726	891292.404	09/20/1974	78	40	3030	2990	Alluvium	--
CP 00534	408704.331	893278.502	10/08/1974	70	40	3080	3040	--	--
CP 00541	409363.189	893915.852	10/08/1974	100	38	3080	3042	Alluvium	--
CP 00557	405421.368	894623.165	11/30/1976	350	42	3040	2998	Dockum	8
CP 00565	409344.226	890618.122	06/06/1977	141	DRY	3100	--	Alluvium	DRY
CP 00607	409996.381	891278.401	05/09/1980	90	60	3100	3040	Alluvium	1
CP 00608	409985.498	889326.014	04/02/1980	235	DRY	3120	--	Dockum	DRY
CP 00619	407073.122	894941.82	06/02/1980	48	25	3050	3025	--	--
CP 00620	408062.919	894593.576	06/02/1980	59	25	3030	3005	--	--

Table 2. Summary of Well Data from NMOSE Database

City of Jal Hydrogeologic Report

Jal, Lea County, New Mexico

OSE File umber	Northing	Easting	Date of Log Filing	Total Well Depth	Depth to Water	Surface Elevation	Groundwater Elevation	Aquifer	Estimated Yield (gpm)
' 00638	404431.571	894971.411	10/06/1981	380	187	3020	2833	Dockum	40
' 00661	408062.919	894593.576	08/30/1983	38	23	3030	3007	--	--
' 00710	409367.251	893259.636	07/22/1987	90	40	3080	3040	Alluvium	--
' 00774	403767.853	895649.794	08/20/1992	100	60	3020	2960	Alluvium	--
' 00777	406406.121	895620.182	11/03/1992	100	28	3035	3007	Alluvium	--
' 00789	408062.919	894593.576	05/07/1993	360	255	3080	2825	Dockum	--
' 00841	405395.017	891988.195	12/27/1994	275	235	3050	2815	Dockum	10
' 00909	395073.189	915201.099	02/02/2001	185	120	3100	2980	Dockum	2
080 POD1	414364.28	908666.242	05/15/2012	65	--	3100	--	--	--
156 POD1	403441.873	917047.659	05/31/2013	80	69	3070	3001	Alluvium	Monitoring Well
156 POD2	403274.836	917528.957	05/31/2013	80	70	3070	3000	Alluvium	Monitoring Well
156 POD3	403240.653	917220.316	05/31/2013	80	70	3070	3000	Alluvium	Monitoring Well
156 POD4	403238.976	916961.094	05/31/2013	80	70	3070	3000	Alluvium	Monitoring Well
156 POD5	403039.961	917307.666	05/31/2013	80	70	3070	3000	Alluvium	Monitoring Well
169 POD1	401702.401	914999.292	02/27/2014	30	--	3060	--	--	--
275 POD1	414163.009	898778.774	02/27/2014	35	--	3120	--	Alluvium	Monitoring Well
275 POD2	414163.009	898778.774	02/27/2014	40	--	3120	--	Alluvium	Monitoring Well
275 POD3	414163.009	898778.774	02/27/2014	37	--	3120	--	Alluvium	Monitoring Well
345 POD1	402250.962	918083.702	07/07/2014	80	71	3070	2999	Alluvium	Monitoring Well
345 POD2	403251.78	918073.488	07/07/2014	80	71	3070	2999	Alluvium	Monitoring Well
345 POD3	403048.336	918075.511	07/07/2014	80	70	3070	3000	Alluvium	Monitoring Well

ates in NM State Plane, East Zone

Group includes Chinle and Santa Rosa Sandstone Formations

Table 3. Summary of Well Data from USGS Database

City of Jal Hydrogeologic Report

Jal, Lea County, New Mexico

Relative Well Number	USGS Station Number	Northing	Easting	Total Well Depth	Surface Elevation	Aquifer	Other ID
1	gwsi321337103070401	450285	917149	36	3160	Alluvial	10615
2	gwsi320634103083901	407546	909289	42	3052	Alluvial	11686
3	gwsi320634103083902	405627	909397	42	3052	Alluvial	11687
4	gwsi320632103095101	405357	903206	46	3054	Alluvial	13152
5	gwsi321220103064801	440699	918547	53	3132	Alluvial	10616
6	gwsi321126103062301	435267	920758	57	3122	Alluvial	11454
7	gwsi320646103105901	406710	897341	60	3076	Alluvial	11677
8	gwsi320650103110201	407111	897079	60	3073	Alluvial	11676
9	gwsi320438103050701	396028	927574	60	3025	Alluvial	11719
10	gwsi320925103090301	422885	907142	62	3144	Alluvial	11628
11	gwsi320547103065702	402996	918201	62	3056	Alluvial	11694
12	gwsi320644103134401	406360	883151	64	3085	Alluvial	12992
13	gwsi320144103044001	376553	930297	65	2980	Alluvial	11598
14	gwsi320705103113501	408597	894225	65	3082	Alluvial	11661
15	gwsi320031103045201	370981	929156	70	2964	Alluvial	11599
16	gwsi320726103115001	410705	892912	70	3098	Alluvial	11656
17	gwsi320315103053101	387616	925606	73	3011	Alluvial	11596
18	gwsi321131103093401	435589	904337	74	3204	Alluvial	10628
19	gwsi321024103162901	428745	867963	75	3234	Alluvial	13655
20	gwsi321003103085201	428420	908142	75	3170	Alluvial	11446
21	gwsi321312103080603	445879	911786	76	3206	Alluvial	10613
22	gwsi320456103062601	397768	920670	77	3033	Alluvial	11718
23	gwsi320704103115701	408476	892333	79	3096	Alluvial	11662
24	gwsi320834103132501	417493	884671	80	3209	Alluvial	11609
25	gwsi320743103071101	412684	916887	80	3084	Alluvial	13643
26	gwsi320745103114401	412631	893408	80	3106	Alluvial	11654
27	gwsi320704103115502	408478	892505	80	3096	Alluvial	11664
28	gwsi320704103115501	408478	892505	80	3095	Alluvial	11663
29	gwsi320633103114601	405353	893313	80	3073	Alluvial	11672
30	gwsi320614103072901	403673	915441	80	3073	Alluvial	11688
31	gwsi320605103065101	402800	918720	80	3057	Alluvial	11693
32	gwsi320451103064701	395325	919149	80	3029	Alluvial	11704
33	gwsi321312103080602	447701	912023	80	3205	Alluvial	10612
34	gwsi321326103075602	447304	912629	80	3205	Alluvial	10611
35	gwsi321050103090801	431470	906618	80	3182	Alluvial	12829
36	gwsi321107103094101	433157	903762	80	3210	Alluvial	12831
37	gwsi321039103090201	430364	907145	80	3180	Alluvial	13623
38	gwsi321039103085801	430368	907489	80	3183	Alluvial	13624
39	gwsi320702103114601	408284	893282	81	3092	Alluvial	11665
40	gwsi321220103064501	440702	918805	82	3132	Alluvial	10617

Table 3. Summary of Well Data from USGS Database

City of Jal Hydrogeologic Report

Jal, Lea County, New Mexico

Relative Well Number	USGS Station Number	Northing	Easting	Total Well Depth	Surface Elevation	Aquifer	Other ID
41	gwsi321044103090601	430866	906796	82	3174	Alluvial	13622
42	gwsi321220103083101	440601	909697	83	3224	Alluvial	10618
43	gwsi320758103085801	414098	907669	84	3109	Alluvial	11637
44	gwsi320702103090601	408431	907043	84	3079	Alluvial	11685
45	gwsi321050103090301	431671	906443	84	3176	Alluvial	13619
46	gwsi321144103062701	437082	920393	84	3124	Alluvial	11453
47	gwsi320706103115801	408677	892245	85	3099	Alluvial	11659
48	gwsi321312103080604	445879	911786	87	3205	Alluvial	10614
49	gwsi321039103085401	430372	907833	87	3179	Alluvial	13625
50	gwsi320954103082901	425848	910032	87	3187	Alluvial	12850
51	gwsi320246103042901	382829	931171	90	3015	Alluvial	11597
52	gwsi320659103113901	407987	893887	90	3077	Alluvial	11667
53	gwsi320654103114601	407475	893290	90	3089	Alluvial	11668
54	gwsi321055103090301	431980	907042	90	3179	Alluvial	13607
55	gwsi320948103084601	425226	908578	90	3166	Alluvial	11447
56	gwsi321017103060401	428312	922471	90	3102	Alluvial	11457
57	gwsi321210103093401	439531	904294	91	3238	Alluvial	10625
58	gwsi321120103092701	434484	904951	91	3201	Alluvial	11442
59	gwsi320935103060101	424071	922777	92	3095	Alluvial	11705
60	gwsi320935103084201	423916	908936	93	3145	Alluvial	13636
61	gwsi320458103062801	396051	920776	94	3033	Alluvial	11701
62	gwsi321055103062101	433934	921224	96	3114	Alluvial	11456
63	gwsi321422103092501	454799	904900	98	3264	Alluvial	10599
64	gwsi320746103112501	412749	895040	100	3105	Alluvial	11653
65	gwsi320730103114801	412929	892888	100	3109	Alluvial	11657
66	gwsi320722103114601	410305	893260	100	3100	Alluvial	11658
67	gwsi320717103114701	409799	893180	100	3090	Alluvial	11660
68	gwsi320659103093201	408104	904810	100	3079	Alluvial	11683
69	gwsi321058103070601	432395	917094	100	3143	Alluvial	11439
70	gwsi320941103084801	424516	908414	100	3154	Alluvial	13106
71	gwsi321022103081301	428693	911376	100	3186	Alluvial	13614
72	gwsi321145103061701	437490	920732	100	3122	Alluvial	13628
73	gwsi320953103082901	425747	910034	101	3188	Alluvial	11448
74	gwsi320244103072001	382459	916454	103	3003	Alluvial	11591
75	gwsi321011103081901	427575	910873	103	3186	Alluvial	13615
76	gwsi320757103085401	414001	908014	105	3103	Alluvial	11638
77	gwsi320510103101301	398761	900696	105	3003	Alluvial	11699
78	gwsi320757103084801	414006	908530	106	3108	Alluvial	11639
79	gwsi320550103081001	403126	911747	106	3029	Alluvial	11695
80	gwsi321219103100501	440411	901621	106	3225	Alluvial	10619

