NORTH CAROLINA DIVISION OF AIR QUALITY

Application Review

Issue Date: February 1, 2023

Region: Winston-Salem Regional Office
County: Randolph
NC Facility ID: 7600353
Inspector's Name: Dylan Wright
Date of Last Inspection: NA
Compliance Code: NA

Facility Data

Applicant (Facility's Name): Toyota Battery Mfg. Inc. dba Toyota Battery Manufacturing NC

Facility Address:
Toyota Battery Mfg. Inc. dba Toyota Battery Manufacturing NC
7039 State Road 1006
Julian, NC 27283

SIC: 3692 / Primary Batteries, Dry and Wet
NAICS: 335912 / Primary Battery Manufacturing

Facility Classification: Before: Small **After:** Title V
Fee Classification: Before: Small **After:** Title V

Permit Applicability (this application only)

SIP: 02D .0202, .0515, .0516, .0521, .0524, .0535, .0540, .0605, .0611, .1111; 02Q .0309, .0711
NSPS: IIII, JJJJ
NESHAP: ZZZZ, CCCCCCC
PSD: NA
PSD Avoidance: NA
NC Toxics: 02Q .0711
112(r): NA
Other: 02D .1806

Contact Data

Facility Contact	Authorized Contact	Technical Contact
Rebecca Bright Manager-Environmental Planning (859) 473-3631 151 Engineering Way Georgetown, KY 25033	April Mason General Manager, Plant Services (502) 867-2299 151 Engineering Way Georgetown, KY 25033	Rebecca Bright Manager-Environmental Planning (859) 473-3631 151 Engineering Way Georgetown, KY 25033

Application Data

Application Number: 7600353.22B
Date Received: 07/21/2022
Application Type: Modification
Application Schedule: State

Existing Permit Data
Existing Permit Number: 10735/R00
Existing Permit Issue Date: 05/06/2022
Existing Permit Expiration Date: 04/30/2030

Total Actual emissions in TONS/YEAR:

CY	SO2	NOX	VOC	CO	PM10	Total HAP	Largest HAP

No emissions inventory on record. The emissions inventory is due 06/30/2023.

Review Engineer: Eric L. Crump, P.E.

Review Engineer's Signature: **Date:** February 1, 2023

Eric L. Crump

Comments / Recommendations:
Issue 10735/R01
Permit Issue Date: February 1, 2023
Permit Expiration Date: April 30, 2030

1. Purpose of Application

Toyota Battery Mfg. Inc. dba Toyota Battery Manufacturing NC (hereinafter referred to as Toyota) is an electric vehicle battery manufacturing facility located in Julian, Randolph County, North Carolina. The facility currently operates under Air Quality Permit No. 10735R00, issued May 6, 2022, with an expiration date of April 30, 2030.

On July 22, 2022, the North Carolina Division of Air Quality (DAQ) received a permit application from Toyota—No. 7600353.22B—to modify the air permit by adding seven battery electric vehicle (BEV) battery production lines to the facility, along with additional equipment (emergency generators, fire pump, tanks, and cooling towers) to support these new production lines.

2. Description of Proposed Modification

Toyota is adding seven new BEV battery production lines to the facility, comprised of the following processes:

- Electrode (Cathode & Anode) Mixing, Pressing & Slitting
- Winding, Terminal Bending, and Can Laser Sealing
- Inspection, Cell Stacking, and Electrolyte Injection
- Cap Laser Sealing

Dry dust collectors will be used to control dust from both the mixing processes, and the winding machines used in the assembly process. Wet dust collectors will be used to control dust from seal-weld machines used in the assembly process. One n-methyl-2-pyrrolidone (NMP) scrubber will be installed on each BEV line to remove NMP from coating exhaust gas (volatile organic compound (VOC) concentration less than 10 ppm). Since maintaining cleanliness is essential to battery production, and NMP recovery is economically necessary due to its high cost, these scrubbers have been determined to be inherent to the manufacturing process and are not considered emission control devices[1].

The new BEV lines include the following emission sources.

Emission Source ID No.	Emission Source Description
ES-CCD5	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S05)
ES-CCD6	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S06)
ES-CCD7	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S07)
ES-CCD8	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S08)
ES-CCD9	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S09)
ES-CCD10	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S010)
ES-CCD11	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S11)
ES-CPM5-11	Cathode: Paste Mixing BEV Lines 5-11 with inherent particulate filters DC-803-01 through DC-809-01
ES-CPH5-11	Cathode: Powder Handling BEV Lines 5-11 with inherent particulate filters DC-803-02 through DC-809-02
ES-CPS5-11	Cathode: Press BEV Lines 5-11 with inherent particulate filters DC-803-03 through DC-809-03

[1] U.S. Environmental Protection Agency. *Criteria for Determining Whether Equipment is Air Pollution Control Equipment or Process Equipment*, Solomon, D, Office of Air Quality Planning and Standards. Letter dated November 27, 1995.

Emission Source ID No.	Emission Source Description
ES-APM5-11	Anode: Mixing BEV Lines 5-11 with inherent particulate filters DC-803-04 through DC-809-04
ES-APH5-11	Anode: Powder Handling BEV Lines 5-11 with inherent particulate filters DC-803-05 through DC-809-05
ES-APP5-11	Anode: Press BEV Lines 5-11 with inherent particulate filters DC-803-06 through DC-809-06
ES-AC5-11	Anode: Tab-cut BEV Lines 5-11 with inherent particulate filters DC-803-07 through DC-809-07
ES-WIN810	Winding BEV Lines 5-11 with inherent particulate filters DC-803-08 through DC-809-08
ES-CPW5-11	Cathode: Press BEV Lines 5-11 with inherent wet dust collectors WDC-803-01 through WDC-809-01
ES-ACW5-11	Anode: Tab-cut BEV Lines 5-11 with inherent wet dust collectors WDC-803-02 through WDC-809-02
ES-TCA5-11	TopCap Assembly BEV Lines 5-11 with inherent wet dust collectors WDC-803-03 through WDC-809-03
ES-AF5-11	Assembly Front BEV Lines 5-11 with inherent wet dust collectors WDC-803-04 through WDC-809-04
ES-MOD5-11	Module BEV Lines 5-11 with inherent wet dust collectors WDC-803-05 through WDC-809-05
ES-GEN2000b	2000 kW Generator

To support the new BEV lines, Toyota is also adding one diesel fired 2000-kilowatt (kW) emergency generator with a displacement of 18.5 liters to provide backup power for heating, ventilation, and air conditioning (HVAC). Finally, Toyota is adding the following sources which would be classified as insignificant activities under NCAC 15A 02Q .0102:

- One 1250 kW diesel fired emergency generator (Tier 3)
- One 50 kW diesel fired emergency generator (Tier 3) for emergency ventilation (Tier 1)
- One 147 horsepower (hp) diesel fire pump (Tier 3)
- Four NMP Supply Tanks (6,604 gallons each)
- Four NMP Recovery Tanks (5,283 gallons each)
- Two Sub NMP Recovery Tanks (793 gallons each)
- One Electrolyte Receiving Tank
- One Electrolyte Supply Tank
- Two Chemical Wastewater Collection Tanks
- Two Cooling Towers

3. Application Chronology

July 21, 2022	Permit Application No. 7600353.22B was received as a 02Q .0300 modification.
July 25, 2022	DAQ sends letter to Toyota acknowledging receipt of the application, that all required elements (except ePayment) were included.
July 26, 2022	DAQ receives permit fee payment via ePayment.

