NATURAL RESOURCES CONSERVATION SERVICE
Wyoming
CONSTRUCTION SPECIFICATIONS
FOR
MONITORING WELL

_____ _____

(Owner/Operator) (Project/Title)

GENERAL

Installation shall be in accordance with a design and plan approved by the responsible technician. Details of construction shown in the design and plan or described in the State of Wyoming State Engineer's Office "Regulations and Instructions", Part III, Water Well Minimum Construction Standards but not included here shall be considered as a part of this specification. Construction activities shall be in accordance with applicable OSHA regulations.

CASING

Monitoring wells or piezometers are not usually a permanent fixture. They are designed to collect information about a given groundwater condition or possible problem. They will have to be removed once their use is completed and the borehole will have to be abandoned. The surface around the well will have to be restored.

Steel pipe used for well casing shall meet or exceed the requirements specified in ASTM A 589.

Plastic Pipe. Plastic pipe used for well casing shall conform to ASTM F 480. Plastic casings for transporting potable water supplies shall be NSF approved.

Joint Strength. Well casing joints shall have adequate strength to carry the load due to the casing length and still be watertight, or shall be mechanically supported during installation to maintain joint integrity. Such mechanically supported casings shall terminate on firm material that can adequately support the casing weight.

SCREEN

A well screen shall be installed in any earth material likely to produce silt or sand. Well screens may be constructed of commercially manufactured screen sections or well points. The screen should be constructed with the slot width determined from formation samples.

Commercially manufactured structurally supporting filter device that allows inflow, retains select material, and is the access for aquifer development and future aquifer maintenance. Screen may be continuous-slot wire-wrapped, pre-packed, louvered, or bridge-slotted or any other commercially manufactured product which is produced for the purpose of water well screening. The length and open area of the screen shall be sized to limit entrance velocity of water into the well to less than or equal to 0.1 foot per second.

Depth of the aquifer below ground surface and the thickness of aquifer to be penetrated by the well shall govern the position of the screen in the well.

Installation of a filter pack around the well screen shall be considered under the following conditions: presence of a poorly graded, fine sand aquifer; presence of a highly variable aquifer, such as alternating sand and clay layers; presence of a poorly cemented sandstone or similar aquifer; a requirement for maximum yield from a low-yielding aquifer; and holes drilled by reverse circulation.

For heaving or caving sands, silty or fine-grained aquifers, and for horizontal or angled wells, a commercial prepacked well screen may be substituted for a conventionally installed (by tremie) filter pack.

INSTALLATION

Borehole. Drilled, jetted, bored, and driven wells shall be sufficiently round, straight, and of adequate diameter, to permit satisfactory installation of inlet, well casing, filter pack, and annular seal, and passage of tremie pipe (including couplings), if used.

Use of Casing. Casing shall be installed to seal out undesirable surface or shallow ground water and to support the side of the hole through unstable earth materials. The intake portion of a well through stable geologic formations may not require casing. Steel casing shall be used in driven wells.

All wells shall be cased to a sufficient height (minimum of 18 inches) above the ground surface to prevent entry of surface and near-surface water.

Casing for artesian aquifers shall be sealed into overlying, impermeable formations in such a manner as to retain confining pressure.

If a zone is penetrated that is not to be monitored, the zone shall be sealed to prevent infiltration water from this zone into the well and the developed portion of the aquifer.

Casing shall extend from above the ground surface down through unstable earth materials to an elevation of at least 2 feet into stable material or to the top of the screen.

Casing Diameter. Casing diameter shall be sized to permit satisfactory installation and efficient groundwater removal for analysis or operation of the pump, and large enough to assure that uphole velocity is 5 feet per second or less, to protect against excessive head loss. Most monitoring wells and piezometers are 2 inch in diameter. This reduces the amount of purge water and ease of removal when the well is no longer needed.

Well Development. Wells to be completed without a filter pack in unconsolidated granular aquifers shall be developed following guidance provided in ASTM D 5521, Standard Guide for Development of Ground-Water Monitoring Wells in Granular Aquifers. The method shall be selected based on geologic character of the aquifer, type of drilling rig, and type of screen. Development is especially important in monitoring wells, because drill fluid residues remaining in the borehole can affect water chemistry of the samples.

Aquifer Development. All monitoring wells must be developed as thoroughly as possible, not only to remove all traces of drilling fluids from the formation, but also to increase the yield so that reliable samples can be collected in the shorts amount of time. Development is also important to assure that the water within the monitoring well is consistent with the ambient water quality of the aquifer.

Grouting and Sealing. The annulus surrounding the monitoring well casing at the upper terminus of the well shall be filled with expansive hydraulic cement (ASTM C 845), shrinkage-compensating concrete, bentonite-based grout, clay, or other material with similar sealing properties. The grout seal shall extend not less than 20 feet below ground surface or to the top of the gravel filter or to the top of the monitored water level and not less than the minimum specified in state or locally applicable construction codes. A positive seal (grouted in place) or packer shall be provided between the casing and the less pervious material overlying the aquifer of artesian wells, and in all aquifers where comingling of waters is undesirable.

Access Port. A removable cap will be used as an access port into the monitoring well.

Disinfection. Wells shall be disinfected immediately following their construction or repair to neutralize any contamination from equipment, material, or surface drainage introduced during construction. The disinfection process shall comply with all local or state requirements.

Water Quality Testing. Sampling and testing shall comply with all applicable federal, state, and local requirements associated with the intended use(s) of the water.

ADDITIONAL SPECIFICATIONS