Table 3. Summary of Well Data from USGS Database

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Jal, Lea County, New Mexico

Relative Well Number	USGS Station Number	Northing	Easting	Total Well Depth	Surface Elevation	Aquifer	Other ID
81	gwsi321056103091101	432074	906353	106	3190	Alluvial	13606
82	gwsi321048103063201	431418	920028	106	3128	Alluvial	13626
83	gwsi321058103063001	432430	920188	108	3136	Alluvial	11440
84	gwsi321021103063601	428685	919715	109	3126	Alluvial	11450
85	gwsi320605103044701	404740	929280	110	3032	Alluvial	11717
86	gwsi321106103092801	433069	904881	110	3199	Alluvial	13621
87	gwsi321014103082601	427872	910268	110	3191	Alluvial	13612
88	gwsi320703103065701	408655	918137	112	3072	Alluvial	11690
89	gwsi321031103211501	428924	844150	112	3259	Alluvial	12732
90	gwsi320902103082101	420601	910779	113	3160	Alluvial	11624
91	gwsi320755103085101	413801	908274	114	3107	Alluvial	11652
92	gwsi321021103083701	428569	909315	114	3195	Alluvial	13611
93	gwsi321007103082201	427168	910620	114	3187	Alluvial	13616
94	gwsi320042103103901	371227	864227	115	2953	Alluvial	11595
95	gwsi320703103052601	408744	925964	115	3082	Alluvial	11714
96	gwsi320713103045601	409785	928533	115	3083	Alluvial	12846
97	gwsi321340103111901	448529	895175	115	3295	Alluvial	10606
98	gwsi321055103062801	432129	920364	115	3132	Alluvial	13618
99	gwsi321035103084001	429981	909041	115	3198	Alluvial	13608
100	gwsi321023103082901	428779	910000	118	3199	Alluvial	13610
101	gwsi321031103082201	429594	910593	118	3195	Alluvial	13613
102	gwsi320401103082903	390175	910428	119	2996	Alluvial	12823
103	gwsi320401103082901	391994	910408	119	2997	Alluvial	11579
104	gwsi320322103100201	386147	902468	120	2972	Alluvial	11586
105	gwsi320849103081401	419293	911395	120	3132	Alluvial	11625
106	gwsi320849103080101	419306	912513	120	3127	Alluvial	11627
107	gwsi320714103065701	409767	918125	120	3074	Alluvial	11651
108	gwsi320713103065701	409666	918126	120	3074	Alluvial	11650
109	gwsi320659103093401	408102	904638	120	3084	Alluvial	11682
110	gwsi320458103062802	396051	920776	120	3033	Alluvial	11702
111	gwsi320458103062803	396051	920776	120	3033	Alluvial	11703
112	gwsi320729103053201	413078	924882	120	3062	Alluvial	12087
113	gwsi321241103103801	442604	898761	120	3248	Alluvial	10621
114	gwsi321105103063601	433132	919665	120	3140	Alluvial	11438
115	gwsi321000103061901	428601	921178	120	3118	Alluvial	11458
116	gwsi320918103211701	423367	844287	122	3221	Alluvial	11602
117	gwsi321028103083201	429281	909736	122	3199	Alluvial	13609
118	gwsi321233103051101	444029	926930	122	3212	Alluvial	11452
119	gwsi320926103062901	423134	920381	128	3107	Alluvial	11621
120	gwsi320633103063001	405650	920494	128	3064	Alluvial	11692

Table 3. Summary of Well Data from USGS Database

City of Jal Hydrogeologic Report

Jal, Lea County, New Mexico

Relative Well Number	USGS Station Number	Northing	Easting	Total Well Depth	Surface Elevation	Aquifer	Other ID
121	gwsi320315103072201	387507	915967	129	3008	Alluvial	11589
122	gwsi320401103082902	390175	910428	130	2998	Alluvial	12822
123	gwsi320925103063101	423031	920210	130	3105	Alluvial	11622
124	gwsi320842103070901	418648	916992	130	3104	Alluvial	11645
125	gwsi321036103063201	430205	920042	130	3125	Alluvial	13627
126	gwsi320309103080401	384134	912561	131	3000	Alluvial	11588
127	gwsi320624103060501	404765	922655	133	3066	Alluvial	11713
128	gwsi320635103063001	405852	920492	135	3064	Alluvial	11691
129	gwsi321105103064901	435038	918440	135	3144	Alluvial	11437
130	gwsi321038103065101	430388	918407	135	3136	Alluvial	11441
131	gwsi320826103061701	417082	921482	138	3097	Alluvial	11709
132	gwsi320303103100901	385936	901695	140	2971	Alluvial	13139
133	gwsi320937103063101	426367	920258	140	3112	Alluvial	11617
134	gwsi320936103062901	424144	920369	140	3110	Alluvial	11618
135	gwsi320931103062901	423639	920375	140	3108	Alluvial	11619
136	gwsi320724103065501	410779	918285	140	3080	Alluvial	13645
137	gwsi320952103042901	425880	930667	140	3159	Alluvial	13639
138	gwsi321342103091201	448849	906082	140	3252	Alluvial	10610
139	gwsi321130103042601	435787	930808	141	3206	Alluvial	11455
140	gwsi320724103071101	410764	916909	143	3083	Alluvial	11649
141	gwsi320724103071502	412677	916285	145	3083	Alluvial	11648
142	gwsi320755103153601	413438	873446	147	3123	Alluvial	11611
143	gwsi320728103064801	411190	918883	147	3073	Alluvial	13646
144	gwsi320907103071101	421173	916791	150	3112	Alluvial	12090
145	gwsi320854103062201	419907	921019	150	3097	Alluvial	13640
146	gwsi320824103062701	416870	920624	150	3096	Alluvial	11708
147	gwsi321235103094701	443863	903044	150	3245	Alluvial	10620
148	gwsi321219103120401	442121	891290	150	3303	Alluvial	10622
149	gwsi320928103062901	423336	920378	152	3107	Alluvial	11620
150	gwsi320847103062901	419192	920426	152	3102	Alluvial	12817
151	gwsi320724103071501	410760	916565	152	3082	Alluvial	11647
152	gwsi321319103115701	448392	891739	152	3305	Alluvial	10602
153	gwsi321204103093401	438924	904301	152	3235	Alluvial	10626
154	gwsi320850103080501	421625	912057	154	3128	Alluvial	11626
155	gwsi320852103062501	419702	920764	155	3101	Alluvial	11707
156	gwsi320830103083001	417358	910041	157	3114	Alluvial	13648
157	gwsi320251103071401	384916	916953	160	3006	Alluvial	11590
158	gwsi320429103092701	392950	905406	160	2999	Alluvial	11700
159	gwsi320857103061801	420214	921360	160	3090	Alluvial	11706
160	gwsi321342103111001	448739	895946	160	3289	Alluvial	10607

Table 3. Summary of Well Data from USGS Database

City of Jal Hydrogeologic Report

Jal, Lea County, New Mexico

Relative Well Number	USGS Station Number	Northing	Easting	Total Well Depth	Surface Elevation	Aquifer	Other ID
161	gwsi321316103094001	448014	903686	160	3276	Alluvial	10609
162	gwsi321152103115601	437581	892112	160	3288	Alluvial	10623
163	gwsi320243103090201	382261	907675	165	2979	Alluvial	11592
164	gwsi320813103084001	415631	909200	174	3114	Alluvial	11636
165	gwsi320824103080301	416778	912369	180	3122	Alluvial	11642
166	gwsi321442103113601	454779	893647	182	3307	Alluvial	10600
167	gwsi320823103081801	416662	911081	183	3121	Alluvial	11641
168	gwsi321320103115901	446472	891760	185	3305	Alluvial	10603
169	gwsi321350103113301	449527	893961	185	3307	Alluvial	10604
170	gwsi321345103111001	449043	895942	185	3286	Alluvial	10605
171	gwsi320823103083101	416650	909963	187	3122	Alluvial	11632
172	gwsi320251103154201	384614	873101	190	2943	Alluvial	11571
173	gwsi321335103214901	449614	841040	190	3362	Alluvial	12727
174	gwsi320823103082901	418470	910028	192	3123	Alluvial	11640
175	gwsi320907103072201	421162	915846	198	3117	Alluvial	11623
176	gwsi362941103052001	384328	873134	200	2938	Alluvial	12960
177	gwsi320149103134201	378133	883858	200	2927	Alluvial	11572
178	gwsi320857103074101	420133	914224	208	3125	Alluvial	12816
179	gwsi321002103063801	426763	919565	215	3118	Alluvial	11451
180	gwsi321138103062401	436478	920658	220	3135	Alluvial	13617
181	gwsi320047103152301	370197	874997	225	2894	Alluvial	11578
182	gwsi320816103085201	415923	908165	270	3110	Alluvial	12086
183	gwsi320831103075701	417491	912877	482	3121	Alluvial	11644
184	gwsi320651103110201	407212	897078	510	3073	Alluvial	11674
185	gwsi320651103110202	408627	897063	510	3073	Alluvial	11675
186	gwsi320220103184001	381000	857806	567	2995	Alluvial	11573
187	gwsi320245103184201	381955	857749	601	2982	Alluvial	11570
188	gwsi362714103071201	369520	864243	604	2917	Alluvial	12961
189	gwsi320138103181201	376687	860266	700	2953	Alluvial	11576
190	gwsi320841103205601	417823	845885	84	3181	Ogalala	11603
191	gwsi320800103040501	416608	932925	100	3137	Ogalala	11710
192	gwsi320800103040101	414589	933207	100	3137	Ogalala	11711
193	gwsi321008103114001	427086	893598	100	3233	Ogalala	11445
194	gwsi320703103035501	410724	933969	110	3116	Ogalala	11715
195	gwsi321123103145101	434496	877103	150	3332	Ogalala	10594
196	gwsi321218103124601	440164	887787	151	3321	Ogalala	10587
197	gwsi321215103134302	441830	882700	170	3348	Ogalala	10592
198	gwsi321217103135701	440000	881688	172	3348	Ogalala	12827
199	gwsi321216103135602	439900	881775	172	3350	Ogalala	10590
200	gwsi321216103135601	439900	881775	172	3349	Ogalala	10589

Table 3. Summary of Well Data from USGS Database

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Jal, Lea County, New Mexico

Relative Well Number	USGS Station Number	Northing	Easting	Total Well Depth	Surface Elevation	Aquifer	Other ID
201	gwsi321308103145101	445107	876995	200	3394	Ogalala	10588
202	gwsi321309103144801	445211	877252	251	3384	Ogalala	12848
203	gwsi320701103113901	408189	893885	142	3077	Chinle	11666
204	gwsi321039103243401	429581	827039	176	3324	Chinle	12730
205	gwsi321039103243402	429581	827039	176	3325	Chinle	12731
206	gwsi320638103110201	405898	897092	230	3056	Chinle	11681
207	gwsi320715103193101	409953	853343	249	3110	Chinle	11604
208	gwsi320528103113301	398796	894501	300	3004	Chinle	11698
209	gwsi320644103104701	406518	898376	350	3055	Chinle	11679
210	gwsi320330103100601	386951	902115	400	2968	Chinle	13642
211	gwsi320611103133901	403029	883616	460	3060	Chinle	11615
212	gwsi320134103384101	373964	742619	405	3132	Dockum	C-231-23
213	gwsi320046103085101	372121	908727	76	2981	Santa Rosa	12825
214	gwsi320752103153501	413135	873535	140	3122	Santa Rosa	12991
215	gwsi320704103222301	409707	838647	180	3230	Santa Rosa	11606
216	gwsi321335103163901	447743	867690	230	3404	Santa Rosa	12828
217	gwsi320620103114301	404042	893585	245	3043	Santa Rosa	11673
218	gwsi320721103221201	409873	838476	275	3230	Santa Rosa	13634
219	gwsi320633103111601	405380	895893	450	3040	Santa Rosa	11680
220	gwsi320304103122701	384196	890007	455	2956	Santa Rosa	12824
221	gwsi320300103121401	383803	891130	455	2958	Santa Rosa	11582
222	gwsi320703103132601	408296	884680	455	3113	Santa Rosa	11613
223	gwsi320604103110801	402457	896613	457	3026	Santa Rosa	11696
224	gwsi320644103110201	406505	897085	460	3073	Santa Rosa	11678
225	gwsi320259103122201	385513	890338	470	2958	Santa Rosa	11581
226	gwsi320251103123001	382879	889763	470	2952	Santa Rosa	11585
227	gwsi320321103122501	385915	890161	470	2956	Santa Rosa	11584
228	gwsi320259103123001	383688	889754	475	2955	Santa Rosa	11580
229	gwsi320704103114201	408489	893623	475	3083	Santa Rosa	12821
230	gwsi320255103123101	383283	889672	476	2952	Santa Rosa	11583
231	gwsi320644103095301	406568	903020	495	3069	Santa Rosa	11684
232	gwsi320104103120301	373693	892358	500	2947	Santa Rosa	11594
233	gwsi320727103134601	410703	882935	500	3098	Santa Rosa	11610
234	gwsi320637103132201	405672	885051	500	3083	Santa Rosa	11614
235	gwsi320758103102901	414013	899843	500	3154	Santa Rosa	11630
236	gwsi320757103153501	413640	873530	508	3121	Santa Rosa	11612
237	gwsi320813103152901	416977	873669	512	3133	Santa Rosa	12990
238	gwsi320851103172401	419005	864104	520	3202	Santa Rosa	11607
239	gwsi320756103124801	413685	887892	524	3188	Santa Rosa	13630
240	gwsi320113103085001	373178	908808	525	2982	Santa Rosa	13140

