

LARGE DIAMETER ABANDONED WELLS – HAZARDS AND PLUGGING





**HEALTH AND
SAFETY
HAZARD**

**THREAT TO
GROUND WATER**

MICHIGAN PENAL CODE
SECTION 493b PUBLIC
SAFETY

750.493b Well or Cistern; abandoning or failing to keep safely covered or fenced; depth and width. Sec. 493b. Any person who shall knowingly abandon or fail to keep covered or fenced any well or cistern of a depth of 4 feet or more and with a top width of 12 inches or more on property owned or occupied by such person shall be guilty of a misdemeanor.

WHAT ARE LARGE DIAMETER ABANDONED WELLS?

- **CROCK WELLS - 18 to 48 INCH DIAM.**
- **BRICK WELLS - 2 to 12 FEET DIAM.**
- **STONE WELLS - 3 to 12 FEET DIAM.**
- **WINDMILL WELLS & ASSOC. PITS.**
- **TEST BORES.**
- **MONITORING WELL BORE HOLES**
- **CASED WELLS - 8 to 18 INCH DIAM.**
- **BORED OR BUCKET AUGER WELLS.**

**OLD "STONE" WELL - 10' DIAM.
30 FEET DEEP**

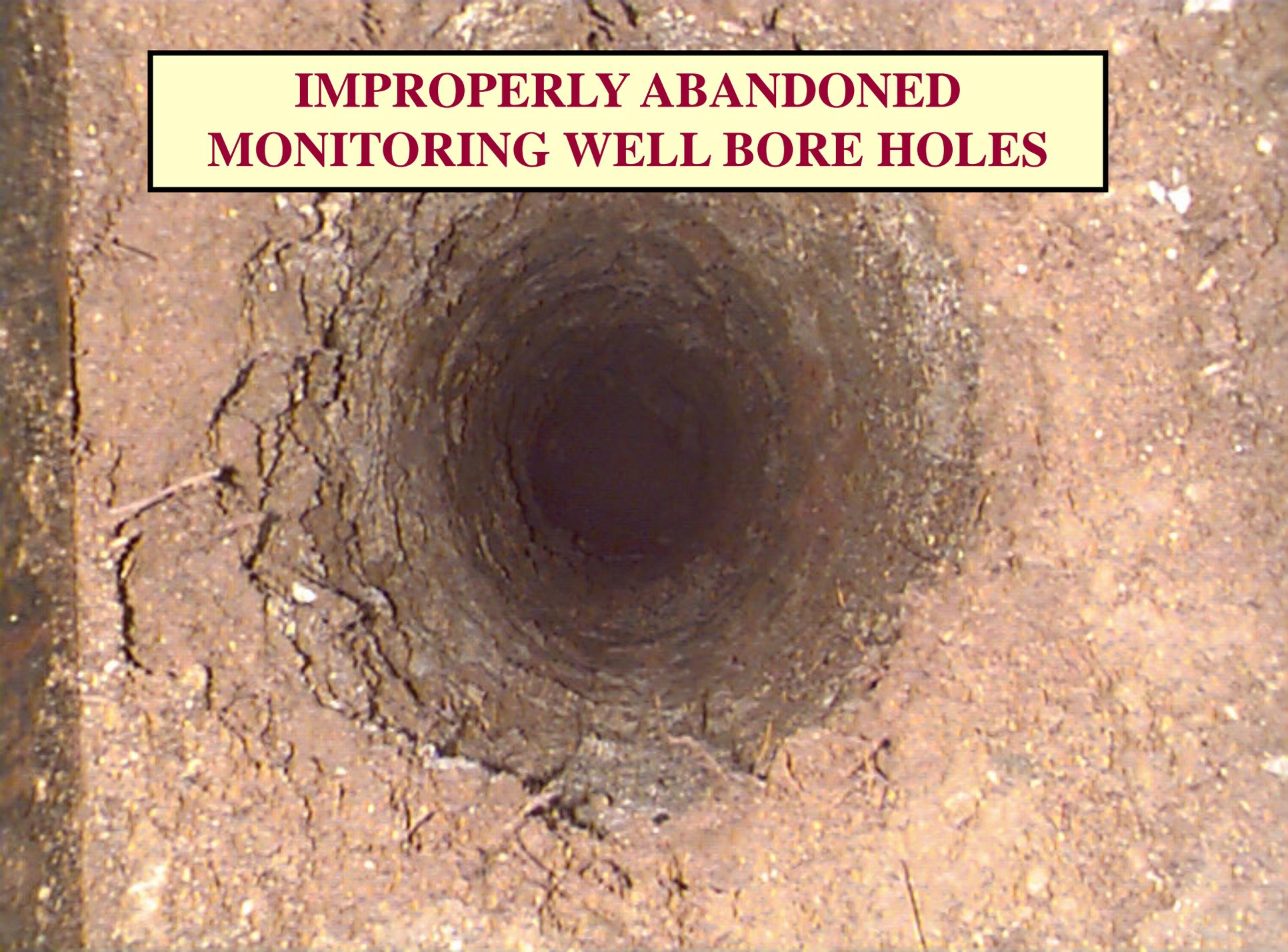


**4 FOOT DIAMETER “BRICK” WELL
ENLARGES TO 5-6 FEET DIAMETER, TEN
FEET BELOW GRADE**



**WATER VISIBLE
AT 20 FEET**

**IMPROPERLY ABANDONED
MONITORING WELL BORE HOLES**





**AT THIS SITE THE
PROPERTY OWNER ASKED
HIS WELL DRILLING
CONTRACTOR ...**

**“What should I do with
my old well?”**

**I DON'T WANT A
CHILD TO FALL IN
HERE.**



**AM I LIABLE FOR
CONTAMINATION
CAUSED BY THIS
WELL?**

HEALTH & SAFETY HAZARDS

- **MICROBIAL & CHEMICAL CONTAMINANTS FROM NEAR GROUND SURFACE GET INTO THE WELLS**
- **PEOPLE (USUALLY CHILDREN) ACCIDENTALLY FALL INTO THE WELLS**

**A Survey of the Quality of
Water Drawn from Domestic
Wells in Nine Midwest States**

