

**Buckman Well Field Water-Level Monitoring Program  
Response to Condition of Approval No. 5,  
Permit No. RG-20516-S-10 thru RG-20516-S-13, City of Santa Fe**

The State Engineer approved with conditions the City of Santa Fe (City)'s Applications for Permits for Supplemental Wells under OSE File Nos. RG-20516-S-10 through RG-20516-S-13 (Buckman Wells 10 through 13) on September 13, 2004. The permits authorize diversion up to 10,000 ac-ft/yr from 13 wells, including RG-20516-S-10 through RG-20516-S-13, subject to a number of conditions specified in New Mexico State Engineer Order HU 03-004 (Order):

5. On or before January 10, 2006, the Permittee shall establish and submit a plan for a Buckman Well Field Monitoring Program, to assist in the evaluation of pumping impacts on ground and surface water sources, acceptable to the State Engineer. An acceptable monitoring program shall be implemented on or before January 10, 2007, and continue thereafter, to the satisfaction of the State Engineer, or diversion of water from Wells No. RG-20516-S-10 through RG-20516-S-13 shall cease and this Permit shall be subject to appropriate action by the State Engineer.
6. No water shall be diverted from wells RG-20516-S-10 through RG-20516-S-13 after December 31, 2010, until such time as the Permittee shall have furnished to the State Engineer such information and/or documents as the Engineer may find necessary to establish that any wells impacted under this Permit, including those wells identified in Table 30-A of Finding 30, will not go dry in 40 years, or that the owners of the right to beneficially use groundwater diverted from those wells have waived or released any claim of liability against the Permittee for impairment to such wells resulting from operations under this Permit, or that the Permittee has acquired the rights of such persons in such wells, or that the Permittee can and will, upon agreement of the well owners, supply water to such wells or the users thereof.
7. No water shall be diverted from wells RG-20516-S-10 through RG-20516-S-13 after December 31, 2043, until such time as the Permittee shall have furnished to the State Engineer such information and/or documents as the Engineer may find necessary to establish that any wells impacted under this Permit, including those wells identified in Table 30-B of Finding 30 in this Order, will not go dry due to Applicant's pumping authorized under this Permit, or that the owners or users of said wells have waived or released any claim of liability against the Permittee for injury resulting to such wells from operations under this permit, or that the Permittee has acquired the rights of such persons in such wells, or that the Permittee can and will supply water to such wells or the users thereof.

This monitoring program shall be implemented pursuant to the Order.

**1.0 PURPOSES**

The purposes of the monitoring program are to give a general indication of water-level change over time, to monitor the effects pumping the Buckman well field has on nearby senior water

rights, including OSE 72-12-1 wells, and to provide data necessary to identify threshold drawdowns for administration of State Engineer Order Conditions 5, 6, and 7. This water-level monitoring program will document water-level change in the vicinity of RG-20516-S-10 through RG-20516-S-13 and guide State Engineer's administration in protecting senior water rights, including 72-12-1 wells. This program will support the State Engineer's existing and on-going annual surface water depletion calculations and the requisite mitigation of surface water depletions resulting from the City's diversions under permit RG-20516. The program will benefit future groundwater resource management in the greater basin.

## **2.0 THE MONITORING PROGRAM**

This Monitoring Program enhances current water-level monitoring efforts conducted by the State Engineer and augments the City's current water-level monitoring program under the existing RG-20516 permits. New water-level monitoring wells are added to the existing program for determining effects of pumping on senior wells in the vicinity of RG-20516-S-10 through RG-20516-S-13.

### **2.1 Geographic boundary of the Monitoring Program Area**

The Monitoring Program Area to which this monitoring plan applies is defined by a 4-mile radius from each RG-20516-S-10 through RG-20516-S-13 (Exhibit A) and is subject to expansion as per Section 3.3. The initial study of wells under Section 2.4 will include the Monitoring Program Area and the Tano Road Area (Exhibit A).

### **2.2 Current RG-20516 water-level monitoring:**

The City of Santa Fe is currently responsible for a water-level monitoring program required by a condition of approval of the original Permit No. RG-20516, issued on May 23, 1972. The monitoring program for RG-20516 has evolved over time, and currently includes the following elements:

- Monthly measurements in each of Buckman Wells 1 through 9.
- Monthly measurements in the Skillet Observation Well, RG-21318, 19N.8E.30.344.
- Monthly measurements in the Weil Corral well, 19N.7E.36.441.
- Monthly measurements in the Permit well, RG-16681, 18N.8E.2.2333
- Continuous measurements (hourly) in SF2B and SF2C under a joint funding agreement with the US Geological Survey (USGS)
- Monthly measurements in SF3A, SF3B, SF3C, SF4A, SF4B, SF4C, and SF5C under a joint funding agreement with the USGS

The City will continue monitoring the wells listed above.

