Dry Weather Screening to IDDE: A Gas Well Incident - Case study

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City of Denton
Watershed Protection
Site 2: Airport Rd
- Hickory Creek Tributary
- Adjacent to Gas Well Pad Site
- Small drainage area west of I-35
- 4 businesses upstream, none of which have a stormwater permit
  - NECs
First Clues

• Odd odor, reminiscent of hydrocarbons but not discernible (to me)
• Unusual sheen with black, fibrous splotches
• Conductivity reading of \textbf{26,000 us/cm}
Further Upstream

- A small debris dam (rock and vegetation) holding back potential unknown IDDE material
- Grey and brown sludge backed up ~50 meters
Possible Source

- Gas Well Pad Site
  - Was actively being fracked at the time of incident
  - 2013 and 2015 aerials do not show the operation but *square* is pad-site

- Drilling Fluid was being stored on-site (*star*) mere yards from stream
  - Obvious discharge path under degraded BMPs (no pic, oops!)
Response Effort

• We Contacted:
  – Gas Well Inspections
  – RRC
  – TCEQ

• RRC contacted the Gas Well Company (who shall not be named...)
  – Their legal and bureaucratic machine stalled the investigation

• Same company claimed
  – no discharge had occurred
  – BMPs were adequate

• Denied our request for permission to sample soil/water on their property

• Eventually (2 weeks later) RRC was able to sample soil
Building the Case

• Monitoring Information
  – ISCO auto sampler
    • Downstream of suspected discharge
  – Sonde Data (stars)
    • Upstream
    • Above Suspected Discharge
    • Pool Above Site 2 (ISCO)

• Grab Samples (stars)

**Had to request permission from adjacent businesses and UNT to get these data**
Historic Conductivity in City of Denton
Results

Downstream Sonde
SpCond uS/cm

Upstream Sonde #2
SpCond [µS/cm]
Results

- Benzene: 0.0004mg/L
- Toluene: 0.0008mg/L
  - Both “below regulatory standards”
  - Indicating it was not an “oil field discharge”

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Upstream</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorides</td>
<td>54</td>
<td>1050</td>
</tr>
<tr>
<td>Sodium</td>
<td>80</td>
<td>667</td>
</tr>
<tr>
<td>Potassium</td>
<td>&lt;0.0043</td>
<td>4.35</td>
</tr>
<tr>
<td>Magnesium</td>
<td>0.994</td>
<td>7.89</td>
</tr>
<tr>
<td>Calcium</td>
<td>86.3</td>
<td>154.1</td>
</tr>
</tbody>
</table>

### RRC and Gas Well Co. Sampling

<table>
<thead>
<tr>
<th>Analyte</th>
<th>Upstream</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>GWC Chlorides (stream: 1/17)</td>
<td>300</td>
<td>800</td>
</tr>
<tr>
<td>RRC Chlorides (1/29) (soil: ditch by frac tanks)</td>
<td>5020</td>
<td>27900</td>
</tr>
<tr>
<td>RRC BTEX</td>
<td>Undetectable</td>
<td>Undetectable</td>
</tr>
<tr>
<td>COD Chlorides (stream: 1/14)</td>
<td>102</td>
<td>18379</td>
</tr>
</tbody>
</table>
Conclusion(s)

• We determined something had occurred
  – Had data to back up this assertion
  – Gas Well Company Denied it to the end
  – Large degree of variability in results made our case difficult so legal did not pursue

• RRC confirmed there was something in the water that could have come from vicinity of storage tanks for proprietary drilling fluids
Conclusion

The operator was directed to:

(1) Immediately remove all free-standing produced fluids from the ground surface.

(2) Repair or replace all leaking equipment and BMPs.

(3) Conduct excavation operations to vertically and horizontally delineate all areas affected by produced fluids.

(4) Initiate and complete remedial clean-up operations for all areas affected by produced fluids to promote aeration and natural remediation.

(5) Provide the District Office with a remedial plan and documentation that all cleanup operations are complete.

(we never received a copy of this report)
End of the Story...?