



Protecting Southwest Florida's unique natural environment and quality of life ... now and forever.

May 17, 2018

John Coates, P.E., Administrator, Wastewater Compliance
Cindy Mulkey, Program Administrator
Daniel Reeves, E.I.T., Engineer Specialist I
Florida Department of Environmental Protection
3900 Commonwealth Boulevard
Tallahassee, FL 32399

Dear Mr. Coates, Ms. Mulkey, and Mr. Reeves,

Thank you for your time in attending a meeting between the Florida Department of Environmental Protection (FDEP) and the Conservancy of Southwest Florida held in Naples on October 17, 2017. We appreciate you discussing water quality monitoring testing, plugging & abandonment, and other issues regarding the Collier-Hogan 20-3H Well.

We are grateful to receive the quarterly water quality monitoring reports and to provide feedback regarding the proposed changes to the analytical suites and monitoring well locations at this site.

Water Quality Monitoring Reports Ongoing Issues

We appreciate FDEP's willingness to provide us water quality monitoring reports quarterly, and that these reports are also being shared with Collier County. With the help of toxicology and chemical engineering experts, one major recommendation to FDEP is that the quality of this sampling effort be improved. While we understand that some of the tests are difficult to conduct, there have been substantial issues with quality control - including holding samples beyond the normal holding time and improperly preserving samples. Thus, the findings are only as reliable as the testing.

For example, there are high Diesel Range Organics readings from the June 2016 testing, which is concerning due to the improper disposal of over 80 barrels of oil/oily waste at Collier-Hogan that was documented by ALL Consulting in February 2016. During our meeting, FDEP attributed this spike to quality control issues, however the monitoring reports did not indicate any data qualifier codes that would rule out the findings;¹ thus, we continue to be very concerned.

The Conservancy noted a difference in reporting for Didecyldimethylammonium, Diesel Range Organics, Gasoline Range Organics, and Oil Range Organics tests starting in the October 2017 report; measurements historically reported in micrograms are now reported in milligrams. Even with this change in reporting

¹ Chemical Analysis Report DIVISN-WRM-2016-06-23-01. Collier-Hogan US Deep Monitoring Well. Serial Number 0089777.



Conservancy of Southwest Florida has been awarded Charity Navigator's prestigious 4-Star top rating for good governance, sound fiscal management and commitment to accountability and transparency. Charity Navigator is America's largest and most respected independent evaluator of charities.

units, the measurements reported for both Oil Range Organics² and Diesel Range Organics³ indicated an increase from previous reports.

We also identified an increase in Arsenic in the June 2017 and October 2017 results.⁴

Given the critical importance of these tests in identifying potential contamination and its direct nexus to the health of our environment, human health, and quality of water supplies, we would like to see an improvement in the quality of the sampling work and to further explore the cause of the monitoring report findings mentioned above with FDEP.

Change in Analytical Suites

We appreciate the opportunity to provide feedback about the FDEP proposed changes to the analytical suites and sampling locations (which may have begun with the December 2017 quarterly monitoring efforts). We encourage FDEP to retain a broad and comprehensive suite of analytical tests for the Collier-Hogan well. However, if changes are going to be made, we ask that you consider our comments below and augment the proposed sampling with necessary tests for water quality protection.

- As discussed at our in-person meeting, we would like to see additional parameters included for the water quality testing, specifically those outlined in Attachment A, which include Acrylamides (either of the two test methods we have outlined could be utilized), Acrylate, Triethanolamine, Vinyl Acetate, and Benzaldehyde. These tests are necessary because these chemicals were utilized at the Collier-Hogan well and are probably carcinogenic.
- FDEP has indicated it believes that Oil Range Organics, Hexane Extractable Materials are duplicative with the Total Recoverable Petroleum Hydrocarbons (TRPH) test. It also has indicated that it considers Diesel Range Organics test to be optional. While retaining the Diesel Range Organics test would be optimal, we are ok with the change to TRPH. Continuing to consistently conduct the TRPH test is critical.
- Further, in reviewing the proposed changes to the analytical suites, there are several tests we would like to see retained and/or included for future analytics at the Collier-Hogan site:
 - pH and Alkalinity: Captures a comprehensive picture of groundwater conditions and pH can be considered an indicator test for oil and gas related impacts to groundwater.⁵

² Quality control for this parameter in both October 2017 and December 2017 indicates the “material was analyzed for but not detected. The reported value is the method detection limit for the sample analyzed.”

