TECHNICAL MEMORANDUM

TO: Bruce Buel, General Manager, Nipomo Community Services District

FROM: Joel Degner, Brad Newton

RE: Groundwater in storage underneath the Nipomo Mesa Management Area as of April 2006, 01-0236-00-9100

DATE: October 11, 2006

INTRODUCTION

Nipomo Community Services District (NCSD) directed SAIC to (1) determine the amount of groundwater that is in storage within the deep aquifer underneath Nipomo Mesa Management Area (NMMA) based on groundwater elevation data collected April 2006 (2) compare the storage in 2006 to 2000 and (3) compute the above sea level and below sea level volumes of groundwater in storage. The following figures and tables are attached.

Table 2: Well Measurements in April 2006

Figure 1: Well Locations and NMMA Boundaries

Figure 2: NMMA Groundwater Level in 2006

Figure 3: NMMA Groundwater Level in 2000

Figure 4: Change in storage between 2006 and 2000

Figure 5: Water Levels in a Confined Aquifer

RESULTS

Table 1: Groundwater in Storage underneath Nipomo Mesa Management Area

	Volume of groundwater in storage above sea level (AF)			Volume of groundwater in storage below sea level (AF)
Boundary	**April 2006**	**April 2000**	**2000 (DWR)**	**2000, 2006**
Nipomo Mesa Management Area (Phase III)	121,000	124,000	N/A	790,000
Nipomo Mesa Hydrologic Sub-area (DWR)	96,000	99,000	84,000	720,000

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METHODOLOGY

Well Measurements

Groundwater level data originated from the San Luis Obispo County Department of Public Works (SLO DPW) and from NCSD. SLO DPW measures the groundwater levels in monitoring wells in the spring and the fall of each year. Their most recent data are from April 2006 and were used in this analysis. NSCD measures the levels in its wells monthly. The NCSD data from April 2006 were used in this analysis. Table 2 lists the data from April 2006 and Figure 1 displays the well locations and the measured groundwater elevations. Well data for April 2000 from SLO DPW and NCSD were also used in this analysis for the comparison of water levels in 2000 and 2006.

The groundwater level data were evaluated for accuracy. Well completion records and historical hydrographic records were reviewed to flag data that appeared to be anomalous. Data that did not follow the historical trend in well hydrographs were removed. Data measured from shallow wells were also removed because of concerns that data measured a perched shallow aquifer and did not represent the water level of the deep aquifer that is the subject of this analysis. Table 2 lists the data that were used for the analysis and which data were removed due to data quality concerns.

Well locations were based on the California Department of Water Resources (DWR) records for the wells where available and NCSD well data from earlier SAIC study. When the DWR well locations were compared to other available well locations (SLO DPW, USGS) there were small discrepancies in some well locations. Therefore there is some uncertainty in the accuracy of the locations of the measured wells. The well ground surface elevations were based on DWR records and SLO DPW records. Based on the current analysis and previous analysis by SAIC the well elevations are not accurate and could vary +/- 20 feet.

Groundwater Surface Interpolation

The well measurements were interpolated using an inverse distance weighting method in ArcView 9.1 (Power=2, Number of points = 12). The interpolation was based on the data points and was not interpreted based on assumptions related to structural geology. The representation of the groundwater surface in April 2006 and in April 2000 is shown in Figure 2 and Figure 3 respectively. In their 2002 report, DWR assumed that the Santa Maria River fault acts as a barrier to groundwater flow. This results in a lower estimate of groundwater in storage and explains the difference between the estimate using only the data points (99,000AF) and DWR estimates using an interpretation of the structural geology for 2000 (84,000 AF) (See Table 1).

Groundwater Volume Estimate

The groundwater volume above sea level as shown in Table 1 was estimated by subtracting sea level surface (elevation equals zero) from the representation of the groundwater surface and subtracting the volume of bedrock above sea level. (The bedrock surface originated from Figure 11: Base of Potential Water-Bearing Sediments (DWR 2002)). The groundwater volume below sea level was estimated by subtracting the bed rock surface from the sea level surface. The total volume of the groundwater was multiplied by the specific yield to estimate the amount of groundwater in storage. The specific yield used was 11.7%, based on the average weighted specific yield for the Nipomo Mesa Hydrologic Sub-area estimated by DWR (DWR 2002, pg. 86).

The amount of groundwater in storage under the Nipomo Mesa depends on the boundary that is used to describe the Nipomo Mesa. Figure 1 displays the Nipomo Mesa Hydrologic Sub-area (HSA) boundary that the DWR used in its 2002 Report, the NMMA boundary used in Phase III of the Santa Maria Groundwater Adjudication, and the NMMA boundary provide in Exhibit C of the proposed stipulation in the Santa Maria Groundwater Adjudication. For this analysis, the NMMA from Phase III of the trial was used for continuity with previous analysis that SAIC had done in 2003. The storage was also calculated with the HSA to provide a comparison to previous estimates that were made by the DWR (See Table 1).

Change in Storage Comparison to 2006 and 2000

The groundwater in storage in April 2006 was compared to storage levels in April 2000, by subtracting the groundwater elevation surface in 2006 from 2000 (See Figure 4).