

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY  
GROUNDWATER SECTION

II - WATER WELL ABANDONMENT SPECIFICATIONS  
FOR PROJECTS FUNDED BY  
PART 201, ACT 451, PA 1994

PART ONE - GENERAL

1.1 SCOPE OF WORK

The work to be done shall consist of furnishing all labor, materials, and equipment for the complete and satisfactory plugging of an abandoned water well. The CONTRACTOR shall comply with all federal, state, and local laws and ordinances relating to performances of the work. All work is to be done in accordance with the Michigan Water Well Construction and Pump Installation Code, Act 368, PA of 1978, Part 127, known as the Ground Water Quality Control Act and administrative rules adopted thereunder and specifications described herein.

The proposed water well abandonment site is indicated on Schedule II (Water Well Abandonment Specifications Summary Sheet). The site has been evaluated by the Michigan Department of Environmental Quality (herein referred to as the DEPARTMENT) representative, local health department representative, or the home owner in an attempt to determine the location, well diameter, and depth of the well to be abandoned. This information is found on the attached Water Supply Survey Form and Schedule II. It is recommended that all bidders thoroughly examine the Technical Specifications for this work and make a personal examination of the well location at the site(s) of the proposed work. Failure by the CONTRACTOR to examine the site(s) prior to making a proposal shall not be considered as cause for an increase in the contract amount.

It should be realized that in some cases it may be impractical to plug a well due to its location, such as a well located under a structure. In the event the CONTRACTOR determines the well to be inaccessible for plugging, the CONTRACTOR shall notify the DEPARTMENT before proceeding.

The decision as to whether a casing must be removed as part of the abandonment procedure will be made by the DEPARTMENT representative on site. In the event a casing must be removed, the CONTRACTOR will be paid a lump sum as indicated in the Itemized Bid Sheet.

All work shall be subject to the order of the DEPARTMENT representative who shall be kept informed at all times as to the status of the work. The DEPARTMENT or its representative must be on site when work is performed unless the CONTRACTOR has been given approval by the DEPARTMENT representative to proceed in his or her absence.

Figures for the depths of wells and location of existing wells listed in Schedule II are estimates based on the information available to the DEPARTMENT.

The DEPARTMENT will pay the contractor for unit price bid based on the actual well depth and diameter encountered.

## 1.2 REGISTRATION

The work shall be completed by a water well drilling contractor registered in the State of Michigan, who shall comply with all applicable rules, regulations, and guidelines published by the State of Michigan regarding the performance of the work.

## 1.3 UTILITIES FOR CONSTRUCTION

Unless otherwise provided for in these specifications, the CONTRACTOR shall furnish his own source of electricity, fuel and water required to perform the work, and shall bear the cost of these services.

## 1.4 PROTECTION OF PROPERTY

The CONTRACTOR shall properly protect all surface and subsurface structures and surrounding areas from damage which may result from the methods employed in performing the work. The CONTRACTOR shall be responsible for any damages to such structures resulting from his operations. Damaged property shall be repaired or replaced to a condition which is equal to that which existed prior to damage. The DEPARTMENT shall have the right to approve these restoration measures.

## 1.5 NOTIFICATION OF UTILITIES

The CONTRACTOR shall comply with Act 53, PA of 1974, by notifying the public utilities of the proposed drilling or excavating at least 48 hours prior to the commencement of such activities by contacting MISS DIG at 1-800-482-7171.

## 1.6 DISPOSAL OF WATER

The CONTRACTOR shall make all provisions necessary for conveying any water encountered in performing the work away from adjacent structures, and shall take measures necessary to prevent erosion and/or flooding of the site and adjacent properties. The CONTRACTOR shall also prevent discharge water from flowing over any adjacent wells or sewage disposal system.

## 1.7 CLEAN-UP

The CONTRACTOR shall provide all material and labor to maintain the site in an orderly condition, which is conducive to good workmanship. The CONTRACTOR shall keep the site free from accumulation of waste materials, rubbish, and other debris resulting from the work.

## 1.8 SAFETY

The CONTRACTOR shall comply with all applicable laws and regulations governing the furnishing and use of safeguards, safety devices, and protection equipment. The CONTRACTOR shall take any necessary precautions to protect the life and health of employees and the public in the performance of the work.

## 1.9 TIME OF COMPLETION

The CONTRACTOR shall begin work on the site within 20 days from the date the contract is awarded and all work shall be completed within 30 days from the date the work is begun unless otherwise specified in Schedule II.