³ For this parameter, both October 2017 and December 2017 did not have corresponding quality control codes.

⁴ From December 2015 through December 2016, Arsenic readings averaged at 0.49 ug/L. The June 2017 and October 2017 results were 0.86 ug/L and 1.19 ug/L respectively. The reading for December 2017 was 0.17 ug/L but had a data qualifier code indicating “the reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.”

⁵ Kroepsch & Williams, 2014. Monitoring Water Quality in Areas of Oil and Natural Gas Development: A Guide of Water Well Users. Colorado Water and Energy Research Center. P. 8.; Fakhru'l-Razi, et al., 2009. Review of Technologies for Oil and Gas Produced Water Treatment. Journal of Hazardous Taterials, 170(2-3), 530-551.

- Total Dissolved Solids (TDS): It is unclear if this test will continue to be conducted; FDEP's document has a comment that TDS is "calculated from field measurement."⁶ The test is important to continue because of its use in defining Underground Source of Drinking Water qualities.
- Chloride and Sulfate/Sulfide: These tests capture a comprehensive picture of groundwater conditions and chloride and sulfates can be considered an indicator test for oil and gas related impacts to groundwater.⁷ Additionally, Benzyl Chloride and Didecyl Dimethyl Ammonium Chloride appear to have been used at the Collier-Hogan well.⁸ Organic Sulfur Compounds and Ammonium Persulphate also appear to have been utilized.⁹
- Bromide and Alpha/Beta: Bromide has been found in water quality monitoring studies related to oil and gas wastewater.¹⁰ Further, Alpha/Beta can help test for Naturally Occurring Radioactive Materials (NORMs). This is particularly important since the Collier-Hogan well experienced improper disposal of waste that may have included flowback/produced waters.
- Metals including Dissolved Metals: Nickel, Arsenic, Cadmium, Copper, Lead, Vanadium, and Antimony are metalloids/metals seen in the analytics from the Collier Hogan well flowback analysis. These elements are also often associated with produced water from oil and gas operations,^{11 12} due to the acid ionization process which allows formerly-inert elements to be found at higher-than-background levels and to become pollutants of concern in our water supplies. (Similarly, this same ionization process can allow for Chloride, Sulfate, and Sulfide to become pollutants of concern.)

Thus, while FDEP plans to retain testing for metals, it should also include testing for Dissolved Metals.

Given not only the unauthorized fracturing that occurred at the well, the known use of toxic chemicals¹³, and the improper disposal of oil/oily waste (which could include contaminants from fluids being brought

⁶ Florida Department of Environmental Protection, 2017. Collier-Hogan Deep Monitoring Well, Current and Proposed Analytical Suites.

⁷ Kroepsch & Williams, 2014. Monitoring Water Quality in Areas of Oil and Natural Gas Development: A Guide of Water Well Users. Colorado Water and Energy Research Center. P. 8.; Fakhru'l-Razi, et al., 2009. Review of Technologies for Oil and Gas Produced Water Treatment. Journal of Hazardous Taterials, 170(2-3), 530-551.

⁸ Hopping, Green & Sams, 2014. Letter to Florida Department of Environmental Protection. RE: Trade Secret Protection under Section 815.045, Florida Statutes. April 3, 2014.

⁹ Hopping, Green & Sams, 2014. Letter to Florida Department of Environmental Protection. RE: Trade Secret Protection under Section 815.045, Florida Statutes. April 3, 2014.

¹⁰ Mall, 2016. More Drinking Water Contamination Linked to the Oil and Gas Industry in Texas and Pennsylvania. Accessed at <https://www.nrdc.org/experts/amy-mall/more-drinking-water-contamination-linked-oil-and-gas-industry-texas-and>

¹¹ Fakhru'l-Razi, et al., 2009. Review of Technologies for Oil and Gas Produced Water Treatment. Journal of Hazardous Taterials, 170(2-3), 530-551.

¹² Fakhru'l-Razi, et al., 2009. Review of Technologies for Oil and Gas Produced Water Treatment. Journal of Hazardous Taterials, 170(2-3), 530-551. Other elements/compounds found in produced water include Zinc, Sulfate, Potassium, Nickel, Manganese, Magnesium, Lead, Iron, Chromium, Chloride, Cadmium, Bromide, Barium, Arsenic, and Aluminum.