August 9, 2022	DAQ sends email to Toyota requesting clarification regarding emission calculations in the permit application.
August 16, 2022	Toyota responds via email to DAQ request for clarifications.
August 30, 2022	DAQ sends email to Toyota requesting additional clarifications; Toyota responds via email providing additional information.
September 9, 2022	Draft permit and permit review forwarded to DAQ Permit Section supervisor for comments.
September 20, 2022	Comments received from DAQ Permit Section supervisor.
September 20, 2022	Draft permit and permit review forwarded to Winston-Salem Regional Office (WSRO) and Toyota for comments.
September 22, 2022	Comments on draft permit and review received from WRSO.
September 23, 2022	Comments on draft permit and review received from Toyota.
September 26, 2022	Draft permit and permit review forwarded to SSCB for comments.
September 28, 2022	Comments on draft permit and review received from SSCB.
October 4, 2022	Toyota permit public notice published; 30-day notice and comment period begins.
November 3, 2022	Public comment period ends. The public comments are summarized in Section 14 of this permit review
November 21, 2022	DAQ sends list of screening questions to Toyota regarding potential emissions of emerging contaminants, including per- and polyfluoroalkyl substances (PFAS).
November 30, 2022	Toyota submits responses to screening questions sent by DAQ (Appendix A of this review).
December 14, 2022	DAQ sends list of follow-up questions to Toyota to gain additional clarity regarding their response to the screening questions.
January 10, 2023	Toyota submits responses to follow-up questions sent by DAQ (Appendix B of this review).
January 19, 2023	DAQ sends second round of follow-up questions to Toyota to clarify their response to the follow-up questions.
January 23, 2023	Toyota submits responses to second round of follow-up questions sent by DAQ (Appendix C of this review). DAQ requests an additional clarification of Toyota's response to one of the questions.

January 26, 2023 Toyota provides additional clarification of Toyota's response.

4. Changes to Permit and ESM Discussion

The following table summarizes changes made to the current Toyota permit resulting from this permit modification.

Page No.	Section	Description of Changes
Cover and throughout	---	• Updated all dates and permit revision numbers • Changed all citations of 15A NCAC 2D to 15A NCAC 02D • Changed all citations of 15A NCAC 2Q to 15A NCAC 02Q
1-4	Emission Sources Table	• Divided table into three subsections (HEV Battery Production, BEV Battery Production, and Miscellaneous) • Added BEV battery line sources (Lines 5-11) • Added generator (ID No. ES-GEN2000b)
5	A.3	Split Condition 3 into two conditions: Condition 3 (Permit Renewal Requirement) and Condition 4 (Annual Emission Inventory Requirement). Renumbered all subsequent conditions in permit accordingly.
6	A.5 A.7 and A.9	Added new condition under 02Q .0504 requiring submittal of application for Title V permit prior to commencing operations Added ID No. ES-GEN2000b to condition (40 CFR 60 Subpart IIII)
8	A.9.d.iv.C	Added phrase "or non-emergency demand response" (text from 40 CFR 60 Subpart IIII not included previously in permit)
10	A.9.f.ii	Changed "described above" to "described in paragraph 7.d.iv.C.I above"
12	A.12	• Added Cathode Coating and Drying Lines 5 through 11 to table • Changed Target Parameter in table from "< 100 tons per year" to" < 250 tons per year"
14	A.14.b.i and A.14.c.i	Changed ES-CCD4 to ES-CCD11
15	A.16	Reformatted list of sources to bullets, and added sources from BEV lines
17	A.16.e.ii	Changed "indicates" to "indicate"
20	A.19	Added source ID Nos. IES-25 through IES-27
24	A.22	Added new requirement "Disclosure of Information Relating to Emissions of Fluorinated Chemicals"
---	Attachment	• Changed description of source ID No. IES-CT from "Cooling Towers" to "Four Cooling Towers" • Added source ID Nos. IES-23 through IES-39 • Revised insignificant activities table to remove references to 02Q .0102, TAPs, and Title V pollutants

The following changes have been made to the ESM:

Revisions: Changed description of source ID No. IES-CT from "Cooling Towers" to "Four Cooling Towers"

Emission Sources Added:

Source ID No.	Source Description
ES-CCD5	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S05)
ES-CCD6	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S06)
ES-CCD7	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S07)
ES-CCD8	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S08)
ES-CCD9	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S09)
ES-CCD10	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S010)
ES-CCD11	Cathode: Coating and Drying Line 5 (BEV) with inherent web scrubber (CD-S11)
ES-CPM5-11	Cathode: Paste Mixing BEV Lines 5-11 with inherent particulate filters DC-803-01 through DC-809-01
ES-CPH5-11	Cathode: Powder Handling BEV Lines 5-11 with inherent particulate filters DC-803-02 through DC-809-02
ES-CPS5-11	Cathode: Press BEV Lines 5-11 with inherent particulate filters DC-803-03 through DC-809-03
ES-APM5-11	Anode: Mixing BEV Lines 5-11 with inherent particulate filters DC-803-04 through DC-809-04
ES-APH5-11	Anode: Powder Handling BEV Lines 5-11 with inherent particulate filters DC-803-05 through DC-809-05
ES-APP5-11	Anode: Press BEV Lines 5-11 with inherent particulate filters DC-803-06 through DC-809-06
ES-AC5-11	Anode: Tab-cut BEV Lines 5-11 with inherent particulate filters DC-803-07 through DC-809-07
ES-WIN810	Winding BEV Lines 5-11 with inherent particulate filters DC-803-08 through DC-809-08
ES-CPW5-11	Cathode: Press BEV Lines 5-11 with inherent wet dust collectors WDC-803-01 through WDC-809-01
ES-ACW5-11	Anode: Tab-cut BEV Lines 5-11 with inherent wet dust collectors WDC-803-02 through WDC-809-02
ES-TCA5-11	TopCap Assembly BEV Lines 5-11 with inherent wet dust collectors WDC-803-03 through WDC-809-03
ES-AF5-11	Assembly Front BEV Lines 5-11 with inherent wet dust collectors WDC-803-04 through WDC-809-04
ES-MOD5-11	Module BEV Lines 5-11 with inherent wet dust collectors WDC-803-05 through WDC-809-05
ES-GEN2000b	2000 kW Generator
IES-23	793 Gallon Sub NMP Recovery Tank
IES-24	793 Gallon Sub NMP Recovery Tank
IES-25	1,250 kW diesel-fired emergency generator (Tier 3)
IES-26	50 kW diesel-fired emergency generator (Tier 3) for emergency ventilation (Tier 1)
IES-27	147 hp diesel fire pump (Tier 3)
IES-28	6,604 Gallon NMP Supply Tank
IES-29	6,604 Gallon NMP Supply Tank
IES-30	6,604 Gallon NMP Supply Tank
IES-31	6,604 Gallon NMP Supply Tank
IES-32	5,283 Gallon NMP Recovery Tank
IES-33	5,283 Gallon NMP Recovery Tank
IES-34	5,283 Gallon NMP Recovery Tank
IES-35	5,283 Gallon NMP Recovery Tank
IES-36	Electrolyte Receiving Tank
IES-37	Electrolyte Supply Tank
IES-38	Chemical Wastewater Collection Tank
IES-39	Chemical Wastewater Collection Tank

5. Facility-wide Emissions

The previous application review for the Toyota facility (Dylan Wright, Permit No. 10735R00, May 6, 2022) provided the following summary of facility-wide emissions:

Pollutant	Potential Emissions (tons per year)
PM	31.69
PM_{10}	31.60
$PM_{2.5}$	31.60
SO_2	0.05
NO_x	9.85
CO	5.35
VOC	30.76
Total HAP	0.324
Highest Individual HAP (methanol)	0.322

Emissions from the addition of the seven BEV battery production lines were calculated using a similar methodology as used for the initial four HEV battery production lines.

