



The State of New Hampshire  
**DEPARTMENT OF ENVIRONMENTAL SERVICES**

**Robert R. Scott, Commissioner**



EMAIL ONLY

April 13, 2018

Christopher S. Angier  
Senior Environmental Project Manager  
Saint-Gobain Performance Plastics  
14 McCaffrey Street  
Hoosick Falls, NY 12090

**Subject:** **Merrimack** – Saint-Gobain Performance Plastics, 701 Daniel Webster Highway  
DES Site #199712055, Project #36430

**Draft Site Investigation Work Plan**, prepared by C.T. Male Associates, dated May 2016

**Draft Initial Site Characterization Report**, prepared by C.T. Male Associates, dated March 31, 2017

**Updated Tables 3.5A and 3.5B, Draft Initial Site Investigation Report**, prepared by Golder Associates, dated September 14, 2017

Dear Mr. Angier:

The New Hampshire Department of Environmental Services (NHDES) has reviewed the above-referenced submittals prepared on behalf of Saint-Gobain Performance Plastics (Saint-Gobain) for the Saint-Gobain facility located at 701 Daniel Webster Highway in Merrimack (facility). Comments based on NHDES' review of these documents are provided in the sections below.

NHDES notes that the extent of the "Site" as defined in Env-Or 600 has yet to be defined, but is anticipated to include the facility property, as well as properties around the facility that have been impacted by releases of per- and polyfluoroalkyl substances (PFAS) from the facility. Based on the detections of PFAS in samples collected by NHDES from private drinking water supply wells in the areas surrounding the facility, the "Site" will most likely include portions of the communities of Bedford, Litchfield, Manchester, and Merrimack. A preliminary Groundwater Management Zone (pre-GMZ) boundary was included in the March 2017 Consent Decree between NHDES and Saint-Gobain.

Site Investigation (SI) will be required to define the nature and extent of contamination and define the "Site," and investigation activities will be required both at the facility ("on-facility") and in the communities around the facility ("off-facility"). The pre-GMZ boundary is likely to be modified to some extent following completion of the off-facility SI.

The comments provided below relate to SI activities to be completed at the Saint-Gobain facility property (on-facility) only ("on-facility SI"). In our November 3, 2017 letter, NHDES requested

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that SI activities also be completed at off-facility properties in close proximity to the Saint-Gobain facility. Work plans for these separate efforts include the following:

- A scope of work for further investigation related to stormwater and surface water quality impacts was provided to NHDES on March 30, 2018.
- A scope of work for garden soil sampling at nearby residential properties was submitted on April 6, 2018.
- Based on information provided by Saint-Gobain, a proposed scope of work for SI activities at the immediately adjacent parcels owned by the John Flatley Company (Town of Merrimack Tax Parcel IDs 6E-3-4, 6E-3-1, 6E-3-3, and 6E-3-5) will be submitted by mid- to late-April.

Comments on these scopes of work will be provided separately. Additional comments on the off-facility SI activities will be provided by NHDES in conjunction with comments on the modeling report prepared by Barr Engineering Co. (Barr)<sup>1</sup>, at a future date.

#### ***Draft Initial Site Characterization Report***

The Draft Initial Site Characterization Report (ISC Report) prepared by C.T. Male Associates (CT Male) describes soil and groundwater sampling completed at the facility by Saint-Gobain as part of initial site characterization investigations. The work described in the ISC Report was completed in accordance with the proposed scope of work.<sup>2</sup>

As part of these efforts, on-facility monitoring wells (MW-1, MW-1S, MW-2, MW-2S, MW-3, MW-3S, MW-4, MW-4S, MW-5, MW-6, and MW-6S) were installed in March 2016 and subsequently sampled in March 2016 and April 2016. Additional sampling was completed in March, June, October, and December 2017; data for these sampling events were provided under separate cover and are summarized in the 2017 Annual Groundwater Monitoring Summary Report<sup>3</sup>. Monitoring wells were installed as shallow and deep couplets in overburden materials, with the exception of MW-5, which was installed as a single overburden well. In addition, soil samples were collected during monitoring well installation, wipe samples were collected from the rooftops of the facility buildings, and a sample was collected of the char material (designated as "stack tar") inside one of the air emission stacks.

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<sup>1</sup> *Preliminary Air, Soil, and Water Modeling Technical Memorandum: Merrimack, New Hampshire*, prepared by Barr, dated June 2017.

<sup>2</sup> *Summary of Work Scope, Initial Site Characterization Investigation*, prepared by CT Male, dated March 13, 2016.

<sup>3</sup> *2017 Annual Groundwater Monitoring Summary, Volumes I and II*, prepared by Golder Associates (Golder), dated February 7, 2018. NHDES comments on this report will be provided under separate cover.