¹³ Hopping, Green & Sams, 2014. Letter to Florida Department of Environmental Protection. RE: Trade Secret Protection under Section 815.045, Florida Statutes. April 3, 2014.

back to the surface and then mishandled), FDEP should reevaluate what it considers parameters of interest and, at minimum, add the tests mentioned above to the tests that are planned to be retained.

Change in Monitoring Wells

With regard to the monitoring wells, FDEP indicated at the in-person meeting that DMW-2, MW-2, MW-4, NWSW, SESW would continue to be used for monitoring, along with a new well identified as DMW2-SW which is about 80 feet deep.

It is our understanding that the 80 foot deep well is likely completed in the upper portion of the Lower Tamiami Aquifer or just above it. In consultation with Noah Kugler, a hydrogeologist with H2O GeoSolutions, we recommend a deeper monitor well be completed in the upper portion of the Sandstone Aquifer to indicate if there is contamination below the Lower Tamiami. This could potentially identify contaminants prior to them reaching the Lower Tamiami, which is very productive and a good quality source of our local drinking water.

Additionally, the Department should consider placing a monitoring well that is just above the retainer and cement at 487' to verify any potential upward movement of contaminants at that depth.

We feel it would be beneficial for the Department to review the lithologic log from the on-site deep monitoring well to help determine additional appropriate monitoring depth intervals below the Lower Tamiami that would yield enough water to be sampled for quality testing. We would be happy to consult with our hydrogeologist to examine this log and work together with you to determine appropriate depths for potential additional monitoring wells.

Permit Language

As you know, the Conservancy is strongly advocating for a statewide ban on well stimulation treatments, including hydraulic fracturing, acid fracturing, and matrix acidizing. Until the legislature passes this ban, FDEP should also include matrix acidizing in the permitting language to explicitly state that *"this permit specifically does not authorize new land disturbance, new wetland impacts, or hydraulic fracturing, acid fracturing, or matrix acidizing."* This is an important addition since the currently utilized permit language does not mention acid fracturing or matrix acidizing.

Improper Oil/Oily Waste Disposal

As we noted in the October meeting, the Conservancy maintains that the adjusted plugging and abandonment (as shown in the 'as-built' schematic) is not consistent with the intent of the requirements articulated in the Florida Administrative Code. We are aware that the Cement Bond Logs are not as strong as they should be (particularly at the interval between 500' and 1200'). Further, while we acknowledge FDEP's stated intent to utilize the drilling mud in the wellbore during plugging & abandonment to limit upward movement of any contaminants, the Conservancy is also aware that drilling mud itself typically contains harmful chemicals.

Similarly, we have outstanding concerns pertaining not just to potential contamination from the 2013 matrix acidizing/hydraulic fracturing operation, but also the improper disposal of oil/oily waste that was documented in 2016 –*two years ago*. We would like to request an update on the Warning Notice issued by FDEP to Dan A. Hughes on September 29, 2016. The Conservancy retains the ability to provide additional

input on future water quality testing pending the results of the ongoing investigation related to this disposal.

Outstanding Requests

Please note there are some additional documents and follow-up items we requested during our in-person meeting that are still outstanding (see Attachment B, particularly the highlighted items). We look forward to discussing these remaining issues and items with you.

Conclusion

We appreciate that FDEP has reached out to the Conservancy regarding changes to its analytical suites and monitoring well locations. We are appreciative of our ability to continue the dialogue regarding the Collier-Hogan well –and other important water resource protection issues- with FDEP. We would like to set up a call or meeting to discuss improving quality control, reviewing the cause of concerning sampling findings, our requests regarding the analytical suites and monitoring well locations, outstanding items we outlined in our October 2017 handout, as well as to receive an update on the improper disposal of oil/oily waste at the well.

We would like to thank you again for your continued engagement on this issue. Feel free to reach me at (239)262-0304, ext. 286.

Sincerely,



Amber Crooks
Environmental Policy Manager

Cc: Danette Kinaszczuk, Collier County

Attachment A

Survey of EPA Test Methods for Aquatic Pollutants from Hogans Well

Acrylamide	EPA Method 8316 (HPLC)	200 uL required
	EPA Method 8032A (GC)	150 ml required
Acrylate	EPA Method 5030B	5 ml required
Triethanolamine	EPA CRL MS016 (LC/MS/MS)	
Vinyl Acetate	EPA Method 8260B (GC/MS)	25 ml required
Benzaldehyde	EPA Method 8315A (HPLC)	20 uL required

Attachment B



CONSERVANCY
of Southwest Florida
OUR WATER, LAND, WILDLIFE, FUTURE.

