

Secretaries' Science Advisory Board

MEETING SUMMARY UNC-Wilmington Warwick Center December 4, 2017 1:00 PM – 4:00PM

The Department of Environmental Quality (DEQ) and the Department of Health and Human Services (DHHS) Secretaries' Science Advisory Board (SAB, or Board) met on Monday, December 4, 2017, at UNC-Wilmington in the Warwick Center's Ballroom. The SAB members in attendance were as follows: Dr. Jamie Bartram, Ph.D. (Chair), Dr. Tom Augspurger, Ph.D., Dr. W. Greg Cope, Ph.D., Dr. Richard T. Di Giulio, Ph.D. (via telephone), Dr. David Dorman, DMV, Ph.D., DABVT, DABT, Dr. Elaina Kenyon, Ph.D., DABT, Dr. Thomas Starr, Ph.D., Dr. Woodhall Stopford, MD, MSPH (via telephone), Dr. Michael Stoskopf, DVM, Ph.D., DACZM, (via telephone), Dr. John Vandenberg, Ph.D., Dr. Betsey Tilson, MD, MPH, Mr. Phillip Tarte, MPH, Dr. Jaqueline MacDonald Gibson, Ph.D., Dr. Detlef Knappe, Ph.D., Dr. Gina Kimble, Ph.D. Also in attendance were DEQ Assistant Secretary Sheila Holman, DHHS Epidemiology Section Chief, Dr. Zack Moore, DEQ and DHHS support staff, and media.

I. Call to Order (Chairman Jamie Bartram)

Chairman Bartram began the meeting at 1:00 pm and thanked all members who could participate, and especially to those attending in person. He stated that the Board's attention should now focus on looking at issues of real substance.

II. Approval of October 23, 2017 SAB Meeting Minutes

Tom Augspurger requested one modification to the draft October 23, 2017 minutes on page 7, which was to change "Director Culpepper" to "Director Scott". The minutes, as revised, were approved unanimously.

III. Ethics Statement

Chairman Bartram read the ethics statement and reminded the members that if anyone had any potential conflict of interest to so indicate. No one identified conflicts.

IV. Priority Table

The SAB discussed the priority for reviewing the DHHS provisional GenX health goal for drinking water and sought clarification of the charge it has been given to: 1) review the health goal calculation done by the Department of Health and Human Services (DHHS); and/or 2) work from scratch to develop a health goal given currently available information. Questions were raised on the process the SAB will use in its deliberations.

Dr. Tilson indicated the documents were sent to members providing information on the health studies for members to review. She indicated DHHS valued their review of the data and documents, and their subsequent recommendation to DHHS. Some members had not received emails. The Departments will ensure they receive emails and the materials for future meetings.

The Chairman indicated the Board has the charge to make recommendations on what to review, not just to review the material and priorities presented. He asked them to listen to what the background information is and give it a scientific review. Dr. Augspurger thought the request from the Department of Environmental Quality (DEQ) was a little more granular, and Dr. Bartram agreed that the level of questions raised would assist both agencies.

V. GenX Interim Report

Assistant Secretary Sheila Holman provided a presentation on background regarding DEQ's work related to the GenX portion of Chemours activities. She indicated DEQ is working on an Interim Report and appreciates the Board's assistance and recommendations to help focus DEQ's limited resources. The report is to include, but not limited to, the regulatory framework, water quality standards, surface water and groundwater monitoring results, air emissions and other emerging compounds and next steps to take.

Background Information

Regulatory programs in place include: Toxic Substance Control Act (TSCA), implemented by the US EPA, the Clean Water Act (CWA) implemented through NC DEQ's National Pollution Discharge Elimination System (NPDES) wastewater permit with oversight from the EPA, and the Safe Drinking Water Act (SDWA) implemented by NC DEQ's Public Water Supply Section. The federal SDWA includes the Unregulated Contaminant Monitoring Rule (UCMR) and the drinking water Contaminant Candidate List (CCL) which help evaluate the concentration and prevalence of emerging contaminants in drinking water nationally. The State also establishes surface water quality standards under the CWA and groundwater standards under state rules, with both being done through the Environmental Management Commission.