### 2.3 New water-level monitoring:

Water-level monitoring in selected wells in the Monitoring Program Area will comprise a well network (the network) designed to better understand pumping effects from RG-20516-S-10 through RG-20516-S-13. The City shall add to the current water-level monitoring program: 1) water-level monitoring of RG-20516-S-10 through RG-20516-S-13, 2) the two dedicated, nested, OSE-USGS monitoring wells at Las Campanas and Buckman-Devil's Throne, whether or not RG-20516-S-10 through RG-20516-S-13 are being pumped, 3) seven private OSE 72-12-1 wells and one Forest Service Well, which will serve as a proxy to predict potential effects on senior wells (wells of record prior to the City's Applications Nos. RG-20516-S-10 through RG-20516-S-13) in the vicinity of RG-20516-S-10 through RG-20516-S-13 pumping, and 4) one dedicated, monitoring well approximately 2-4 miles east of RG-20516-S-13, which is to be drilled by the City.

The City will measure the water-levels in the wells identified below on the given measurement schedules:

- Monthly measurements, whether pumping or not pumping, in RG-20516-S-10 through RG-20516-S-13.
- Continuous (hourly) measurements using electronic transducers downloaded monthly in the existing piezometer nests installed by the State Engineer and USGS at Buckman-Devil's Throne (SF6-A, SF6-B and SF6-C; 18N.8E.17.1341) and Las Campanas (USGS ID# 354228406044901, 354228406044902, and 354228406044903; 17N.8E.15.12444).
- Continuous (hourly) measurements using electronic transducers downloaded quarterly in RG-30777, the unequipped Bernstein well (17N.8E.2.232).
- Semi-annual, non-pumping measurements in January and July , provided that permission and access can be obtained from the owners of:
  - RG-6386, Tony's Windmill (NMSU; 18N.8E.24.3144, TD 350 ft).
  - RG-29524, Las Dos 1, (Gonzales, formerly Vigil well; 18N.9E.30.2431, TD 773ft).
  - RG-25463, Piñon-Bogle (formerly Lilienthal well; 18N.9E.31.412, TD 841 ft).
  - RG-24584, Santa Fe Ranch (Daniels; 17N.8E.1.2123, TD 602 ft; Note: this well does not appear in WATERS database).
  - RG-438, Midway Windmill Well (18N.8E.17.21314, TD 310 ft)
  - RG- 29723, USFS well (17N.8E.5.323, TD approximately 684 ft).

- Continuous (hourly) measurements using an electronic transducer downloaded quarterly in an active, metered OSE 72-12-1 well within two miles of RG-20516-S-12 or RG-20516-S-13, provided that permission and access can be obtained. The State Engineer and the City may, after monitoring the OSE 72-12-1 well for two years, jointly decide to suspend the continuous measurement, if the data are not found to be useful for the purpose of the monitoring program.
- Continuous (hourly) measurements using an electronic transducer downloaded quarterly in a well approximately 2-4 miles east of RG-20516-S-13. The City will install a 4" schedule 40 PVC, monitoring well with a 20-ft screened interval, to a depth of 1,200-1,500 feet, and a transducer. The City may augment the monitoring well specifications above at its option. The SFBWA shall secure appropriate land or easement upon which to drill the well required under this paragraph and the City shall cooperate in good faith in determining an appropriate location and effectuating any necessary transfer of title.

The City may, depending upon access arrangements, well suitability, and value of the collected data and after consultation with the State Engineer, replace measuring schedules or the OSE 72-12-1 wells with other similar wells that lie within the Monitoring Program Area. Wells already in the OSE-USGS cooperative monitoring network will be given substitution preference.

#### **2.4 Initial study of local wells**

In preparation to commence this monitoring program, the City will conduct a detailed study of local wells in the Monitoring Program Area and the Tano Road Area (Exhibit A). The study will summarize the data available from sources such as the WATERS database, the NMBG well study, and information provided by SFBWA and Tano Road Association. Some of the wells identified in the study may be identified for monitoring, in which case the City will seek permission to make water-level measurements. The City will submit the study with a list of wells, which will be submitted for review and acceptance by the State Engineer and will be posted on the internet accessible to the public described in Section 3.2 below. A paper map of all identified wells will be submitted to the State Engineer.

#### **2.5 Quality of Data Collection**

The water-level measurements will be made by trained personnel, and will follow the data-collection and quality assurance guidelines in use by USGS and State Engineer staff and contractors in the existing statewide monitoring program.

### **3.0 REPORTING**

The purpose of the following reporting requirement is to comply with the RG-20516 permit and to make all pertinent production and water-level data, analysis and reports readily available for retrieval and analysis. Without the ability to correlate water-level trends to city well production data, the water-level measurements are of limited utility.

