

## **NBB's response to DEC's statements in their letter to John Ruspantini (dated August 1, 2020)**

**Sept 16, 2020**

### **Introduction:**

The No Burn Broome science team (**NBB**) is responding to the long letter Tom Elter (of the NYSDEC) sent to John Ruspantini on August 1, 2020. Answers to our concerns were given under 17 headings.

Promoters of the SungEel (or SMCC, used interchangeably in this letter) project are claiming that this DEC letter has taken care of all of No Burn Broome's concerns and that this facility poses no health threat to local residents. Nothing could be further from the truth. The NBB response below (in bold) sets out to put the record straight.

**We have put Elter's 17 headings in blue because they refer back to statements from ourselves (No Burn Broome).**

**Sept 16, 2020**

Dear Mr. Elter:

Thank you for responding to the letter that we originally addressed to Governor Andrew Cuomo dated June 1, 2020. We are writing this letter to address the comments you made in your August 1, 2020 letter response.

In general, we found your responses to be dismissive and unable to fully address the concerns and risks that we have raised. It is clear that NYSDEC, Empire State Development or anyone else involved in the siting of this so-called battery recycling facility is intent on ensuring that it becomes a reality, regardless of its true nature or risks to the community.

NYSDEC is principally concerned with issuing a permit from a legal perspective; that is, only what is enforceable by current state environmental law (which we believe to be inadequate for the current task) and regulation and seems disinterested in trying to fully understand the nature of what it is they are permitting with regard to hazardous air pollutants. The Empire State Development Corp, now under fire for reckless spending of taxpayer money (see Albany Times Union Article <https://www.timesunion.com/opinion/article/Editorial-ESD-s-reckless-spending-15514634.php>)

rushed to bring this facility to Endicott without properly vetting it for safety, taking the company's own information as gospel proof that it is a "green" operation, and most unbelievably, never actually visiting the site.

And so, NYSDEC chooses to rubber stamp initiatives driven by the Cuomo administration while admitting that the chemistry of the process is not well understood. Well then, how can NYSDEC be protective of human health and the environment if it does not understand the nature of the hazards posed by the chemicals involved in the process? The answer is, it cannot.

**1. You suggest that Empire State Development cancel their public subsidy to Metallica Commodities Corp and SungEel.**

**NYSDEC Comment:** Empire State Development offered incentives to encourage this company to set up its operations in Endicott, and not in Pennsylvania where the business was originally looking. Endicott and the greater Binghamton region included a growing cluster of lithium-ion and other battery businesses and the State economic development agency believed the battery recycling project was a good fit for the area and would bring needed investment and jobs to the community. Currently, Empire State Development does not intend to rescind its incentive offer. However, it is important to note that the business will not receive any incentives if it does not meet its committed investment goals and create at least 86 full-time jobs in New York State.

**NBB Response:** The battery incinerator is a terrible fit for the community and ESD should have vetted SungEel before taxpayer funds were committed to this project. The site in Endicott was never even visited by Brenda Grober of ESD who brokered this deal. She has stated that she was completely unaware that Endicott had a TCE plume issue and has been suffering from related cancers and diseases for these past several decades.

Most disturbingly, a 6NYCRR617.4 Type1 SEQR Coordinated Review followed by a full Environmental Impact Statement (EIS) should have been conducted to allow the community to have had an opportunity to weigh in on this decision in a proper fashion. This important step was completely bypassed. This was a very insensitive way of treating a community that has already suffered from past industrial operations, which were presumably permitted by NY State authorities.

**2. The Title V permit issued to SMCC must be rescinded.**

**NYSDEC Comment:** The facility was not issued a Title V permit. Title V permits are issued to facilities with the potential to emit pollutants at major source thresholds (10 tons per year of any federal hazardous air pollutant, 25 tons per year of all federal hazardous air pollutants, 50 tons per year of volatile organic compounds, and 100 tons per year of all other regulated pollutants), or are otherwise required to obtain a Title V permit (such as incineration facilities regulated by the federal

Environmental Protection Agency, or EPA). The EPA has determined that this process is not regulated by their rules. Also, annual emissions are well below the Title V thresholds; for example, NOx emissions are estimated to be 0.6 tons per year; the Title V threshold is 100 tons per year. VOC emissions are projected to be 0.3 tons per year; the Title V threshold is 50 tons per year. Emissions of other contaminants were similarly much lower than the Title V thresholds. Given such low emissions, a Title V permit was not required. The facility was issued a State Facility Permit.

Regardless of the type of permit, you state that it should be rescinded. The facility is required to comply with our regulations, and has provided sufficient documentation that such compliance will be achieved. DEC does not see any justification for rescinding the permit. And, as discussed below, the facility cannot operate without first documenting whether the batteries contain PFAS.

**NBB Response:** The DEC acknowledges that the chemistry of this so-called recycling process is not well understood. Accordingly, it is unclear how NYSDEC can make a determination on what type of permit should be issued. If the NYSDEC does not have a good understanding of the hazardous air pollutants regulated or not, it is illogical to assert implicitly or explicitly that human health and the environment are adequately protected. Compliance with regulation does not ensure the safety of the community or the environment, especially for a process that is a “first of its kind” in the US. There is no precedent for permitting of such a facility anywhere in the U.S. and to rely solely on what is “legal” instead of investigating scientific arguments is unprotective of the community.

Furthermore, the State Air Quality Permit was issued under the assumption that the local zoning could accept the facility which was not the case and it was also incompatible with the Town of Union’s Comprehensive Plan. These faulty assumptions calls into question the legality of the permit and is cause alone for the permit to be revoked until such time the local zoning ordinance and local planning is amended to accept the facility.

### **3. The proposed SMCC facility poses a serious health risks to the Endicott community.**

**DEC Comment:** You have not provided any documentation that suggests that emissions from this facility will pose a serious health risk to the community. The presence of a contaminant in the exhaust is not dispositive that serious health risks will occur. The SMCC facility is subject to 6 NYCRR Part 212, which was designed to protect the health of the public, especially where toxic contaminants persist.

The permit requires compliance with Part 212, and includes permit conditions for specific High Toxicity Air Contaminants that limit annual emissions to less than the mass emission thresholds in that regulation, and includes a generic, catch-all condition that limits emissions of all HTACs to below their respective mass emission thresholds. The emissions of HTACs from the facility are

predicted to be well below the thresholds. DEC believes compliance with the rule will protect the environment.<sup>1</sup>

Regarding per- and poly- fluorinated alkyl compounds (PFAS): DEC has the authority to modify, suspend or revoke permits based on newly discovered information. As soon as DEC became aware of the potential presence of PFAS in the batteries, we directed SMCC to investigate the issue. We also advised SMCC that processing PFAS containing batteries would not be allowed under the current permit, and that a modification would be required if batteries containing PFAS were accepted. Furthermore, to process any batteries at all, SMCC would have to document, through vendor certifications, that those batteries did not contain PFAS. Finally, SMCC has committed to testing its plant in South Korea for certain contaminants, including PFAS, dioxins and hydrogen fluoride.

DEC has taken all necessary steps to insure emissions from the facility will protect public health.