In 1971 DuPont-Fayetteville Works began its operation in Bladen and Cumberland County. DuPont didn't began manufacturing fluorinated compounds until around 1980. In 2009, DuPont signed a Consent Agreement with EPA TSCA to allow the manufacture of GenX. The DEQ learned during a meeting on June 12, 2017 that GenX has been a byproduct of the vinyl ether production line which was not included in the Consent Agreement. DuPont eventually transitioned site ownership to the Chemours Company.

North Carolina State University (NCSU) and the Environmental Protection Agency (EPA) study of the Cape Fear River water began during the same time period as the 2013-2015 SDWA UCMR3, which included monitoring for 28 chemicals including PFOA, PFOS and 1,4 Dioxane. In 2014, DEQ initiated a study of 1,4 Dioxane in the Cape Fear River since UCMR3 results indicated higher concentrations in the Cape Fear than from other river basins. In 2015, Dr. Strynar et al., with EPA National Environmental Research Laboratory (NERL), published a research paper indicating the presence of fluorinated compounds in the surface water including two compounds which were identified as suspected byproducts from the Chemours Nafion® manufacturing process. In 2016, Dr. Detlef Knappe (NCSU) and others began further study of these contaminants. Dr. Mei Sun, et al.(NCSU) published research findings on PFOA/PFOS and GenX in November of 2016.

Around June 19, 2017, DEQ sampling began around the Chemours facility. Samples were collected from raw surface water, finished drinking water, outfalls, and wastewater (both discrete and composite samples) for analysis. This testing is on-going. Towards the end of June 2017, Chemours notified the state that it would begin to contain the vinyl ether wastewater and ship it offsite for disposal. In late August, EPA identified five additional perfluorinated compounds that could be in the wastewater discharge at higher quantities than GenX. However, no lab standards existed for any of these compounds. Two of the compounds were identified as Nafion® byproducts by EPA. The analysis showed that the Nafion® byproducts had not decreased over the June through August timeframe, while the other three compounds had decreased similarly to GenX. The facility later agreed to also contain the wastestream containing the Nafion® byproducts as well. The concentrations of the compounds, including GenX, significantly dropped. The property on which Chemours is located is also the location of two other industrial operations, one owned by Kuraray, America and one owned by Dupont. It should be noted that the wastewater discharges from Kuraray, America and Dupont are sent to the wastewater treatment plant owned and controlled by Chemours. The facility began a plant shut down for annual maintenance on October 17th. The operations at both Kuraray, America and DuPont were also down for maintenance at this time. The three industrial operations started operations up again on November 2nd. DEQ received preliminary results from EPA NERL indicating there was a spike in the level of GenX at the Chemours outfall 002 in early October. After DEQ brought this to Chemours attention, Chemours notified the state that a release had occurred on October 6th, and a rain event contributed to GenX being released into the open ditch area leading to the wastewater treatment and outfall 002. Based on the weekly sampling at the drinking water systems downstream of Chemours, it was learned that two drinking water systems, Bladen Bluffs and NW Brunswick, were impacted such that GenX levels were temporarily above the DHHS provisional health goal for drinking water. DEQ gave Chemours until November 30, 2017 to divert Chemours manufacturing wastewater from the wastewater treatment unit regulated under the NPDES permit. This added the remaining Chemours manufacturing wastewater to the wastewater already being captured and shipped offsite for disposal. This action did not impact other wastewater such as boiler non-contact water, domestic wastewater or wastewater from Kuraray and Dupont facilities, which could continue to be managed in the wastewater treatment system under the NPDES permit. On November 14-15, Chemours notified DEQ that an unexpected air vent release had occurred. On November 16, DEQ issued a Notice of Partial Suspension and 60-day Notice of Intent to Partially Revoke the Chemours NPDES Permit. Sampling at the Chemours NPDES outfall 002 and at the drinking water facilities downstream is on-going. Follow up levels at all drinking water facilities downstream have remained below the provisional DHHS health goal.

The DEQ is beginning Phase III of its private well sampling, going further out from the previous mile and a half surrounding the facility. Phase III sampling is mostly to the east of the facility. The outer boundary of the Phase III Sampling is approximately 2.5 miles east of the facility boundary, 1.25 miles north of the facility boundary at US 87 and 1.75 miles north of the facility at the Cape Fear River, 2 miles south of the facility at the Cape Fear River and 1.25 miles southwest of the facility. There was no additional sampling conducted directly west of the facility.

Two Cumberland County elementary school wells were also sampled in response to request by the community. Both schools were non-detect for PFOA/PFOA. One was non-detect for Gen-X and the other was at the lower limit of measurement and below the DHHS provisional health goal for drinking water. Surface water samples were collected from two lakes used for recreational purposes, but not for drinking water: Camp Dixie (Bladen County) and Marshwood Lake (Cumberland County). These tests were also done in response to request by the community. GenX was detected in both lakes. An analysis by DHHS determined that recreational exposures to GenX at the levels measured in the lake at Camp Dixie (620 ppt) are not expected to harm people's health. DEQ has been working with DHHS collaboratively to address the use of recreational areas. In areas where private wells used for drinking water are above the provisional health goal DHHS has established, Chemours has been directed to provide bottled water to those residents. Air Emissions "Stack Testing" is planned due to groundwater wells to the west of the facility, which is not in the direction of groundwater flow, indicating levels above the provisional DHHS health goal for GenX in drinking water. This testing will help verify air emissions estimates previously submitted by Chemours to DEQ. Testing will begin in December or January.

Chairman Bartram opened the floor for questions from the SAB members:

1. Is there a groundwater standard that the state has established? (Response) There is currently not a state groundwater standard for GenX, but the Division uses the US EPA's 10 ppt Practical Quantitation Limit as the regulatory compliance threshold. The analytical labs are continuing to analyze to lower quantitation limits.
2. Regarding how the compound is being released through air emissions, is it gaseous and are the emissions in a liquid or solid form? (Response) Current knowledge is that they are a mix of aerosols and gases. The air emission estimates for the last 5 years were used as inputs – along with local meteorological parameters - to the air deposition model to estimate wet and dry deposition. There were several assumptions that had to be made, such as assuming that annual emissions were released in equal amounts for each hour of the year being modeled. DEQ has relatively high confidence in the deposition patterns predicted by the model and believes the results can be used to identify areas of potential maximum impact from air deposition of the compounds of interest.
3. Is there off-site soil testing? (Response) Testing will begin January of 2018.
4. Will there be follow up air deposition with soil sampling? (Response) There are onsite soil sampling efforts with data due in January 2018 at different depths onsite. Discussions on offsite sampling are being evaluated.
5. Will Chemours start to conduct routine or additional emissions testing? (Response)The company has stated that they will perform emissions testing, and will begin with a focus on GenX emissions.
6. What air emissions are of most interest and, were the emissions routine or upsets? (Response) DEQ followed up with the company on estimates, including possible upsets. They indicated the emissions inventory does include normal operations and other releases.
7. Are air emissions requirements part of the permit? (Response) Permitting for a new facility would have to give projections and then submit annual values. Because GenX is not regulated as a criteria pollutant or a hazardous or toxic air pollutant, the company

included it as one of the several pollutants that make up the total volatile organic compounds expected to be emitted by the facility.

Did current emissions estimates agree with current findings? (Response) We are looking at doing stack testing on all the stacks. DEQ will look at Nafion® byproducts/pre-cursors in stack testing. Well owners doing their own testing have seen some of these chemicals. The focus is on GenX. Will expand to Nafion® in the future.

8. In assessing groundwater quality violations, if there is not an established state standard, what does DEQ use? (Response) DEQ has used US EPA's PQL of 10 ppt to determine the violation assessment. DWR noted that laboratories are reporting at lower PQLs (5 ppt) and precision and accuracy are being examined.
9. Has there been any wastewater tested from the polymer site? (Response) DEQ recently sampled both of the other facilities to verify their wastewater content and we are awaiting results to come back.
10. Explain how Practical Quantitation Limit (PQL) plays into this? (Response) If there is no groundwater standard established, then you use the PQL, which is the minimum concentration of an analyte that can be measured with a high degree of confidence (Note: conversation here refers to 15A NCAC 02L regulations) DWR uses EPA's PQL of 10 ppt. PQL is not health related, it was a regulatory level set by the groundwater rules for enforcement when a standard has not yet been set. The DHHS provisional health goal for drinking water of 140 ppt was set based on health of bottle fed infants.
11. With laboratories lowering their PQL, was matrix interference seen? (Response) It was not seen in many instances. Are the data qualifications with the data online? (Response) DWR has posted the data with the lab qualifications on the DEQ website and can be found at the following link:
<https://deq.nc.gov/news/hot-topics/genx-investigation/genx-sampling-sites>
12. Has analysis of food products been completed? (Response) We are aware of one local farmer producing honey for family/friends. Preliminary results indicated around 2,000 ppt of GenX in the honey. DEQ will be meeting later in the month with the NC Department of Agriculture. Conversation with counterparts in the Netherlands has indicated that they are studying crop concentrations as well and will be part of the January 29th SAB meeting.
13. It was nice to see the GenX concentration curve level coming down. Did the curve represent stack emissions or represent a concentration in a reservoir? (Response)– DEQ has directed Chemours to test the facility grounds to see if there are residuals in soils, sump areas, etc. The spike in concentrations have also led to DEQ to evaluate stormwater, which may be contributing to the increases in the wastewater discharge.
14. Has anyone tested sediment/fish tissue in the Cape Fear river and biota? (Response) – Samples have not been collected and tested to our knowledge. There is a workshop being hosted by DEQ and UNCW at UNCW next week (December 11, 2017) to discuss future studies needed.
15. For groundwater testing, is the reported 61,000 ppt GenX closer to the facility or was it earlier in time? (Response) That data was from a little earlier, around the first week in August. The groundwater well is onsite, and near the Chemours production area compared to other monitoring wells.

16. What is the soil quality/structure and what is the depth of the wells? (Response) Soil is sandy and depth of wells onsite is 100 feet, with deeper wells 200 to 250 feet in the Black Creek Aquifer. Residential wells are typically 100 feet deep.
17. Two lakes were tested. What are the sampled lakes? (Response) – Camp Dixie (Bladen County) and Marshwood Lake (Cumberland County). Camp Dixie Lake is periodically drained and refills, but the contamination is coming back and not sure from where. The SAB members would like to discuss the results from these lakes further.

VI. GenX Available Health Studies

Dr. Zack Moore, DHHS State Epidemiologist and Epidemiology Section Chief, discussed in detail how DHHS will continue to address new health studies and health advisories through examination of monitoring results and continued communication with DEQ, EPA and local partners. DHHS will give guidance on public health by conducting risk assessments and communicating those risks, giving guidance on the levels of exposure to certain contaminants and the risk those compounds pose to human health. They will also examine and recommend, if known, the best treatment options for private drinking water wells, as well as give guidance and assistance on health risk evaluations for public water supplies, as requested by DEQ. DHHS will continue to monitor and update its provisional health goal for drinking water based on any new information provided by further laboratory animal studies, epidemiologic studies, or other sources.

Dr. Moore reviewed results of several repeated dose oral toxicity studies of GenX conducted using rats and mice, including a subchronic oral toxicity study in mice that provided the No Adverse Effect Level (NOAEL) used as the point of departure in calculating the current provisional health goal for drinking water. Dr. Moore also noted that other studies have been conducted that contain considerable health data on PFOA, PFOS and other legacy PFAS which helps to gain a better perspective on the effects the emerging compounds could pose.

-----Questions and follow-up items were posed throughout the DHHS presentation with a few follow-up action items:

1. Does the state have a target cancer risk probability like “10⁻⁴”? (Response) The current DHHS provisional health goal is based on non-cancer end-points. Data were considered insufficient to calculate a cancer slope factor and thus a cancer end-point.
2. When there are limited data to evaluate, are you willing to use computational toxicology? (Response) Yes, amenable to that and to read-across using inferences, if there is sufficient data to do so. However, the read-across poses a challenge with little to no data on many compounds and known differences among compounds in the PFAS family.
3. Why did DHHS use the same Relative Source Contribution assumption for all areas, rather than making different assumptions for those near the plant versus those in Wilmington? (Response) We used the 20% Relative Source Contribution uniformly because there was limited data on other exposure routes. If we get more information and exposure routes (food, etc), we could adjust the 20% apportionment of the Relative Source Contribution.
4. What is the possibility of sharing detailed laboratory animal study data with the SAB, especially for the 28-day study and the chronic toxicity/carcinogenicity study? This

could provide information that is relevant for interpreting the findings, such as how similar findings were within and between studies and whether adjustments were made for purity of test compounds used. (Response) DEQ has received confidential business information (CBI) regarding studies submitted to EPA as part of the registration process. This information has been shared with DHHS. The DEQ is requesting the company for CBI clearance to be able to share information with the SAB. The chronic toxicity/carcinogenicity study did account for 84% purity in test compound used.

5. We have had human exposure (in the Wilmington area) for a period of time, there is an opportunity for a health study and to look over time and after since discharge has decreased/ceased. (Response) State does not conduct epidemiologic research, but have supported academic studies such as those being conducted by NCSU and partners to look for GenX and other PFAS in blood/urine samples and from persons in the Wilmington area (<https://news.ncsu.edu/2017/11/genx-study/>).
6. Are the four repeated-dose oral toxicity studies presented all the studies that are available for GenX? (Response) DHHS has three additional repeated dose oral toxicity studies which validated that the point of departure used in the provisional health goal calculations. DHHS will share information regarding all of these studies with the SAB. There are several other studies regarding acute toxicity other endpoints that are not useful in calculation of a drinking water level.
7. Are there any other publications that could become available? (Response) The studies reviewed in the presentation and mentioned in these responses represent all relevant data of which DHHS is aware. It would be appreciated if Board members have knowledge of other data that is available to include it in future discussions. One Board member mentioned that New Jersey went through a series of studies for PFOA, and suggested it would be a good idea to try to get those to review. (Board) If other information is available to examine approaches to handling dissimilar results from different test species and determining the appropriate uncertainty factors (UF) the Board would like to have access to it.
8. Is there information available on inhalation? This may be an important consideration when you look at the use of well water for showering, etc. (Response) DHHS will get back to the Board on volatility/inhalation issues.
9. EPA uses a modifying factor for uncertainty of the database, sometimes up to 3-fold. Did the state use a modifying factor, or do you think you have a good data set? (Response) This was discussed with EPA, and it was determined that it was not necessary to include a modifying factor as an additional uncertainty factor.
10. A suggestion was made to go through each uncertainty factor with rationale for use/not use. Board also wanted to know if the data was available to perform Benchmark Dose Modeling (BDM). (Response) DHHS will provide this information to the SAB.
11. There is a tendency to see a calculated health goal level as a “bright line” between safe and unsafe, but uncertainties could be orders of magnitude. Was consideration given to using a range rather than a single value? Several Board members mentioned that a range could be more valuable for setting health goals. (Response) DHHS generally calculates and presents a single health value based on the most vulnerable population so it will be protective for all groups, rather than presenting a range of values. Previous experience has indicated that presenting a range of values rather than a single value can increase

public confusion. DHHS acknowledged that once a number was issued, it became a “bright line” in public perception and welcomed input from SAB on ways to address this.

Discussion continued on other available studies, more available physical chemical information, and transformation chemistry. Pharmacokinetics was discussed. PFOA pharmacokinetic studies, which used rodents and monkeys, showed many differences across the species. However, in the GenX references, differences were not seen and Gen X was absorbed and excreted mostly unchanged. Elaina Kenyon was noted as having expertise in pharmacokinetic evaluations. The Board would like to discuss all the studies that are available. The Board wanted to discuss if using “default” UFs was preferable to other choices. A suggestion was to run a Monte Carlo analysis to examine the range of UFs implemented

It was suggested to look at test results for GenX and Nafion ® in emissions and what is known about the fluoromonomers processes. With regards to Camp Dixie Lake, where is the contamination coming from to still be seeing high levels of GenX after it has been drained? (Response) Currently, DEQ has one sample point at Camp Dixie (~600 ppt). The lake is a natural spring fed water body. DEQ can’t speak to prior conditions, or conditions beyond the one data point as to how GenX is getting in the water. The Board would like to see more information and data on this issue.

The Board wanted to provide statements for the Departments on where data may be lacking, statements on degree of data certainty, acknowledgement of data gaps, and a recognition that conclusions may change as additional information becomes available. Mention was also made that finalized reports on reproductive and developmental toxicity were needed.

VIII. Interaction with Media

Jamie Kritzer, Communications Director for DEQ, briefly went over how and when to interact with the media, including what best methods and processes to use. The Department encourages the Board to talk to the media if they are within their knowledge base and to make sure that it is noted that the communication is their opinion and not that of a Department. If any of the Board members are unsure how to answer question(s), they can email Jamie Kritzer. Whenever a Board member is approached from media, they should let the Departments know. Each Board member has been set up with a denr.gov email account. For records requests, this will work best, so as to not pull personal information into record requests. For the members who work for EPA, those employees need to check in with their supervisor before speaking with the media. Other advisory committees have a designated person for all media to go through, though the SAB does not, but individuals can respond based on personal experience. The SAB can use Sheila Holman (DEQ) as a point of contact. The current record retention schedule for all documents is 5 years.

IX. SAB Principles and Practices

This item was postponed for a later meeting.

X. Next Meetings

Board members agreed that for the January 29, 2018 meeting, the focus will be a substantive review of the GenX health effects information. Members proposed to evaluate what was done by DHHS and what could be contributed from a new literature review. They requested charge questions to help them prepare for discussions. This information should be given to the Board the first full week in January for them to be prepared.

For the March 19, 2018 meeting: the SAB requested to be oriented to the Hexavalent Chromium issues. The meeting was recommended to be held in a Piedmont meeting location.

The SAB meeting adjourned at 3:53 pm, December 4, 2017.

SAB Public Meeting

12/4/2017

Began at 6:05pm

(46 people)

Chairman Bartram recognized Rep. Deb Butler and Rep. Ted Davis in the audience. Bartram started with introductions of Phillip Tarte, Dr. Jackie McDonald Gibson, Dr. Betsey Tilson, Dr. John Vanderburg, Dr. David Doorman, Dr. Elaina Kenyon, Dr. Tom Augspurgen, Dr. Greg Cope, and Dr. Detlef Knappe, and stated that the chemicals they were asked to examine, have very little science backing.

Rep. Ted Davis, Jr. New Hanover County area – Representative Davis welcomed and was pleased to have the SAB in Wilmington. He is currently Chairing the NC River Quality Committee and is looking at all river areas across the state. He appreciates the varied expertise and is looking forward to working together for the benefit of all.

John Vindner, Chatham County along the Haw River – Commented on the amazing team in the SAB. He listened to the uncertainties and had a few statements. 1) with all the uncertainties, look at 30 years' worth of data in Wilmington. The epidemiological study will take some time. He encouraged the Board to look at birth certificate and death certificates, and possibly get students to help with research such as, Lake Norman for a possible cancer cluster. 2) The Board has an important task. Emerging contaminants are just coming to the forefront nationally. Be cautious. If you err, be too cautious, chemical companies have to spend too much. If you err on the other side, you may miss something of importance to people in the communities – toxic waste free play. Err on side of caution, follow the Cautionary Principle.

Roger Shea, Geology Professor – Mr. Shea stated he is less worried about GenX itself, but think more so the state departments should be conducting more of the work with people like

SAB for all the chemicals. Sometimes there are misstatements on protecting public health. Appreciated concept earlier on range of values and in context to exposures. The 2000 ppt in honey is of concern to the individual and what else could be contributing, like the plastics? What are the levels in our food? Does it bioaccumulate or pass through? How do these compounds work in conjunction? NJ – put out on their website (err on the side of caution) vs. EPA comparison of values on consumption. SAB work is a great way to assess all the information. Would like to see soil profiles and sediment, especially at Camp Dixie location. Look at other types of soils along the river to see concentrations. Asked that all materials be relatively available to the public. TSCA is woefully lacking in the US. His drinking water level is 900 ng/l, and concern is not just GenX. Can buy Reverse Osmosis (RO) water at Whole Foods.

Jessica Cannon – Ms. Cannon thanked the Board and was grateful for the process. She is a mother of sons ages 14 and 7 years. She is a retired OB-GYN doctor, and had some policy experience on Capitol Hill. Ms. Cannon has focused on this issue since it started in June. Precursor C-8 are associated with a host of cancers. They easily slipped into GenX, could it have similar actions? The corporation has horrifying safety record and lost class action law suit in the past, which speaks to their corporate culture. North Carolina is somewhat losing forest through the trees. She advocated using the precautionary principle to protect public health, as done internationally. Have half a century of robust information on two of these chemicals:

- 1) Start health studies to see what has happened.
- 2) Educate public and legislators on precautionary principle
- 3) Ensure state agencies have adequate staff to work on these problems. The company can out gun them. Science is now political. Ask the questions to ensure they can address the issues.

Representative from **Cape Fear Care** – requested based on information shared during the afternoon: 1) Look at New Jersey and PFOA format for setting standard. As Rodger Shea and Dr. Knappe mentioned, we are ignoring all the other compounds. Get realistic in the reporting the combination of chemicals. Chemours should have studies even if under CBI, or can start their own mice and rat/animal studies including Nafion®. Toxicologists indicate there are potentially more toxic chemicals and at higher concentration than GenX. Air permit: Nafion® testing, groundwater and air standards. Assume EMC is working on GenX surface water standard, ask them to look at groundwater standard. None of this has been on the EMC agenda in November. Is DHHS working on a Nafion® health goal, any studies, ask Chemours for health studies and data? Talk to DEQ to have a public hearing in Wilmington on the permit, not just near the plant. They advocated representation on Ted Davis’ committee from other representatives, specifically select Rep. Deb Butler to join the Committee.

Ellen Donnavan – Ms. Donnavan is a mother of twins that are 8 years old and have drank the treated water their entire life. She has attended meetings and toured US EPA lab. She understands precautionary principle. You can’t answer questions, you cannot say it is safe. Look at thyroid cancer rate in New Hanover County: three counties have highest level in the

state, which was not released in original DHHS health study. If you have drunk a high level of GenX for long time, is it accurate to assume health level is 140 ppt? There is more than GenX in the water. DEQ is working hard on getting Nafion® assessment done. Please engage semi-quantitate assumptions in the process. They are in the water. Tested school water – all PFAS totaled 168 ppt on 10/31/17. What does it mean if we only have toxicity on a few chemicals, what does it mean to have all these other compounds in there, too?

Nelson Bullard – Mr. Bullard is a father of two children. He thanked the panel, and has a sense of confidence. Sense of fear from something so simple as letting us know just how safe our water is. Focus on transparency and clarity. In a crisis, information breeds confidence, lack of it breeds fear. He is running for office in New Hanover County. Constituents say they don't know what's going on. He does not feel like he knows enough, that goes back to lack of communication. Struggling with clarity on water quality information, which is difficult. Need transparency and communication.

Sue Mintz, Cape Fear for Justice – is focused on clean water, concern on all the things brought up. Most disturbing thing she heard earlier, is that Bladen County residences are being provided with bottled water. The state must realize that it's not safe. She believes more advisement is needed to the public, more specifically on drinking water. Really feel that the Scientific Board should study every school in the Cape Fear school systems. She is a retired Pender County school employee. Concern on groundwater in Pender County wells. Build confidence if all the schools are tested and more wells in Pender County.

Name not listed – participated in the afternoon meeting. Really appreciates the SAB opening to other people to speak and listening to people telling you what to do. Whatever the level is, if it's 140 ppt, or not. There should be recommendations not to cook, drink, etc. We have not heard about levels in foods. We use farmers markets and support local farmers. We use water to grow foods. What happens when it passes through a tomato? Not just drinking the water, we are eating the water. Keep that in mind.

Name not listed – Dr. Bartram made a comment earlier on being data poor, and I agree with that statement. As you convene in the piedmont on GenX, we don't have a lot of information. One clinical test performed by Chemours, that's essentially it. EPA may have some studies to look at. This evaluation will take the right research and data. It will not come quickly, in January when Rep. Davis will hold his next meeting. I have confidence in UNC-W but it is beyond that data. Gather data, who is the best source for the information to bring it forward, and not to be political, will be key. Precautionary principle should be on the front page. Advocated for Rep. Deb Butler to sit on Rep. Davis Committee. Much more comfortable having her on the Committee to help address issues.

Clara Shultz – appreciate everyone's participation. She has a son, with diverticulitis and moved to a home near Superfund site unbeknownst to her. When away in Paris, everything cleared up. Countries in Europe so far ahead of us in protecting the citizens. As a mom, please look at this and understand you are working with people's lives.

Chairman Bartram summarized the comments heard. There is a long history and this has been happening for a long time. There is a complexity of many substances that need to be studied. The need to communicate clearly is great and need to err towards caution. The SAB needs not lose sight of other pathways and to try to stay clear of being political. Bartram thanked everyone for participating, and that the information will continue to be posted on the website.

Adjourned – 7:10 pm