Table 3. Summary of Well Data from USGS Database

City of Jal Hydrogeologic Report

Jal, Lea County, New Mexico

Relative Well Number	USGS Station Number	Northing	Easting	Total Well Depth	Surface Elevation	Aquifer	Other ID
241	gwsi321402103153901	450523	872817	530	3397	Santa Rosa	10584
242	gwsi321402103153701	450525	872989	550	3398	Santa Rosa	10583
243	gwsi320916103182501	423497	858300	605	3263	Santa Rosa	11608
244	gwsi320707103192901	408393	853455	606	3107	Santa Rosa	11605
245	gwsi320956103042301	426290	931178	733	3180	Santa Rosa	12832
246	gwsi321136103092601	436102	905019	747	3227	Santa Rosa	11434
247	gwsi320946103040101	425302	933081	765	3162	Santa Rosa	11461
248	gwsi321125103093001	435283	904083	770	3206	Santa Rosa	13620
249	gwsi321139103095901	436375	902180	775	3222	Santa Rosa	10627
250	gwsi321012103042001	427910	931417	775	3189	Santa Rosa	11460
251	gwsi321034103100201	429803	901994	798	3247	Santa Rosa	11444
252	gwsi320959103051901	426537	926360	824	3148	Santa Rosa	12834
253	gwsi321045103092301	432868	905055	830	3196	Santa Rosa	12830
254	gwsi320944103052401	425017	925948	835	3131	Santa Rosa	11459
255	gwsi321011103045201	427777	928667	845	3197	Santa Rosa	12833
256	gwsi321353103214201	449316	841644	1250	3383	Santa Rosa	12726
257	gwsi320639103071301	408032	916596	901	3076	Rustler	11689
258	gwsi321151103091801	437626	905690	1173	3245	Rustler	11433
259	gwsi320823103083201	416649	909877	1260	3123	Rustler	11631
260	gwsi320723103072101	410653	916050	7090	3086	San Andres	CP-782 (NOI)

Coordinates in NM State Plane, East Zone

APPENDIX A

Local Well Records from NMOSE Database

Form WR-23

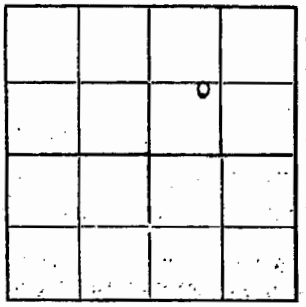
SANTA FE

STATE ENGINEER OFFICE

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1



(Plat of 640 acres)

(A) Owner of well PAUL S BALLENGER

Street and Number 1101 THORTON ADDITUON

City JAL State N.M.

Well was drilled under Permit No. CP-387 and is located in the

¼ SW ¼ NE ¼ of Section 29 Twp. 25S Rge. #37E

(B) Drilling Contractor QUINCE L. WHITE License No. WD -439

Street and Number 708 N3rd

City JAL State N.M.

Drilling was commenced OCT. 2 1966

Drilling was completed OCT 20 1966

Elevation at top of casing in feet above sea level 3,030' Total depth of well 305'

State whether well is shallow or artesian SHALLOW Depth to water upon completion 250'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	236	245	9	GRAY SANDY SHALE AND BLUE SHALE
2	257	260	3	GRAY SANDY LIME
3	268	280	12	COURSE SANDY LIME WITH CHUNKS OF RED SHALE
4	288	293	5	CORSE PINK SANDY LIME
5				

NOV 10 1966 STATE ENGINEER SANTA FE N.M.

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
6"	7.5	WELDED	1"	80'	80'	FLAIR	NONE	
4"	4.7	"	1"	295'	295'	NONE	283'	" 293'

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
1"	80'	8"	3	18	CALLED READY MIX AND DUMPED IT ON BOTTOM, DROPED CASING WAITED 36HRS. DRILLED OUT PLUG AND FINISHED WELL WITH 6", RUN 4" CASING AND PUMP WELL MAKES FROM 10 TO 12 GAL. PER MIN.

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.

Street and Number City State

Tons of Clay used Tons of Roughage used Type of roughage

Plugging method used Date Plugged 19

Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received NOV -7 AM 8: 32 1966 STATE ENGINEER OFFICE

File No. CP-387 Use Dom Location No. 25.37.29.230

Section 6 LOG OF WELL

	Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
	1	10	10	light red	sand
Qal or To	10	53	43	caliche	caliche
To	53	72	19	gray & yellow	sandy shale
	72	75	3	water gravel	mixed colors
K	75	80	5	light blue	sandy shale
	80	101	21	gray & yellow	sandy shale
	101	118	17	dark red	shale
Tkc	118	120	2	pink	sand & shale
	120	132	12	red	shale
	132	135	3	blue	"
	135	175	40	red	"
	175	194	19	red& blue	shale streeks
	194	195	1	gravel	shale gravel
	195	201	6	blue	shale
	201	205	4	red	"
	205	212	7	red	red bed
	212	215	3	blue	shale
	215	230	15	red	"
	230	236	6	gray	sandy shale
	236	245	9	blue	shale
	245	255	10	gray	sandy lime & shale streeks
	255	257	2	"	lime
	257	260	3	"	sandy lime
	260	261	1	yellow	shale
	261	263	2	gray	lime (hard)
	263	268	5	"	sandy lime
	268	280	12	"	course sandy lime with red shale chunks
	280	284	4	light gray	sandy lime
	284	288	4	" red	sand (hard)
	288	293	5	pink	course sandy lime
	293	305	12	pink &gray	sand streeks (hard)

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

PUT 10 GALLONS OF COURSE GRAVEL IN BOTTOM OF WELL AND SET 4" CASING ON IT.

QUINCE L. WHITE
Well Driller

Quince L. White

SANTA FE

Form WR-23 STATE ENGINEER OFFICE

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well W. L. Charter
Street and Number P. O. Box 242
City Jal, State New Mexico.
Well was drilled under Permit No. CP-426 and is located in the
¼ NE ¼ NE ¼ of Section 20 Twp. 25 Rge. 37 S
(B) Drilling Contractor W. L. Van Noy License No. WD-208
Street and Number P. O. Box 74
City Oil Center, State New Mexico
Drilling was commenced March 20, 19 67
Drilling was completed March 22, 19 67

Elevation at top of casing in feet above sea level ..... Total depth of well 235
State whether well is shallow or artesian ..... Depth to water upon completion 70

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	70	80	10	Red water sand
2	220	235	15	Red water sand.
3				
4				
5				

1967 MAY 25 AM 9
STATE ENGINEER OFFICE
SANTA FE, N. M.

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
7			0	20	20		0	0

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor ..... License No. .....
Street and Number ..... City ..... State .....
Tons of Clay used ..... Tons of Roughage used ..... Type of roughage .....
Plugging method used ..... Date Plugged ..... 19 .....
Plugging approved by: Cement Plugs were placed as follows:

Basin Supervisor

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

STATE ENGINEER OFFICE
RECEIVED
1967 MAR 31 AM 8 28

Date Received ✓

File No. CP-426 Use Dom. Location No. 25.37.20.220

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	25	25	grey	Caliche
25	70	45	brown	Sandy shale
70	80	10	Red	Red water sand (very little water)
80	220	140	red & blue	Red shale with strips of blue shale
220	235	15	red	Red water sand.
235	-	-	red	red bed.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

W. L. Van Noy.
Well Driller

Revised June 1972

STATE ENGINEER OFFICE

SANTA FE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Annice Kathleen Butler '78 MAR 10 PM 1 24 Owner's Well No. _____

Street or Post Office Address _____

City and State Jal, New Mexico 88252

STATE ENGINEER OFFICE

Well was drilled under Permit No. CP-428 and is located in the SANTA FE, N.M. 87501

a. NE ¼ NE ¼ NE ¼ ¼ of Section 19 Township 25-S Range 37-E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor W. L. Van Noy License No. WD-208

Address P. O. Box 74 Oil Center, New Mexico 88266

Drilling Began March 12, Completed March 13 1967 Type tools spudder Size of hole 8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 90 ft.

Completed well is ☐ shallow ☐ artesian. Depth to water upon completion of well 60 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
60	65	05	fine water sand.	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
6	welded		0	90	90	none	75	85

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____

Address _____

Plugging Method _____

Date Well Plugged _____

Plugging approved by:

_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received March 2, 1978

Quad _____ FWL _____ FSL _____

File No. CP-428 Use DOM. Location No. 25.37.19.222432

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	5	5	top soil
5	30	25	caliche
30	55	25	sand rock
55	60	5	hard rock
60	65	5	fine water sand,
65	90	25	sand rock.

Section 7. REMARKS AND ADDITIONAL INFORMATION

'78 MAR 2 AM 8 22
STATE ENGINEER OFFICE
ROSWELL, N. M.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

SANTA FE

Form WR-23

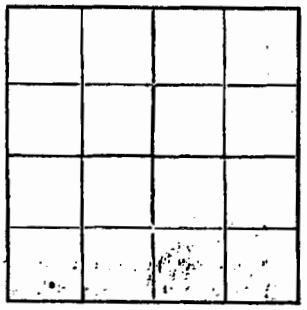
STATE ENGINEER OFFICE

478374

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1



(Plat of 640 acres)

(A) Owner of well HOMER E. MOLDER

Street and Number 608 N. 4th.

City JAL State N.M.

Well was drilled under Permit No. CP 429 and is located in the LOT 10 BLK. 45 ORIG. TOWN OF JAL NE¼ of Section 19 Twp. 25S Rge. 37E

(B) Drilling Contractor QUINCE L. WHITE License No. WD- 439

Street and Number 708 n. 3rd.

City JAL State N.M.

Drilling was commenced 4-1-67 19

Drilling was completed 4-10-67 19

Elevation at top of casing in feet above sea level 3030' Total depth of well 142'

State whether well is shallow or artesian shallow Depth to water upon completion 37'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	55'	60'	5'	RED SAND AND BIG GRAVELS
2	73'	77'	4'	YELLOW SAND ROCK AND SHALE
3	97'	140'	43'	BLUE SHALE AND GRAVEL
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
7"	14	WELD.	XXX'0	144'			50'	137'

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
					NONE

STATE ENGINEER OFFICE SANTA FE, N. M. 1967 JUL 14 AM 9:14

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.

