Bureau of Mining Regulation and Reclamation

GUIDANCE DOCUMENT FOR THE DESIGN AND CONSTRUCTION OF GROUNDWATER MONITORING WELLS AND APPROVED MONITORING AND SAMPLING METHODS

All monitoring wells installed for the sampling of groundwater associated with a Water Pollution Control Permit granted under the provisions of Nevada Administrative Code (NAC) 445A.350 through 445A.447 inclusive must be designed, constructed, modified, and abandoned according to the requirements described in this guidance document. Any deviation therefrom must be approved in writing by the Bureau of Mining Regulation and Reclamation (BMRR) prior to construction, modification, or abandonment of the well. BMRR may modify or amend these requirements if warranted based on site conditions and/or new information.

Under the authority of the Nevada Division of Water Resources (NDWR), monitoring well design and installation must also conform to all applicable sections of NAC Chapter 534, Regulations for Water Well and Related Drilling. All monitoring wells must be installed by a well driller licensed in the State of Nevada.

Preliminary Documentation

Installation of the well must not proceed until approval is received from the BMRR. Prior to installing any monitoring well, the following documentation must be submitted to the specified agency (Water Pollution Control Permit modification fees may be required):

1. Complete technical description, design drawings, location map, and the purpose of the well to the BMRR;
2. Notarized Affidavit of Intent to Abandon a Monitoring Well to the NDWR; and
3. Request for appropriate waiver to the NDWR.

Monitoring Well Design

In addition to the requirements for monitoring wells presented in NAC Chapter 534, the following must also be incorporated into the design of the well:

1. The number and locations of monitoring wells must be approved by the BMRR prior to installation. The location of each well must be selected based on the relationship between the component or source requiring monitoring and the gradient of groundwater in the area.
    a. At least one monitoring well must be placed directly upgradient from the component or source.
    b. One or more monitoring wells must be placed directly downgradient from the potential component or source to be monitored.
    c. Each well must be located the minimum practicable distance from the component or source that is compatible with the approved purpose of the well.
    d. In the case of rapid infiltration basins, monitoring wells will be screened immediately outside of, or under, the projected mounding effects of the infiltration activity, unless

the water in the infiltration mound may be utilized by an existing groundwater user, in which case some monitoring wells will also be screened within the mound.

e. BMRR may require additional monitoring wells if new and/or changing conditions dictate.

2. The screened interval of the well must extend at least 15 feet into the groundwater unless warranted by site hydrogeologic conditions, and extend at least 1 foot above the seasonal high elevation of the water table. Unless otherwise approved by BMRR the screened intervals shall be 20 to 30 feet in length. If the well is designed to monitor a confined aquifer or groundwater under an infiltration mound, BMRR may require installation of the entire screen under the static water elevation.

3. Wells with multiple screened intervals intended to provide monitoring of more than one groundwater body, must not be installed unless approved by the BMRR in advance.

Monitoring Well Installation

In addition to the requirements for monitoring wells presented in NAC Chapter 534, the following measures must be taken:

1. The well must be developed until the return waters are clear and sediment free using one of the following methods:
   a. Mechanical surging and pumping/bailing; or
   b. Pumping and backwashing.

2. As-built documentation of the completed well must be submitted to the BMRR within 30 days after installation and must include the following:

   a. Well driller's report;
   b. A hydrogeologic log completed by a qualified geologist, hydrologist, or hydrogeologist who has reviewed all available information pertaining to the well installation;
   c. Cross-section as-built drawing of the well showing all materials, components, and measurements;
   d. An updated map of all monitoring locations for the permitted facility;
   e. An updated well completion table that includes the following data for all permitted wells at the facility: well identification, collar UTM coordinates (in meters, NAD 83 datum), completion date, casing diameter, collar elevation (in feet above mean sea level [specify datum used]), collar stick up (feet above ground surface), screen top (feet below ground surface[bgs]), screen bottom (feet bgs), and terminal depth (feet bgs); and
   f. Static water elevation (feet amsl), and results of a Profile I water quality analysis performed by a Nevada Certified Laboratory.

Monitoring Well Sample Collection

1. Sample collection from groundwater monitoring wells must be performed in accordance with the American Society of Testing and Materials (ASTM) methods or other method approved by the BMRR. BMRR-approved methods for the sampling of groundwater monitoring wells are listed at the end of this guidance document.

Monitoring Well Closure/Abandonment

1. Closure/abandonment of the well must be performed in accordance with the requirements of NAC Chapter 534.
2. Abandonment of the well must not proceed until written approval is received from the BMRR.

BMRR-Approved ASTM Standards for Groundwater Monitoring Well Sampling Methods

D4448 Standard Guide for Sampling Groundwater Monitoring Wells

D4750 Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitoring Well (Observation Well)

D5088 Practice for Decontamination of Field Equipment Used at Waste Sites

D5792 Practice for Generation of Environmental Data Related to Waste Management Activities: Development of Data Quality Objectives

D5903 Guide for Planning and Preparing for a Groundwater Sampling Event

D6089 Guide for Documenting a Groundwater Sampling Event

D6452 Guide for Purging Methods for Wells Used for Groundwater Quality Investigations

D6517 Guide for Field Preservation of Groundwater Samples