PM emissions for the BEV lines were estimated assuming an exit grain loading of 0.01 grains (gr) per standard cubic foot (ft^3) and multiplying that loading by the fabric filter flow rate in minutes per hour (min/hr).

$$PM = filter\ flow\ rate\left(\frac{ft^3}{min}\right) \times 0.01\frac{gr}{ft^3} \times \frac{lb}{7{,}000\ gr} \times \frac{60\ min}{hr}$$

VOC emissions: VOC emissions from the BEV processes (electrode mixing, paste application, and electrolyte filling, were estimated using the following methods (conversions from pounds to tons and from hours to years are not shown):

- Electrode mixing: Using an emissions factor of 10 parts per million (ppm) from the NMP used in the electrode mixing process, and a molecular weight for NMP of 99.13 pounds per pound-mole (lb/lbmol) the following equation was used:

$$VOC\ \left(\frac{lb}{hr}\right) = flow\ rate\left(\frac{ft^3}{min}\right) \times\ 99.13\frac{lb}{lbmol} \times \left(\frac{10\ ppm}{10^6}\right) \times \frac{1}{385.5\ ft^3/_{lbmol}} \times \frac{60\ min}{hr}$$

- Application of paste to electrodes: Emissions were calculated based on the electrode paste being comprised of 0.3% DPK4 (a paste ingredient containing five percent methanol (MeOH) content):

  VOC (lb/yr) = total paste usage (lb/yr) × 0.003 × 0.05

- Electrolyte filling for the BEV lines: Emissions were calculated based on annual electrolyte usage in gallons per year (gal/yr), with an electrolyte VOC content of 85%, an electrolyte density of 10.27 pounds per gallon (lb/gal) and assuming a 1% electrolyte evaporation loss.

$$VOC\ \left(\frac{lb}{yr}\right) = electrolyte\ usage\left(\frac{gal}{yr}\right) 10.27\frac{lb}{gal} \times 0.85 \times 0.01$$

- There was no additional use of ethanol from cleaning activities due to addition of the BEV lines.

For the diesel-fired generator, engines, and fire pump, based on 500 hours per year of operation:

- PM, NO_X, VOC, and CO emissions were estimated using the uncontrolled emission factors for diesel engines (provided in units of grams per brake kilowatt-hour, or g/bkW-hr), taken from the Tier II emission limits established for engines in 40 CFR Part 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (more specifically, 40 CFR 60.4202).
- SO_2 emissions were estimated using uncontrolled emission factors for diesel engines from U.S. EPA's AP-42 Compilation of Air Pollutant Emission Factors, Volume 1 – Stationary Sources, Fifth Edition, Chapter 3.4, Table 3.4-1.
- HAP emissions were determined using the NC DEQ Internal Combustion (large gasoline and diesel engines) spreadsheet (Rev. J, 06/22/2015), which utilizes emission factors from AP-42.

The table on the following page displays potential annual emissions from Phase 1 (initial construction including the HEV lines), potential annual emissions from each element of the modification, or Phase 2 (BEV lines, additional supporting tanks, and generators), and the total potential emissions for the entire facility, including both phases 1 and 2. From this emissions data, the following can be observed:

- Emissions from the two additional cooling towers, the storage tanks, the smaller generators (1250 kW and 50 kW), and the 147 hp fuel pump meet the criteria for insignificant activities under 15A NCAC 02Q .0503(8) because the emissions from each source would not violate any applicable emissions standard, the potential uncontrolled criteria pollutant emissions from each source would be no more than five tons per year, and the potential uncontrolled HAP emissions from each source would be below 1000 pounds per year.
- As shown, the addition of the HEV lines and related sources increase potential emissions of criteria pollutants and HAP by more than double. However, potential VOC emissions for the entire facility increase significantly—from 13.51 tons/yr to 245.89 tons/yr (including fugitive emissions)– with the addition of the HEV lines.
- Under 40 CFR 51.166(b)(1)(iii), fugitive emissions shall not be included in determining whether a source is a major stationary source for prevention of significant deterioration (PSD) of air quality, unless the source belongs to one of the 28 categories listed therein. The Toyota facility does not fall under any of the 28 categories. If the fugitive VOC emissions at the Toyota facility—7.99 tpy of VOC emitted from cleaning operations—are subtracted from the total potential VOC emissions, this leaves an annual projected potential VOC emissions total of 237.90 tpy – which is less than the 250 tpy major source threshold for prevention of significant deterioration (PSD) in 40 CFR 51.166(b)(1)(i).

6. Regulatory Review

Toyota is subject to the following state regulations, in addition to the requirements listed in the General Conditions of the permit:

- 15A NCAC 02D .0202 – Registration of Air Pollution Sources
- 15A NCAC 02D .0515 – Particulates from Miscellaneous Industrial Processes
- 15A NCAC 02D .0516 – Sulfur Dioxide (SO_2) Emissions from Combustion Sources
- 15A NCAC 02D .0521 – Control of Visible Emissions (VE)
- 15A NCAC 02D .0524 – New Source Performance Standards (NSPS)

TOTAL POTENTIAL EMISSIONS – BEFORE AND AFTER ADDITION OF BEV LINES

Emissions are presented in tons per year (ton/yr)

Pollutant	Current Permitted Facility Phase 1	Modification - Phase 2									TOTAL Phases 1 and 2
		BEV Lines 5-11	BEV Cleaning Activities	BEV NMP Storage Tanks	BEV Cooling Towers	BEV New 2000 kW Generator	BEV New 1250 kW Generator	BEV New 50 kW Generator	BEV New 147 hp Fire Pump	TOTAL Phase 2	
PM	31.69	54.23	0	0	0.15	0.230	0.138	0.0072	0.081	54.75	86.44
PM-10	31.60	54.23	0	0	0.06	0.230	0.138	0.0072	0.081	54.66	86.26
PM-2.5	31.60	54.23	0	0	0.06	0.230	0.138	0.0072	0.081	54.66	86.26
SO_2	0.050	0	0	0		0.0086	0.0052	0.034	0.076	0.048	0.098
NOx	9.85	0	0	0		7.37	4.41	0.12	1.14	11.89	21.74
CO	5.350	0	0	0		4.028	2.41	0.028	0.25	6.47	11.82
VOC	13.51*	228.76	2.74†	0.0037		0.413	0.249	0.122	0.091	232.38	245.89
Total HAP	0.324	0.42	0	0	0	0	0	0	0	0.42	0.75
Largest Single HAP‡	0.322	0.42	0	0	0	0	0	0.001	0.001	0.42	0.74

*Of the total VOC emissions from Phase I, 5.25 tpy are fugitive emissions from cleaning operations
†Fugitive VOC emissions
‡Methanol

- 15A NCAC 02D .0535 – Excess Emissions Reporting and Malfunctions
- 15A NCAC 02D .0540 – Particulates from Fugitive Dust Emission Sources
- 15A NCAC 02D .0605 – General Recordkeeping and Reporting Requirements
- 15A NCAC 02D .0611 – Monitoring Emissions from Other Sources
- 15A NCAC 02D .1111 – Maximum Achievable Control Technology
- 15A NCAC 02D .1806 – Control and Prohibition of Odorous Emissions (State-enforceable only)
- 15A NCAC 02Q .0309 – Termination, Modification and Revocation of Permits
- 15A NCAC 02Q .0711 – Emission Rates Requiring a Permit (State-enforceable only)

With this modification, the new BEV lines, as well as the emergency generators, fire pump, and tanks added to the facility in support of those lines will become subject to the above regulations as appropriate. No additional state regulations will be added to or removed from the permit due to changes to the facility resulting from this permit modification (see Dylan Wright, Permit No. 10735R00, May 6, 2022).