Street and Number City State

Tons of Clay used Tons of Roughage used Type of roughage

Plugging method used Date Plugged 19

Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received

STATE ENGINEER OFFICE 1967 APR 21 AM 8:23

Section 6 LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
1'	36'	36'	CALICHE	CALICHE
36'	51'	15'	LIGHT RED	SANDY SHALE
51'	55'	4'	RED	Shale
55'	60'	5'	RED	WATER SAND AND GRAVEL
60'	68'	8'	RED	SHALE AND CLAY
68'	73'	5'	GRAY	SHALE
73'	77'	4'	YELLOW	SAND ROCK AND SHALE
77'	97'	20'	RED	SAND AND SHALE
97'	140'	43'	BLUE	SHALE AND GRAVEL
140'	142'	2'	LIGHT RED	CHALK AND CLAY

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

Well Driller

Form WR-23 STATE ENGINEER OFFICE Dom 473341

SANTA FE

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well D.C. HUFFINGTON
Street and Number 407 N.6th.
City JAL CP-444 State N.M.
Well was drilled under Permit No. 20173 and is located in the ¼ NE ¼ NE ¼ of Section Lot 7, BLK 34, Orig. Town of JAL Twp. 25 Rge. 37
(B) Drilling Contractor QUINCE L. WHITE License No. WD 439
Street and Number 708 N 3rd.
City JAL State N.M.
Drilling was commenced 10-28 19 67
Drilling was completed 11-10 19 67

Elevation at top of casing in feet above sea level 3030' Total depth of well 101'
State whether well is shallow or artesian Shallow Depth to water upon completion 50'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	To	Thickness in Feet	Description of Water-Bearing Formation
1	55	56	1	Light red water sand
2	65	67	2	Red sand and small gravel
3	77	81	4	Coarse red sand and large gravel
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	To
6	11	0	21'	0	21'	0	0	

STATE ENGINEER OFFICE SANTA FE, N.M. 1968 JAN 18 AM 10 27

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
					none

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.
Street and Number City State
Tons of Clay used Tons of Roughage used Type of roughage
Plugging method used Date Plugged 19
Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received 1967 DEC -4 AM 8:28

STATE ENGINEER OFFICE ✓

File No. CP-444 Use Dom Location No. 25.37.19.2 20

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	43	43	Caliche	Caliche
43	55	12	Light red	Sandy shale
55	56	1	Light red	Water sand
56	65	9	Red	Red shale
65	67	2	Red	Red sand and small gravel
67	77	10	Red	Red sand and shale
77	81	4	Red	Coarse red sand and large gravel
81	84	3	Red	Red bed and shale
84	89	5	Yellow	Yellow sand and shale
89	101	12	Blue	Blue shale

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

Well Driller

Form WR-23 STATE ENGINEER OFFICE

SANTA FE
473445

WELL RECORD

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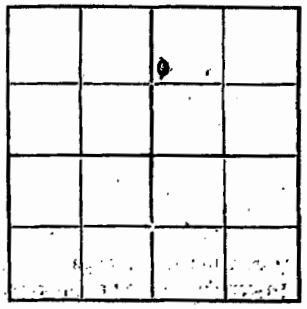
Section 1



(Plat of 640 acres)

(A) Owner of well E.W. HUSCHE
Street and Number WEST KANSAS AVE.
City JAL State N.M.
Well was drilled under Permit No. CL-460 and is located in the SW ¼ NW ¼ NE ¼ of Section 19 Twp. 25 S Rge. 37E
(B) Drilling Contractor O.L. WHITE License No. WD-439
Street and Number 708 N 3rd
City JAL State N.M.
Drilling was commenced SEPT21st 19 68
Drilling was completed FEB. 18th 19 69

Elevation at top of casing in feet above sea level 3035' Total depth of well 128'
State whether well is shallow or artesian shallow Depth to water upon completion 63'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	To	Thickness in Feet	Description of Water-Bearing Formation
1	78	81	3	LIGHT RED SAND AND GRAVEL
2	87	93	6	SAND AND YELLOW SHALE
3	98	109	11	SAND AND YELLOW SHALE
4				
5	120	125	5	BLUE AND GYAY SHALE WITH GRAVEL

STATE ENGINEER OFFICE RECEIVED 1969 MAY 23 AM 9:50

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
5½	21	STD.	1	128	128	0	60	125

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
1	20'	8"	N	N	WELDED FLAT RING 8" IN DIA. 20' DOWN ON TOP JOINT OF CASING THEN FILLED INAROUNR CASING TO TOP OF GROUND WITH MUD

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.
Street and Number City State
Tons of Clay used Tons of Roughage used Type of roughage
Plugging method used Date Plugged 19
Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

STATE ENGINEER OFFICE
1969 MAR 26 AM 8:28

Date Received

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
2	38	36	off white	caliche
38	70	32	light red	shale
70	72	2	"	sand and gravel
72	78	6	"	shale
78	81	3	"	sand and gravel (water)
81	85	4	lime & gray	shale
85	87	2	gravel	" gravel
87	93	6	yellow	sand & shale (water)
93	99	6	"	shale
99	109	11	"	sand & shale (water)
109	120	11	lime	shale
120	126	6	red gray	shale & gravel (water)
126	129	3	red	red bed (TD)

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

Well Driller

Revised June 1972

STATE ENGINEER OFFICE SANTA FE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Luther L. Reed Owner's Well No. # 1

Street or Post Office Address Box 654

City and State Jal, New Mexico

Well was drilled under Permit No. CP-487 and is located in the:

a. ___ ¼ N.E. ¼ N.W. ¼ ___ ¼ of Section 29 Township 25S Range 37 E N.M.P.M.

b. Tract No. ___ of Map No. ___ of the ___

c. Lot No. ___ of Block No. ___ of the ___
Subdivision, recorded in Lea County.

ORIGINAL DOCUMENT IS OF POOR QUALITY
FOR LEGIBLE MICROFILM

d. X= ___ feet, Y= ___ feet, N.M. Coordinate System ___ Zone in the ___ Grant.

(B) Drilling Contractor Bill Stanton License No. W.D. 560

Address ___

Drilling Began 12-22-72 Completed 5-24-73 Type tools Cable Size of hole 8" in.

Elevation of land surface or ___ at well is ___ ft. Total depth of well 421 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 250 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
264	267	3'	Water Sand	4 Gal.
326	341	15'	Water Sand	10 Gal. appx.
410	420	10'	Water Sand	36 Gal.

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
6 5/8"	20	Welded	0	421			245	420

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
0	117	8"	20 cement		Haliburton Plug

STATE ENGINEER OFFICE
SANTA FE, N.M.
FEB 15 PM 1 3

Section 5. PLUGGING RECORD

Plugging Contractor ___

Address ___

Plugging Method ___

Date Well Plugged ___

Plugging approved by: ___

State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received ___

Quad ___ FWL ___ FSL ___

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	10	10	Top Soil Sand
10	35	25	Caliche Yellow and Sand
35	67		Sand Stone Pink
67	70	3	Water Sand Gray
70	80	10	Brown Shale
80	117		Red Shale
117	137		Red Shale
137	170		Red Sand Shale
170	198		Red Shale and Shells
198	201		Blue Shale
201	225		Brown Shale
225	240		Gray Sand
240	247		Sandy Lime Brown
247	251		Brown Lime
251	259		Brown Sandy Lime
259	260	1	Blue Shale
260	264		Brown Sandy Lime
264	267		Gray Water Sand
267	270		Brown Sandy Shale
270	281		Lime A.H.H.Y.
281	292		Lime A.H.H.Y. and Blue Shale
292	311		Brown Sandy Shale
311	326		Blue and Red Shale
326	341		Gray Water Sand
341	379		Hard Sand and A.H.H.Y. Lime
379	410		Sand With Gray Shale Stringers
410	420		Water Sand
420	421		Red Shale

Section 7. REMARKS AND ADDITIONAL INFORMATION

Bail tested from 250 + for 2 hours at approximately 50 gallon per minute.
Set 421' of 6 5/8" casing.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Bill Heaton
Driller

473694
SANTA FE

Form WR-23 STATE ENGINEER OFFICE

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well Charles D. Taff
Street and Number P. O. Box 203
City Jal, State New Mexico
Well was drilled under Permit No. CP-506 and is located in the NE ¼ - ¼ - ¼ of Section 29 Twp. 25-S Rge. 37-E
(B) Drilling Contractor W. L. Van Noy License No. WD-209 708
Street and Number P. O. Box 74
City Oil Center, State New Mex. 88266
Drilling was commenced June 20, 19 72
Drilling was completed July 10, 19 72
Elevation at top of casing in feet above sea level Total depth of well 425
State whether well is shallow or artesian Depth to water upon completion ± 200'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	To	Thickness in Feet	Description of Water-Bearing Formation
1	39	49	10	sand & gravel (salty)
2	49			
3	260	265	5	grey sand
4	275	285	10	grey sand
5	400	423	23	soft grey sand

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
5⅝	welded		0	200	200			
	welded		184	423	241	none	330	420

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.
Street and Number City State
Tons of Clay used Tons of Roughage used Type of roughage
Plugging method used Date Plugged 19
Plugging approved by:
Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY
Date Received JUL 19 AM 8:27 1972

File No. CP-506 Use Dom Location No. 25.37.29.21232

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	4	4		Top soil
4	39	35	grey	caliche
39	49	10	grey	water sand & gravel (salty)
49	81	40	red	sandy shale
81	148	67	brown	sany shale
148	195	47	grey	sandy shale
195	260	65	blue	sandy shale
260	265	5	grey	water sand
265	275	10	grey	sandy anhydrite & lime shells
275	285	10	grey	water sand
285	375	90	grey	hard sand & anhydrite
375	385	10	blue	shale
385	400	15	grey	sand with stringers
400	423	23	grey	soft grey water sand.
423	425	2	red	shale. T: D.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

W. L. VAN NOY,
Well Driller

Form WR-23 STATE ENGINEER OFFICE SANTA FE 473708

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well ~~Union Texas Petroleum~~
Street and Number Box 2120
City Houston CP-507 State Texas 77001
Well was drilled under Permit No. and is located in the
NE ¼ SE ¼ ¼ of Section 5 Twp. 25S Rge. 37E
(B) Drilling Contractor Leatherwood Drlg. Co. License No. WD452
Street and Number P. O. Drawer N
City Kermit State Texas 79745
Drilling was commenced 7/26/ 19 73
Drilling was completed 8/16 19 73

Elevation at top of casing in feet above sea level Total depth of well 4900'
State whether well is shallow or artesian Depth to water upon completion

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	100	278	178	Sand
2	4050	4900	850	Reef
3				
4				
5				

STATE ENGINEER OFFICE SANTA FE, N.M. 87501 '75 FEB 13 AM 11 33

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads In	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
13 3/8	48#	8 rd.	0	819	826	Texas Pattern	None	
8 5/8	36#	8 rd.	0	3698	3715	Halliburton	None	

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
0	820	17 1/2		680 Class C 2% CC. Circ. out 100 sks to surface	
820	3700	12 1/4		2130 Class C w/3% CC. Cement circ.	
3700	4900	7 7/8	Open hole		

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.
Street and Number City State
Tons of Clay used Tons of Roughage used Type of roughage
Plugging method used Date Plugged 19
Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received STATE ENGINEER OFFICE DISTRICT II ✓
1973 OCT -9 AM 8:39

CP 507 SRO 25.37.5.12111

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	100	100		Surf. rock and sand
100	278	178		Redbed and sand
278	438	160		Anhy, sand, gyp
438	539	101		Anhy, sand
539	633	94		Redbed and gyp
633	799	166		Anhy & Redbed
799	820	21		Anhy & gyp
820	1085	265		Redbed
1085	1245	160		Sand, Anhy.
1245	1604	359		Salt
1604	2885	1281		Salt and Anhy
2885	3092	207		Anhy
3092	3192	100		Anhy & Lime
3192	3289	97		Anhy & Lime & Gyp
3289	3700	411		Lime

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

J. R. Wallace
Well Driller

Form WR-23 STATE ENGINEER OFFICE

47367

WELL RECORD

SANTA FE

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(A) Owner of well Charles Dorminey
Street and Number Box 71
City Plains, Texas 79355 State
Well was drilled under Permit No. CP-509 and is located in the
SE ¼NW ¼NE ¼ of Section 29 Twp. 25-S Rge. 37-E
(B) Drilling Contractor W. L. Van Noy License No. WD-208
Street and Number P. O. Box 74
City Oil Center, State New Mexico 88266
Drilling was commenced Jan. 15, 19 73
Drilling was completed Jan. 20, 19 73

(Plat of 640 acres)

Elevation at top of casing in feet above sea level Total depth of well 300 ft.
State whether well is shallow or artesian Depth to water upon completion 275'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1				
2	39	49	10	Water sand & gravel (~~FRESH~~) (Salty),
3				
4	280	295	15	Soft water sand.
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
8"	Welded		0	150	150	none	none	
6 5/8"	welded		0	3 00	300	none	265	295

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

STATE ENGINEER OFFICE SANTA FE, N.M. 1973 FEB 16 AM 11 35

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.
Street and Number City State
Tons of Clay used Tons of Roughage used Type of roughage
Plugging method used Date Plugged 19
Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received 1973 JAN 29 AM 8:32

STATE ENGINEER OFFICE SANTA FE, N. MEX.

