Comments for
West Virginia Office of Oil and Gas
Buckeye Creek Discharge Final Report

George Monk and Molly Schaffnit
Poca, West Virginia
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We appreciate the effort that went into the creation of the *Buckeye Creek Discharge Final Report*, the first report of this type authored by the Office of Oil and Gas.[1] The inclusion of all the materials related to the incident in one document makes independent study of the incident possible.

Two elements in the spill are still a mystery to us. Locations of the booms and sample collection sites are described in the Report in the vaguest verbal terms so that it is impossible to know exactly what happened where along the miles of affected Creek. It is also impossible to know if sample location sites are related to one another chronologically (if the Ryan samples were taken in the same locations as later DEP samples, for instance) over the period discussed in the Report.

The two Water Assessment Branch reports, one of which is reproduced in the Office of Oil and Gas Report, do include maps and precise locations from which samples were taken.

The other mystery is what exactly was seen by the Inspectors so that they associated the spill with Powell #7. While the Report focuses on improper waste management as the cause of the spill, there is no stated reason in the report for this assumption. There is no discussion of other possible sources of the pollution and no discussion of the operational practices of the driller that would discount the possibility of a blowout (a subsurface blowout with surface leakage). For instance, had the well been shut down for a period of time? What was the bradenhead pressure? Without stated reasons for the conclusions reached in the Report it is hard to accept those conclusions.

The Report would have been vastly improved by the presence of a map, or maps, showing sample locations, features of remediation (booms, vac

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[1] West Virginia Office of Oil and Gas, [2010], *Buckeye Creek Discharge Final Report*, cited in text as Report.

truck sites, etc.) and possible sources of contamination (well sites, pipelines, underground tanks, etc.).

What the report does show is the need for clean up standards for soil and water using TPH criteria (since TPH testing was so important in this case); a process for on site quantified examination of oil and gas facilities for sources of pollution; and a standard for reporting including photographs, map and text.

Laboratory testing carried out to characterize the spill used different criteria for the four different sample collection dates in the Report. One commonality was for TPH (for three of the dates), even though there are no TPH criteria in 47CSR2. In a spill of this sort the most volatile fraction is gone after a couple of days -- the fraction covered by existing water and soil standards for the presence of BTEX (none was shown in the Downstream sample).

If the Office is willing to use TPH as an indicator of a need for soil and water remediation, a standard needs to be used. Oklahoma's remediation manual, which uses TPH criteria, is recommended and we urge the Office to adopt something similar.[2]

While Powell #7 was stated to be the source of the pollution, there was no examination of the actual well site for evidence. We have found the techniques and methodology created by James Otton of the USGS to be extremely useful.[3] The techniques are low cost and where equipment would be required (such as a photoionization detector), such would probably be available from within the DEP from another Division. These techniques generally give instantaneous results (except we have found that chloride soil tests take 12-24 hours to complete off site). It is possible, using these techniques, to carefully delineate areas on a site that are contaminated and have an idea of the level of contamination. The chloride test strips recommended by James Otton cost only about $1.40 each and work for water or soil.[4] A water test using these strips takes only minutes.

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[2] The Oklahoma Corporation Commission, 2008, *Pollution Abatement Department, Oil and Gas Conservation Division, Guardian Guidance for the Assessment and Cleanup of Complex Crude Oil, Condensate, and Other Hydrocarbon Release Sites, Including Historically Impacted Sites.*

[3] Otton and Zielinski, 2000, *Simple techniques for assessing impacts of oil and gas operations on Federal Lands: a field evaluation at Big South Fork National River and Recreation Area, Scott County, Tennessee (online edition)* and 2001, *Simple techniques for assessing impacts of oil and gas operations on public lands: a field evaluation of a photoionization detector (PID) at a condensate release site, Padre Island National Seashore, Texas.*

[4] A description of how we use the Quantab test strips is available on our website, George Monk and Molly Schaffnit, *Environmental Assessment -- Chloride Testing*, Sootypaws website.