## PART TWO - METHOD OF MEASUREMENT AND BASIS OF PAYMENT

### 2.1 EXCAVATION OF WELL

Payment for locating buried wells, excavation, backfilling, and site restoration shall be on the basis of the unit price per hour and shall include all labor, material, and equipment to locate and expose the well, backfill the excavation, including well pits, and perform site restoration as specified herein not to exceed the time estimated on the bid sheet without prior approval or the Department representative.

### 2.2 CASING REMOVAL

Payment for removal of well casing shall be on a lump sum basis and shall include all labor, material, and equipment to remove the well casing from the borehole.

### 2.3 WELL PLUGGING

Payment for plugging of the well shall be on the basis of the unit price per foot of well actually plugged for the diameter listed in Schedule II and shall include all labor, material, and equipment to place the plugging material into the borehole or casing.

## PART THREE - MATERIALS

### 3.1 PLUGGING MATERIALS

- A. Neat cement slurry - a mixture of one bag (94 pounds) of Type I Portland cement to not more than 6 gallons of clean water as defined in R325.1603a(1), Rule 103a(1), definitions; N,O.
- B. Concrete slurry - a mixture of one bag (94 pounds) of Type I Portland cement to an equal amount of dry sand to not more than 6 gallons of clean water as defined in R325.1602(3), Rule 102(3), definitions; C, D.
- C. Coarse grade bentonite - crushed high swelling sodium bentonite. The minimum particle size shall be 1/4 inch in diameter as defined in R325.1601a(4), Rule 101a(4), definitions; B.
- D. Bentonite pellets - a pre-formed compressed tablet made of high swelling sodium bentonite. The minimum pellet size shall be 1/4 inch in diameter as defined in R325.1601a(6), Rule 101a(6), definitions; B.

### 3.2 GROUTS AND GROUT/FLUID ADDITIVES

Bentonite grouts; special cements; or other admixtures to the grout material to reduce permeability, increase fluidity, control time of set, or alter the slurry composition in any way, shall not be used unless approved by the DEPARTMENT. DEPARTMENT approval shall be based upon compliance with the following specifications as applicable: ANSI/NSF standards 60 or 61 (additives), ASTM specification C 150 (cements), or section 10 of the API specification 10 and section 4 of the API specification 13A (bentonites) in accordance with R325.1640(2)(a) and (b), Rule 140(2)(a) and (b), certification of water well components.

## PART FOUR - COMPLETION OF WORK

### 4.1 GENERAL REQUIREMENTS

Unless otherwise specified, abandonment of an existing contaminated well shall take place after construction of the replacement well in order to minimize interruption of water service to the property owner.

Prior to plugging the existing contaminated well, the CONTRACTOR shall make appropriate measurements to verify well depth.

The CONTRACTOR shall maintain a complete and accurate record of the plugging operation. The information to be recorded shall include the type of plugging material used, volume of material used, and method of placing plugging material into the well. Such written record shall be available for inspection on site at the request of the DEPARTMENT. The completed well plugging report shall be submitted to the DEPARTMENT within 60 days of completion of the plugging operation. Final approval and payment to the CONTRACTOR shall be withheld by the DEPARTMENT until the plugging report has been submitted. Water necessary for preparing plugging slurries shall be obtained by the CONTRACTOR at his own expense from a source satisfactory to the DEPARTMENT and shall be conveyed in a clean, sanitary container.

### 4.2 REMOVAL OF WELL MATERIALS

The CONTRACTOR shall remove all materials from the well which may hinder its proper abandonment, if possible, in accordance with R325.1662(2), Rule 162(2), abandoned wells and dry holes; removal of debris and obstructions. This shall include pumping equipment, drop pipe, and packer jets. Removal of bremer check valves is not required. Electrical disconnections of the pumping equipment shall be made in accordance with applicable electrical codes.

### 4.3 CASING REMOVAL

The casing and screen shall be removed where specified by the DEPARTMENT in Schedule II and in the manner specified in Schedule II. If measurements and available local geological information indicate that the existing contaminated well terminates in the same formation as the completed replacement well, penetrates a confining formation (clay, hardpan), or the DEPARTMENT representative believes there is a visible open annular space around the casing, the CONTRACTOR shall remove the casing with the approval of the DEPARTMENT representative.