25.37.29.21441

File No. CP-509 Use Dom Location No. 25.37.29.21441

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
0	4	4		Top soil
4	39	35	grey	Caliche
39	49	10	grey	water sand & gravel
49	81	32	red	s andy shale
81	148	67	brown	sandy shale
148	200	52	blue	shale
200	240	40	grey	shale
240	280	40	grey	anhydrite and lime shells
280	295	15	red	soft w ater sand.
295	300	5	red	sandy shale.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

W. L. Van Noy.
Well Driller

413793

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

SANTA FE

Section 1. GENERAL INFORMATION

(A) Owner of well John Sheaver Owner's Well No. 1

Street or Post Office Address Box 217

City and State Jal, New Mexico - 88252

Well was drilled under Permit No. File #CP-515 and is located in the:

a. SW ¼ SE ¼ NW ¼ ¼ of Section 19 Township 25S Range 37-E N.M.P.M.

b. Tract No. ____ of Map No. ____ of the ____

c. Lot No. ____ of Block No. 67 of the Original City of Jal Subdivision, recorded in ____ County.

d. X= ____ feet, Y= ____ feet, N.M. Coordinate System ____ Zone in the ____ Grant.

(B) Drilling Contractor Hoaton License No. WD 550

Address 119 5 th. on Corner of 5 th. and Wyoming

Drilling Began 6-5-73 Completed 6-12-73 Type tools Cable Size of hole 7 in.

Elevation of land surface or ____ at well is ____ ft. Total depth of well 72 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 42 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
60	70	10	Sand and Grevel	15 gal.

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
6 OD		Welded	0	72	72		60	72

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

STATE ENGINEER OFFICE SANTA FE, N.M. JUL 11 3 33

ORIGINAL DOCUMENT IS OF POOR QUALITY FOR LEGIBLE MICROFILM

Section 5. PLUGGING RECORD

Plugging Contractor ____

Address ____

Plugging Method ____

Date Well Plugged ____

Plugging approved by: ____ State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received ____

Quad ____ FWL ____ FSL ____

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
Top Soil			
0	2	2	
2	18	16	Caliche
18	24	6	Hard Red Sand
24	30	6	Red Rock
30	34	4	Water Sand & Gravel
34	60	26	Red Shale
60	70	10	Water Sand & Gravel
70	72	2	Red Bed

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Bill Heaton
Driller

47386 3

Revised June 1972

LOG FILED

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Darrol Stephenson Owner's Well No. _____

Street or Post Office Address P.O.Box 749

City and State Jal, NM 88252

STATE ENGINEER
SANTA FE, N. M.

Well was drilled under Permit No. CP524 and is located in the

a. NW ¼ NE ¼ NE ¼ NW ¼ of Section 19 Township 24S Range 37E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in _____ Lea _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Larry's Drilling License No. WD882

Address 2501 W. Bender Hobbs, NM 88240

Drilling Began 4-12-83 Completed 4-12-83 Type tools tricone Size of hole 7 7/8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 86 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 68 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
68	82	14	red clay & gravel	15

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5 1/2	160PVC		0	86	86		66	86

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____

Address _____

Plugging Method _____

Date Well Plugged _____

Plugging approved by:

_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received April 20, 1983

Quad _____ FWL _____ FSL _____

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	2	2	topsoil
2	8	6	caliche
8	24	16	red clay & sand
24	34	10	red clay
34	68	34	sand
68	82	14	red clay & gravel
82	86	4	red bed

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Driller

473881

SANTA FE

Form WR-23 STATE ENGINEER OFFICE

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well A . D . KEMP

Street and Number 206 TEXAS AV.

City JAL State N.M.

Well was drilled under Permit No. CP 533 and is located in the Lot 2 1/4 Blk 55 1/4 of Section J R4 Twp. Rge.

(B) Drilling Contractor QUINCE L. WHITE License No. WD 439

Street and Number 708 N. 3rd.

City JAL State N.M.

Drilling was commenced 8-20 19 74

Drilling was completed 9-4 19 74

Elevation at top of casing in feet above sea level 3300 Total depth of well 78 ft.

State whether well is shallow or artesian shallow Depth to water upon completion 40ft.

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	55	57	2	light red sand and gravel
2	66	68	2	red sand and gravel
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
6	7	weld	1	78			50	78

74 OCT 25 AM 11 42

STATE ENGINEER OFFICE SANTA FE, N.M. 87501

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
				none	

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.

Street and Number City State

Tons of Clay used Tons of Roughage used Type of roughage

Plugging method used Date Plugged 19

Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received

STATE ENGINEER OFFICE

1974 SEP 20 AM 8 34

Log Dem Location No. 25.37.19.244U

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
1	2	1	brown	top soil
2	4	2	pink	chert
4	22	18	red	shale
22	25	3	red	chert
25	55	30	red	shale
55	57	2	light red	sand and gravel (water)
57	66	9	red	sh ale
66	68	2	red	sand and gravel (water)
68	78	10	red	shale

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

Well Driller

Form WR-23 STATE ENGINEER OFFICE SANTA FE 473 994

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well Billey W. MOSLEY
Street and Number 119 N.6th.
City JAL State N.M.
Well was drilled under Permit No. 541 and is located in the Lot 24, Blk. 67, Orig. JAL ¼ ¼ of Section Twp. Rge.
(B) Drilling Contractor QUINCE L. WHITE License No. WD 439
Street and Number 708 N. 3rd.
City JAL State N.M.
Drilling was commenced 9-15-74 19
Drilling was completed 10-3-74 19

Elevation at top of casing in feet above sea level 3300' Total depth of well 100'
State whether well is shallow or artesian shallow Depth to water upon completion 38'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	To	Thickness in Feet	Description of Water-Bearing Formation
1	54	56	2	pink sand rock
2	66	68	2	red sand and gravel
3	80	84	4	gray shale and gravel
4	96	99	3	blue shale and gravel
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Bottom	Feet	Type Shoe	Perforations From	To
6	7	weld	1	100	100	none	45	100

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

STATE ENGINEER OFFICE SANTA FE, N. M. 1974 OCT 25 AM 11 45

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.
Street and Number City State
Tons of Clay used Tons of Roughage used Type of Roughage
Plugging method used Date Plugged 19
Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received 1974 OCT -8 AM 8:12 STATE ENGINEER OFFICE SANTA FE, N. M.

File No. CP-541 Use Dom. Location No. 25.37.19.22434

Section 6 LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
1	3	2	brown	top soil
3	4	1	pink	churt
4	8	4	pink	sand rock
8	22	14	claiche	claiche
22	28	6	red	churt
28	54	26	pink	sandy shale
54	56	2	pink	sand rock (water)
56	66	10	red	shale
66	68	2	red	sand and gravel (water)
68	80	12	gray	shale
80	84	4	light gray	shale and gravel (water)
84	96	12	red	shale
96	99	3	blue	shale and gravel (water)
99	100	1	red	shale

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

Well Driller

Form WR-23 STATE ENGINEER OFFICE

476142
SANTA FE

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well Lucille Bock Webb
Street and Number 415 South 2nd. St.
City JAL State N.M.
Well was drilled under Permit No. 42 and is located in the Lot 36, Blk. 24, Herwig & Stewart 3rd. Addition to City of JAL
SW ¼ SW ¼ SW ¼ of Section 20 Twp. 25-S Rge. 37-E
(B) Drilling Contractor Quince L. White License No. WD 439
Street and Number 708 N. 3rd.
City JAL State N.M.
Drilling was commenced 6-20 19 76
Drilling was completed 10-14 19 76
Elevation at top of casing in feet above sea level 3370 Total depth of well 350
State whether well is shallow or artesian Shallow Depth to water upon completion 42'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	58	59	1	Water sand and gravel Appt. ½ gal. per min.
2	308	311	3	Blue shale " 3 " " min.
3	347	350	3	Gray sand " ½ gal. per. min.
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
8"	18	0	1	5	5'	starter pipe	no casing walls in good shape	

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
					4' of clay packed around starter pipe.
					8 x 8 concret slab to be run around top of starter pipe

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.
Street and Number City State
Tons of Clay used Tons of Roughage used Type of roughage
Plugging method used Date Plugged 19
Plugging approved by:

Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received

File No. CP-557 Use Dom. Location No. 25.37.20.333

STATE ENGINEER OFFICE SANTA FE, N. MEX.

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
1	3	3	brown	top soil
3	23	20	claiche	claiche
23	58	35	red	red shale
58	59	1	"	sand and gravel ½ gal water
59	72	13	"	red shale
72	100	28	gray	gray shale
100	103	3	blue	blue " (seep of water)
103	148	45	red	red "
148	153	5	gray	gray "
153	180	27	blue	blue "
180	205	25	gray	gray "
205	207	2	hard red sand	red sand hard
207	215	8	gray	sandy shale
215	222	7	tan	" "
222	235	13	yellow	sand rock
235	265	30	light red	sandy shale
265	272	7	" gray	" "
272	282	10	"	gray lime (hard)
282	308	26	tan	sandy shale
308	311	3	blue	" (water)
311	347	36	brown	sandy "
347	350	3	gray	sand (water)

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well.

Well Driller

'80 MAR 19 PM 1 14

STATE ENGINEER OFFICE

Revised June 1972

WELL RECORD

STATE ENGINEER OFFICE
SANTA FE, N.M. 87501

SANTA FE
474208

Section 1. GENERAL INFORMATION

(A) Owner of well Sam R. Beaird Owner's Well No. 1
Street or Post Office Address P.O. Box 957
City and State Jal, New Mexico

Well was drilled under Permit No. CP 565 and is located in the:

a. SW ¼ NE ¼ NW ¼ ¼ of Section 19 Township 25S Range 37E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. 11 of Block No. 2 of the Western Heights Addition # 1
Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Bill Heaton License No. WD560
Address Box 184 - Jal, New Mexico

Drilling Began 5/16/77 Completed 5/20/77 Type tools Cable Size of hole 8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 141 ft.