**Centers for Disease Control and
Prevention National Center for
Environmental Health**

September 1998

Study Conducted in May - Nov. , 1994

- **Water samples were collected 1 year after flooding.
(Coliform bacteria, E. coli, Nitrate, and Atrazine)**
- **5520 Households with domestic wells sampled.**
- **Samples were collected at intersections of 10 mile grid lines (within 3 miles, over 9 states).**
- **Sanitary surveys were conducted on well to determine construction, isolation, and maintenance.**
- **Survey of residents conducted on the occurrence of diarrhea illnesses.**

Executive Summary

“Water Samples from households with bored or dug wells were 10 to 15 times more likely to contain Coliform bacteria or E. coli than were samples from households with drilled or driven wells.”

- **Coliform bacteria, E. coli, nitrate, and atrazine were found in many of the water samples collected from Midwestern households with a domestic well.**
- **Most of the water samples with these pollutants were drawn from dug or bored wells that were old and shallow and had large diameter brick or concrete casing.**
- **People relying on these types of wells for their drinking water should be informed that they are at increased risk to these pollutants.**

SAFETY HAZARDS



Accidents Reported in Michigan - Since February, 1997 -

- 13 year old falls into old windmill well pit.
- 2 year old falls into crock well.
- Two 10 year old girls fall into dug well, then mother also falls in trying to help.
- 4 year old girl falls into crock well.
- 3 year old boy snatched from brink of 18 inch x 30 foot deep abandoned monitoring well bore hole.