October 17, 2017 Agenda

- Welcome and Introductions
- FDEP presentation
- Review history of Collier-Hogan well and remaining questions
 - Disposal of oil/oily waste and plugging & abandonment
 - Groundwater and chemical testing
 - Original consent order
 - Workover
- Open discussion

Summary of Key Collier-Hogan Well Events

December 23, 2013 Hughes notifies DEP of workover

December 29, 2013 Workover begins

December 31, 2013 DEP issues Cease and Desist

- “After reviewing the documents attached to the December 23, 2013 email, the Department is not satisfied that it has sufficient information that the proposed workover would be protective of the State’s groundwater resources...”

January 1, 2014 at 2:30PM workover stops

April 8, 2014 Consent Order is issued

May 12, 2014 Conservancy petition to Consent Order (amended June 6 and June 19)

June 6, 2014 Collier County petition to Consent Order (amended July 1)

July 18, 2014 DEP Revokes Hughes Permits (OGC Case No. 14-0400) (amended August 2014)

- Permits revoked due to violation of Consent Order, failure to provide records, failure to post signs, dumpster on site

July 18, 2014 DEP files Case No: 11-2014-CA-001643-0001-XX (amended August 2014)

- Enforcement of the consent order
 - Inadequate interim spill prevention and cleanup plan

- Failure to retain agreed upon 3rd party expert
- Disposal of flowback without notice and failure to submit sampling results in timely manner
- Failure to cooperate with the department and carry out intent of the Consent Order
- Failure to provide records
 - Failure to provide waste manifests as requested on April 16, April 23, May 5, 2014
- Failure to post signs
 - Failure to post required signage on site
- Roll off dumpster
 - Leaking dumpster was a stationary installation without DEP permit
 - No pad or berm around dumpster
 - Dumpster leaked into nearby canal constituting violation of water quality standards and failure to report spills
- Requested relief
 - Require P&A of well
 - Require Hughes produce all requested records
 - Authorize DEP to select 3rd party expert at the expense of Hughes
 - \$10,000/day for each day records were not provided
 - \$10,000/day for each day spill prevention plan was late
 - \$10,000/day for each day Hughes failed to retain agreed upon expert
 - \$10,000 for disposal of flowback without sampling
 - Award DEP investigating costs and attorney's fees
 - Require sign postings
 - \$10,000/day for each day signs were not posted
 - Require contamination assessment and remedial action plan
 - \$10,000/day for each day dumpster was out without permit, each day canal was contaminated, each day dumpster was not properly maintained, and each day spills were not reported

August 6, 2014 Hughes challenges Cease and Desist

September 4, 2014 Hughes challenges Notice of Revocation (OGC No. 14-0400, not forwarded)

- Hughes claims revocation is arbitrary and capricious
- Requested relief
 - Withdraw notice of revocation and reinstate permits
 - 20-H Collier-Hogan, 22-5 Collier SWDW, 7-2H Collier, 7-5 SWDW

September 23, 2014 DEP and Conservancy enter into Stipulation

- DEP commits to funding and completing groundwater monitoring in Consent Order
- DEP commits to drilling deep well below USDW to fulfill paragraph 19(c) of Consent order and per the Consent Order commits to sampling all monitoring wells on a quarterly basis for 10 years from approval of monitoring plan or 5 years after P&A.
- Deep well to be started on Oct 31, 2014 and completed Jan 31, 2015 with water quality results released in February 2015

- DEP will use available means to obtain samples of flowback and investigate potential inappropriate treatment and disposal of flowback
- Evaluate abandoned wells 86 and 103 and potential for contamination from Hogan

October 10, 2014 Hogan P&A Plan is submitted to DEP

November 24, 2014 Motion for Extension

- Hughes requests continuance of Dec 3, 2014 hearing as Hughes intended to submit additional information to DEP regarding the P&A of the Hogan well

Dec 17, 2014 DEP begins drilling DMW-1

- Drilling issues eventually result in drilling of a second well (DMW-2)

Dec 3, 2014 Conservancy identifies issues with Hogan P&A plan and notifies DEP

- Plan is not in accordance with 62C-29.009 as it lacks a 400' plug at the USDW

March 23, 2015 DEP begins DMW-2

- This is the well that was ultimately sampled

August 3, 2015 Completion of DMW-2

October 2015 ALL Groundwater report released

January 7, 2016 DEP dismisses case No 11-2014-CA-001643-0001-XX

May 31, 2016 Stipulation Agreement Expires

- Conservancy attempts to connect with FDEP on multiple occasions to check the status of requirements set forth in the stipulation agreement, however FDEP failed to return emails and calls.