Completed well is ☐ shallow ☐ artesian. Depth to water upon completion of well no water ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____
Address _____
Plugging Method _____
Date Well Plugged _____
Plugging approved by:
_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received June 7, 1977

Quad _____ FWL _____ FSL _____

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	0	0	White Caliche
8	20	12	Red Sand
20	28	8	Gray Sandy Shale
28	35	7	Red Sandy Shale
25	47	12	Gray Sandy Shale
47	55	8	Yellow Sand
55	60	5	Gray Sandy Shale
60	85	25	Red Sandy Shale
85	90	5	Gray Sandy Shale
90	97	7	Red Sandy Shale
97	108	11	Gray Sand
108	114	6	Red Shale
114	125	11	Sandy Red Shale
125	141	16	Gray Sandy Shale

Section 7. REMARKS AND ADDITIONAL INFORMATION

Very small amount of water from
97 Ft. to 105 Ft.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Bill Hunter

Bill Hunter
Driller

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

475029 SANTA FE

Section 1. GENERAL INFORMATION

(A) Owner of well Raymond F. Gray Owner's Well No. 1

Street or Post Office Address Box 642

City and State Jal, New Mexico 88252

Well was drilled under Permit No. CP607 and is located in the:

a. NE ¼ NE ¼ NW ¼ ¼ of Section 19 Township 25S Range 37E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor W. E. Heaton License No. WD586

Address Box 184, Jal, N.M. 88252

Drilling Began 5/4/80 Completed 5/5/80 Type tools Cable Size of hole 8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 90 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 60 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
65	68	3	Red Water Sand	1 gal

STATE ENGINEER SANTA FE, N.M. 1980 JUN 2 PM 2 59

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
	NO PIPE RAN IN HOLE							

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____

Address _____

Plugging Method _____

Date Well Plugged _____

Plugging approved by: _____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received May 9, 1980

Quad _____ FWL _____ FSL _____

File No. CP-607 Use DOM & STK Location No. 25.37.19.122

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	2	2	Top Soil
2	12	10	Caliche
12	65	53	Red & Sand Stone
65	68	3	Red Water Sand
68	70	2	Red Bed
70	90	20	Gray Sandy Shale

Section 7. REMARKS AND ADDITIONAL INFORMATION

No Pipe run in hole.

'80 MAY 9 AM 8 18

STATE ENGINEER OFFICE
ROSWELL, N.M.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

W E Alexander
Driller

Revised June 1972

475039

SANTA FE

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Floyd McCune Mathis Owner's Well No. _____

Street or Post Office Address Drawer 88

City and State Jal, New Mexico 88265

Well was drilled under Permit No. CP-608 and is located in the:

a. _____ ¼ NW ¼ NW ¼ NW ¼ of Section 19 Township 25-S Range 37-E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor W. L. Van Noy License No. WD-208

Address P. O. Box 74 Oil Center, N. M. 88266

Drilling Began Mar. 20, 1980 Completed March 26, 1908 Type tools Spudder Size of hole 10 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 235 @35 ft.

Completed well is ☐ shallow ☐ artesian. Depth to water upon completion of well 0 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
			no water	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
none					0			

'80 APR 11 PM 1 05

STATE ENGINEER SANTA FE, N.M.

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____

Address _____

Plugging Method _____

Date Well Plugged _____

Plugging approved by:

_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received April 2, 1980

Quad _____ FWL _____ FSL _____

File No. CP-608 Use DOM. (Dry hole) Location No. 25.37.19.11100

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	4	4	top soil
4	39	35	caliche
39	81	42	sandy shale
81	148	67	hard sady shale
148	195	47	red sandy shale
195	235	40	dry sand ft
235	0		dry well.

Section 7. REMARKS AND ADDITIONAL INFORMATION

'80 APR 2 AM 8 06
STATE ENGINEER OFFICE
ROSWELL, N. M.

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

W. L. Van Many
Driller

Revised June 1972

STATE ENGINEER OFFICE

SANTA FE 47532?

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Donald R. Trice Owner's Well No. CP-638
Street or Post Office Address 301 Avenue D Box 533
City and State Jal, NM 88252

Well was drilled under Permit No. CP-638 and is located in the:

a. ___ ¼ ___ ¼ NW ¼ NW ¼ of Section 29 Township 25-S Range 37-E N.M.P.M.

b. Tract No. ___ of Map No. ___ of the ___

c. Lot No. ___ of Block No. ___ of the ___
Subdivision, recorded in Lea County.

d. X= ___ feet, Y= ___ feet, N.M. Coordinate System ___ Zone in the ___ Grant.

(B) Drilling Contractor Sprull Bros. Drlg Co. License No. WD-803
Address Box 6129, Odessa, Tex. 79762

Drilling Began 9-4-81 Completed 9-5-81 Type tools Rotary Size of hole 8¾ in.

Elevation of land surface or ___ at well is ___ ft. Total depth of well 380 ft.

Completed well is ☑ shallow ☐ artesian. Depth to water upon completion of well 187 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
285	295	10	sand	20 gal per min
310	320	10	sand	20 gal per min

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
6⅝	plastic 160				20ft. 380		355 ~~300~~	375
							315	335
							275	295

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
0	120	8¾		17	Mixt Poured by hand Don Trice

STATE ENGINEER SANTA FE, N.M. '81 NOV 18 AM 11

Section 5. PLUGGING RECORD

Plugging Contractor ___
Address ___
Plugging Method ___
Date Well Plugged ___
Plugging approved by: ___
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received October 6, 1981

Quad ___ FWL ___ FSL ___

CP-638 DOM. Location No. 25.37.29.11

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	3	3	soil
3	7	4	sandy caliche
7	35	28	caliche + sand streaks
35	80	46	sand + sandy shale
80	95	15	sand (water)
95	165	70	shale + sandy shale
165	265	100	sandstone + shale streaks
265	285	20	sandstone + sand
285	295	15	sand (water)
295	310	15	sandstone
310	330	10	sand (water)
330	380	60	sandstone with sand streaks

STATE ENGINEER
ROSWELL, NM
OCT 19 8 37 AM '81

Section 7. REMARKS AND ADDITIONAL INFORMATION

OCT 6 8 30 AM '81
STATE ENGINEER
ROSWELL, NM

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Norman Sprunell
Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office

Form WR-23 STATE ENGINEER OFFICE 47513

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well D.A. & LAVETA SEARGY

Street and Number 320 W. KANSAS

City Lot 14, Blk. 9, Orig. Town of JAL, LEA, CO State N.M.

Well was drilled under Permit No. CP 710 and is located in the

N.E. ¼ N.E. ¼ ¼ of Section 19 Twp. 25 S. Rge. 37 E.

(B) Drilling Contractor BILL G. TAYLOR License No. W.D. 650 655

Street and Number 1106 COUNTRY CLUB RD.

City CARLSBAD State N.M.

Drilling was commenced 6-28 19 87

Drilling was completed 7-12 19 87

Elevation at top of casing in feet above sea level 3300 Total depth of well 90'

State whether well is shallow or artesian Shallow Depth to water upon completion 40'

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	50'	73'	23'	SAND & GRAVEL
2				
3				
4				
5				

87 NOV 4 P1:42 STATE ENGR. NEW MEXICO

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in.	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
5	PLASTIC		1'	75'	75'	NONE	50'	70'

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used
				NONE	2Yds. ¾" Gravel

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.

Street and Number City State

Tons of Clay used Tons of Roughage used Type of roughage

Plugging method used Date Plugged 19

Plugging approved by: Cement Plugs were placed as follows:

Basin Supervisor

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received July 22, 1987

File No. CP-710 Use DOMESTIC Location No. 25.37.19.22323

Section 6

LOG OF WELL

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color	Type of Material Encountered
1	2	1	TOP SOIL TAN	SAND
2	6	4	Caliche TAN	Caleche
6	21	15	Coarse Sand LIGHT RED	Sand
21	44	23	SAND & GRAVEL TAN WHITE	SAND & GRAVEL (DRY)
44	50	6	FINE SAND	FINE SAND
50	73	23	SAND & GRAVEL	WATER SAND & GRAVEL (LIGHT RED)
73	90	17	RED	SANDY SHALE

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described well

Bill L. Taylor
Well Driller

JUL 22 8 21 AM '67

Revised June 1972

47602

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well ANTONIO HOLGUIN Owner's Well No. _____

Street or Post Office Address BOX 489

City and State JAL, NM 88252

Well was drilled under Permit No. CP-774 and is located in the:

a. NW ¼ ¼ ¼ ¼ of Section 29 Township 25S Range 37E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in LEA County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor W. L. VAN NOY License No. WD-208

Address BOX 7, OIL CENTER, NM 88266

Drilling Began 8-12-92 Completed 8-14-92 Type tools cable Size of hole 8" in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 100 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 60 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
60	100	40	water bearing sand	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5"	PVC		0	100			80	95

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____

Address _____

Plugging Method _____

Date Well Plugged _____

Plugging approved by: _____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

August 20, 1992 FOR USE OF STATE ENGINEER ONLY

Date Received

Quad _____ FWL _____ FSL _____

CP-774 DOMESTIC 25.37.29.14444

RECEIVED
AUG 19 1992
OIL CONSERVATION DIV.
SANTA FE, NEW MEXICO

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	15	15	top soil
15	35	20	caliche
35	75	40	brown sand rock
75	100	25	sand rock
100	—		red bed

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Driller

Revised June 1972

476020

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Guan Miller Owner's Well No. _____

Street or Post Office Address _____

City and State Jal, NM 88252

Well was drilled under Permit No. C P-777 and is located in the:

a. SW ¼ ¼ ¼ ¼ of Section 20 Township 25-S Range 37 E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____

Subdivision, recorded in Lea County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Billy Bentle/ W.L. VanNoy License No. Wd 208

Address Box 533 Jal, NM 88252

Drilling Began 10/12/92 Completed 10/16/92 Type tools cable tool Size of hole 8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 100 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 28 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
28	100	72	water-bearing sand, gravel	

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5 in.	PVC		0	100			80	95

'94 MAR 31 AM 9 14
STATE ENGINEER OFFICE
SANTA FE, NEW MEXICO

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor _____

Address _____

Plugging Method _____

Date Well Plugged _____

Plugging approved by:

_____ State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received November 3, 1992

Quad _____ FWL _____ FSL _____

File No. CP-777 Use DOMESTIC Location No. 25S.37E.20.32433

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	5	5	top soil
10	20	10	cliche
20	50	30	red, sandy shell with water-bearing gravel
50	52	2	red bed
52	70	18	brown sand, rock
70	100	30	red sand-water-bearing sand

Section 7. REMARKS AND ADDITIONAL INFORMATION

STATE ENGINEER OFFICE
ROSWELL NEW MEXICO
'82 NOV 3 AM 11 20

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office

57

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

47602

Section 1. GENERAL INFORMATION

(A) Owner of well Darrel E. Bailey, Sr. Owner's Well No. _____
Street or Post Office Address P.O. Box 1225
City and State Jal, N.M. 88252

Well was drilled under Permit No. CP-789 and is located in the:

a. _____ ¼ SW ¼ SW ¼ NW ¼ of Section 20 Township 25S Range 37E N.M.P.M.

