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# BLACKHAWK ENGINEERING, INC.

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To: Dave Shaver/Gary Gray  
 From: Dan Guy  
 Subject: Wildcat Loadout Storms  
 Date: August 20, 2007

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 OGM PRICE FIELD OFFICE

*J. Gray JK*  
 C/007/0033

Per your request, I have examined the hydrologic controls and resulting damage from the storms that hit the Wildcat Loadout area on August 6, 2007. It should be noted that a DOGM representative observed the site on 8/7/07. I was not able to get to the site until 8/9/07. At the time of my visit, most of the ditches were dried out, the Depression Area was nearly pumped out and a contractor was on site preparing to repair any damage not being done by the operation.

The following is a brief report of my observations and professional opinion as to the conditions of the site as a result of the storms:

- ▶ Based on the attached rain gauge readings and conversations with on-site personnel, the site was hit with 3 storms during an approximate 11 hour period on Monday, August 6, 2007. The total recorded rainfall in this 11 hour period was 2.10", with 1.35" occurring in the first 2 storms in a 2-hour period and the remaining 0.75" that night during approximately 45 minutes.
- ▶ Hydrologic control structures at the Wildcat Loadout have all been sized for the 10 year-24 hour event of 1.85" with the exception of the refuse pile ditches and undisturbed diversions, sized for the 100 year-6 hour event of 1.91", and the sediment pond overflows, sized for the 25 year-6 hour event of 1.48" as required. Based on the rain gauge readings, the first 2 events dropped 1.35" in less than 2 hours - this actually exceeded the 10 year-6 hour event of 1.23" (required for design by regulation). The 3<sup>rd</sup> event of 0.75" pushed the total to 2.10", which exceeded the 10 year-24 hour design event of 1.85" and is very close to the 25 year-24 hour event of 2.15".

- ▶ Based on conversations with on-site personnel, the hydrologic structures held up even after the first 2 events, which were well in excess of the 10 year-6 hour design event required by regulation. The 3<sup>rd</sup> event was 0.75" of rainfall in about 45 minutes. This event fell on already saturated ground conditions, and created higher-than-normal runoff, resulting in some obstructed culverts, ditch overflows and damage to 2 pond inlet structures.
  
- ▶ Observations of a number of the high water levels in the ditches indicated that the flows were well in excess of the normal ditch sections; however, since each ditch has a specific required size and some ditches were receiving flow from non-designated areas due to re-routing of flows from obstructed culverts, etc., such after-event ditch measurements can be misleading. Nonetheless, 4 flow depth measurements were taken on ditch numbers D-1, D-5, D-13 and D-17. The projected 10 year-24 hour flow depths for these ditches are 0.82', 0.90', 1.00' and 0.92', respectively. Measured flow depths for each of the ditches exceeded the 10 year-24 hour projected depths by approximately 1.0', 0.80', 0.90' and 0.5' respectively. These measurements do further support the rain gauge readings and the conclusion that the rainfall events exceeded the 10 year-24 hour design.
  
- ▶ Although the storms resulted in a considerable number of maintenance items (i.e. cleaning culverts & ditches, pumping water, pond inlet repairs), I did not see any major damage, or evidence of off-site impacts. Photos previously taken by DOGM personnel indicated the need for repair of the culvert inlets between the upper and lower cells of the Permanent Impoundment, and the inlet to Sediment Pond E. The Depression Area also contained a considerable amount of water which has since been pumped out to Sediment Pond C. There was a small amount of water on the refuse pile, which has also been removed and regraded. Sediment Pond E did overflow; however, the flow was handled by the Primary Spillway with no apparent problems. The overflow was not sampled since it occurred in late evening, and had stopped by the time it was noted.

Conclusions:

Based on my site visit, observations and measurements, I am of the opinion that the 3 storm events which hit the Wildcat Loadout area were well in excess of the 1.85" design event for the 10 year-24 hour storm. As a result, the company should not be held responsible for damage to hydrologic control structures, effluent limitations or off-site impacts. I am also of the opinion that overall, the hydrologic control system functioned very well during this storm, and although some internal damage did occur, runoff was directed to, held and in one case, discharged, from the Sediment Ponds as designed. I made a follow-up visit on 8/14/07, and as of that date, most of the ditches had been cleaned and regraded, culverts were cleaned, the Depression Area was nearly dry, the refuse pile had no water impoundment, and work was planned to start on the pond inlet repairs.

I hereby certify that the above observations and conclusions are true and accurate to the best of my knowledge and within the limitation of data provided by others.

  
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Dan W. Guy, P.E.

8/20/07  
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Date