**NBB Response:** The NBB Science Team has provided ample documentation for the potential for serious health risks in our June 1, 2020, white paper entitled *Chemical and toxicological concerns about the SMCC (SungEel) facility proposed for Endicott, NY*, as well as other correspondences. However, NYSDEC is attempting to dismiss nearly every concern out of hand, with the exception of the PFAS issue, the environmental concern du jour. They have ignored or downplayed the potential for the formation of fluorinated benzene compounds from subjecting PVDF to high temperatures and the formation of PICs (products of incomplete combustion) from subjecting PFAS to high temperatures. Not to mention nanoparticle formation which DEC has completely dismissed and trivialized, as noted below in section 11.

It is unclear how DEC can ensure protection of human health and the environment, when they do not know what hazardous air contaminants will be present in the SMCC process stream. DEC has acknowledged that the chemistry of this process is not well understood. Ergo, it would be impossible to use any chemical list and threshold limit thereof to make a determination as to whether or not the local community will be adversely impacted.

While the DEC might argue that they do not understand the chemistry involved in this process, well enough to make predictions, what they could have done – and should have done – was to make sure that the emission data submitted to them by SungEel was thorough and comprehensive and collected with third party oversight. The data sets presented are way too sparse to represent conditions in a dynamic process.

The SMCC sister plant has operated in South Korea without monitoring for 10 years or more. The NYSDEC is basing its permit on an inadequate data set density with poor reporting and no third-party oversight. Every estimate of yearly emissions was based on single spot tests for each pollutant. Thus, none of their data was “statistically valid”- you need at least three tests for each

pollutant to determine a low value, a high value, a geometric mean, a standard deviation and a 95% upper confidence interval to estimate yearly emissions with any confidence. For a “first of its kind” operation in the USA it was incredible that the NYSDEC accepted these test results to gauge the safety of this operation. This becomes clearer as you look at the details.

Three separate testing events were reported as summarized in the attachments (D, E and F) and Tables 2E and 2F (see Figures 1 and 2 below) in SungEel’s air permit application.

The first testing was on a pilot scale project and measured the air pollutants before the air pollution control (baghouse and wet scrubber). See figure 1. Only single test results were given for each pollutant. No date was given for this testing and it could have been done any time during 10 years of operation, but since it is labelled a “pilot test” it was probably performed early in the plant’s history (otherwise they could have done the testing on the full-scale facility).

The puzzling feature about these test results was the Non-Detect (N.D.) value given for Fluoride compounds (i.e., hydrogen fluoride). Because hydrogen fluoride should have been produced by heating and breaking down both PVDF (the binder) and LiPF<sub>6</sub> (a common electrolyte). It is possible that they have confused hydrogen chloride (which they found at 24 ppm) for hydrogen fluoride. Such a confusion seems a reasonable suggestion because there not many compounds containing chlorine in Lithium-ion batteries, but there are several containing fluorine.

If SungEel did not confuse HCl for HF in this testing, then this is not good news for SungEel because it means that most of the fluorine has ended up in fluorocarbons that they did not monitor.

The second testing was done on Nov 19, 2018 on emissions made on the full-scale sister plant to that proposed for Endicott. See Table 2C, reproduced in Figure 2 below. Everything was based on a single test, and all carried out on a single day. Again, there is no valid basis to use this data to estimate yearly emissions, given the dynamic nature of this process.

The third testing was done in June 2019 for dioxins. In this testing only one short term (4 -hour test) measurement was made for the 17 dioxin and furan family members of concern. Again, this gave no statistically valid data to estimate a yearly emission figure for dioxins - but the DEC used this single data point to do just that!

**SMCC LIB Recycling Facility**  
**Village of Endicott, Broome County**

**Table 2D - RK Dryer - Exhaust Gas Analysis - Pilot Test\* (No Controls)**

Contaminant Name	Units	Cylindrical Li-Ion Battery Cell	Polymer Li-Ion Battery Cell	Prismatic Li-Ion Battery Cell	Maximum Concentration	Units	Maximum Concentration
Dust	mg/m <sup>3</sup>	ND	ND	ND	0	lbs/scf	0
Ammonia	ppm	37.27	155.92	42.19	155.92	lbs/scf	6.90E-06
Benzene	ppm	ND	ND	ND	0	lbs/scf	0
Carbon Monoxide	ppm	ND	ND	ND	0	lbs/scf	0
Fluoride Compounds	ppm	ND	ND	ND	0	lbs/scf	0
Formaldehyde	ppm	1.27	0.07	ND	1.27	lbs/scf	9.90E-08
Hydrocarbons	ppm	ND	ND	ND	0.00	lbs/scf	0
Hydrogen Chloride	ppm	24.30	ND	ND	24.30	lbs/scf	2.30E-06
Nitrogen Oxide	ppm	ND	ND	ND	0	lbs/scf	0
Sulfur Dioxide	ppm	ND	ND	ND	0	lbs/scf	0
Cadmium	mg/m <sup>3</sup>	0.15	0.09	ND	0.15	lbs/scf	9.36E-09
Copper	mg/m <sup>3</sup>	0.08	1.21	ND	1.21	lbs/scf	7.55E-08
Lead	mg/m <sup>3</sup>	ND	ND	ND	0	lbs/scf	0
Mercury	mg/m <sup>3</sup>	ND	ND	ND	0	lbs/scf	0
Nickel	mg/m <sup>3</sup>	0.22	3.63	0.11	3.63	lbs/scf	2.27E-07

\*Pilot test of same process on pilot scale performed in South Korea. Data is for exhaust emissions from furnace before baghouse and

ND Not

mg/m<sup>3</sup> Milligrams per

ppm parts per million by

lbs/scf pounds per standard cubic foot

**Figure 1: A pilot scale test in South Korea. The emissions were measured after the furnace (afterburner?) and before air pollution controls (baghouse and wet scrubber).**

**SMCC LIB Recycling Facility**  
**Village of Endicott, Broome County**

**Table 2E - RK Dryer - Exhaust Gas Analysis - Full Scale Facility\***

Contaminant Name	Molecular Weight	Units	Various Li-Ion Battery Cell 11/19/2018	Units	Maximum Concentration
Dust-PM-2.5	NA	mg/Sm <sup>3</sup>	0.4	lbs/scf	2.50E-08
Dust-PM-10	NA	mg/Sm <sup>3</sup>	0.9	lbs/scf	5.62E-08
Ammonia	NA	ppm	ND	lbs/scf	0.00E+00
Fluoride Compounds	19	ppm	0.10	lbs/scf	4.93E-09
Formaldehyde	30	ppm	0.05	lbs/scf	3.90E-09
Hydrocarbons	78	ppm	34.59	lbs/scf	7.01E-06
Hydrogen Chloride	NA	ppm	ND	lbs/scf	0.00E+00
Nitrogen Oxide	46	ppm	9.0	lbs/scf	1.08E-06
Sulfur Dioxide	64	ppm	1.0	lbs/scf	1.66E-07
Sulfuric Acid	98	ppm	1.0	lbs/scf	2.54E-07
Aluminum	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Arsenic	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Beryllium	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Cadmium	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Chromium	NA	mg/Sm <sup>3</sup>	0.0002	lbs/scf	1.25E-11
Chromium, Hexavalent	NA	mg/Sm <sup>3</sup>	0.0002	lbs/scf	1.25E-11
Cobalt	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Copper	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Lead	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Lithium	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Manganese	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Mercury	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Nickel	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
Vanadium	NA	mg/Sm <sup>3</sup>	ND	lbs/scf	0E+00
PCDD/DFs	NA	ng/Sm <sup>3</sup>	0.016	lbs/scf	9.99E-16

\*Test of same process performed in South Korea. Data is for exhaust emissions from furnace after afterburner, baghouse and scrubber.