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in _____ County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor Alan Eades License No. WD-1044

Address 1200 E. Bender, Hobbs, N.M. 88240

Drilling Began 3-16-93 Completed 3-25-93 Type tools Rotary Size of hole 0-60'-12" 60-360'-7 7/8 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well 360' ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 255 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
255	360	95	Sand, Sandy Clay & Sandstone	20

'93 SEP 22 AM 8 [illegible]
STATE ENGINEER OFFICE
SANTA FE, NEW MEXICO

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
5 3/4	20#DS1		0	360	360		320	360
8 5/8	#24.1-55	API	0	60	60			

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
0	60	12"	25	25	circulated to surface Portland Cement

Section 5. PLUGGING RECORD

Plugging Contractor _____
Address _____
Plugging Method _____
Date Well Plugged _____
Plugging approved by:

_____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received May 7, 1993

Quad _____ FWL _____ FSL _____

File No. CP-789 Use DOM Location No. 25.37.20.133433

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	2	2	Top Soil
2	4	2	Caliche
4	11	7	Sandstone
11	30	19	Red Clay
30	42	12	Red Sandy Clay Water Sand
42	64	22	Red Clay
64	70	6	Blue Shale
70	78	8	Red Sandy Clay
78	89	11	Red Clay
89	107	18	Blue Shale
107	111	4	Red Clay
111	120	9	Blue Shale
120	140	20	Red Clay & Blue Shale
140	175	35	Red Clay
175	215	40	Red Clay & Blue Shale
215	228	13	Blue Shale
228	255	27	Red Clay & Blue Shale
255	328	73	Sand & Sandy Clay
328	330	2	Sandstone
330	340	10	Sandy Clay
340	360	20	Sandstone

'93 JUN 1 PM 1 06
ROSWELL NEW MEXICO

Section 7. REMARKS AND ADDITIONAL INFORMATION

'93 MAY 7 AM 10 42
STATE ENGINEER OFFICE
ROSWELL NEW MEXICO

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Alan Eades
Driller
by Kathy Eades

Revised June 1972

STATE ENGINEER OFFICE
WELL RECORD

4TTMeq

Section 1. GENERAL INFORMATION

(A) Owner of well Felix R. Hernandez Owner's Well No. CP-841
Street or Post Office Address Box 729
City and State Jal, NM 88252

Well was drilled under Permit No. CP-841 and is located in the:

a. ___ ¼ SW ¼ SW ¼ SE ¼ of Section 19 Township 25 S Range 37E N.M.P.M.

b. Tract No. ___ of Map No. ___ of the ___

c. Lot No. ___ of Block No. ___ of the ___
Subdivision, recorded in Lea County.

d. X= ___ feet, Y= ___ feet, N.M. Coordinate System ___ Zone in the ___ Grant.

(B) Drilling Contractor Billy Bentle License No. WD-1292

Address Box 533 Jal, NM 88252

Drilling Began 12/3/94 Completed 12/15/94 Type tools cable Size of hole 5 in.

Elevation of land surface or ___ at well is ___ ft. Total depth of well 275' ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 235' ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
			Blond sand rock	8-10 gal.

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
8"	PVC						245	275

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement

Section 5. PLUGGING RECORD

Plugging Contractor ___
Address ___
Plugging Method ___
Date Well Plugged ___
Plugging approved by:
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received DEC 27 1994

Quad ___ FWL ___ FSL ___

File No. CP-841 Use Stock Location No. 25.37.19.43333

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	5	5	top soil
5	30	20	cliche
30	50	20	blond sand
50	130	80	red sand shell
130	180	50	brown shell
180	205	25	gray shell
205	260	55	yellow sandy shell
260	265	5	5brown shell
265	273	8	tan clay with water gravel
273	275	2	blond sand rock

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office

SF

Revised June 1972

STATE ENGINEER OFFICE
WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well GEORGE WILLIS Owner's Well No. CP00909
Street or Post Office Address P. O. BOX 307
City and State JAL, NM 88252

Well was drilled under Permit No. 72-12-1 and is located in the:

a. SE ¼ SE ¼ SE ¼ ¼ of Section 35 Township 25S Range 37E N.M.P.M.
(SOUTH SIDE)

b. Tract No. _____ of Map No. _____ of the _____

c. Lot No. _____ of Block No. _____ of the _____
Subdivision, recorded in LEA County.

d. X= _____ feet, Y= _____ feet, N.M. Coordinate System _____ Zone in the _____ Grant.

(B) Drilling Contractor WEST TEXAS WATER WELL SERVICE License No. WD1184

Address 3432 W. UNIVERSITY BLVD. , ODESSA TX. 79764

Drilling Began 1-22-01 Completed 1-24-01 Type tools ROTARY Size of hole 9 1/2 in.

Elevation of land surface or _____ at well is _____ ft. Total depth of well _____ ft. ?

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well 185 ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)
115	160	45	SAND & GRAVEL W/STREAKS OF CLAY	2 GPM

STATE ENGINEER OFFICE ROSWELL, NEW MEXICO
01 FEB -2 AM 11:47

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
6"	SCH. 40	END GLUE	2'AGL	135	135		2'AGL	135
6"	SCH. 40	END GLUE	135	155	20		135	155
6"	SCH. 40	END GLUE	155	175	20		155	175
6"	SCH. 40	END GLUE	175	185	10		175	185

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
0	15		3		POURED SLURRY
45	60		4		HOLE PLUG

Section 5. PLUGGING RECORD

Plugging Contractor _____
Address _____
Plugging Method _____
Date Well Plugged _____
Plugging approved by:

State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY #204095

Date Received 2/2/2001

Quad _____ FWL _____ FSL _____

File No. CP-909 Use STK Location No. 25.37.35.444

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	1	1	TOP SOIL
1	15	14	CALICHE
15	20	5	SAND
20	25	5	CLAY
25	52	27	CALICHE
52	60	8	HARD LIMESTONE
60	80	20	SAND & GRAVEL
80	110	20	CLAY
110	115	5	LIMESTONE
115	160	45	SAND & GRAVEL W/CLAY STREAKS
160	184	24	BLUE SHALE
184	185	1	RED BED

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Bernard Lumbum

Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

STATE ENGINEER OFFICE
ROSWELL, NEW MEXICO

2013 MAY 31 | A 10: 29

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER): (POD5) 14 INCH VAC TO JAL LEGACY MW-6	OSE FILE NUMBER(S): CP 01156
WELL OWNER NAME(S): PLAINS MARKETING LP	PHONE (OPTIONAL):
WELL OWNER MAILING ADDRESS: 333 CLAY STREET, SUITE 1600	CITY: HOUSTON STATE: TX ZIP: 77078

WELL LOCATION (FROM GPS)	DEGREES	MINUTES	SECONDS	
LATITUDE	32	06	08	N
LONGITUDE	103	07	09	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE: HWY 128 EAST OF JAL - SE/NW SEC 25, TWP 25S, RANGE 37E

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD1478	MARTIN STRAUB	STRAUB CORPORATION

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
5-8-13	5-8-13	80'	80'	N/A

COMPLETED WELL IS: ( ) ARTESIAN ( ) DRY HOLE (•) SHALLOW (UNCONFINED) — STATIC WATER LEVEL IN COMPLETED WELL (FT): 70'

DRILLING FLUID: (•) AIR ( ) MUD ADDITIVES - SPECIFY:

DRILLING METHOD: (•) ROTARY ( ) HAMMER ( ) CABLE TOOL ( ) OTHER - SPECIFY:

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
80'	55'	6"	SCH 40 .010 SCREEN	FJ	2"	0.154	.010
55'	+4	6"	SCH 40 RISER	FJ	2"	0.154	RISER

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
80'	52'	6"	26 BAGS OF 20/40 SAND		TOPLOAD
52'	2'	6"	26 BAGS OF 3/8 HOLEPLUG		TOPLOAD
0'	2'	6"	1 BAG CONCRETE		TOPLOAD

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1156	POD NUMBER	5	TRN NUMBER	520931
LOCATION	Mon	25S.37E.25.143			PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	1'	1'	BROWN SILTY CLAY & SAND	○ Y ◉ N	N/A
1'	2'	2'	HARD CALICHE	○ Y ◉ N	N/A
2'	14'	12'	GRAVELY & SAND CALICHE	○ Y ◉ N	N/A
14'	27'	13'	MEDIUM HARD CALICHE LAYERS	○ Y ◉ N	N/A
27'	30'	3'	TAN PINK SILTY SAND	○ Y ◉ N	N/A
30'	37'	7'	TAN RED SILTY SAND & GRAVEL	○ Y ◉ N	N/A
37'	44'	7'	PINK & RED SILTY CLAY & SAND	○ Y ◉ N	N/A
44'	53'	9'	TAN PINK SILTY SAND & GRAVEL	○ Y ◉ N	N/A
53'	58'	5'	GRAVEL & SAND	○ Y ◉ N	N/A
58'	62'	4'	TAN RED SILTY SAND & BIG GRAVEL	○ Y ◉ N	N/A
62'	66'	4'	HARD SANDSTONE & GRAVEL	○ Y ◉ N	N/A
66'	73'	7'	TAN RED SILTY SAND & GRAVEL	◉ Y ○ N	N/A
73'	77'	4'	RED SILTY CLAY & SAND	◉ Y ○ N	N/A
77'	80'	3'	RED CLAY	◉ Y ○ N	N/A
TD	80'			○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: ○ PUMP ○ AIR LIFT ○ BAILER ○ OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm):

5. TEST; RIG SUPERVISION

WELL TEST — TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

2X2 HIGH RISE
LEA COUNTY NM

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

Martin Strab MARTIN STRAB 5-28-13

SIGNATURE OF DRILLER / PRINT SIGNEE NAME DATE

FOR OSE INTERNAL USE WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	POD NUMBER	TRN NUMBER	
LOCATION			PAGE 2 OF 2

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

www.ose.state.nm.us

1. GENERAL AND WELL LOCATION

OSE POD NUMBER (WELL NUMBER)	OSE FILE NUMBER(S)
(POD1)14" VAC TO JAL LEGACY MW-7	CP-01345
WELL OWNER NAME(S)	**PHONE (OPTIONAL)**
PLAINS MARKETING LP	
WELL OWNER MAILING ADDRESS	**CITY / STATE / ZIP**
333 CLAY STREET, SUITE 1600	HOUSTON TX 77002

WELL LOCATION (FROM GPS)	DEGREES	MINUTES	SECONDS	
LATITUDE	32	06	09	N
LONGITUDE	103	07	09	W

* ACCURACY REQUIRED: ONE TENTH OF A SECOND
* DATUM REQUIRED: WGS 84

DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHIP, RANGE) WHERE AVAILABLE

4 MILES EAST OF JAL 2 MILES SOUTH HWY 128. UNIT F, SENW, SEC 25, T25S, R37E, LEA CO NM

2. DRILLING & CASING INFORMATION

LICENSE NUMBER	NAME OF LICENSED DRILLER	NAME OF WELL DRILLING COMPANY
WD-1710	MARTIN STRAUB	STRAUB CORPORATION

DRILLING STARTED	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HOLE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT)
6-26-14	6-26-14	80'	80'	N/A

COMPLETED WELL IS: ( ) ARTESIAN ( ) DRY HOLE (•) SHALLOW (UNCONFINED) — STATIC WATER LEVEL IN COMPLETED WELL (FT): 71'

DRILLING FLUID: (•) AIR ( ) MUD ADDITIVES - SPECIFY:

DRILLING METHOD: (•) ROTARY ( ) HAMMER ( ) CABLE TOOL ( ) OTHER - SPECIFY:

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CASING CONNECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
80'	55'	8"	SCH 40 .010 SCREEN	FJ	4"	0.237	.010
55'	+43"	8"	SCH 40 RISER	FJ	4"	0.237	RISER