#### **3.1 Data reporting to State Engineer**

In addition to its current reporting requirements, the City will submit daily production data for RG-20516-S-10 through RG-20516-S-13 and monthly water-level measurements collected under this monitoring program to the State Engineer within 30 days of measurement. Semi-annual measurements and continuous measurements will be reported by February 28 and August 31 following the January or July measuring period, respectively.

### **3.2 Data and report availability**

By April 15, 2008, the City will make accessible to the public on the internet at a single site: 1) a map showing the Monitoring Plan Area, roads within the Area and drawdown effects in the Area, 2) pre-2007 monthly and post-2006 daily production from RG-20516, 3) past and current measured water-level data, 4) hydrographs from the monitored wells, 5) this monitoring plan, and 6) any pertinent reports generated by this monitoring program. The specified water-level and production data will be maintained from the beginning of this monitoring program or the beginning of the period of record, whichever occurred earlier, and updated quarterly. Data will be available in an Excel-compatible format for ease of use.

### **3.3 Biennial Summary Report**

Every two years by February 28th, and beginning by April 15, 2008 the City will submit to the State Engineer a brief report summarizing RG-20516 production and the water-level trends of the monitored wells. Each report will include a ten-year and forty-year projection of water-level declines in the monitored wells and a projection of water-level declines for wells in the Monitoring Program Area or as specified in the RG-20516 permit. The report will also include ten and forty year projections for one well from the western terminus of the Tano Road Subdivision. The water columns in senior wells will be determined from OSE Drillers Well Logs, actual static water-levels, site-specific studies, or a combination of these data.

Each report will forecast whether the remaining water column at the end of both projections will, in any monitored well, in any of the wells specifically identified in the Permit, or in any other senior well within Monitoring Plan Area, exceed 70% drawdown of the water column available at the initiation of this monitoring program, (see finding number 31 in the State Engineer Order). If the water level declines within the Monitoring Program Area are considered significant at its current boundary, and as additional hydrologic and geologic information becomes available, the Monitoring Program Area may be expanded.

The report will also include a map depicting water-level trends in the monitored wells. The report with a more generalized map will be posted on an internet site (Section 3.2) accessible to the public within 30 days of submittal to the State Engineer. The public may submit comments on the report to the State Engineer.

There shall be a presumption that water-level declines in Monitoring Program Area are the result of the pumping of RG-20516-S-10 to RG-20516-S-13, which the City may rebut with appropriate evidence. The report may include results from groundwater modeling to analyze the contribution of RG-20516-S-10 to RG-20516-S-13 toward any monitored decline.

If the Biennial Summary Report forecasts a greater than 70% induced drawdown in any identified well with its forty-year projection, but not with its 10-year projection, the report shall include the City's strategy for complying with the conditions of the Permit as to those wells. If the Biennial Summary Report forecasts a greater than 70% induced drawdown in any such well with its 10-year projection, the City shall comply with the terms Section 4.0 below. The public may submit comments on the report to the State Engineer.

#### **4.0 MITIGATION OF RG-20516-S-10 THROUGH RG-20516-S-13-INDUCED DRAWDOWN IN SENIOR WELLS**

If, at the time of any Biennial Summary Report, the 70% induced drawdown limit in any senior well is forecast "by water level trends" to be reached within ten years of the date of the report, the City shall, within one year of the date of the Report, submit to the State Engineer a plan to come into compliance with the conditions of the Permit. The plan may adjust City pumping schedules, or mitigate the effects of City-induced drawdown in specific wells by other actions, such as connecting the water users to other sources, or other measures acceptable to the water user and acceptable to the State Engineer. The public may submit comments on the plan to the State Engineer.

Should any senior well owner within the vicinity of RG-20516-S-10 through RG-20516-S-13 claim that the 70% induced drawdown limit is being reached, technical representatives of the City, the State Engineer, and the owner of the senior well shall review the evidence and determine a finding. Should this finding confirm the presence of City induced drawdown approaching or exceeding the 70% drawdown guideline, the City shall, within six months of the finding, submit to the State Engineer a plan to come into compliance with the conditions of the Permit with regard to the said senior well.

The State Engineer may accept any plan submitted pursuant to this section, may adopt his own findings, and may order alternative means of mitigation of effects on senior wells. Should effects continue, the State Engineer may seek to enforce compliance with the permit conditions pursuant to NMSA 1978, as amended, Section 72-2-18. Any plan submitted to the State Engineer pursuant to this section shall be posted on a website accessible to the public within 30 days of submittal.

Exhibit A: Buckman Supplemental Wells (RG-20516-S-10 through RG-S0516-S-13) Monitoring Program Area