ND            Not detected

mg/Sm<sup>3</sup>      Milligrams per standard cubic meter

ppm            parts per million by volume

lbs/scf        pounds per standard cubic foot

**Figure 2: Table 2C. Exhaust emissions from stack made after the air pollution control (baghouse and wet scrubber).**

**The DEC thus used a non-representative set of data – which were statistically invalid – to estimate yearly emissions to support issuing its air permit.**

Furthermore, this air permit was issued without taking into account the special vulnerabilities of the local community and it was issued without even a visit to the location in Endicott. How much more exposure to carcinogens could someone take who already has cancer? It is because of these special vulnerabilities that a full environmental impact assessment should have been taken. DEC has proceeded as if this required no examination beyond regulatory standards. Would DEC's regulatory standards protect any community regardless of location or previous chemical exposures?

**4. Aqueous processes should be sought out and employed in preference over incineration or pyrolysis.**

**DEC Comment:** DEC does not generally prescribe to an applicant how to manufacture or process its raw materials; that is left to the applicant. Rather, we prescribe permit conditions that will insure compliance with our rules. Nonetheless, we have briefly discussed with SMCC lithium ion battery recycling processes that do not involve heating, and they described their reasons for selecting a heat-based treatment. DEC did not prescribe, nor has the authority to prescribe (without supporting regulations), the use of specific processes over others.

**NBB Response:** If a 6NYCRR617.4 Type1 SEQR Coordinated Review followed by a full Environmental Impact Statement (EIS) was conducted before a deal was brokered with SMCC, alternatives to incineration or gasification would have clearly demonstrated that utilize less risky methods of recycling these batteries. These would have been more appropriate especially in the context of a diseased community that has suffered decades of exposure to industrial pollution. We can only surmise that NYSDEC was afraid that an EIS would have revealed this or realized that would have taken too long for SMCC to wait around. In any case, we find this most disturbing omission to be a reflective of an insensitive attitude towards the welfare of the people of Endicott.

**5. DEC did not adequately scrutinize a first-of-its-kind in the US incineration process.**

**DEC Comment:** The application, as are all air pollution control permit applications, was submitted by a licensed professional engineer. It is the obligation of the applicant's engineer (and the applicant) to make a complete submission, including estimation of all emissions. That application was reviewed by myself, also a licensed professional engineer; as a result, multiple correspondence between DEC and the applicant occurred. The permit, after issuance, was also evaluated by an independent environmental consultant hired by the Village.

In addition to imposing enforceable conditions on emissions that are very restrictive, DEC also included conditions for the applicant that require monitoring of emission control equipment, monitoring of contaminants in captured dust, an operation and maintenance plan, and a battery sorting plan with the intent to focus on fire prevention. DEC also required additional data on dioxin emissions. The permit process took over a year, with a Registration application submitted in December 2018, followed by a State Facility Permit application in May 2019, with a revised application in September 2019. The application received a great deal of scrutiny.

**NBB Response:** SMCC and/or their engineer failed to disclose that some lithium-ion batteries contain PFAS which is an important concern for New York, given that water supplies in Hoosick Falls and Newburgh have been contaminated with the highly toxic forever compounds *that are designed not to burn or degrade*. Accordingly, it would only stand to reason that the applicant and their engineer do not have a complete understanding of their process and the chemical hazards present, or simply decided to withhold this information from the DEC to avoid more stringent regulation. In either case, relying on these parties to provide NYSDEC with all the information necessary to make an appropriate decision regarding this facility would not be prudent in the endeavor of protecting human health or the environment.

NYSDEC did not properly explore the potential for the various fluorinated compounds to react and reform other species perhaps even more toxic than the original compounds when heated in the process train. Despite repeated requests from NBB, the NYSDEC could not provide the percentage by weight of fluorine in the batteries. The DEC should have been able to get this from the company. This is exactly the kind of data one needs to assess potential emission problems - in the absence of a lot of data from existing plants and for a first of its kind of operation in the USA! Considering the highly reactive nature of fluorine and its propensity to form highly toxic compounds such as HF and fluorinated benzenes, and other fluorinated byproducts (including PFAS) as we have posited, NYSDEC was remiss in not asking more of the company in this regard.

Everyone knows that oil and water do not mix. The scrubber system that SMCC plans to utilize uses a polar solvent (sodium hydroxide – NaOH – solution) and will only remove polar compounds such as HF. What about the non-polar compounds such as the fluorinated benzenes and other fluorinated byproducts (including PFAS)? “Not enough to matter,” you DEC said in a recent phone conversation. Is that based on empirical data or a professional guess?

Furthermore, the “independent” consultant hired by the Village was working under the direction of Mayor Linda Jackson who has been a vociferous proponent of this facility and is clearly fixated on establishing this facility in Endicott by any means necessary. It would be in this consultant’s best interest to slant its view of this matter in favor of its client and therefore cannot be characterized as truly “independent”.

## **6. A full Environmental Impact Statement was never prepared.**

**DEC Comment:** Under the New York State Environmental Quality Review Act (SEQR), only projects determined to have a potential for a significant adverse environmental impact are required to be evaluated in an environmental impact statement. Nevertheless, based on the available information provided in the company's permit application, all relevant areas of environmental impact were identified, and none were found to have a potentially significant adverse environmental impact. Any new information that may become available and requires action on the issued permit will be thoroughly evaluated under SEQR to determine the potential environmental impacts.

**NBB Response:** The NYSDEC and ESD took SMCC's assertions that they had a "green" process at face value. They both failed to subject a "first of its kind" in the U.S. of this high temperature battery recycling facility, to an adequately rigorous analysis that an EIS would have furnished. The ESD brokered a deal with the company to site them in a pollution weary community before determining its safety. DEC issued a permit from a legal perspective; that is, only what is enforceable by current state environmental law and regulation and were disinterested in trying to fully understand the nature of what it is they are permitting with regard to hazardous air pollutants.

The fact that this technology is coming from a foreign country and the fragile nature of Endicott should alone have been enough to require an EIS. We believe that a full EIS would have determined that this facility is completely inappropriate for this location and that is the reason why it was sidestepped.

Furthermore, why is it the job of the public to provide NYSDEC with information regarding what it regulates, such as the PFAS. Shouldn't we, the people you work for,-rely on you, the DEC, to dig for the information needed to protect us?

## **7. The chemistry of the process is not fully understood.**

**DEC Comment:** *We agree that the chemistry is not well understood*, but emission tests can be specified to look at those contaminants that might be expected to be created (such as dioxin). We were presented with emissions data from both a pilot plant (uncontrolled emissions) and an existing facility in South Korea, of which the proposed Endicott facility will be patterned; DEC was told that the South Korean facility will essentially be replicated at the Huron campus. Emissions data from a similar device is, in the opinion of just about any air pollution professional, the desired source of data. Also, the control equipment that will be installed to meet these limits will effectively control a wide range of contaminants (*our emphasis*).