2014 JUL -7 PM 1:08 STATE ENGINEER ROSWELL, NEW MEXICO

3. ANNULAR MATERIAL

DEPTH (feet bgl) FROM	DEPTH (feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL	AMOUNT (cubic feet)	METHOD OF PLACEMENT
80'	53'	8"	25 BAGS OF 20/40 SAND		TOPLOAD
53'	2'	8"	29 BAG OF 3/8 HOLEPLUG		TOPLOAD

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1345	POD NUMBER		TRN NUMBER	548539
LOCATION	Exp1	25S.37E.25.143			PAGE 1 OF 2

4. HYDROGEOLOGIC LOG OF WELL

DEPTH (feet bgl) FROM	TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER-BEARING ZONES (gpm)
0	1'	1'	SOFT CALICHE	○ Y ◉ N	N/A
1'	2'	1'	HARD CALICHE & SANDSTONE	○ Y ◉ N	N/A
2'	7'	5'	GRAVELY CALICHE	○ Y ◉ N	N/A
7'	27'	20'	MEDIUM HARD CALICHE & SANDSTONE	○ Y ◉ N	N/A
27'	29'	2'	TAN PINK SANDSTONE & SILTY SAND	○ Y ◉ N	N/A
29'	31'	2'	PINK SILTY SAND & CLAY	○ Y ◉ N	N/A
31'	35'	4'	PINK SANDSTONE & SILTY SAND	○ Y ◉ N	N/A
35'	36'	1'	PINK LOOSE SAND	○ Y ◉ N	N/A
36'	44'	8'	PINK SILTY SAND & CLAY	○ Y ◉ N	N/A
44'	47'	3'	PINK SILTY SAND & GRAVEL	○ Y ◉ N	N/A
47'	63'	16'	PINK SILTY SAND & MEDIUM TO SMALL GRAVEL	○ Y ◉ N	N/A
63'	67'	4'	PINK HARD CEMENTED GRAVEL & SANDSTONE	○ Y ◉ N	N/A
67'	73'	6'	PINK SILTY SAND & CLAY	◉ Y ○ N	
73'	76'	3'	RED SILTY SAND & CLAY	◉ Y ○ N	
76'	80'	4'	RED SILTY CLAY	◉ Y ○ N	
TD	80'			◉ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	
				○ Y ○ N	

METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: ○ PUMP ○ AIR LIFT ○ BAILER ○ OTHER – SPECIFY:

TOTAL ESTIMATED WELL YIELD (gpm):

5. TEST; RIG SUPERVISION

WELL TEST — TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.

MISCELLANEOUS INFORMATION:

6X6X60 HIGH RISE
2X2 PAD
LEA COUNTY NM

PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSEE:

6. SIGNATURE

THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:

Martin Strand /MARTIN STRAND — SIGNATURE OF DRILLER / PRINT SIGNEE NAME

7-2-14 — DATE

FOR OSE INTERNAL USE — WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER	CP-1345	POD NUMBER	1	TRN NUMBER	548534
LOCATION	Exp 1	25S.37E.25.143			PAGE 2 OF 2

APPENDIX B

Theis Equation Calculation Spreadsheet

Appendix B - Theis Equation Well Draw-down Calculations
City of Jal Hydrogeologic Report

User Inputs

Proposed Diversion in Acre-feet	300
Assumed Transmissivity (gpd/ft)	300
Assumed Aquifer Storativity (unitless)	0.05
Well Specific Capacity (gpm/ft)	0.14
Pumping Time (years)	40

Transmissivity Estimator	
Specific Capacity of Nearby Well (gpm per foot)	0.14
Estimated Transmissivity (gpd/ft)	280

Existing Wells

Name (NMOSE File Record #)	Distance from Proposed Well (ft)	Depth to Water (ft)	Total Well Depth (ft bgs)	Water Column Thickness (ft)	Assumed Pump Rate (gpm)	Predicated Pump Drawdown (ft)	Predicted Drawdown from Proposed Well	Total Drawdown	Allowable Drawdown	Percent of Water Column
CP-841	850	235	275	40	5	35.7	256.5	292.2	20	730%
CP-638	3420	190	380	190	5	35.7	74.3	110.0	133	58%
CP-557	3150	50	350	300	5	35.7	83.5	119.3	210	40%
CP-487	4750	250	420	170	5	35.7	41.4	77.1	119	45%

Formulas and Equations
Drawdown= s =(114.6*Q/T) W(u)
u = 1.87r2S/(T*t)
W(u) = -0.577216-LN(u)+u-(u^2/4)+(u^3/18)-(u^4/96)+(u^5/600)-(u^6/4320)
Estimated T = 2000* Specific Capacity

Equations taken from Theory of Aquifer Tests, USGS Paper 1536-E

Appendix B - Theis Equation Well Draw-down Calculations
City of Jal Hydrogeologic Report

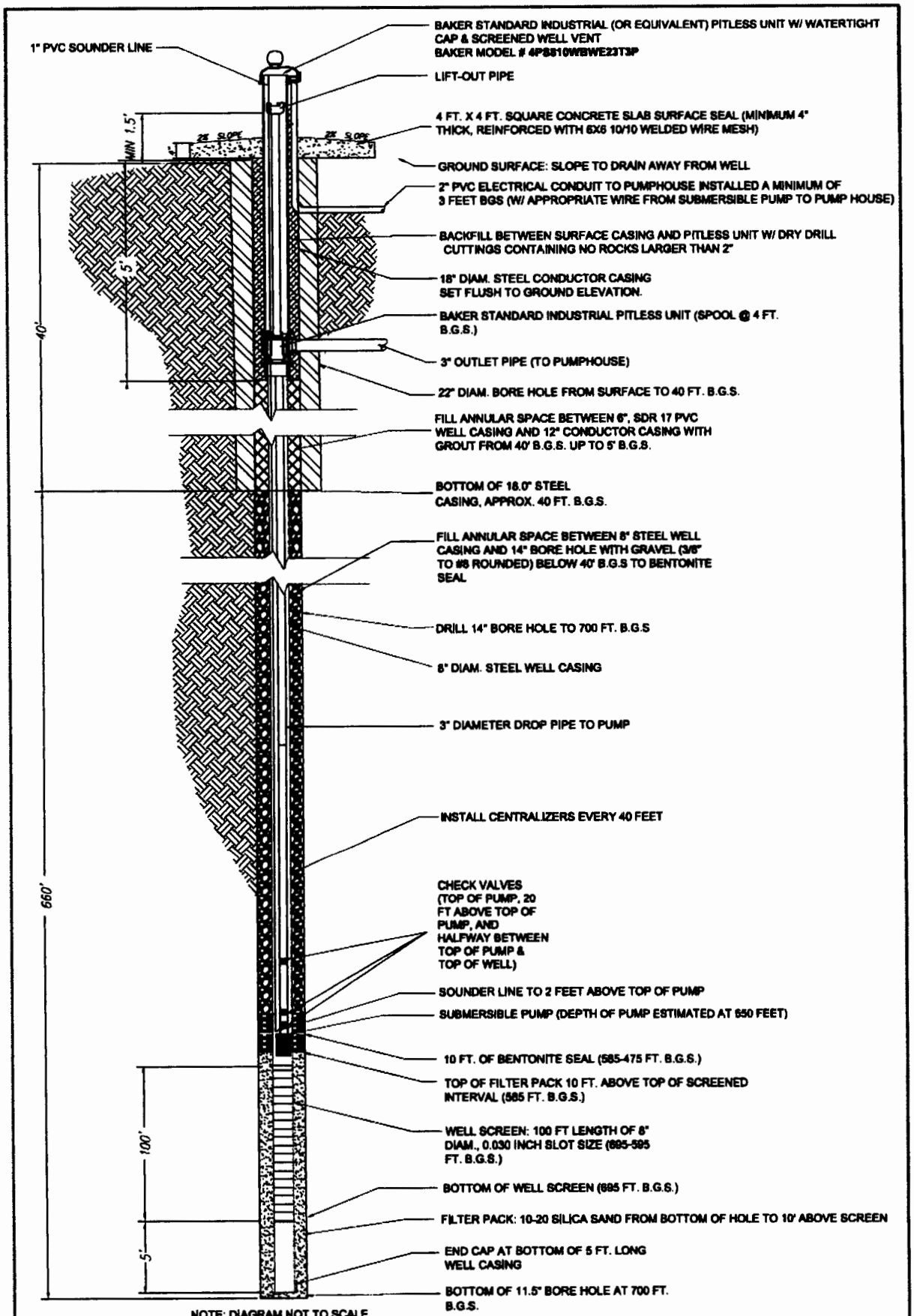
Proposed Well Calculations	
GPM to Acre Feet	
Proposed GPM	100
Pump %	50%
Potential Acre Feet	**80.7**

Calculations

Pump Time in Days	14600		Proposed Diversion in gpm	186.0	
u =	0.015423	W(u) =	3.610028391		Minutes per Year
	0.249683		1.045269275		525600
	0.211816		1.175928774		gal per acre foot
	0.481642		0.582671914		325851

APPENDIX C

Dockum Group Conceptual Well Design Diagram



NOTE: DIAGRAM NOT TO SCALE

SOUDER, MILLER & ASSOCIATES
3451 CANDELARIA RD. NE, SUITE D
Albuquerque, NM 87107

CONCEPTUAL PRODUCTION WELL DESIGN
CITY OF JAL HYDROGEOLOGIC INVESTIGATION
JAL, LEA COUNTY, NEW MEXICO

Drawn	Checked	Approved
MAE	SAM	SAM

Date: APRIL, 2015
Scale: Horiz: NA Vert: NA
Project No: 1C23766
Sheet: APPENDIX C

P:\1-Jal Hydrogeo and NMOSE Appl\ACAD\Well Construction Diagram.dwg, 4/7/2015 10:19:32 AM mae

APPENDIX D
City of Midland Water Use Data

Appendix D: 2014 City of Midland Water Use

Summary of Water Use Survey Submitted to Texas Water Development Board

Month	Water Source					
	FWSD 1 (Pecos Alluvium, MG)	Ogalalla (MG)	Colorado MWR (Surface Water, MG)	Water Reuse (MG)	Total Water Use (MG/Month)	% of Total Use Supplied from FWSD 1
January	66.40	73.03	296.14	--	4.36E+02	15%
February	63.50	63.64	288.49	--	4.16E+02	15%
March	72.30	64.18	391.08	--	5.28E+02	14%
April	259.00	81.43	520.64	--	8.61E+02	30%
May	182.40	248.07	417.95	--	8.48E+02	21%
June	210.00	278.08	390.60	--	8.79E+02	24%
July	461.96	276.60	461.96	--	1.20E+03	38%
August	162.20	221.54	512.21	--	8.96E+02	18%
September	210.00	266.55	310.12	--	7.87E+02	27%
October	217.00	54.00	350.05	--	6.21E+02	35%
November	166.20	59.00	238.07	--	4.63E+02	36%
December	155.00	60.00	225.73	--	4.41E+02	35%
2014 Total (MG)	**2,226**	**1,746**	**4,403**	**3,287**		
2014 Total (Acre-feet)	**6,831**	**5,359**	**13,512**	**10,089**		
Average Daily Use, MG	**6.1**	**4.8**	**12.1**	**--**		
Total 2014 City of Midland Water Use (MG, Excluding Re-Use)						**8,375**
Total 2014 City of Midland Water Use (Acre-Feet, Excluding Re-Use)						**25,702**

MG - Million Gallons

Appendix D. City of Midland Pecos Alluvium 2014 Water Use