7. National Emission Standards for Hazardous Air Pollutants (NESHAPS): Maximum and/or Generally Achievable Control Technology (MACT/GACT)

Toyota remains subject to the following standards under 40 CFR Part 63:

Subpart ZZZZ "National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines." The following equipment added to the Toyota facility with this modification will be subject to this NESHAP.

- ES-GEN2000b - 2000 kW diesel-fired generator
- IES-25 – 1,250 kW diesel-fired emergency generator
- IES-26 – 50 kW diesel-fired emergency generator
- IES-27 - 147 hp diesel-fired fire pump

However, as discussed earlier in this review, the two smaller generators (IES-25 and IES-26) and the fire pump IES-27 will be considered as insignificant activities in this permit under 15A NCAC 02Q .0503(8), and therefore specific permit conditions will not be included in the permit for these sources.

In accordance with 40 CFR §63.6590(c)(1), Toyota shall meet the requirements of 40 CFR 63 Subpart ZZZZ by meeting the requirements of 40 CFR 60 Subpart IIII for compression ignition engines, or 40 CFR 60 Subpart JJJJ for spark ignition engines. There are no spark ignition engines identified at Toyota at this time, and none have been included in this modification.

Subpart CCCCCCC, "National Emission Standards for Hazardous Air Pollutants for Area Sources: Paints and Allied Products Manufacturing." The following sources added to the permit through this modification will be subject to this NESHAP:

- Cathode: Paste Mixing BEV Lines 5-11 with inherent particulate filters DC-803-01 through DC-809-01 (ID No. ES-CPM5-11_
- Cathode: Powder Handling BEV Lines 5-11 with inherent particulate filters DC-803-02 through DC-809-02 (ES-CPH5-11)
- Cathode: Press BEV Lines 5-11 with inherent particulate filters DC-803-03 through DC-809-03 (ES-CPS5-11)

- Anode: Mixing BEV Lines 5-11 with inherent particulate filters DC-803-04 through DC-809-04 (ES-APM5-11)
- Anode: Powder Handling BEV Lines 5-11 with inherent particulate filters DC-803-05 through DC-809-05 (ES-APH5-11)
- Anode: Press BEV Lines 5-11 with inherent particulate filters DC-803-06 through DC-809-06 (ES-APP5-11)
- Anode: Tab-cut BEV Lines 5-11 with inherent particulate filters DC-803-07 through DC-809-07 (ES-AC5-11)
- Winding BEV Lines 5-11 with inherent particulate filters DC-803-08 through DC-809-08 (ES-WIN810)
- Cathode: Press BEV Lines 5-11 with inherent wet dust collectors WDC-803-01 through WDC-809-01 (ES-CPS5-11)

While these sources have particulate filters and wet dust collectors as noted in the source descriptions, these devices are considered inherent to the production process, since it is essential to remove any trace dust away from the product (anode and cathode) to avoid costly product defects. This rationale was established in the initial application review for this facility as a policy decision at the direction of senior DAQ management (D. Wright, 10735R00, May 6, 2022 – also see the footnote in Section 2 of this review). Compliance is expected.

8. New Source Performance Standards (NSPS)

Toyota is subject to the following NSPS under 40 CFR Part 60:

- 40 CFR Part 60, NSPS Subpart IIII "Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE)"
- 40 CFR Part 60, Subpart JJJJ, “Standards of Performance for Stationary Spark Ignition Internal Combustion Engines”,

In accordance with 40 CFR §63.6590(c)(1), Toyota shall meet the requirements of 40 CFR 63 Subpart ZZZZ by meeting the requirements of 40 CFR 60 Subpart IIII for compression ignition engines, or 40 CFR 60 Subpart JJJJ for spark ignition engines. As noted earlier in this review, there are no spark ignition engines identified at Toyota at this time, and none have been included in this modification. Therefore, the new diesel-fired engines listed above in Section X of this permit will be subject to Subpart IIII. Compliance is expected.

9. New Source Review (NSR)/Prevention of Significant Deterioration (PSD)

Randolph County is considered in attainment or unclassifiable for all regulated pollutants. As discussed in Section 5 of this review, this modification will not result in potential emissions increases of regulated pollutants equal to or exceeding the 250 tpy major source threshold for PSD in 40 CFR 51.166(b)(1)(i). The facility will remain PSD minor following this modification.

10. Risk Management Plan (RMP) Requirements

40 CFR Part 68 requires stationary sources storing more than threshold quantities of regulated substances to develop a RMP in accordance with Section 112(r) of the Clean Air Act. The RMP would list the potential effects of a chemical accident at the facility, steps the facility is taking to prevent an accident, and emergency response procedures to be followed if an accident should occur.

Toyota is not subject to Section 112(r) of the Clean Air Act requirements because it does not store any of the regulated substances in quantities above the thresholds in the Rule. This permit modification does not affect the 112(r) status of the facility.

11. Compliance Assurance Monitoring (CAM)

The CAM rule (40 CFR 64) applies to each pollutant specific emissions unit located at a major source that is required to obtain a Title V, Part 70 or 71 permit if it meets all of the following criteria:

- It is subject to an emission limitation or standard, and
- It uses a control device to achieve compliance, and
- It has potential pre-control emissions that equal or exceed the major source threshold (i.e., either 100 tpy for criteria pollutants, 10 tpy of any individual HAP, or 25 tpy of any combination of HAP).

The following emission limitations or standards are exempted from the CAM rule:

- NSPS or NESHAP standards proposed after November 15, 1990;
- Stratospheric ozone protection requirements under Title VI of the Clean Air Act
- Acid rain program requirements;
- Emission limitations or standards or other requirements that apply solely under an approved emissions trading program;
- An emissions cap that meets requirements of 40 CFR 70.4(b)(12) or 71.6(a)(13);
- Emission limitations or standards for which a Part 70 or 71 permit specifies a continuous compliance determination method, as defined in 40 CFR 64.1, unless the applicable compliance method includes an assumed control device emission reduction factor that could be affected by the actual operation and maintenance of the control device (e.g., a surface coating line controlled by an incinerator for which continuous compliance is determined by calculating emissions on the basis of coating records and an assumed control device efficiency factor based on an initial performance test; in this example, this part would apply to the control device and capture system, but not to the remaining elements of the coating line, such as raw material usage).
- Certain municipally owned utility units, as defined in 40 CFR 72.2.

Please note that the emission unit is not exempted from the CAM rule if nonexempt emission limitations or standards (e.g. a state rule or an older NSPS emission limits) apply to the emissions unit.

No sources at the Toyota facility are subject to the CAM rule at this time, since none of the sources meet all the criteria listed above. This permit modification does not affect this status.

12. Facility-wide Air Toxics Review

Pursuant to 15A NCAC 02Q .0711 "Emission Rates Requiring a Permit," for each toxic air pollutant (TAP) listed in the following table, Toyota has demonstrated that facility-wide actual emissions, where one or more emission release points are obstructed or non-vertically oriented, do not exceed the Toxic Permit Emission Rates (TPERs) listed in 15A NCAC 02Q .0711(a). Toyota is required to operate and maintain the facility such that emissions of these TAPs will not exceed the TPERs listed in 15A NCAC 02Q .0711(a), which are also shown in the following table.

Pollutant	Carcinogens (lb/yr)	Chronic Toxicants (lb/day)	Acute Systemic Toxicants (lb/hr)	Acute Irritants (lb/hr)
Acetaldehyde (75-07-0)				6.8
Acrolein (107-02-8)				0.02
Arsenic & Compounds (total mass of elemental AS, arsine and all inorganic compounds) (ASC (7778394))	0.053			
Benzene (71-43-2)	8.1			
Benzo(a)pyrene (Component of 83329/POMTV & 56553/7PAH) (50-32-8)	2.2			
Beryllium Metal (unreacted) (Component of BEC) (7440-41-7)	0.28			
Cadmium Metal, elemental, unreacted (Component of CDC) (7440-43-9)	0.37			
Chromium (VI) Soluble Chromate Compounds (Component of CRC) (SolCR6)		0.013		
Formaldehyde (50-00-0)				0.04
Manganese & compounds (MNC)		0.63		
Mercury, vapor (Component of HGC) (7439-97-6)		0.013		
Nickel metal (Component of NIC) (7440-02-0)		0.13		
Toluene (108-88-3)		98		14.4
Xylene (mixed isomers) (1330-20-7)		57		16.4

If actual emissions from all sources will become greater than the corresponding TPERs, Toyota would be required to obtain a permit to emit TAPs and to demonstrate compliance with the requirements of 15A NCAC 02D .1100 "Control of Toxic Air Pollutants. This permit would be required PRIOR to exceeding any of the listed TPERs.

To evaluate whether this modification would result in emissions of any TAP in excess of the TPERs, potential TAP emissions from the modification (Phase 2) were added to the potential TAP emissions from the current permitted facility (Phase 1). These TAP emissions are summarized in the following table and compared to the appropriate TPERS.

Toxic Air Pollutant	TPER (per 02Q .0711(a))	Potential Emissions Phase 1 (tons/yr)	Potential Emissions Phase 2 (tons/yr)	Total Potential Emissions Phase 1 & 2 Total (tons/yr)	Total Potential Emissions Phase 1 & 2 Total (converted to units of TPER)
Acetaldehyde	6.8 lb/hr	1.17E-04	3.15E-04	4.32E-04	9.87E-05 lb/hr
Acrolein	0.02 lb/hr	1.43E-05	3.82E-05	5.25E-05	1.20E-05 lb/hr
Arsenic	0.053 lb/yr	1.87E-07	2.32E-07	4.19E-07	8.39E-04 lb/yr
Benzene	8.1 lb/yr	1.76E-04	0.000424	6.00E-04	1.20 lb/yr
Benzo(a)pyrene	2.2 lb/yr	4.01E-08	9.1E-08	1.31E-07	2.62E-04 lb/yr
Beryilium	0.28 lb/yr	1.40E-07	1.75E-07	3.15E-07	6.29E-04 lb/yr

Toxic Air Pollutant	TPER (per 02Q .0711(a))	Potential Emissions Phase 1 (tons/yr)	Potential Emissions Phase 2 (tons/yr)	Total Potential Emissions Phase 1 & 2 Total (tons/yr)	Total Potential Emissions Phase 1 & 2 Total (converted to units of TPER)
Cadmium	0.37 lb/yr	1.40E-07	1.69E-07	3.09E-07	6.18E-04 lb/yr
Chromium	0.013 lb/day	1.40E-07	1.69E-07	3.09E-07	1.69E-06 lb/day
Formaldehyde	0.04 lb/hr	1.81E-04	0.000487	6.68E-04	1.52E-04 lb/hr
Manganese	0.63 lb/day	4.90E-04	0.00134	1.83E-03	1.00E-02 lb/day
Mercury	0.013 lb/day	1.40E-07	1.69E-07	3.09E-07	1.69E-06 lb/day
Nickel	0.013 lb/day	4.90E-04	0.00163	2.12E-03	1.16E-02 lb/day
Toluene	98 lb/day 14.4 lb/hr	7.45E-05	0.000177	2.52E-04	1.38E-03 lb/day 5.75E-05 lb/hr
Xylene	57 lb/day 16.4 lb/hr	5.18E-05	0.000127	1.79E-04	9.81E-04 lb/day 4.09E-05 lb/hr

As the data above indicate, the projected TAP emissions rates are not expected to exceed the TPERs. The permit requires Toyota to operate and maintain the facility so that emissions of any listed TAPs from the facility, including fugitive emissions, will not exceed the TPERs; and to maintain records that demonstrate compliance with each TPER. Compliance with 02Q .0711 can be reasonably expected.

13. Compliance History and Status

No compliance inspections have been conducted to date; the Toyota facility is still under construction since the issue of the initial Air Quality Permit (No. 10735R00) on May 6, 2022. Compliance inspections will commence after initial production begins at the facility.

On August 12, 2022, WSRO issued a Notice of Deficiency (NOD) to Toyota for failure to submit the semiannual. report required by condition A.12.c of their air quality permit No. 10735R00 (i.e., reporting monthly gallons of NMP received at the facility and monthly gallons of virgin and recycled NMP used in the Cathode Coating and Drying lines). The NOD requested that Toyota submit the report as soon as possible, with an explanation for its lateness, and stating what steps would be taken to ensure future reports are submitted on time. DAQ received the late report from Toyota on August 22, 2022.

14. Public Notice/EPA and Affected State(s) Review

A notice of the DRAFT Title V Permit shall be made pursuant to 15A NCAC 02Q .0521. The notice will provide for a 30-day comment period, with an opportunity for a public hearing. Consistent with 15A NCAC 02Q .0525, the EPA will have a concurrent 45-day review period. Copies of the public notice shall be sent to persons on the Title V mailing list and EPA. Pursuant to 15A NCAC 02Q .0522, a copy of each permit application, each proposed permit and each final permit shall be provided to EPA. Also, pursuant to 02Q .0522, a notice of the DRAFT Title V Permit shall be provided to each affected State at or before the time notice is provided to the public under 02Q .0521 above. Virginia is an affected state within 50 miles of the facility. There are no affected local programs within 50 miles of the facility.

The public comment period ran from October 4, 2022 through November 3, 2022. During the comment period, three comments were received by DAQ via email. Each comment is summarized below, followed

by a response from DAQ. The documents referred to in the public comments are available at the website listed below:

https://deq.nc.gov/news/events/public-comment-period-preliminary-determination-toyota-battery

COMMENT: Numerous volatile toxics are now in the stream of commerce that never existed when lists of federal hazardous air pollutants (HAPs) and state toxic air pollutants (TAPs) were adopted in the early 1990s. Some of these compounds find their way into the environment. One example of these unlisted toxics are the various species of per- and polyfluoroalkyl substances (PFAS)– which are used in the manufacture of lithium-ion batteries. Many PFAS and PFAS precursors are volatile and will be emitted as air pollutants unless controlled with appropriate technologies. They can be deposited by rain across a wide area around the facility and accumulate in soil and groundwater, potentially violating state groundwater protection statutes and generating significant liability for the source. We urge DAQ to (1) require that Toyota disclose all volatile chemicals that may be used or released from its processes, including those that are not listed as HAPs or TAPs; (2) condition the permit to prevent or control all emissions of emerging contaminants, including PFAS; and (3) require appropriate monitoring to ensure that the conditions are met during the facility's operation.

RESPONSE: DEQ, along with its partner agencies, is working aggressively to address the impacts of PFAS in North Carolina. Our state has been a national leader on PFAS since 2017 when the public became aware that PFAS had been discovered in the Cape Fear River.

Steps have been taken at the state and Federal level to improve understanding of the scope of PFAS contamination, the health impacts, and to determine ways to prevent future contamination and protect human health. To that end, DEQ published the Action Strategy for PFAS in June 2022 that outlines the agency's current and planned work to determine the extent of existing PFAS contamination, protect our residents and drinking water supplies and prevent future contamination.