**NBB's response:** If the chemistry of the process is not well understood then the hazards associated with the process are not well understood and NYSDEC cannot adequately protect human health and the environment from hazards associated with the SungEel process.

### **The DEC's lack of curiosity**

But, it is not the DEC's lack of understanding on some key emissions (e.g., nanoparticles and fluorinated by-products) but their *lack of curiosity* on these matters that concerns us.

Here are some of the key weaknesses in the NYS DEC's position which underline their lack of curiosity:

1. Apart from a test on a pilot scale plant, SungEel provided no testing data for over 10 years of operation in South Korea. Why was that?
2. The first data SungEel provided was for its air permit application in 2019. Even so, the air samples collected were not overseen by anybody working under the direction of the DEC. The DEC has relied entirely on SungEel's own data with no oversight or scrutiny. For site remediation projects, DEC has a monitor present to observe samples being collected for endpoint of excavation, for example. Why the double standard?
3. Moreover, SungEel only provided single tests for each pollutant (single tests for kiln emissions; a single test for dioxin and a single test for stack emissions for each battery type). You can't do statistical analysis on single data points. You need at least three data points for each test so that a low value, a high value, a geometric mean, a standard deviation and a 95% upper confidence interval can be reported. Without this statistical treatment you cannot predict annual emissions.
4. Barton and Loguidice (a firm hired by the Village of Endicott to review the air permit application) also noted that single tests were insufficient – that triplicates are usually required – and more information was needed. However, they swallowed these inadequacies on the basis that further testing would take place in Endicott, after the facility went into operation. This is too late as far as the residents and we are concerned. Appropriate testing should be done in South Korea, under the purview of DEC, *before* any green light is given for this project to proceed. Here is the excerpt from the Barton and Loguidice Report (April, 2020):

"The stack test results presented in the Air Permit Application indicate that the results are based from a single sampling run for each test. The facility operational data and laboratory reports are not included with this data. Typically, this information is required to be included to review how the facility was operating during the testing. For example, NYSDEC mandated testing requires a facility to operate within 90% of a source design capacity for regulatory tests. For the dioxin test, the battery cell throughput rate was provided (2,070 lb/hr), which is within 90% of the proposed facility design capacity (2,200 lb/hr). Operational parameters were not provided for the other tests. Additionally, triplicate test runs are typically required for stack testing to evaluate variability in operations and testing methods.  
<http://fluoridealert.org/wp-content/uploads/endicott.barton-loguidice.april20.2020.pdf>

5. We repeat that DEC is relying on data that is statistically invalid. This does not represent a solid basis on which to base permit levels or judgments about safety.
6. The DEC makes the implicit assumption that if something is not monitored or regulated it poses no risks to human health (e.g., nanoparticles and uncharacterized fluorinated by-products). This is not defendable from a scientific point of view.
7. The DEC makes the implicit assumption that *small* quantities of persistent and exquisitely toxic materials are tolerable. Again, this is not defendable from a scientific point of view.
8. The DEC makes the implicit assumption that the Endicott population can withstand more pollution despite their previous exposure to industrial pollution and the resulting compromised health situation for the local population.
9. Did the DEC not consider the fact that Local residents have experienced statistically significant elevations of leukemia, kidney and testicular cancer, measures of low birth weight, and congenital heart defects? These elevated health conditions have been very well documented by reputable researchers from state and federal agencies and independent researchers, including: New York State Department of Health, 2004<sup>1</sup>; ATSDR 2006<sup>2</sup>; Clapp and Hoffman, 2008<sup>3</sup>; and Forand, et al. 2012<sup>4</sup>.
10. Knowing that the DEC had identified at least three known carcinogenic substances that would be emitted from SungEel's smokestacks (chromium VI, formaldehyde and dioxins), did they not ask basic common-sense questions like: how much more cancer-causing chemicals can someone withstand, who already has cancer?
11. The NYSDEC's optimistic assumptions (based upon the slimmest and unscientifically defendable databases) are inadequate to address the dangers and hazards posed by a "first of its kind" operation in the U.S. and certainly inadequate to assess the special threat to this health-compromised community.
12. The DEC's air permit is based on grossly inadequate data, but before this was issued the fatal flaw in the DEC's actions was publishing a "negative declaration" in its SEQRA review published in Oct 2019. This action ruled out a Type 1 SEQR review, thereby eliminating the need for a Full Environmental Impact Statement (EIS). An EIS would have established that this project in this location, in this already health-compromised community, was unacceptable by any reasonable standard.
13. Issuing this "negative declaration" was a huge disservice to the citizens of Endicott and beyond. In our view, it did not meet the DEC's obligation to protect human health or the environment. We can only assume this decision was made based upon political pressures exerted from Albany, rather than a careful analysis of the potential impacts of this plant on the local community and local environment.
14. Turning to the chemistry, there is not a single mention in DEC's letter of PVDF (PolyVinylidene DiFluoride) even though:
  - 1) We discussed this extensively in our letter to Governor Cuomo and our white paper.
  - 2) PVDF makes up 3% of the cathode material of lithium -ion batteries. And in turn the cathode material makes up about 30% of most of these batteries.
  - 3) It contains 60% fluorine and would be a large source of hydrogen fluoride when burning 12 tons of these batteries a day.
  - 4) It is likely to yield many fluorinated byproducts among the PICs (products of incomplete combustion) emerging from the afterburner in SungEel's process.

- 5) We have provided empirical evidence for the formation of these PICs in our letter to Governor Cuomo and our white paper, based on a search of the literature.
- 6) These PICs are likely to include PFAS (which the DEC is so concerned about) because of the likely production of precursors like CF<sub>2</sub> free radicals in the rotary kiln. Phelps discusses these CF<sub>2</sub> free radicals in her EPA presentation (Phelps, 2020<sup>5</sup>).
- 7) One can easily see how formaldehyde (CH<sub>2</sub>O) (one of the contaminants that DEC recognized and is regulating) is formed from the partial combustion of PVDF (CH<sub>2</sub>CF<sub>2</sub>)<sub>n</sub> and its breakdown products.
- 8) A curious DEC would have acknowledged the findings above. Had they done so they might have pursued with more vigor what fluorinated PICs might be produced in this process over and beyond their legitimate concerns about the PFAS in the batteries themselves.

## 8. **There is a potential to produce significant amounts of hydrogen fluoride**

**DEC Comment:** Estimates of hydrogen fluoride (HF) provided by Dr. Connett conflict with the data provided by SMCC for both the pilot plant (uncontrolled) and the South Korean facility (again, with controls like what is proposed for Endicott). The HF emissions calculations provided by Dr. Connett were under a hypothetical battery fire; another reference included emissions from simulated battery fires.

The kiln process heats the batteries, the internals of which are isolated from free oxygen. The intent is to vaporize or volatilize the electrolyte carrier, as well as conditioning the batteries and removing residual charge. Comparing a controlled process to uncontrolled fires is not appropriate.

While the HF estimates provided by Dr. Connett, on paper, appear possible, if those emissions occurred in practice the concentrations that result (~3,000 ppm HF) would likely deteriorate the process equipment quickly, and present a dangerous, potentially deadly situation should leakage into the plant occur. Instead of all the fluorine being liberated as HF in the kiln, it is possible, if not likely, that fluoride salts (such as sodium and lithium) remain behind as the solvent is vaporized of those salts boil at 3,000 degrees F. This will reduce the amount of HF that is emitted. We cannot conclusively say that HF will not be emitted. Instead, we rely on actual test data. The calculations provided by SMCC result in actual emissions of HF that are very low. Reliance on test data is standard protocol. While the opponents of this facility debate the robustness of the testing, and clearly doubt the results, such testing but nonetheless, have asked SMCC to test HF emissions as the South Korean facility. DEC may consider a condition limiting HF emissions to no more than 100 pounds per year, pending more testing on the South Korean facility. The current application presented an actual annual emission rate of just 5.4 pounds per year.

**NBB Response:** We well understand the practical difference between open flame burning of batteries and heating the batteries to a high temperature in the absence of oxygen; however, scientific literature concerning the former is scant, so we used the closest scientific information available to posit potential chemical hazards. But therein lies the problem; that is, because there is little-to-no information regarding the chemistry of this process, no one seems to have the knowledge necessary to make the decisions that NYSDEC is making. Way too much guesswork.

And guesswork is not good enough when it comes to protecting human health and the environment.

As for the sampling, NYSDEC requires that a monitor be present to view sampling for site investigations and remediations. That site monitor often directs the Responsible Party's representatives on where and how many samples to collect, to ensure the integrity of the sampling. Why does NYSDEC not require the same level of sampling scrutiny for the South Korean sister plant? We totally understand that a Professional Engineer (PE) is signing off on the sampling in this case, but NYSDEC has no way to possibly verify that these air samples were collected properly when they or a NYSDEC contractor was never present to see it. The risk for the PE is virtually non-existent under these circumstances. Furthermore, NYSDEC should have required the facility to provide test results from more than just one sampling event given the dynamic nature of such a process. After all, the SungEel plant in S. Korea has been reputed to be in operation for 10 years. Why not look at the operation data from this period of time? Or, were they even doing any sampling during this time?

HF is very toxic and is a principal concern. We were forced to do these rough calculations because neither SungEel nor the DEC provided any information on this important tissue. We may agree that using data from battery fires is not a good comparison to the portion of the process in the kiln or the first heating stage; however, the second stage where the resulting gases are burned in the afterburner would in fact be a much more comparable circumstance.

We have highlighted (in-underline-italics) a section of DEC's response on HF which goes to the heart of the problem.

- 1) SungEel only offered one measurement of HF at the rotary kiln exit and only one measurement of each of three battery types at the stack exit (i.e., no HF measurement for a mix of batteries that will be burned in the Endicott facility). This data is statistically invalid. As explained in section 6 above, you need at least three data points for each measurement to undergo statistical analysis.
- 2) SungEel should have measured HF before and after the wet scrubber for several key reasons:
  - a) It would have given a measure of the total HF generated (i.e., before removal in the wet scrubber);
  - b) It would have given an indirect measure of how much fluorine was not fully converted to HF and thus, by deduction, how much of the fluorine ended up in fluorinated byproducts (i.e., as PICS); and
  - c) It would also have given us a measure of the efficiency of the wet scrubber (which we expect was good).

We discount the speculation (unsupported with any scientific reference) the DEC offers for what they say are low HF emissions from the kiln exit. DEC asserts, "Instead of all the fluorine being

liberated as HF in the kiln, it is possible, if not likely, that fluoride salts (such as sodium and lithium) remain behind as the solvent is vaporized; both of those salts boil at 3,000 degrees F. This will reduce the amount of HF that is emitted. We cannot conclusively say that HF will not be emitted."

DEC's speculation is here highly unlikely to be true for the following reasons:

1. There is no evidence for the presence of sodium ions in the lithium-ion batteries.
2. As far as the electrolyte is concerned ( $\text{LiPF}_6$ ) there is only one lithium ion for six fluorine atoms, so there would be inadequate lithium to mop up all the fluorine from the  $\text{LiPF}_6$ , let alone from the PVDF, to form lithium fluoride.
3. A more likely explanation is that in the rotary kiln the thermolytic breakdown of the PVDF has yielded hundreds of different fluorinated organic compounds and reactive intermediates (e.g., CF<sub>2</sub> free radicals).
4. In the afterburner some of these will be further broken down to yield more HF and other PICs containing the C-F bonds. SungEel made no effort to monitor any of these, nor did the DEC even consider the possibility of their formation. Some of these PICs may have been newly formed PFAS.

**Finally, DEC gives us no reference to this calculation for an emission rate of 5.4 pounds of HF per year. On what is this based?**

## **9. DEC is looking into the presence of PFAS in batteries after issuance of the Title V permit.**

**DEC Comment:** Correct, though, as noted above, the Department issued an Air State Facility permit, not a Title V permit. We became aware of the possible presence of PFAS shortly after the permit was issued from scientists at the New York State Attorney General's office, upon which we acted immediately to inform SMCC's consultant, and followed that up with a letter to SMCC that stated we would not allow processing of batteries without certification from the vendor of the absence of PFAS containing- materials. If PFAS is found to be in the batteries that SMCC will process, a permit modification will be required. SMCC has agreed to conduct testing of PFAS at its South Korean facility.

In your co-authored paper on the concerns about the SMCC project, you identified lithium bis(tri-fluoromethanesulfonyl) amide (sic), two carbon atoms bonded with the fluorine atoms separated by a sulfonyl amide functional group. At the temperatures we expect, this PFAS will break into two carbon groups, and possibly trifluoro methane or carbon tetrafluoride will result. DEC has an ambient concentration established for carbon tetrafluoride; emissions of this compound will be less than 100 pounds per year. We would expect longer-chain (C8) fluorocarbons, if present, to break down in the proposed oxidizer.

**NBB's Response:** First of all, DEC does not acknowledge here that it was the NBB science team that first found the presence of these PFAS in some of the lithium-ion batteries during our literature search. This finding eventually made its way to the AG's office. Knowing the current concern regarding the ubiquitous presence of PFAS in the environment, DEC should have investigated for the presence of the PFAS in these batteries themselves. This fact notwithstanding, NBB has publicly applauded DEC's swift response to this issue once they learned about it. We are unclear as to why SungEel has yet to prepare a plan for the DEC to review in order to resolve this matter, months after it was brought to their attention.

On the technical side of this issue, DEC assumes that this PFAS compounds will simply break down into inert and harmless chemical species, yet offers no chemical mechanisms to support this assertion.