The casing shall be removed by applying a lifting force to the casing with the drilling rig, jacks, jarring head, trip casing spear or a combination of the above methods. The plugging material shall be placed into the well after the screen is removed and prior to the removal of the casing so that the plugging material is in contact with the formation materials as the casing is being pulled.

### 4.4 CASING TERMINATION

Where removal of the casing is not required, as determined by the DEPARTMENT representative, or where the casing cannot be removed, the CONTRACTOR shall cut the casing off at least 12 inches below grade. For wells located in a building, upon completion of well plugging, the CONTRACTOR shall fill the casing to floor level with no less than 12 inches of cement. Casing shall be cut off not more than 3 inches from floor level. For wells terminating in a well pit, casing shall be cut off not less than twelve inches below the grade established when the pit is filled. Where the well cannot be

located, or is determined by the DEPARTMENT to be inaccessible, the service line shall be cut off not more than 3 inches from the point of building or structure entry, and shall be filled with no less than 12 inches of cement.

#### 4.5 SALVAGE RIGHTS

All casing, drop pipe, packer jets, check valves, screens or other fittings removed from the well by the CONTRACTOR shall be considered property of the property owner and left on the site, unless other arrangements are made between the CONTRACTOR and the property owner.

#### 4.6 PLUGGING PROCEDURES

Wells shall be plugged in accordance with the CODE, R325.1663, Rule 163, Abandoned wells and dry holes; plugging method and R325.1664, abandonment of wells; plugging materials.

- A. Slurry mixture and pumping - When neat cement slurry or concrete slurry is used, it shall be placed into the well by pumping down a tremie pipe of at least one inch inside diameter which has been placed to the bottom of the well to avoid segregation or dilution of sealing materials. The slurry shall be applied in one continuous operation until the well is filled. The tremie pipe shall be submerged in the slurry at all times during slurry placement. Equipment used for pumping cement grout shall be of the diaphragm, piston, gear, or helical type. The CONTRACTOR shall be responsible for determining the amount of slurry required to plug the well. Appendix IV of the Michigan Water Well Construction and Pump Installation Code, Act 368, PA of 1978, Part 127, known as the Ground Water Quality Control Act and administrative rules, may be used as a guide.
- B. Cement slurries - Neat cement or concrete slurries shall be prepared by adding cement or sand-and-cement to the calculated required volume of clean water. The material shall be mixed in the mixing equipment until it is adequately mixed and free of lumps, then immediately pumped into the well without delay.
- C. Coarse grade or pelletized bentonite - Where coarse grade or pelletized bentonite is used, it shall be poured slowly into the top of the well to avoid bridging of material in the casing or borehole. Pellets or coarse bentonite shall be placed into the well by pouring at an even rate not to exceed five (5) minutes per fifty (50) pounds of materials. Fine bentonite particles which accumulate in the bottom of the shipping container shall not be used. A work pipe or weighted drop string shall be placed in the well and the height of accumulated plugging material measured after each 50 pounds of bentonite is placed in the well. If measurement indicates that bridging of plugging material has occurred, a work pipe, drill rods, or other weighted device shall be run into the casing to break the bridge. The plugging operation shall continue until the bentonite appears at the surface. Water shall then be placed into the casing to promote expansion of the bentonite above the static water level.

#### 4.7 WELL PIT ABANDONMENT

The CONTRACTOR shall upon completion of well plugging, abandon a well pit by filling with clean soil to the established grade level.

#### 4.8 SITE RESTORATION

The CONTRACTOR shall restore the site to a condition that reasonably approaches the original condition of the property prior to the start of work. After all trenches are backfilled with clean topsoil, the work area shall be graded to conform to existing ground contours.

Special site restoration activities deemed necessary by the DEPARTMENT will be specified in Schedule I.

#### 4.9 SITE CLEAN-UP

Upon completion of the work, the CONTRACTOR shall remove from the premises all materials, debris, tools, and machinery. Plugging material, grease, or other materials, which have accumulated on structures or around the premises, shall be removed. The CONTRACTOR may dispose of these materials, as appropriate, on site with permission of the property owner.

#### 4.10 FINAL BILLING

Upon completion of all work, the CONTRACTOR shall submit the following items to the DEPARTMENT.

1. Itemized bill for each well consistent with the items listed on the Itemized Bid Sheet.
2. Completed well abandonment records (completed on water well records form if replacement well(s) constructed).

The above items shall be mailed to the following address: