ATTACHMENT B

HYDROGEOLOGIC REPORT REQUIREMENTS

Aquifer test results must be documented and summarized in a hydrogeologic report through a series of maps, graphs, and tables that are accompanied by supporting and interpretive text. The following data and analyses are generally required in a hydrogeologic report submitted in support of a groundwater withdrawal application to the Commission:

General Requirements:

1. A detailed hydrogeologic description and groundwater availability analysis, which may be copied from the aquifer test plan and updated to include new information gained through the aquifer testing. If the percent utilization is greater than 50 percent, a Phase II analysis must be completed.

2. A graphical well log for the source(s). The log must include a professional grade description of the lithologies penetrated. Water-bearing zones must be located and described (i.e., weathered fracture, void, broken zone, etc.) and the approximate yield from each should be provided.

3. Hydraulic parameters for the aquifer(s) if they are used in calculations to determine impacts or to determine the area of influence. If included, the method of determination/calculation must be given and conditions of applicability must be documented, as satisfied or otherwise discussed.

4. An analysis of the pumping-induced impacts of the requested withdrawal considering projected 90-day drawdown data, to include:

    a. The potential for dewatering significant water-bearing zones within the source well(s).
    b. Potential impacts to existing water supplies within the area of influence for the test well(s).
    c. Potential impacts to surface water features within the area of influence for the test well(s). If wetland impacts are anticipated, provide a hydrologic characterization (source of water, seasonality, depth of rooting, etc.).
    d. Potential impacts to environmental resources within the recharge area for the source well(s).

5. A description of how the projected safe yield of the tested source(s) will help meet the project's 15-year projected demand. Additional support documenting the 15-year demand may be needed.

6. Mitigation must be proposed for any significant adverse impacts that were observed during testing or are projected to occur based on the review of the aquifer testing data.

7. Accurate coordinates and elevations for the source(s) and all monitoring points should be provided in the hydrogeologic report. The coordinates should be accurate to within 10 meters and provided in latitude/longitude format using the North American Datum of 1983 (NAD83) in decimal degrees (to six decimal places). Vertical measurements for the wells should be made in the North American Vertical Datum of 1988 (NAVD88) to the nearest 0.05 foot. A licensed surveyor may be needed to determine accurate elevations and coordinates.

Maps:

1. A map identifying the key hydrogeologic features (hydraulic boundaries, springs, wetlands, streams, divides, withdrawals, etc.) in the project area. Generally, all maps should identify any hydraulic boundaries on a topographic base map using a scale no smaller than 1 inch equals 2,000 feet.

2. A map identifying the type (well, stream, wetland, etc.) and location of approved and tested monitoring points and the test discharge location.

3. A pretest contoured water table (or piezometric surface) elevation map using a round of water levels measured prior to the constant-rate phase of testing.

4. An end-of-test contoured water table (or piezometric surface) elevation map showing the maximum test drawdown condition.

5. A drawdown contour map depicting the maximum observed drawdown as a result of the aquifer test.

6. A projected 90-day contoured water table (or piezometric surface) elevation map depicting the projected piezometric surface that may occur as a result of operating the test well at the requested rate for a 90-day period without recharge.

7. A map identifying the contoured 90-day projected drawdown that may occur as a result of operating the test well at the requested rate for a 90-day period without recharge.

Graphs:

1. Linear scale graphs of all water level, flow (weir and flume data should be in gallons per minute), and chemistry data for the background, pumping test, and recovery with

the start of these phases, and any irregularities or trends clearly labeled. Manual water level measurements should be depicted on the graphs. All slope breaks, abrupt changes, irregularities, and other trends must be identified on the graphs and discussed in the text. The water level and flow graphs should identify the duration and amount for precipitation events.

2. A safe yield analysis consisting, at a minimum, of a semi-log time-drawdown graph with the terminal trend extended to 90 days, or 129,600 minutes, and with water-bearing zones indicated by labeled, heavy horizontal lines.

3. Semi-log graphs depicting drawdown at each monitoring location. All slope breaks, abrupt changes, irregularities, and other trends must be identified on the graphs and discussed in the text.

4. A semi-log distance-drawdown graph that incorporates well efficiency in the pumping well to derive water level in the adjacent aquifer.

5. A semi-log residual-drawdown graph with t/t' on the horizontal axis **for each monitoring location**. The calculated u value for each monitoring location (excluding the pumping well) should be included on the graph.

6. A precipitation bar graph for the background, pumping, and recovery test phases.

7. All graphs should meet the following requirements:

   a. The Y-axis should span a scale appropriate for illustrating the test results.
   b. Time scales on all semi-log graphs should be in minutes and consistent from graph to graph. The end of test should be clearly depicted on each graph.
   c. Linear graphs should depict the background, constant rate, and recovery phases of testing, using similar horizontal scales for all graphs. Additional detailed graphs can be provided, as needed.
   d. Any data gaps must be explained.
   e. All slope trend changes (such as pumping impacts, aquifer recharge, hydraulic boundaries, and pumping rate changes) occurring after 100 minutes into the pumping test must be labeled on the graph and explained in the report.
   f. If semi-log distance-drawdown and time-drawdown graphs are used to determine water level impacts or hydraulic parameters, confirmation must be provided that the u value criteria are satisfied and the submittal must include the calculated u value on the graph.

Tables:

1. A personnel table listing all the individuals participating in the setup and performance of the test, with their profession (including any applicable license number[s]) and affiliation (geological and engineering consultants, project sponsor personnel, etc.), and a summary of their role.

2. A test schedule summary table listing the start and end dates for each test phase (i.e., background, pumping test, recovery, and [optional] step test).

3. A table of aquifer testing information, an example of which may be found on the Commission's website at http://www.srbc.net/policies/policies.htm (bottom of page). The table(s) should include the following:

    a. All monitoring point identifiers, the type of monitoring device (data logger, etc.), and the monitoring schedule.
    b. A list of starting water levels, end-of-background water levels, rate of recession at the start of the test, and pumping-induced change.
    c. Test specific water level data for all monitoring points, including the starting water levels, the end-of-test recession, the end-of-test water levels, and the end-of-test drawdowns (if any).

4. Tables summarizing the results of water quality monitoring, flow rate monitoring, and manual water level measurements for the pumping well. Additionally, any water quality monitoring or manual water level data measured for the monitoring network should also be tabulated and provided in the hydrogeologic report.

Other graphs, maps, and tables may be included, but not to the exclusion of those listed above.