DAQ presented Toyota a list of screening questions to access the planned use of PFAS in the production processes and potential emissions. Toyota provided responses to the questions, which are found in Appendix A of this review. Two additional rounds of follow-up questions and responses followed, which are found in Appendix B and C of this review. After review and consideration of the responses provided by Toyota, DAQ has added the following condition to the Toyota permit:

22. DISCLOSURE OF INFORMATION RELATING TO EMISSIONS OF FLUORINATED CHEMICALS [15A NCAC 02Q. 0308(a); 15A NCAC 02Q.0309(b)] - The Permittee shall have an ongoing duty to disclose the presence of materials containing fluorinated chemicals at the facility that have the potential to result in the emission of fluorinated chemicals to the environment. Such disclosures shall be in writing and submitted to the Regional Supervisor, DAQ within thirty days of the Permittee becoming aware of such information, unless such information has already been disclosed to DAQ by the Permittee. The disclosure shall describe the identity, quantity, and use of such material to the extent known. DAQ may require the permittee to conduct analysis or testing of fluorinated chemical emissions as necessary to properly evaluate emissions sources at the facility. As used in this condition, the term "fluorinated chemicals" includes but is not limited to per- and polyfluoroalkyl substances (PFAS).

DAQ intends to follow up with Toyota regarding this new permit condition with each subsequent facility inspection and permitting action, consistent with DEQ's overall PFAS Action Strategy.

COMMENT: Why is the Toyota Battery Manufacturing facility requesting an assembly line production increase while the site is still in construction? It seems that the original permitting should

have included the 11 assembly lines; this may have to do with Toyota later advising the investment of additional $1 billion into the facility. It raises the question of why the initial permitting did not look another few months into the future.

RESPONSE: It is not unusual for businesses to expand production, and depending on the industrial processes required, the expansion may result in increased air emissions. DAQ's responsibility is to ensure that in every situation, emission sources within the state of North Carolina fully comply with established state and Federal air pollution standards and requirements. DAQ has reviewed the proposed modification of the Toyota facility and included the required emission standards in the draft permit. In accordance with state and federal requirements DAQ has made the draft permit, draft permit review, and draft environmental justice report available for public review and comment.

COMMENT: Could DAQ present an 'executive' level overview or handout summarizing the numerous chemicals and elements noting their potential significant impacts on the air quality, and how their risks will be mitigated?

RESPONSE: Section 5 of the draft permit review provides a good overview of potential air emissions from the Toyota Battery Manufacturing facility. The review lists emissions of criteria pollutants (particulate matter, volatile organic compounds, sulfur dioxide, nitrogen oxides, and carbon monoxide), total hazardous air pollutants (which are 99 percent methanol) and estimates of potential emissions of NC toxic air pollutants.

In addition, a list of the facility's emission calculations, separated by emission source, is available on page 39 of the permit application (https://deq.nc.gov/media/31594/download?attachment). A summary of facility emissions by source category, with emissions broken out by current permit facility and the proposed facility modification is included in Section 5 of this application review.

COMMENT: How will DAQ make sure that the facility adheres to safeguards for risks to health and safety? I read where Toyota is required to keep test records available for two (2) years--are these records going to be archived for availability after the 2-year window is up? What is there to prevent a situation such as the Camp Lejeune water quality issue that went on for almost 50 years--what monitoring and protection methodology will be in place when Toyota ceases to use this production facility—especially years, and hopefully decades, into the future? Who will be responsible?

RESPONSE: As stated in the permit, Toyota will be required to perform emissions testing on the eleven production lines to determine if emission requirements are being met. They must first submit a testing protocol to DAQ for approval prior to testing, provide DAQ with fifteen days' notice of any required testing so that DAQ can have an observer on site, and submit written reports of the testing to DAQ for approval. Toyota is also required to conduct regular inspections of filters, scrubbers, and wet dust collectors on site, conduct inspections and visual observations for particulate control, and keep records of virgin and recycled NMP (n-methyl-2-pyrrolidone) received and used. They are required to keep records of their inspections onsite for two years, and for five years total. In addition, Toyota must submit an annual inventory of actual emissions of each air pollutant from each emission source within the facility, and an annual certification that they have complied with their permit requirements. The facility will also be subject to an annual compliance inspection by DAQ staff.

COMMENT: There are concerns that the Toyota Battery Manufacturing facility will move from being a minor source to a major source. One commenter asks for an explanation of how minor sources differ from major sources, and what impact a change from minor to major would have for those surrounding the facility. Another commenter said that for a site this large, even a minor source is still a significant amount of air pollution, therefore this modification provides an opportunity to

require more advanced technology--even if Toyota is allowed to add additional lines--to keep the facility as a minor source. One commenter suggests that Toyota would become classified as a "Prevention of Significant Deterioration" major air pollution source, which would require the facility to install "Best Available Control Technology," but not preventing it from increasing emissions. This reclassification "moves the goalposts" so that a facility can comply with the law.

RESPONSE: Regulations for sources of air pollution generally establish limits based on the types of pollutants they the sources emit, and the quantities of those pollutants emitted. In general, sources are classified as major if their emissions exceed a specified amount. The specified amount differs depending upon whether the goal of the regulation is meeting the national ambient air quality standards (NAAQS) or the national emission standards for hazardous air pollutants (NESHAP). Major sources typically emit higher amounts of pollutants than minor sources; accordingly, the emission limits established in regulations for major sources tend to be more restrictive than those established for minor sources.

It is true that emissions from a facility can increase while still meeting state and Federal requirements. However, it should be noted that the NAAQS are established to ensure that they provide adequate health and environmental protection. They are established and regularly reviewed based upon a comprehensive synthesis, and evaluation of the most current and policy-relevant science, with input from the scientific community and the public. The North Carolina regulations for criteria pollutants establish limits designed to ensure that the concentration of these pollutants will remain below the NAAQS.

In the event that potential emissions at the Toyota Battery Manufacturing facility increase so that Toyota becomes a major source of pollution, Toyota would become subject to the PSD program, which would require the installation of BACT to control emissions. As defined in 42 USC § 7479(3), BACT is an emission limitation based on the maximum degree of reduction of each pollutant emitted from a major emitting facility. BACT can include the application of production processes and available methods, systems, and techniques to control pollutants, and is determined for facilities on a case-by-case basis, taking into account energy, environmental, economic impacts, and other costs. In no event shall application of BACT result in emissions of any pollutants which will exceed the emissions allowed by any applicable Federal air pollution standard for criteria or hazardous air pollutants.

COMMENT: Based on 2020 census data, the demographics of Liberty, NC are indicative of a population prone to chronic disease that will certainly be exacerbated by increased pollutants in the air. At the very least, we can expect a decrease in our property values. Since water and air quality are of equal concern in this area, and as the entire Northeast corner of Randolph County, including the town of Liberty, is reliant on well water this will ultimately become an environmental justice issue. Instead of rushing the expansion of this project, I would like to see how Toyota plans to honor its "100% renewable energy" use at its facility,

RESPONSE: In anticipation of environmental justice concerns, DEQ developed a draft Environmental Justice report for the Toyota Battery Manufacturing facility for public review and comment. With this draft report, issued September 28, 2022, DEQ assessed the historical context, current permit conditions, County health rankings, and the demographics of the communities in the area surrounding the facility (encompassing Census Tract 170 in Guilford County and Census Tracts 312 and 313.07 in Randolph County). The DEQ follows the approved rules and regulations for permit effluent limits, which are designed to be protective of human health and the environment.

