

Memorandum

Surface Water Runoff Event – Surface Exploration Drilling

To: [REDACTED] (NIEA)

From: [REDACTED] (DGL)

Date: 12 February 2015

This memorandum summarises environmental management details associated with a surface water runoff event on Friday 5 February 2016 at the existing Dalradian Gold Limited (DGL) surface drilling exploration program near Gortin, County Tyrone. The current surface drilling program is permitted under Part 16 of the Planning (General Development) Order 2015, and is taking place to the south southeast of the DGL advanced exploration infrastructure site. At present the permitted four month drilling program, which has been implemented to support an on-going Feasibility Study and Environmental Impact Assessment for full mine development at Curraghinalt, is coming to an end and all rigs will have stopped drilling by 17 February 2016. Drill rigs are currently leaving site and the work has been transitioning into the restoration phase.

Included below is a sequence of events covering observations and actions undertaken on and since 5 February (up to and including 10 February), laboratory derived Total Suspended Solids (TSS) results from relevant water courses during this timeline, and a summary of findings and associated learnings by DGL.

Sequence of events

Approximate timing	Observations and Associated Actions – Incident
Friday 5th	
10:50	Member of DGL staff notified environmental team, Shane Feehan (SF), that Curraghinalt Burn was visibly discoloured following a heavy rainfall event.
11:10	SF arrives on site and meets with Denise Turner (DT) of the Northern Ireland Environment Agency (NIEA), who is already present on a routine inspection. DT also informs SF that runoff from the drilling program area is entering the burn at several points.
11:15	DT took a water sample at Attagh Bridge on the Curraghinalt Burn downstream of the drilling operations. SF commences inspection of DGL drilling operations and implements a stop notice on all drilling related traffic

	in relevant areas.
11:25	DT takes a water sample from the Curraghinalt Burn upstream of DGL drilling activities.
11:40	SF takes water sample at Attagh Bridge. SF speaks to DT to inform that Curraghinalt Burn is starting to run clear (one hour after first noticed). DT passes a duplicate of both NIEA samples to SF. SF informs DGL management team of events.
12:00 – 12:10	A member of DGL environmental team, Keith O’Flynn (KO’F), takes water samples from the receiving water course (Owenkillew River) both upstream and downstream of the confluence with Curraghinalt Burn.

Approximate timing	Preventative action
Friday 5th	
13:00	SF identifies blocked drain adjacent to the track which is used to access some drilling pad sites. It is considered that the drain became blocked during on-going demobilization and rehabilitation activities and was no longer able to divert runoff from the track (exposed ground). SF arranges for unblocking of drain (Photo 1), and further action plan is formulated to mitigate against any potential re-occurrence of incident.
14:00 – 16:00	SF commences preventative measures action plan by instructing excavator and dumper to remove any loose materials from access track. SF also orders hay bales to augment existing silt control measures in place at the surface drilling program site.
15:00	Hay bales arrive and are placed in all identified ditches leading from drill program site to slow any drainage leaving the site and support settlement of solids.
19:00	Full traffic ban lifted to allow a restricted traffic flow only. No heavy vehicles allowed.
Saturday 6th	
07:00	Restricted traffic flow to drilling program continued. No heavy vehicles allowed.
13:00	Contractor mobilized to install temporary sumps in ditches leading from drill program site (see Photo 2). As a temporary measure Drinking Water Inspectorate approved floc blocks are positioned prior to sumps. Hay bales located after sumps for final solids removal.
Sunday 7th	
07:00	Restricted traffic flow continued. No heavy vehicles allowed.
12:00	Improvements made to temporary sumps.
Monday 8th	
07:00	Restricted traffic flow continued. No heavy vehicle allowed.
09:00	Further improvements made to temporary sumps to help ensure no re-occurrence.
10:00	Cut off trenches installed across access track to disperse rainfall to vegetated land.
16:00	Met office issue yellow warning for rainfall. Full traffic ban implemented.

Tuesday 9th	
11:00	Work commenced to fully upgrade surface of existing access track with geotextile cover and fresh gravel (see Photo 3) to minimize the amount of exposed ground ¹ . Plan includes for resurfacing approximately 450m of track (marked blue on Figure 1) to be completed by 13 February.
12:30	Full traffic ban reduced to restricted traffic flow only. No heavy vehicles allowed.
Wednesday 10th	
07:00	Restricted traffic flow lifted to light vehicles only. Exception made for vehicles undertaking track improvements.
09:00	Continuation of track improvements.
11:00	DT revisits exploration drilling site for inspection. Conditions understood to be satisfactory.

Total Suspended Solids (TSS) Monitoring Results

During the above sequence of events, DGL have collected and tested surface water samples for total suspended solids. Relevant laboratory certificates are attached. Sample results are presented below, together with locations referenced (Figure 1). It is understood that the NIEA also have separate analysis of the initial samples collected on 5 February.