USEPA is not so sure. In a presentation from Lara Phelps of USEPA on the topic of subjecting PFAS to high temperatures (which we have frequently shared with you), she states the following:

1. *Information regarding potential products of incomplete combustion (PICs) is lacking*
2. *PICs are more likely formed with F radicals than other halogens such as Cl*

**3. PICs may be larger or smaller than the original fluorinated Principal Organic Hazardous**

**Constituents (POHC) of concern:**

- ***CF<sub>2</sub> radicals preferred and relatively stable, suggesting the possibility of reforming fluorinated alkyl chains***
- ***Remaining C-F fragments may recombine to produce a wide variety of fluorinated PICs with no analytical method or calibration standards***
- ***May result in adequate PFAS destruction but unmeasured and unquantified PICs***

**4. Very little information is published on PFAS destruction**

- ***Fluorine chemistry sufficiently different than Cl that we cannot extrapolate***
- ***Analytical methods and PFAS standards are lacking***
- ***Measurements focusing on POHC destruction may miss the formation of PICs (Phelps, USEPA, 2020<sup>5</sup>)***

We believe your assertion that PFAS will simply break apart into harmless fragments is too simple to be true, especially in light of the fact that other fluorinated compounds such as PVDF and LiPF<sub>6</sub> are present in abundance. Fluorine radicals are extremely reactive. Without detailed elucidation of these chemical reactions or actual measurements, neither the DEC nor anyone else could possibly know what other PFAS compounds might be formed (as PICs). To cavalierly dismiss our concerns is in no way protective of human health or the environment.

Again, this assertion is simply speculation by the DEC. From a theoretical perspective, It is more likely that breakdown products in the kiln will include CF<sub>2</sub> and CF<sub>3</sub> radicals which could generate other PFAS. In the afterburner (thermal oxidizer), in the presence of oxygen, other breakdown products of the bis(tri-fluoromethanesulfonyl) imide ion, will probably include CF<sub>3</sub>SO<sub>3</sub>H (i.e. a 1 carbon PFAS) as well as dozens of other PFAS as PICs.

Speculation aside, no one will really know unless the DEC requires SungEel to look for products like this when they conduct new emissions tests on their facility in South Korea.

**10. Dioxin emissions were based on a single short-term test when the pollutants can vary by over 1000-fold.**

**DEC Comment:** Correct; dioxin testing was conducted for a short duration. The testing was not coordinated with DEC. Nonetheless, SMCC will be held to its permitted emission limit, the mass emission limit of 6 NYCRR 2122. DEC expects the emission rate to be low, because the concentration of hydrogen chloride is low. Typical HCl emissions at municipal solid waste combustors is much higher; the emission limit, for example, of the MWC in DeWitt, NY is 25 ppm, much higher than what is allowed from this facility.

Dr. Connett has advocated for the use of a continuous dioxin analyzer, and has claimed that some municipal incinerators equipped with such analyzers have shown emissions can be 1000

times higher than that recorded during a traditional stack test. However, that does not necessarily transfer to SMCC. The process feed of a municipal waste conductor is variable, while the process feed at SMCC will be a steady stream of known quality. The high dioxin data to which he referred was a result of *by-passing the emissions control equipment*; no by-pass is provided at SMCC's facility. It is not valid to conclude that because by-pass emissions from an MWC greatly exceeded controlled emissions, that emissions from SMCC could also exhibit such variability. Also, there will be a startup/shutdown plan at SMCC, which will help to avoid variable operating conditions. Finally, the high concentration Dr. Connett reported may have been the result of contamination.

The continuous AMESA analyzer (<http://www.environnement-sa.com/products-page/en/emission-monitoring-en/amesa-2/>) is not a method that is promulgated by the Environmental Protection Agency.

There are aspects of that sampling device that may be problematic. For example, the method does not do a probe rinse. In fact, there is more than just a probe; a sample line will run from the stack sample location to a monitoring shelter. The sample may be heated or diluted to prevent condensation; a dilution probe adds a level of systemic error.

DEC believes that the promulgated dioxin reference method will produce accurate values and should be used to determine compliance at this facility. If warranted, startup emissions could be part of the measurement process. Most importantly, the emissions control system cannot be by-passed.

**NBB's Response:** The DEC's argument for not conducting the 4-week test for dioxins and using the same test to monitor PFAS and other PICs is not convincing. They offer no explanation why Belgium, Germany and some other European countries have been using these tests successfully for many years. To only require a single 4-hour test cannot account for changes in condition in a dynamic process and is therefore totally unacceptable. It will only lead to further distrust on the part of the residents of Endicott in the DEC's unwillingness to do anything other than the minimum required by current law and guidance in monitoring this proposed facility. Just because it is legal does not mean it is safe.

Further, the DEC does not explain what happens if there is an upset condition, if there is no by-pass equipment (i.e., a dump stack). If there is failure of the pump or blockage in one of the air pollution devices, what happens to the built-up gases in the kiln if there is no by-pass equipment?

## 11. Nanoparticles were never assessed.

**DEC Comment:** Correct.

The nanoparticles to which you refer, that is, those from combustion, are ubiquitous. We combust home heating fuel, use natural gas for cooking, combust fuel for power generation, rely on fossil-fueled transportation sectors, our industries have boilers (such as those on the Huron campus), and many of us enjoy a simple camp fire. I cannot think of a civilization without combustion and exposure to the resultant "nanoparticles." We have been exposed to nanoparticles long before the word was coined.

Nanoparticles are not currently a regulated pollutant; there is no test method; and there are no health standards upon which to base an emission limit. Current test methods and technology is geared toward PM2.5, particulate matter with an aerodynamic diameter equal to and less than 2.5 micrometers. The emission control proposed will capture PM2.5 as defined by the test method. Until we study nanoparticles further, DEC is not able to establish emissions limits or ambient standards.

We may find that the installation of a lithium ion battery recycling plant will reduce our reliance on internal combustion engines, and thus reduce nanoparticles, overall.

**NBB Response:** DEC is trivializing this issue. The nanoparticles we are talking about are far more dangerous than most of those mentioned by DEC. They will contain carcinogenic metals like chromium VI; they will contain a number of chlorinated and fluorinated dioxins and furans

(the batteries contain copper which is a well-known catalyst for dioxin formation) and other fluorinated by-products, possibly including PFAS. We cited a reference to the literature which indicates that the cathode material is likely to produce nanoparticle when heated to a high temperature (Tubke, 2019<sup>6</sup>)

DEC ignored this.

Unfortunately, the NYSDEC gives no indication of being up to date on the scientific literature on the threat posed by nanoparticles. Nor do they seem willing to pursue the references we have given them. It appears that the DEC does not have a scientist on staff who has any background in nanotoxicology. In short, we do not believe they are capable of protecting the public on this matter.

The fact is that the production of nanoparticles in this process will deliver very toxic substances directly into the tissues of anyone in the neighborhood of this facility. SungEel's air pollution control devices will not capture them, nor will the membrane of the lung prevent their entry into the blood and other tissues of local residents.

Because of the difficulties of measuring the nanoparticles in the stacks of incinerators, we have suggested that the DEC adopt a simpler approach. For any future project involving incineration, the DEC should require measurement of the nanoparticles in the ambient air (as in the study by Weichenthal et al. 2020<sup>7</sup>) before and regularly after the facility goes into operation. This might be expensive but that expense should be borne by SungEel since they stand to make a handsome profit from this enterprise.

## **12. HF compliance will be based on a single stack test and not continuous monitoring.**

**DEC Comment:** Initial testing will occur, and, depending on the measured emission rate and operational characteristics of the process and control equipment, additional testing can be required at any time, at the request of DEC. Continuous monitoring is not required in the permit. Continuous monitoring of control equipment parameters will be required.

**NBB's response:** Rather than tailoring the requirements for industrial regulation to the needs of a health compromised community, DEC relies on a legalistic rather than a scientific approach for fear of being challenged in court. Just because it is legal doesn't mean it is safe. Without continuous monitoring, we would have no way of knowing what is coming out of that stack once they are in full operation. No way of knowing whether or not pollution control devices, inadequate as they may be, are working properly.

## **13. The risk of a chain reaction fire is a real risk.**

**DEC Comment:** DEC agrees that there is a real risk of fires. DEC does not regulate this, nor does DEC have the expertise. Fire prevention is the purview of local authorities. Nonetheless, DEC included a condition that will cause SMCC to focus on fire prevention. The condition may be unnecessary; we are aware that SMCC has considered fire prevention independent of DEC.

**NBB's Response:** If the DEC had not made a “negative declaration” in its SEQRA review for this facility in Oct 2019, a Full EIS would have been required. A Full EIS would have considered the fire risks and likely required a full fire and accident analysis and emergency response plan. This “life and death” issue should not be simply left to SungEel to address on their own. Local authorities from multiple agencies should have been involved, but the Village of Endicott ignored this recommendation from Broome County as well.

### 1. Residences, ball fields, swimming pools, and schools are nearby.

**DEC Comment :** There are aspects of this project over which DEC does not have authority; one is location. DEC does not regulate local land use; local communities address this through zoning decisions. Our responsibility is to make certain that facility operations are compliant with our regulations, and we feel we have accomplished that through the permit review process. DEC’s regulatory standards ensure the protection of human health and the environment at and beyond the property lines of permitted

facilities. These standards consider whether sensitive receptors are located nearby when assigning Environmental Ratings under Part 212; all the HTACs are assigned the most sensitive rating, A.

**NBB Response:** Again, If the DEC had not made a “negative declaration” in its SEQRA review for this facility in Oct 2019, a Full EIS would have been required. A Full EIS would have examined all the impacts discussed here, importantly, the sensitivity of siting an incinerator in the middle of the Village of Endicott. We find that omission of a full EIS in this matter to be most disturbing and inappropriate.

**DEC:** The following points address items from your White Paper that are not addressed above.

**15. Your paper references EPA’s Maximum Contaminant Level for fluoride in drinking water, and state that the scrubber water will exceed this level by a “very large amount.”**

**DEC Comment:** DEC agrees, and recommends that the scrubber wastewater not be used as a potable supply. The water will be either discharged to a treatment facility or shipped off-site for treatment.

**NBB Response:** In our view, “shipping off-site” is a poor response for a project that claims to be a “green” and use a “closed -loop” operation. An EIS would have taken this into account and balanced the wastes generated, including exhaust from trucking to and from the facility, and weighed that against the benefit of recycling the batteries. This seems incongruous with the State’s drive toward green initiatives.

**16. You say that SMCC should have tested for brominated and fluorinated dioxins.**

**DEC Comment:** DEC does not expect fluorinated dioxins to be formed because of the low presence of HF in the gas stream. In addition, a high temperature oxidizer will treat and dioxin that may be present in the gas stream. Thermal oxidation is being used elsewhere to control other PFAS emissions. DEC is unaware that the batteries contain brominated fire retardants. We would greatly appreciate if you could share that information with us.

**NBB Response:** Such a claim has not been established in the DEC’s analysis above – to which we have responded. In fact, there is far more HF available than HCl, which prompted the DEC to ask for the monitoring of *chlorinated* dioxins and furans. Moreover, there are more fluorinated materials in the lithium ion batteries than chlorinated materials.

Clearly SungEel’s system did not remove all the dioxins and furans formed. The single test revealed emission which reached 12% of the DEC’s standard. Interestingly, DEC states that “*Thermal oxidation is being used elsewhere to control other PFAS emissions*”. However, as yet there is no evidence – at least according to the US EPA (Phelps, 2020<sup>5</sup>) – that this is being done successfully, and without the formation of new PFAS in the process.

**Moreover, recent events at the Norlite facility in Cohoes, NY where PFAS contaminated AFFF released PFAS into the air and contaminated the local groundwater aquifer, with a DEC monitor present at the facility full time, would suggest otherwise.**

**The DEC should do more investigations of its own on which substances are used in these batteries. They are in a far better position to get answers from SungEel than we are. We are still waiting for an answer to one of our most basic questions on this matter: What is the analysis by weight of each element in these batteries – especially fluorine.**

## **17. You want the ambient air to be monitored in Endicott.**

**DEC Comment:** DEC's air permitting regulations ensure the protection of ambient air by limiting emissions from facilities to levels that will not exceed the Department's ambient air standards and guideline concentrations. There are limitations to conducting ambient monitoring to determine impacts from individual sources. Meteorology and background sources present challenges to discerning facility impacts, and long term monitoring is needed to make statistical comparisons to chronic exposure standards and guidance values.

**NBB Response:** It is interesting that the DEC invokes the need for "statistical" requirements here, when it completely ignored the need for statistical validity when accepting the inadequate monitoring data from SungEel for estimates of emissions from its sister plant in South Korea. Such measurements were used to determine annual permit levels for the purpose of assessing "chronic exposure." Isn't this a glaring double standard from the DEC? One standard to protect SungEel another to protect the residents of Endicott?

**DEC Comment:** Finally, you ask the Governor to intervene to stop the project. DEC is sensitive to the concerns of the people of Endicott. Given the location, the prior history in Endicott, and the nature of the facility proposed by SMCC, *DEC used its discretion to increase the regulatory review from a registration to an Air State Facility Permit (our emphasis)*. This allowed the DEC to impose added conditions on the facility and allow for public comment. We abided by the requirements for public involvement and even extended the comment period when so requested, making available the information that we have. Even though the comment period has ended and the DEC has issued a permit to SMCC, we are still listening, as evidenced by this letter and my numerous discussions with Dr. Connett.

DEC has regulations to minimize the release of contaminants to the environment, and SMCC's process is required to be compliant with these regulations. The permit requires extensive emissions testing and monitoring of control equipment parameters to ensure emissions are controlled long after initial testing is completed. *DEC's permit was reviewed by an independent consultant hired by the Village, and their review found that the permit includes the appropriate monitoring, recordkeeping and reporting requirements necessary to protect human health and the environment (our emphasis).*

Please note that DEC will continue to review any new information brought to our attention on this matter, and that DEC has *the authority to modify, suspend or revoke any permit if newly discovered material or information changes the basis upon which the permit was granted (our emphasis)*.

We appreciate you taking the time to write and share your concerns. If you have further questions, I encourage you to contact me. I can be reached at [thomas.elter@dec.ny.gov](mailto:thomas.elter@dec.ny.gov).

**NBB's Response:** Sadly, DEC added conditions after it had issued a negative declaration, and an EIS was not conducted. Then the DEC compounded the problem by accepting inadequate (and statistically invalid) monitoring information from SungEel when issuing the Air permit. (see extensive discussion in 6 above.) Not to mention the fact that the local zoning was not able to accept siting of the facility, nor was it compatible with local planning, calling into question the permit's legality.

As explained, much of the information we have supplied to the DEC has been ignored or dismissed, and sometimes for trivial reasons. DEC is only focused on enforcing ECL law guidance, and standards and has no interest in tailoring its regulation to address the needs of a pollution weary and health compromised community. Just because it is legal does not mean it is safe.