Timeline:

- 05/04: Email sent to Craig Varn to set up a phone conference
- 05/04: Call made the Heather Chapman, Program Administrator Office of General Counsel to connect with someone as Craig Varn is no longer with the office
- 05/04: Heather Chapman forwarded my request to Shayna Acree, Administrative Assistant II to Fred Aschauer Jr., General Counsel
- 05/18: Follow up call attempt
- 06/01: Follow up call attempt
- 06/06: Follow up call attempt
- 06/07: Follow up call attempt
- 06/13: Follow up call attempt

September 29, 2016 FDEP Issues Warning Letter Regarding Possible Violations of Chapters 377 & 403

October 7, 2016 Conservancy letter to FDEP regarding Plugging & Abandonment and Waste Disposal

December 1, 2016 FDEP response letter to Conservancy

May 23, 2017 Conservancy letter to FDEP regarding Plugging & Abandonment and Waste Disposal
Outstanding Concerns /Questions to Discuss:

Disposal of Oil/Oily Waste and Plugging & Abandonment

1. Inconsistencies in the plugging and abandonment required by Florida Administrative Code and the documented 'as-built' plugging and abandonment model in the 2016 ALL Report.
2. Regarding the illegal dumping of 83.5 barrels of oily waste:
 - a. Time frame of the disposal
 - b. Total amount illegally disposed of (83.5 vs. 201 barrels) and amount recovered
 - c. Concerns for potential aquifer migration
 - d. Actual thickness of the cement plug around the USDW
 - e. Conflicting CBL records from 2013 and 2016 ALL Reports
 - f. Concerns regarding the concentrations found in the USDW being described as 'negligible' in the 2016 ALL Report
 - g. Poor sample collection (ie: volume and depth)
 - h. Concern for the potential migration of lighter fluids
 - i. Disposal of what was recovered at Cliff Berry

Groundwater and Chemical Testing

3. Does FDEP intend to complete and/or continue (per Consent Order):
 - a. Series of shallow monitoring wells around the pad (to include the specific chemicals used at the Collier Hogan well)?
 - b. Groundwater quality sampling and analysis of all monitoring wells on a quarterly basis for either 10 years from the date upon which FDEP approves the groundwater monitoring plan or 5 years after P&A of well?
 - c. An inventory of freshwater supply wells within a quarter mile of the wellbore hole?
 - d. Follow a schedule for the implementation of the groundwater monitoring plan?
4. The chemicals tested for do not completely coincide with the chemicals actually used at the Collier Hogan well (i.e. Acrylamides¹⁴). Please provide input as to why this is the case? Can this be remedied?

¹⁴ See Attachment A.

5. It appears that several of the samples sent for analysis are noted as having 'insufficient volume' necessary for testing.
6. Last available water quality monitoring report was 03/17. When will we receive the remainder of tests to-date?
7. Water Quality Monitoring Report results
 - a. TRPH results from 03/18/16, and Diesel organics results from 06/23/16
 - b. TRPH v. Diesel organics frequency of tests
 - c. Elevated metals in 2016

Enforcement Actions from original Consent Order

8. It appears that fines, investigative costs, recovering attorney's fees incurred etc. are no longer being pursued.
 - a. Did DEP receive any of the payments for failure to comply with Consent Order (ct 1) failure to provide records when requested (ct 2), failure to post required signage (ct 3), maintaining a stationary installment without a permit (dumpster; ct 4), contamination of surface waters (leak from dumpster; ct 5), failure to report spill (dumpster; ct 6), failure to properly maintain equipment (ct 7)?
 - b. Were any investigative costs recovered by DEP?
 - c. Were any fines levied against Hughes?
9. Has DEP received the \$800,000 due on 1-5-16 under the settlement?
10. Under the 1-5-16 settlement, Hughes is required to pay \$350,000 to Minerals Trust for work done under the Consent Order
 - a. What has/will this money be put towards:
 - i. Long term monitoring at the Hogan well?
 - ii. Reimbursement for previous DEP sampling?

Workover

11. Fracture modeling from the Baker Hughes model differs from that of the Hughes workover proposal and the actual workover. Do we know the results of the workover in terms of fracture results?

We would like to request a copy of:

- a. Dan A. Hughes notice of dismissal and surrender of permits
- b. FDEP's withdrawn notice of revocation