Title:	**Flowing Holes and Encountering Gas**
Number:	**ED2006-17**
Program Name:	**Operations**
Effective Date:	**Nov 8, 2006**
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Background

Occasionally an aquifer or stratum releases water that comes to the ground surface or flows. This may occur during or after a shot hole or test hole is drilled (i.e., flowing holes). The program licensee and program permittee, under Section 46(1) and 47 of the *Exploration Regulation* (*AR 284/2006*) as defined in Sections 1(ee) and 1(ff) of the *Exploration Regulation*, must follow pre-established procedures when this occurs.

Requirements

1. When water is released from a stratum or aquifer and rises to the surface of a shot hole or test hole while drilling, the program licensee or program permittee for the approved exploration program must immediately discontinue the drilling and ensure no explosive charge is loaded in the shot hole.

2. When aquifer or stratum releases water that comes to the ground surface or flows from a shot hole or test hole, the water must be contained to the aquifer or stratum of origin as described in the procedures section of this directive.

3. For commenced operations, when water is released from a shot hole or test hole, step drilling procedures must be implemented before successive shot holes or test hole drilling is continued.

4. When a shot hole becomes a flowing hole before a charge is detonated, the charge is to be shot. This is due to the danger of detonating the charge while attempting to confine the flow to the aquifer or stratum of origin.

5. The program licensee or program permittee must immediately submit a flowing hole report, which can be viewed or downloaded from the AER website at aer.ca, for each flowing shot hole or test hole that is encountered for any approved exploration programs. The report can be e-mailed to exploration@aer.ca, or mailed to the Alberta Energy Regulator (AER) at the address identified in the contact section of this directive.

6. The program licensee or program permittee must immediately submit a flowing hole report, which can be viewed or downloaded from the AER website at aer.ca, for each shot hole or test hole that encounters gas for any approved exploration programs. The report can be e-mailed to

exploration@aer.ca, or mailed to the AER at the address identified in the contact section of this directive.

Procedure

Containment of Released Water or Water Rises to the Ground Surface

1. For commenced programs, immediately discontinue drilling the shot hole or test hole.

2. For commenced or completed programs, contain the water from the shot hole or test hole to the aquifer of origin as quickly as possible using one of the following methods:

   a. Use of inflatable plugging device and bentonite:

      - Remove bentonite and approved hole plug (plastic) from hole.
      - Sound shot hole or test hole to bottom to establish the depth and check for bridging of hole (sand and gravel).
      - Insert inflatable plugging device to the bottom (total depth) of the hole.
      - Inflate and check for effect on flow rate of water.
      - If flow rate does not cease, deflate plugging device and raise it 1 m up the shot hole or test hole and re-inflate.
      - Continue process in this manner until flow is stopped.
      - Remove the inflation pipe form the hole.
      - Install bentonite chips or pellets from the top of the inflatable plug to within 1 m of the surface.
      - Install approved hole plug (plastic) and abandon the shot hole or test hole as per Section 51 of the *Exploration Regulation* and it associated directive (ED 2006-20).
      - Record the GPS location of the shot hole or hole and any information (if available) from a permit tag next to the hole.
      - Remove all equipment, surplus materials and waste from the site.

   b. Pressure cement the shot hole or test hole from bottom to within 1 meter of the surface and abandon as per Section 51 of the *Exploration Regulation* and its associated directive (ED 2006-20); **or**

   c. Reverse auger bentonite into the shot hole or test hole from bottom to top; **or**

   d. Contact the AER for approval to use any other method to contain water that is released or comes to the surface of a shot hole or test hole.

Note: The method, material and equipment used to contain the flow of water or gas to the aquifer or stratum from which it was released depends on variables such as (but not limited to) geology, flow rate, hole and ground surface condition.

Step Drilling / Commenced Programs

Drilling must be discontinued immediately if water is observed and/or the shot hole or test hole starts to flow at the surface. The water must then be confined to the aquifer or stratum of origin using the above procedure (Containment of Released Water or Water Rises to the Ground Surface). The "step up–step down" process described below **must** then be implemented.

1. Regardless of whether the next shot hole or test hole to be drilled in the program is part of a multi-hole pattern or the next hole in a sequence the following step must be taken:
    - If the depth at which the water was encountered in the flowing hole is known, the maximum depth of the next shot hole or test hole must be 3 m **less** than that point of encounter; **or**
    - The maximum depth of the next shot hole or test hole must be 3 m **less** than the drilled depth of the flowing hole.

2. If water is again observed, the water must be confined to the aquifer or stratum of origin using the procedure identified above (Containment of Released Water or Water Rises to the Ground Surface). As well, the drilling depth of the subsequent shot hole or test hole in the program must be "stepped up" by 3 m. Continue this process as long as water is observed.

3. Once water is no longer observed, the same drilling depth must be maintained for the next shot holes or test holes in the sequence for a minimum of 200 m. Beyond this distance, the drilling can be "stepped down" by 3 m at the next hole. If no water is observed, the following shot hole or test hole can be "stepped down" by another 3 m. This pattern must be followed until the original proposed drilling depth is reached.

4. If water is observed at any point, the drilling must again be "stepped up" by 3 m, as described above.

Flowing Hole Report

The **flowing hole report**, which can be viewed or downloaded from the AER website at aer.ca, is to be used to report any/ all releases of water and/or gas from a commenced or complete program. The form must be submitted to the AER.

Other

Converting Flowing Hole to Water Well

A flowing shot hole or flowing test hole remains a shot hole or test hole as defined in the *Exploration Regulation* until the flow of water in the hole is confined and contained in accordance with the above procedure. The above procedure does not apply if the flow of water from a shot hole or test hole is confined and contained by the completion and operation of the flowing hole (shot hole or test hole) as a water well in accordance with the *Water (Ministerial) Regulation (AR 205/98)*. If a flowing hole is to be converted to a water well, contact Environment and Sustainable Resource Development.

Damage by a Third Party

If the shot hole(s) or test hole(s) complies with Section 46 and/or Section 47 of the *Exploration Regulation*, and the plugging is intentionally damaged or destroyed (unless through construction or upgrading of a highway or public road), the **responsible party** must repair the damage or replug the hole. This is in accordance with directions from the AER, as per Section 53 of the *Exploration Regulation*.

Enforcement/Compliance

Enforcement policy and procedures are currently under review and this directive will be updated accordingly.

Contact Information

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Authorities

Mines and Minerals Act (Part 8) and Exploration Regulation (AR 284/2006)

Approved

Original signed by

Kem Singh
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