The “independent” consultant *actually* concluded that the dioxin monitoring was inadequate but said that this would be rectified when the plant went online in Endicott. In our view, that is *too late*. Adequate measurements must be made in South Korea before this goes online elsewhere.

The “monitoring” on which the permit was issued was inadequate for a “first-of-its-kind” operation in the USA. The data set was incomplete (PFAS) and statistically invalid (as we have discussed above). Not to mention that the property was not zoned to accept the facility and still is not. Accordingly, DEC already has several grounds for revoking the Air permit.

We appreciate the DEC’s attempt to answer our questions on behalf of the Governor, but we feel these answers are more in line with protecting a project, in which the state has a considerable amount of money at stake, rather than a true effort to protect the citizens of Endicott. In that respect, their track record from their “negative declaration” on Oct 2, 2019, through their issuing of an Air Permit on March 27, 2020 has done a true disservice to the Endicott community.

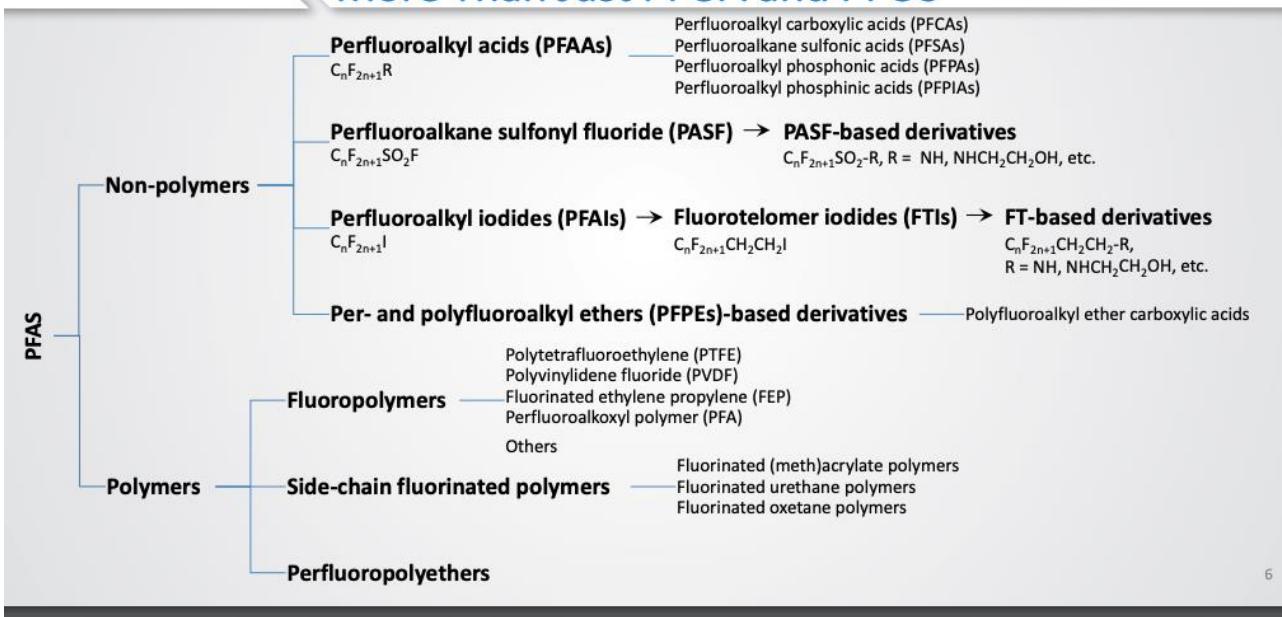
Their putting the Air Permit on hold in May, 2010, when they finally discovered, what we had found weeks before, that these batteries contained PFAS, has made partial amends. Whether that will completely salvage the situation will depend on just how thoroughly the SungEel facility is tested second time around.

## The Elephant in the Room

DEC did not mention anything about our extensive treatment of PVDF. We find this questionable because PVDF is formally listed by the US EPA as a PFAS. See the chart below:



## Thousands of Chemicals: More Than Just PFOA and PFOS



6

Figure 3 Graphic taken from a US EPA power point presentation:

[https://www.epa.gov/sites/production/files/2018-09/documents/final\\_epa\\_pfes\\_leavenworth\\_kansas\\_presentations\\_september\\_5\\_2018.pdf](https://www.epa.gov/sites/production/files/2018-09/documents/final_epa_pfes_leavenworth_kansas_presentations_september_5_2018.pdf)

PVDF may have received less attention as a PFAS because it is a polymer and therefore does not pose the same *direct* threat as smaller PFAS compounds to human health and the environment. However, its threats emerge (like Teflon or PTFE, another PFAS) when it is heated and/or burned. At which point the polymer breaks down to produce potentially hundreds of smaller chain PFAS which do pose both a human health and environmental threat. It should be noted that the DEC has special requirements limiting the burning of Teflon, but not for PVDF. We believe this gap in regulation needs to be corrected.

What this means for the SungEel project is that not just a *few* lithium-ion batteries contain PFAS substances, but nearly *all* lithium-ion batteries contain PFAS! The potential for the formation of many smaller PFAS (as PICs) from this large PFAS makes this issue easier to appreciate. Until this chemistry is studied and understood, contaminants of concern identified, and appropriate test methods developed, the current State Air Permit must be revoked.

We appreciate your consideration of these additional responses. Please feel free to contact us at [pconnet@gmail.com](mailto:pconnet@gmail.com) or [jiruspantini@nptusa.org](mailto:jiruspantini@nptusa.org).

Sincerely yours,

NBB Science Team

Paul Connett, PhD

**John J. Ruspantini, CHMM, PMP**

**References:**

1. NYS DOH. 2004. IBM Endicott Site, Health Statistics Review: Cancer and Birth Outcome Analysis, Village of Endicott and Endwell, Town of Union, Broome County, NY. A Study Protocol. By the New York State Department of Health, Center for Environmental Health.
2. ATSDR. 2006. Health consultation: Endicott area investigation: Health statistics review: Cancer and birth outcome analysis, Endicott area, town of Union, Broome County, New York. By the Agency for Toxic Substances and Disease Registry. HERO ID 730426. Technical Report.
3. Clapp RW and Hoffman K. 2008. Cancer mortality in IBM Endicott plant workers, 1969–2001: an update on a NY production plant. Environmental Health 7:13.
4. Forand SP, Lewis-Michl EL, Gomez MI. 2012. Adverse Birth Outcomes and Maternal Exposure to Trichloroethylene and Tetrachloroethylene through Soil Vapor Intrusion in New York.
5. Phelps L. 2020. USEPA PFAS Thermal Treatment & Methods Research - Opportunities for Collaborative Incineration Field Testing. April 27, 2020.
6. Tubke J et al. 2019. Li-Secondary Battery. Chapter 12 in the book Electrochemical Power Sources: Fundamentals, Systems, and Applications. Excerpt at <https://www.sciencedirect.com/topics/materialsscience/cathode-material>
7. Weichenthal S, Olaniyan T, Christidis T, et al. 2020. Within-city Spatial Variations in Ambient Ultrafine Particle Concentrations and Incident Brain Tumors in Adults. Epidemiology 31 (2):177-181.

