CASE STUDY
September 2013

Using Above-Ground Sumps for Air Drilling

Capturing and managing the water and mud discharged from cyclones and outside return hoses during air drilling is particularly important given current environmental conditions on Exploration Licences. Capturing the water and mud greatly reduces the visual impact of drilling, wetting of the ground around the rig (and subsequent disturbance), and rehabilitation time and cost. These measures can make drilling safer, cause less surface disturbance and are more acceptable to landholders.

UNITY Mining Limited

Background

One of the prospects where Dargues Gold Mine (DGM) conducted reverse circulation (RC) drilling was on prime grazing land. The landholder had invested considerable time and money to grow high quality pasture for his stock and the last thing he wanted was damage caused by exploration. The drilling program plan also anticipated intersecting water in the holes. The program had to be managed to minimise the impact of the water, contained rock fragments and mud on the pasture, as well as generation of muddy conditions around the rig. DGM therefore had to undertake the drilling program with minimal disturbance in this difficult and sensitive area.

The Solution

One of the measures to minimise surface disturbance was to capture the water discharged from the cyclone and outside return hoses in an above-ground sump. As well as minimising disturbance, by containing the water the drill site stayed drier, more comfortable and safer.

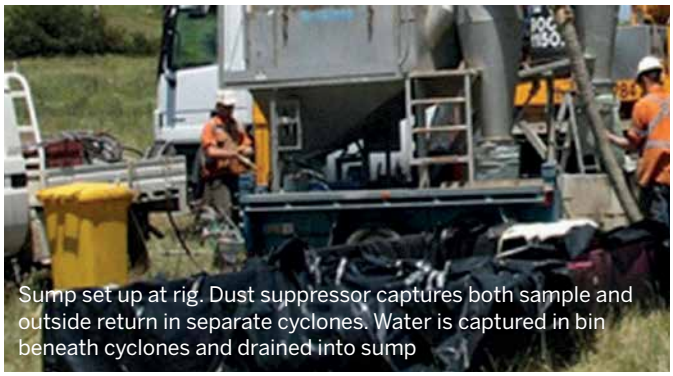
The other integral measure was the use of a dust suppression system to capture both the sample and outside return material. The dust suppressor had two cyclones, one for the sample and the other for the outside return. The unit had a bin beneath the cyclones to capture the water and drain it into the above ground sumps.

Above-Ground Sumps

Above ground sumps can be made by forming a dam of hay bales or using a collapsible frame of 'form ply' and lining the structure with plastic.DGM uses form-ply sumps that can be used over and over again. This frame was affordable and easy to make, easily handled by one person, portable and allowed for quick clean-up upon completion of the hole. The above-ground drill sump system had the following components:

- Four 20mm thick plywood side panels approximately 600mm high (sheet of 'form-ply' cut in half lengthwise
- The side panels joined at each corner with detachable fittings or hinges. Two methods of joining the panels are:
  - Each panel can be fitted with four steel rings at the end of sufficient diameter to allow a star picket to be passed through or
  - Heavy duty gate hinges, which can come apart on 2 corners and lever over latches on the other 2 corners DGM has used both systems, and both work equally well.
- Notches of sufficient size to accommodate a 150mm PVC pipe were cut into the top edge of the end panels
- Rolls of plastic of sufficient width to allow the sump to be lined
- A cable drive pump or syphon.

The sumps were assembled by joining the edges of two panels, passing a star picket through all four steel rings and driving it into the ground or inserting pins in hinges and securing the latches. This process was repeated to form a rectangular sump. The sump was then lined using plastic and the edges of the plastic held in place with clamps as required. The overflow pipe from the


Sump set up at rig. Dust suppressor captures both sample and outside return in separate cyclones. Water is captured in bin beneath cyclones and drained into sump


Drill site on completion of hole showing minimal impact and sump liner drying out


Form-ply sump showing hinges


Form-ply sump showing latches

dust suppression unit or cyclone and outside return hose were then directed into the sump. The outside return hose had to be restrained to prevent injury in the event of sudden movement.

Once the sump was full or near capacity and the water was sufficiently clear, it could be pumped or syphoned away from the work area if of suitable quality. If the water is not of suitable quality it should be retained until the sediment has settled or, if saline, should be disposed of at a suitable location. Criteria for releasing water, suitable disposal locations and the availability of required equipment (extra sump-building material and access to vacuum truck or similar) should be determined well in advance of the drill program and included in the Review of Environmental Factors prepared for the program. If in doubt about water quality, do not discharge until it has been tested.

In DGM's case, the water could be syphoned away down slope of the drill site. Every situation is different, but only clean water may be discharged onto the ground. If the volume of water intersected required greater settling time than could be achieved using a single sump, a second (or more) sump(s) could be setup in series.

Once the drill hole was complete, the sump was emptied of water and the sides removed. The remaining sediment was then left to dry, bagged and removed from site. The plastic liner could have been reused if undamaged, otherwise disposed of appropriately. The plastic liner was only left on the ground for a couple of days to reduce damage to the grass underneath.
If the sediment was not dry it was bagged up wet or disposed of down the drill hole.

Containing the water in the sumps greatly reduced the wetting of the ground around the rig, disturbance to the ground by drillers walking in mud, visual scarring from rock fragment laden water flowing over the ground and overall drill pad rehabilitation times.

Once the program was complete, the landholder was happy with the minimal amount of disturbance to his pasture, a positive outcome for both parties.