Genesee County Accident

- **13 year old boy falls into windmill well pit when deteriorated wooded cover collapses.**
- **Leg injury incurred.**
- **Mother contacts DEQ due to property owner's failure to correct problem.**
- **DEQ contacts property owner and requires abandonment of well & pit.**
- **Incident reported to Genesee County Health Department by DEQ.**
- **DEQ conducts site visit, but pit already plugged.**

This boy was injured when he fell into the well pit associated with this windmill.



The land owner refused to fill in the pit until DEQ became involved.

Washtenaw County

Neighbor helps rescue mom, toddler

NORTHVILLE TOWNSHIP — A woman who jumped into a well to save her 20-month-old toddler was rescued unharmed with the child by a neighbor who heard the mother's screams.

Officials credited Dianne Burkhardt with pulling Kefei Gong and toddler Calvin from the 8-foot-deep well about 11:20 a.m. Monday outside the mother's apartment before firefighters arrived.

"The neighbor is a big part of the success story," said Bill Zhmendak, fire chief in Northville Township.

Zhmendak said Gong "just turned her head for a second, and (her son) disappeared." The mother searched, looked down the well and spotted the boy's feet sticking from the water. She jumped in after him, then began screaming.

- **Two children playing in backyard.**
- **2 year old Calvin falls through deteriorated well cover, head first into water.**
- **Mother searches for missing son and finds him in the well.**
- **Mother jumps into well to keep child from drowning.**

Washtenaw County Accident

- **Neighbor calls 911.**
- **Neighbor extracts mother and son from well before rescue team arrives.**
- **Accident reported to Washtenaw County Health Department who reports it to DEQ.**
- **Crock well still in use, cover replaced.**

LENAWEE COUNTY

- Two 10 year old girls fall into crock well while playing.
- One is able to climb out and warn her mother.
- Mother falls into well, but is able to brace herself & child.
- 1st child (frantic) calls 911.
- Rescue team arrives on time to prevent hypothermia.

Saved from the well 07/17



Daily Telegram/John F. Elbers II

Shina Feko, 35, and friend Kevin Grayer look over a 25-foot-deep well that Feko and two 10-year-old children fell into about 4 p.m. Tuesday afternoon. One of the children was able to climb out, but Feko and the other child had to be rescued by Palmyra Township firefighters.

Woman, 2 girls narrowly escape tragedy after falling into old well

By ROGER A. FERGUSON
Daily Telegram Staff Writer

PALMYRA TWP. — A Palmyra Township woman and her daughter's 10-year-old friend were rescued Tuesday afternoon by township firefighters after they had fallen into a 25-foot-deep well.

Shina Feko, 35, said this morning that it was by the grace of God that she and Jennifer Mehan survived long enough for rescuers to pull them out of the well, located at 5692 Deerfield Rd.

"We didn't know if we were going to be able to hang on," Feko said.

According to Feko's account, Mehan and Clara Feko, 10, were playing outside and were walking across the well's cement cover at about 4 p.m. when it collapsed.

"It just crumbled," Feko said. "(The girls) said they could feel the ground giving way and they just went in."

Mehan fell completely into the ground-level well, splashing into the water about five feet from the Earth's surface. Clara Feko fell too, but managed to grab the edge of the circular well cap and pull herself out.

Shina Feko was preparing dinner when she said her daughter ran to the house and told her what had happened. Telling her daughter to call 911, the mother then ran out to the well to help Mehan.

"If (my daughter) wouldn't have been able to get out I never would have heard them," Feko said. She said she heard a

scream when the girls fell but thought they were just playing.

Upon her arrival at the well, Feko said her footing gave way and she fell into the cold water also, but missed hitting Mehan. Although the two of them were unable to get out, Feko was able to brace herself and hold the two of them in one spot.

"There is something, a little tab, I don't know what it was but you could put your foot on it," she said.

In the meantime, her daughter had called 911 and was standing by the well with a cordless telephone.