Date and time	Curraghinalt Burn upstream of surface drilling program	Curraghinalt Burn downstream of surface drilling program at Attagh Bridge (SW02)	Owenkillev River upstream of confluence with Curraghinalt Burn (SW05)	Owenkillev River downstream of confluence with Curraghinalt Burn (SW06)
5 Feb., 11:15 to 11:25	<10*	157*		
5 Feb., 11:40 to 12:10		53 [#]	<10	10
8 Feb., 9:00		3.6 [#]		
8 Feb., 16:30		18.0 [#]		
9 Feb., 15:00		<3.0 [#]		
10 Feb., 16:30		<3.0 [#]		
11 Feb., 15:45		8.0 [#]		

NOTES:

* Duplicates of NIEA samples sent by DGL to Jones Environmental Laboratory

[#] Analysis undertaken by DGL using in-house filtering equipment and drying oven, and following standard operating procedure.

SW05 – Immediately upstream of the confluence of Curraghinalt Burn and the Owenkillev River

SW06 – Immediately downstream of the confluence of the Curraghinalt Burn and the Owenkillev River.

¹ PPG5 October 2007. Pollution Prevention Guidelines. Works and maintenance in or near water: PPG5.

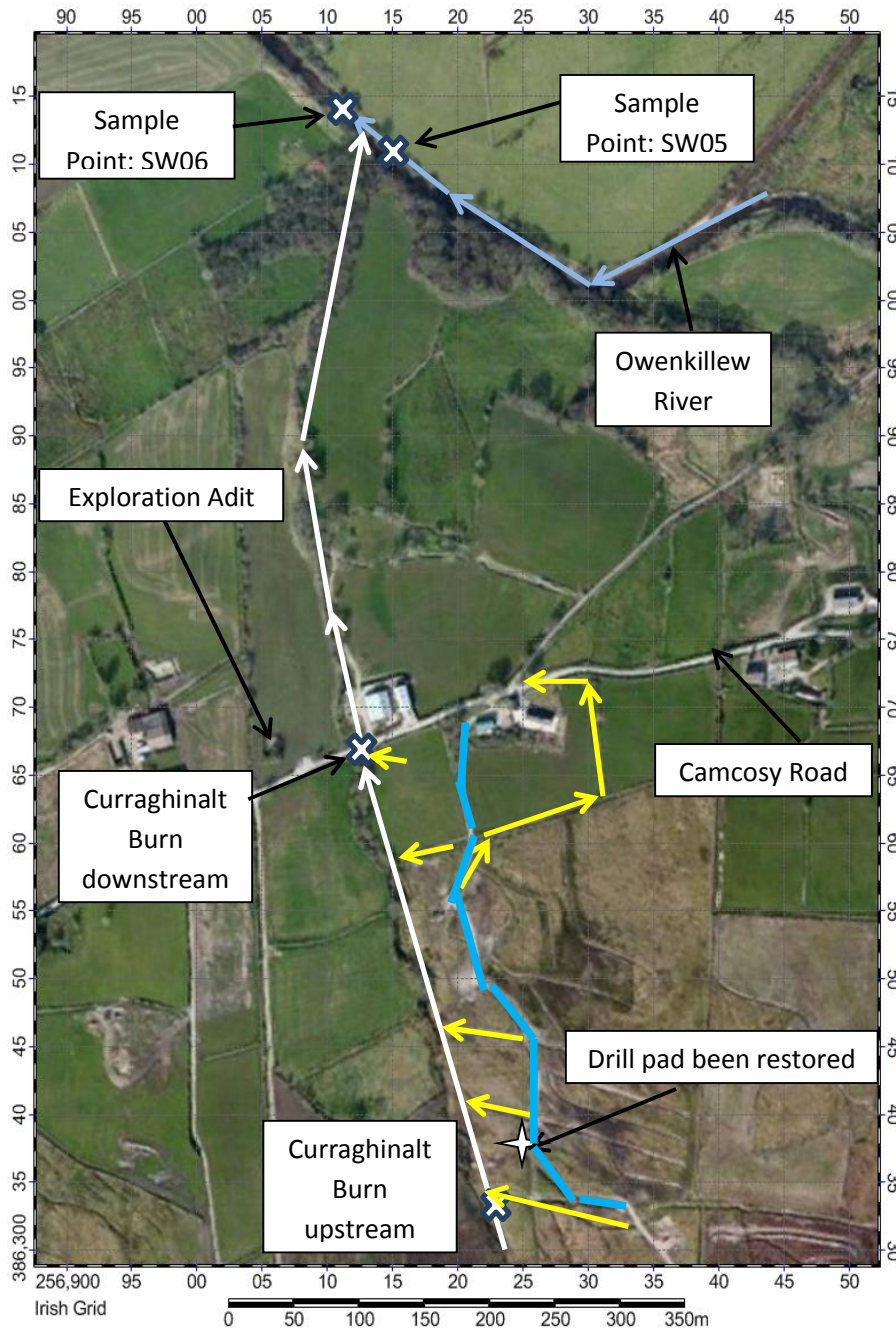
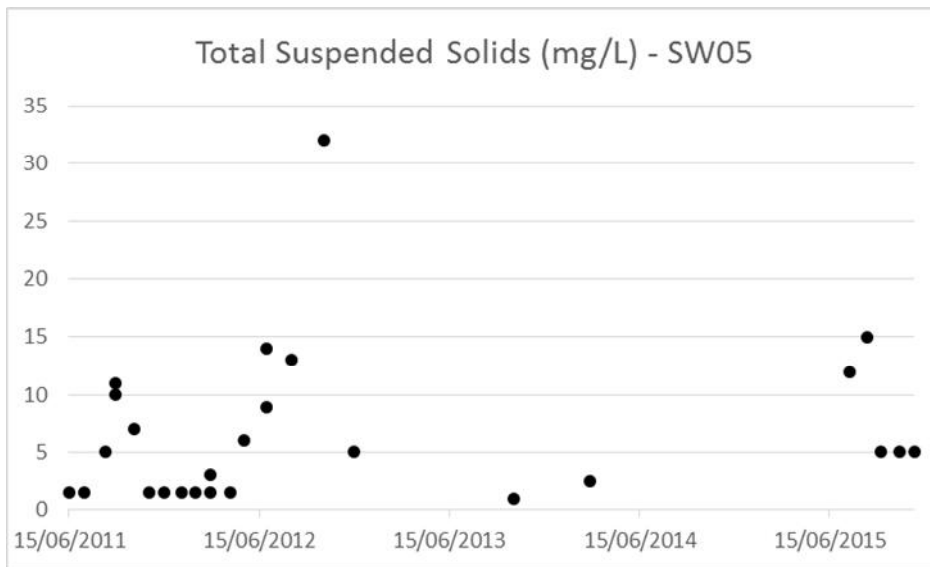