COMMENT: With regard to the draft Environmental Justice report, PM_{10} and $PM_{2.}5$ emissions are combined; however, upon review these are separate items with separate national standards tracked in micrograms per cubic meter. The commenter requests the breakdown amounts of PM_{10} and $PM_{2.5}$ as quantified against National/North Carolina standard permissible emission limits. In the draft Environmental Justice report it appears that no controls are being implemented based on "Before..." and "After..." controls of potential emissions. Clear comparative information between proposed potential emissions and the national limits established by law would be appropriate and beneficial to the "layman" public. Is a summary table available listing the specific sources of the pollutants summarized in the Outreach fact sheet? Are the summarized emissions the true potential of what the community surrounding the Toyota facility will be exposed to each year?

RESPONSE: Both PM_{10} and $PM_{2.5}$ refer to sizes of particulate matter. PM_{10} particles are 10 micrometers in diameter or smaller, and $PM_{2.5}$ particles are 2.5 micrometers in diameter or smaller. The table in the draft DEQ Environmental Justice report combined the two because all the PM the facility emits is expected to be 2.5 micrometers or smaller, meaning it qualifies as both $PM_{2.5}$ and PM_{10} (i.e., a particle smaller than 2.5 micrometers is also smaller than 10 micrometers). The standards for $PM_{2.5}$ are more stringent than those for PM_{10}, so in this case, if the facility meets the $PM_{2.5}$ standards, it also meets the PM_{10} standards.

The National Ambient Air Quality Standards, or NAAQS, are not “emission limits” for a facility’s pollutants. They are federally set limits on the allowed concentrations of pollutants in outdoor air. EPA sets the NAAQS to be protective of public health, and DAQ designed its permitting program and state implementation plans to ensure the state complies with the standards. DAQ does not directly compare a facility’s emissions (in tons per year) to these air quality standards (in micrograms per meter cubed).

One way that DAQ ensures emissions do not cause nonattainment with the NAAQS is through implementation of the Prevention of Significant Deterioration (PSD) permitting program. Because Toyota’s potential emissions of its largest pollutant (volatile organic compounds, or VOCs) are below 250 tons per year, the facility does not trigger PSD permitting requirements. Facilities that do trigger PSD are subject to additional emission limits to ensure the state remains in attainment with all NAAQS.

The Toyota Battery Manufacturing facility will control PM and VOC emissions with wet and dry scrubbers. DAQ determined that these scrubbers are inherent to the manufacturing process and are not add-on emission control devices as defined in our rules, because the facility needs the scrubbers to keep its production area clean enough for battery production.

The “summarized emissions” are the potential emissions for the Toyota Battery Manufacturing Facility. They are calculated based on a “worst case” scenario, which assumes the facility’s highest-emitting processes are operating 24 hours per day, 365 days per year. In practice, a facility’s actual emissions tend to be less than its potential emissions. The actual emissions for the Toyota facility should not exceed these estimates.

15. Other Regulatory Considerations

The following items were required and provided in Permit Application No. 7600353.22B:

- A Professional Engineer’s seal was not required for this modification.
- A zoning consistency determination was required for this modification, and this determination from Randolph County Planning and Zoning was received by DAQ on July 25, 2022. This

determination confirmed that the proposed modification is consistent with applicable zoning ordinances.

- A permit fee of $3090 was required for this modification. Payment was received via ePayment on July 26, 2022.

16. Recommendation

It is recommended that Air Quality Permit No. 10735R01 be issued to Toyota Battery Mfg. Inc. dba Toyota Battery Manufacturing NC.

APPENDIX A: INITIAL SCREENING QUESTIONS AND TOYOTA RESPONSES

11/17/2022

Addressing Emerging Contaminants Screening Question

1. **Will your facility use any material or products in your operations that contain fluorinated chemicals? If so, please identify such materials or products and the fluorinated chemicals they contain.**
    a. No PFAS were identified in the SDS review; however, there are two materials (one lubricant and one oil repellent) that may be used in small quantities that contain 'Perfluoropolyether' and 'Polyfluoroakylethyl acrylate copolymer' listed as trade secrets with no CAS numbers. Therefore, these 2 ingredients require further review.

2. **Will your facility formulate/create products or byproducts (directly or indirectly) containing fluorinated chemicals (across multiple media)? If so, please identify such products or byproducts and the fluorinated chemicals they contain.**
    a. No

3. **Will your facility generate solid, liquid, or gaseous related emissions, discharges, or wastes/products containing fluorinated chemicals? If so, please identify such waste streams or materials and the fluorinated chemicals they contain.**
    a. No. Upon the review of the trade secret ingredients in Question 1 above, it may be possible to generate some waste that has come into contact with the lubricant and oil repellent, should it be identified to contain PFAS (e.g., cleanup rags).

4. **Do your facility's processes or operations use equipment, material, or components that contain fluorinated chemicals (e.g., surface coating, clean room applications, solvents, lubricants, fittings, tubing, processing tools, packaging, facility infrastructure, air pollution control units)? Could these processes or operations directly or indirectly (e.g., through leaching, chemical process, heat treatment, pressurization, etc.) result in the release of fluorinated chemicals into the environment?**
    a. No

5. **List the fluorinated chemicals identified (i.e., through testing or desktop review) above in your response under the appropriate methods/approaches? If one is not, are they on any other known US or International target lists?**
    - **OTM-45 (air emissions)**
    - **Methods 533 & 537.1 (drinking water)**
    - **SW-846: Method 8327 (water)**
    - **Draft Method 1633 (water, solids, tissue)**
    - **"Total PFAS" Draft Method 1621 for Adsorbable Organic Fluorine (wastewater)**
    - **Non targeted analytical methods**

- **Qualitative approach through suspect screening**
  a. None currently identified; however, as stated above, there are two trade secret ingredients that require further review.

6. **Are there other facilities or operations in the U.S. or internationally engaged in the same or similar activities involving fluorinated chemicals addressed in your response to the above questions? If so, please provide facility identification information? In addition, are there any ISO (International Organization for Standardization) certification requirements?**
   a. Based on our discussions with other EV cell manufacturing sites, at this point none are aware of any PFAS/emerging compounds used in the manufacturing process.

7. **Do you plan to store AFFF on site, use it in fire training at the site, use it for fighting fires at the facility, or include it in a fire fighting system at the site?**
   a. Currently, the site is planning on using water and fluorine free foam options (SFFF). The site is submitting a request to the engineering firm to investigate alternative options for any building areas that may be planning to use fluorinated foam.

8. **Are other emerging contaminants (e.g., 1,4-dioxane, brome, perchlorate, 1,2,3-Trichloropropane) used in some capacity within your facility or operations?**
   a. No

9. **Do you need technical assistance to answer the above questions?**
   a. No

In identifying any fluorinated chemicals or emerging contaminants in response to any of the above questions, please use CAS numbers (if available) and specify the relevant quantities of any such chemicals. If your answers to any of the above questions rely on assumptions or, if information necessary to respond to any of these questions is unavailable, please state. If any of the information requested is deemed a "trade secret" under N.C.G.S. § 66-152(3) and subject to confidential treatment under N.C.G.S. § 132-1.2(1) as required under the Public Record Act, please contact us to discuss proper designation of this information.