"She was out there just pulling her hair and screaming and giving them directions ... the dispatch talked to her the whole time," Feko said speaking of her daughter. "My daughter's pulling her hair out saying don't let us die."

When Palmyra Township fire captain Derek Ery and rescuer Paul Rohlan arrived, Feko said she and Mehan were able to reach up and meet their rescuers' hands, who pulled them out one at a time — Mehan first as Feko pushed the girl from underneath.

"Both of us were drenched," Feko said, adding that the water was frigid and their feet were burning.

Feko and Mehan were transported to Bixby Medical Center but were allowed to leave shortly thereafter with no signs of hypothermia.

"We're just sore, but we're fine, thank God," Feko said. Both girls attended school today.

"We have a lot of faith. That's what I told my daughter, 'You never lose your faith' ... I told them both that God had better plans for us, there's no doubt about that," Feko said.

Even with her faith, Feko said, she'd never been so scared in her life and surviving has never made her feel so blessed. Feko said she was searching this morning for someone who could recover the well, which is four feet in diameter, though she is unsure of the purpose of the well.

Government assistance is available to help homeowners and farmers to close unused wells which present a groundwater contamination threat as well as a safety hazard, said Brian Elbert of the Lenawee Cooperative Extension Program.

An AmeriCorps volunteer who worked in his office last year when the program began was involved in closing 34 wells of various types, he said.

Following proper closing techniques can be costly, he said, but the program offers a 75 percent reimbursement of property owners' costs.

Well closure grants are still available this year, said Elbert. Information on the program is available by contacting the Natural Resources Conservation Services office in Lenawee at 265-5887.

Midland County

- Two sisters playing with stray cat after church, in their backyard.
- **4 year old sister Jennifer climbs on wooden crock well cover.**
- Cover collapses & she falls into the water (later found to be 7-8 feet deep).
- **2 year old sister Emily runs to house and kicks door crying “Jennifer-water”!**
- Jennifer, now in the well, in the water, clings to a pipe.

‘A miracle’

4-year-old falls into well, is rescued by dad

By CHERYL WADE
of the Daily News

A 4-year-old Larkin Township girl is doing fine today after she fell into an abandoned water well Sunday and was rescued by her father.

The girl, Jennifer VerWay, keeps telling her mother Brenda VerWay that God protected her.

Jennifer and her 2-year-old sister, Emily, were playing outside in their Sunday dresses after coming home from church, Brenda said. Brenda's husband, Michael VerWay, is youth pastor at Calvary Baptist Church. The family lives on North Waldo Road.

Brenda said “the two girls probably were chasing a stray cat when they came upon the abandoned well shaft. The circular hole was covered with a piece of plywood with two metal straps across it, Brenda said. But when Jennifer decided to climb on top of it, the rotted wood broke.

“As soon as she stood on it, she flew right through,” Brenda said.

Brenda didn't know it at the time, but she later learned the hole had 7 or 8 feet of water in it. After Emily gave her house (See “Well,” page A2)

Midland County Accident

- **Heroic father is suspended hanging by his ankles down into the well, supported by his wife (head and arms downward) to reach his daughter.**
- **4 year old Jennifer saved.**
- **Incident reported to Midland County Health Department, who reports incident to DEQ.**
- **Father has old crock well plugged.**
- **Incident inspires DEQ press release.**

Lapeer County Incident

- While looking for a Christmas tree on their property, a family including a 3 year old boy approaches a 18” diameter, 25+ foot deep open well bore hole.
- **Father grabs 3 year old son before he falls into hole.**
- Incident reported to DEQ by boy’s mother.
- **DEQ coordinates immediate securing/plugging of this “plugged” monitoring well bore hole.**
- Incident appears related to settling of bentonite.

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Crews find boy's body after 30 hours in well

By Kevin Gray
Associated Press

BUENOS AIRES, Argentina — A 5-year-old boy trapped for more than 30 hours in an abandoned well was found dead Friday by searchers working with mini-cameras and heavy equipment.