Figure 1: Site map (Bing Maps) showing surface water sample locations. Potential drainage channels from surface drilling program site are highlighted in yellow.

Historically, the UK environmental standard and condition followed for suspended solids has been set by the Freshwater Fish Directive, giving a guideline standard of an annual mean of 25 mg/L. If the concentrations observed between 8 and 11 February in Curraghinalt Burn are taken to be a typical background (average 7.12 mg/L) for the week, and a concentration of 105 mg/L (average between 157 mg/L and 53 mg/L measured on 5 February) is assumed to have occurred for two hours during the incident, this would equate to a weekly average concentration of less than 8.5 mg/L. Taken as a whole, it is considered that the incident will have no material consequence to Curraghinalt Burn achieving an annual mean 25 mg/L standard for suspended solids.

DGL have also been carrying out environmental baseline monitoring in the catchment as a whole, and have been developing an understanding of baseline conditions with respect to surface water quality. Our total suspended solids data for the Owenkillew River from location SW05 is presented as a function of time on the graph below. It can be observed that suspended solids loading in the Owenkillew upstream of DGL operations fluctuate, and that they can readily exceed values of greater than 10 mg/L. Therefore, the measured suspended solids concentration in the Owenkillew directly following the incident fits entirely within the range of background conditions. There is considered to have been no discernible impact upon the Owenkillew River.



NB: Values below detection limit have been graphed as half the detection limit

Summary of findings and learnings

- Suspended solids loading in Curraghinalt Burn reached visible levels for a short period of time on Friday 5 February. Indications are that this period approximated 1 hour;
- Weight of traffic during initial demobilization and rehabilitation of the current DGL surface drilling program at Curraghinalt has been judged to have contributed to the measured spot suspended solids loading in Curraghinalt Burn during this time. In addition, a man made drain became blocked during demobilization and diverted runoff over exposed ground;

- The elevated suspended solids loading in the burn dissipated quickly and naturally following cessation of a heavy rainfall event on Friday morning;
- The suspended solids concentration in the receiving water course, Owenkillew River, at the time of the incident was not elevated above historical baseline conditions;
- DGL have since been implementing a preventative active plan to ensure no reoccurrence. This plan has include resurfacing approximately 450m of track (with geotextile and fresh clean stone cover) and additional drainage improvements, together with the use of further temporary silt control enhance measures (e.g. sumps and bales). These temporary measures will be removed as the drilling program is full demobilized over the coming days; and
- Operations continue to be carefully monitored and will not be progressed during periods of heavy rainfall. If necessary, DGL will discuss an extension to the 28 days restoration period stated in the Planning (General Development) Order 2015 with the planning authority to ensure protection of the water environment.

Photo 1: Unblocked drain



**Photo 2:
Temporary
sumps**



**Photo 3:
Resurfaced
Track**