APPENDIX B: FOLLOW-UP QUESTIONS AND TOYOTA RESPONSES

12/14/2022

Follow-up to Emerging Contaminants Screening Questions

1. In your initial response to the DAQ emerging contaminants screening questions dated November 17, 2022, you noted that one lubricant and one oil repellent that may be used in small quantities contain "perfluoropolyether" and "polyfluoroakylethyl acrylate copolymer". You stated both these materials are listed as trade secrets with no CAS numbers, and would therefore require further review. When do you expect to complete this review? Will the review include an estimate of PFAS emissions resulting from use of these materials at the Toyota facility?

   a. The two materials mentioned previously are indirect materials used for equipment maintenance and are not used directly in the battery making process. Operations are not planned until 2025; therefore, indirect materials have not been sourced yet, but these are the current materials used in Japan. Toyota is currently seeking clarification if an alternate lubricant and oil repellent without PFAS can be used with the specific equipment it will be supporting. Additional SDS information is expected to be received in the coming months.

2. You responded "No" to the question: "Will your facility formulate/create products or byproducts (directly or indirectly) containing fluorinated chemicals (across multiple media)?" PFAS have been reported as commonly used in the manufacture of lithium-ion batteries – particularly the binder in the electrode (polyvinylidene fluoride (PVDF) and polytetrafluoroethylene (PTFE)), separator coatings, additives in the electrolyte (e.g., lithium bis(trifluoromethylsulfonyl)imide), gaskets/seals, pipes, valves and sealings (e.g., fluorinated ethylene propylene (FEP) and PTFE). Can you clarify what measures you have taken to ensure the batteries manufactured at the Greensboro site will not be comprised of any PFAS compounds?

   a. There is PVDF powder (binder) used in the paste that contains poly(vinylidene fluoride); however the CAS No. 24937-79-9 for this compound is not listed on EPA's PFAS/EPA: ToxCast Chemical Inventory. Therefore, it was not flagged as a PFAS.
   b. Toyota has done a thorough SDS review to identify and flag PFAS materials and / or constituents in direct and indirect material involved with the manufacturing process, as well as ancillary services such as fire suppression and maintenance chemicals. Additionally, Toyota has discussed PFAS concerns with departments such as fire suppression, maintenance, and production to ensure that any PFAS were identified and discussed prior to planned usage. There is a separate Chemical Management Organization (CMO) within Toyota that reviews CAS Numbers for TSCA compliance and other environmental compliance programs such as flagging PFAS chemicals. They review and approve every chemical/material prior to any Toyota Team Member (TM) or Department ordering/purchasing that material. There are procedures in place with our Purchasing system that will not allow any Toyota TM to purchase an unapproved material.

3. Have you discussed with any suppliers of the materials you will use to manufacture batteries whether or not their materials contain PFAS? Have you requested that your suppliers provide materials that do not contain PFAS?

   a. Toyota will continue to evaluate materials prior to being purchased for use. Currently PFAS are not included on the Toyota Banned Chemical List, but it is being investigated. The Toyota

Chemical Management Organization reviews all chemicals/materials for TSCA compliance and other environmental compliance programs. They will continue to flag any items containing PFAS chemicals because we are aware that regulations are being drafted to start regulating and monitoring PFAS. At this time, there are no PFAS chemicals being used in the manufacturing process. If PFAS are found in any materials in the future, we will investigate options to eliminate or find an alternate material.

4. Presuming suppliers inform you (or you otherwise discover) that one or more of the materials you will use to make batteries contains PFAS (either as a component or as part of the manufacturing process), have you conducted a review of your production processes to identify where PFAS would be emitted? What were the results of that review? If you have not conducted such a review, do you have plans to do so?

a. We have evaluated our processes and there are no PFAS chemicals used in our manufacturing processes; therefore, no PFAS would be released from manufacturing processes. The CMO has been established to do thorough review for environmental compliance of all EDS' or full disclosure SDS' for all materials/chemicals used in the manufacturing process. These materials cannot be purchased or brought on-site without going through the CMO material approval process.

APPENDIX C: SECOND ROUND OF FOLLOW-UP QUESTIONS AND TOYOTA RESPONSES

1. **The initial questionnaire did not specify responses for only "PFAS" but to consider all "fluorinated chemicals". Based on the responses, we request that you go back and review the information to include all "fluorinated" chemicals and compounds regardless of that chemical/compound being included in "EPA's PFAS/EPA: ToxCast Chemical Inventory", TSCA list, or part of any other "compliance" program. We are interested in understanding the use of all fluorinated compounds.**

   A complete review of SDS was completed to identify all fluorinated chemicals. As a result of the SDS review, the following four materials were the only materials identified as containing a fluorine compound:
   - Direct Materials PVdf (active binder in paste) – Not listed on EPA's PFAS list, but does contain a fluorine compound
   - Electrolyte – Not listed on EPA's PFAS list, but does contain a fluorine compound
   - NoxBarrier ST-463 (oil repellant) – Not listed on EPA's PFAS list, but does contain a fluorine compound (indirect material confirming if replacement is acceptable)
   - NoxLub KF0921 (grease) – Not listed on EPA's PFAS list, but does contain a fluorine compound (storage quantity <1L; indirect material confirming if replacement is acceptable)

   Indirect materials have not been sourced for TBMNC. SDS review consisted of materials currently used in Japan for battery manufacturing. Once indirect materials are sourced a ENV review and approval is required prior to purchasing, bringing onsite and use.

2. **What is the approximate mass of PVDF binder used on an annual basis? How are fugitive PVDF powder residuals controlled? Are these binders applied in a clean-room environment?**

   1. PVdF is the active binder in the paste. Maximum paste usage for all BEV lines = 5,587,748 lbs/yr. Maximum paste for all HEV lines = 12,863 lb/yr. The paste is comprised of 3.2% by weight PVdF. Therefore, total PVdF usage (HEV & BEV lines) is 179,220 lbs/year. [(5,587,748 + 12,863 lb/yr) * 0.032 = 179,220 lb/yr]
   2. A dry dust collector is used to control PM in the paste mixing process, as specified in the application submitted on July 21, 2022.
   3. Yes the PVdF active binder is mixed into the paste and applied in a clean room environment.

3. **It is recognized that electrolytes used in EV batteries are fluoridated. Would you please specify if you will be utilizing a fluoridated electrolyte? If so, what quantity of this electrolyte will be used on an annual basis (e.g., convert mass of electrolyte to estimated mass of fluorine) and how will the emissions of fluorinated compounds be controlled at the site?**

   Yes the electrolyte is fluorinated. Maximum annual usage for the BEV and HEV lines = 33,279,144 lbs/year. The fluorinated chemical makeup is 14.92% = 4,965,248 lbs/yr [33,279,144 lb/yr * 0.1492]. The electrolyte is injected into the battery cell under vacuum control. We assumed 1% loss from evaporation. The total mass of fluorine in the electrolyte was calculated as 3,497,273 lb/yr, by scaling the molecular weight of fluorine to the molecular weight of each fluorinated constituent using the chemical formula. Therefore, the estimated mass of fluorine lost to evaporation is 34,973 lb/yr [3,497,273 lb/yr * 0.01].

4. Presuming suppliers inform you (or you otherwise discover) that one or more of the materials you will use to make batteries contains PFAS (either as a component or as part of the manufacturing process), have you conducted a review of your production processes to identify where PFAS would be emitted? What were the results of that review? If you have not conducted such a review, do you have plans to do so?

We have evaluated our processes and there are no PFAS chemicals used in our manufacturing processes; therefore, no PFAS would be released from manufacturing processes. The CMO has been established to do thorough review for environmental compliance of all EDS' or full disclosure SDS' for all materials/chemicals used in the manufacturing process. These materials cannot be purchased or brought on-site without going through the CMO material approval process.

Note: An additional clarification provided by Toyota on the response to question 3: the loss of fluorine from evaporation is to the atmosphere.