Covered in a blanket, Cristian Quiroz's body was whisked into a caravan of three ambulances and rushed to a local hospital in San Nicolas, a city about 140 miles north of the Argentine capital.

"Unfortunately, Cristian is dead," said San Nicolas Mayor Jose Corral, moments after the ambulance took the body away.

Quiroz plunged down the 59-foot well shaft while out for a walk Thursday with his mother.

"We were walking, we heard a

shout, we turned around and saw Cristian had disappeared," the boy's aunt, Eva Quiroz, said.

"We heard crying and we realized he had fallen in."

Working through clumps of mud and rock, and tunneling to where the boy was located in the shaft, the rescue effort was captured by a small camera attached to the rescuer's head.

The boy could not be seen moving and was covered in dirt.

Relatives said the boy had cried at the outset of his ordeal and was consoled by his mother; but after whimpering for about three hours, he fell silent.

Construction crews worked through the night, digging a second tunnel alongside the well. They dug a passageway between the two tunnels to reach the trapped boy.

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Feko and Mehan were transported to Bixby Medical Center but were allowed to leave shortly thereafter with no signs of hypothermia.

When closure grants are submitted this year, said Ehler. Information on the program is available by contacting the Natural Resources Conservation Services office in Lenawee at 265-5887.

DEQ PRESS RELEASE

Jan. 8, 1999

DEQ Urges Property Owners To Plug Abandoned Wells

The Department of Environmental Quality (DEQ) advises property owners to inspect their properties for abandoned dug or bored water wells, and to prevent a tragedy by properly plugging them.

According to DEQ, if the dug well, also known as a “crock well” is in service, its cover should be inspected to ensure that it is structurally sound.

“Unplugged or poorly covered wells are accidents waiting to happen,” DEQ Director Russell Harding said. They also pose an unnecessary liability for property owners. By taking responsible action, landowners can prevent needless misery for themselves and their neighbors.”

DEQ recommends replacing deteriorated or wood covers with covers made out of steel-reinforced concrete or a steel plate at least 3/4 inch thick.

**PROBING OPEN BORE HOLE TO
DETERMINE HOW FAR BENTONITE
GROUT HAD SLUMPED**



TEMPORARY STEEL PLATE

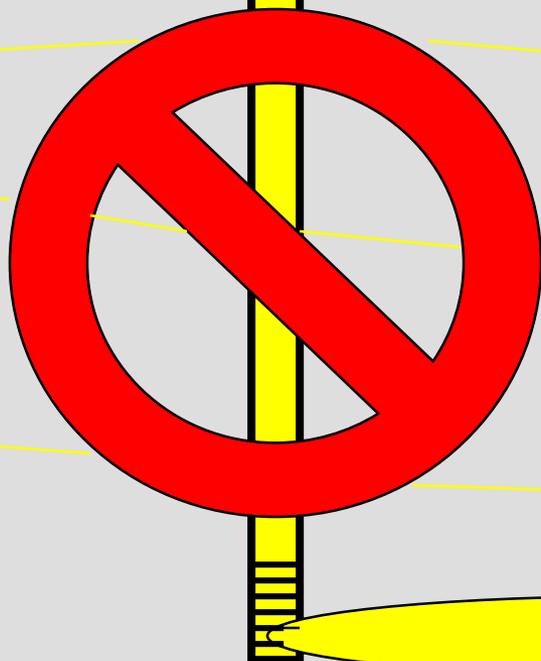
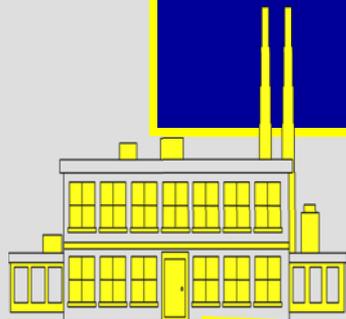
Deep Uncased Bore Holes and Dug Wells

Where deep, large diameter abandoned dug wells or uncased bore holes are to be plugged, we recommend that neat cement or concrete grout, rather than bentonite be used, in layers, in combination with layers of clean fill. This will result in a more stable plugging job and will help to prevent future down-hole slumping of the fill and grout material.