Inspector Scranage's report (and the Office's Report) would have been improved with the inclusion of select photographs and a map. The Water Assessment Branch report provides a good model with map, standardized report text format, pertinent GPS locations, and photographs. The Office could create a template for inspectors to drop in required information. This could be done using Word or other program.

Other Issues with Report

(1) The Office seems to be unaware (referring to Report, page 5) of the EPA's Health Advisory for sodium in drinking water (20 mg/l).[5]

(2) Downstream Strategies' water sample location, "embayment," is clearly marked on an aerial photograph in their report and can be approximately located on an USGS topographical map (referring to footnote 18 in the Report).[6] This is the only water sample location that is known to us.

(3) The extent of the spill was minimized in Inspector Scranage's report and in the Office's Report. No attempt was made to measure stream flow to determine possible travel speed and distance. It's been shown that a condensate spill in a stream with low flow could travel up to 40 km in one day.[7]

We agree with West Union that the spill affected their water supply (referring to page 9 of the Report where it is stated that pollution did not reach Middle Island Creek).

(4) We are troubled by the lack of laboratory analyses for RCRA metals even though EPA reports and sponsored studies indicate the presence of these metals in industry waste and stormwater runoff in concentrations to cause a concern.[8] At a minimum we would have liked to have seen laboratory analysis for arsenic, barium, copper and lead.

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[5] Environmental Protection Agency, 2003, *Drinking Water Advisory: Consumer Acceptability Advice and Health Effects Analysis on Sodium.*

[6] Downstream Strategies, 2009, *Water Monitoring Report: Buckeye Creek at Louanne Fatora's Property*, page 3. This refers to a statement in the OOG's Report text regarding the lack of specificity of the location of the "embayment."

[7] Santos, 2003, *Summary Report: Potential Effects of a Crude Oil or Condensate Spill to the North West Branch of the Cooper Creek*.

[8] See Environmental Protection Agency, 2000, *Associated Waste Report: Completion and Workover Wastes;* David Wachal, 2008, *Characterizing Storm Water Runoff from Natural Gas Well Sites in Denton County, Texas*, see table 2.6; and Kenneth Banks and David Wachal, 2007, *Demonstrating the Impacts of Oil and Gas Exploration on Water Quality and How to Minimize These Impacts Through Targeted Monitoring Activities and Local Ordinances*.

(5) Analysis of samples examined salinity in a number of different measures -- conductivity, TDS and chloride. Of these measures, only analysis of chloride indicates possible toxicity to the environment. 2008 EPA sponsored research indicates that chloride toxicity is dependent on water hardness and the presence of sulfates and that acute toxicity can be at a much lower concentration than earlier 1988 EPA chloride criteria of 860 mg/l.[9] We believe that there is a reason to have concern when chloride is found in surface water above 30 mg/l and that the high concentration found in the Downstream sample, while under the 1988 EPA chronic concentration of 230 mg/l, is significant. The 1988 EPA paper based its acute and chronic criteria on short term exposure. There is every indication, because of the time between the actual spill and the collection of samples, that the Creek was exposed to concentrations of chloride that went over the chronic criteria and possibly went over the acute because of increased water hardness.

Conclusions

While the Office's Report is titled Final, we believe questions still have to be answered. It is not clear that Powell #7 was the source of the pollution or why the Office thinks it was. There are low cost tools available to make a much-needed on site assessment. Until the source can be identified, it can only be assumed that what happened at Buckeye Creek in 2009 was a singular event.

We believe that the DEP needs to determine criteria for analysis, procedures to evaluate flow and speed of transport, and develop a speedy way to notify those downstream of an event. The five mile boundary may not be sufficient at all. We also believe that the DEP needs to work toward updating its chloride criteria for 47CSR2.

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[9] Iowa Department of Natural Resources in their 2009 *Water Quality Standards Review: Chloride, Sulfate and Total Dissolved Solids* uses this 2008 research, see Table 2. Environmental Protection Agency, 1988, *Ambient Water Quality Criteria for Chloride -- 1988*.

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