PLUGGING LARGE DIAMETER DUG OR CROCK WELLS



WELL ABANDONMENT REGULATIONS



Part 127
ACT 368 PA 1978

**GROUNDWATER QUALITY
CONTROL RULES**

**MEASURE WELL
DEPTH AND
DIAMETER TO
CALCULATE
AMOUNT OF
BENTONITE AND
FILL NEEDED.**





**ASSEMBLE
MATERIALS
ON SITE**

RULES

R 325.1665 Rule 165. (a)

- **DUG AND CROCK WELLS**
- **6 INCH BENTONITE LAYER SHALL BE PLACED AT THE BOTTOM OF THE WELL.**
- **REMAINDER OF WELL SHALL BE PLUGGED BY PLACING CLEAN SOIL BACKFILL LAYERS THAT ARE NOT MORE THAN 10 FEET THICK.**

**POUR 6 INCH
LAYER OF
CHIPPED OR
PELLETIZED
BENTONITE
IN BOTTOM
OF WELL.**



RULES

R 325.1665 Rule 165. (a)

- **DUG AND CROCK WELLS**
- **BENTONITE LAYERS AT LEAST 6 INCHES THICK SHALL BE PLACED ON TOP OF EACH CLEAN SOIL LAYER.**
- **DRY GRANULAR BENTONITE MAY BE USED IN PLACE OF OR IN COMBINATION WITH BENTONITE CHIPS, PELLETS, AND NEAT CEMENT OR CONCRETE GROUT IF THE WELL HAS BEEN DEWATERED OR IN THE DRY PORTION OF THE WELL.**



**PLACE
CLEAN FILL
LAYER NOT
MORE THAN
10 FEET
THICK.**

**6 INCH
LAYERS OF
GRANULAR,
CHIPPED, OR
PELLETIZED
BENTONITE
MAY BE
USED IN THE
DRY
PORTION OF
THE WELL.**





**6 INCH LAYER OF
GRANULAR,
CHIPPED, OR
PELLETIZED
BENTONITE TO
BE PLACED
BEFORE
BACKFILLING UP
TO FINISH
GRADE.**

RULES

R 325.1665 Rule 165. (b)

- **DUG AND CROCK WELLS**
- **THE UPPER SECTION OF CROCK OR THE UPPER 3 FEET OF BRICK, CEMENT, OR STONE CURBING THAT SUPPORTS THE BORE HOLE SHALL BE REMOVED.**
- **BEFORE BACKFILLING, A LAYER OF BENTONITE CHIPS OR PELLETS NOT LESS THAN 6 INCHES THICK SHALL BE PLACED.**

**BREAK UP TOP
3 TO 4 FEET OF
“CURBING.”**

**CROWN
BACKFILL
OVER HOLE.**



RULES

R 325.1663 Rule 163. (b)

- **DUG AND CROCK WELLS IN BEDROCK**
- **A SECTION OF A WELL OR DRY HOLE THAT IS IN BEDROCK SHALL BE PLUGGED BY FILLING WITH NEAT CEMENT OR CONCRETE GROUT FROM THE BOTTOM OF THE WELL TO NOT LESS THAN 20 FEET ABOVE THE TOP OF THE BEDROCK OR TO THE GROUND SURFACE.**

PLUGGING ABANDONED DUG OR CROCK WELLS IN BEDROCK

**USE NEAT
CEMENT OR
CONCRETE IN
NEAR-SURFACE
BEDROCK
SITUATIONS**