In summary, results presented in the ISC Report indicate the following key findings:

- PFAS are present in on-facility soil and groundwater. PFAS were also detected in samples collected from rooftops and stack tar.
- The detected concentrations of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) in groundwater at the facility are greater than the NHDES Ambient Groundwater Quality Standards (AGQS) of 70 nanograms per liter (ng/L) for PFOA and PFOS, either individually or combined. Several other PFAS that are currently not regulated were also detected in groundwater.
- The detected concentrations of PFOA and PFOS in soil were less than the NHDES soil guidance levels of 500 parts per billion (ppb) for these compounds, which are based on a direct-contact exposure scenario.
- NHDES notes that the locations with the highest concentrations of PFOA in groundwater do not correlate to those locations with the highest concentrations of PFOA in soil. In addition, concentrations of PFOA detected in groundwater are greater on the eastern side of the facility than the western side of the facility. These patterns suggest that in addition to leaching of PFOA deposited from facility air emissions, other sources of groundwater contamination are likely present.

NHDES makes the following comments on the ISC Report, which should be addressed in a revised report:

- 1) Section 1.3 (Scope of Work) indicates that soil samples were collected at each soil boring location at depths up to 24"; however, we note that soils were sampled at deeper intervals at some locations, as noted on the soil boring logs in Appendix A and Table 2.2. *Please revise.*
- 2) Section 1.5 (Site History) indicates that Saint-Gobain acquired the facility from ChemFab in 2000; however, NHDES notes that the online tax parcel map maintained by the Town of Merrimack lists the owner of the property as CHEMFAB CORPORATION and the co-owner as C/O SAINT-GOBAIN PPL CORP/AP. *Please clarify who currently owns the facility property.*
- 3) Section 1.5 (Site History) does not mention that the abutting properties owned by John Flatley Company (Town of Merrimack Tax Parcel IDs 6E-3-4, 6E-3-1, 6E-3-3, and 6E-3-5) were previously owned by ChemFab. In addition, we note that Section 1.5 contains little information about the prior site operations under General Electric's (GE's) ownership of the property. *Please provide additional information about the property ownership and history and prior site operations.*
- 4) Section 1.8.3 (Environmental Orders, Decrees, and Violations Associated with the Site) indicates that the underground injection control (UIC) registration for the facility was likely associated with the used/waste oil underground storage tank (UST) that was removed from the facility in 1992. It is unclear based on the information provided in the report why this



association was assumed. UIC registrations are issued for wastewater discharges to the subsurface, and the May 2003 letter to NHDES referenced in the report indicates that a floor drain had been closed with concrete in 2003. Thus, it is unlikely that the 2003 registration and closure were associated with the UST. *Please provide additional information related to the UIC and the process(es) and location(s) with which it was associated.*

- 5) Section 1.8.3 describes a spill in the state spills database with NHDES Site Number 201103015 as being associated with the facility. We note that this Site Number pertains to a spill with an address of 70 Daniel Webster Highway and appears to be an error in the database report. *Please clarify.*
- 6) The database report provided in Appendix G includes several listings for the Saint-Gobain facility, with hyperlinks for additional information. The hyperlinks in the report provided are not active. *For completeness of the project record, please provide a full copy of the database report that includes these additional hyperlinked reports.*
- 7) Section 1.8.3 does not include descriptions of December 2003 and April 2004 spills of dispersions on the exterior of the building, or a June 2015 spill inside the facility building that seeped through the wall and leaked onto the ground on the outside of the building. These spills were described in previous correspondence to NHDES<sup>4</sup> and are documented in files maintained by NHDES and the Town of Merrimack. *Please provide a description of these incidents.*
- 8) Section 3.2 (Soil Borings and Monitoring Wells) indicates that drilling refusal, assumed to be till, boulders, and/or bedrock, was encountered in each of the borings at depths ranging from 23.8 to 28 feet below ground surface (ft bgs). However, the Geologic Cross Sections presented as Figures 8A-C and the Subsurface Logs and Monitoring Well Construction Logs provided in Appendix G do not indicate the presence of till in the exploration locations. *For clarity, lithological descriptions on the boring logs, cross-sections, and in the report text should be consistent.*
- 9) Section 3.4 (Hydraulic Conductivity Testing) indicates that the range of estimated hydraulic conductivity values for the deep wells is consistent with silty sand, silt, and glacial till, suggesting a greater component of fine-grained material than was observed in the samples. We note that the soil descriptions contained on the boring logs in Appendix A contain minimal information regarding the secondary components observed in the soil samples. *Please provide additional soil description information, if available.* Otherwise, going forward, please provide detailed soil descriptions for samples collected during future site investigation activities to better understand geological conditions.
- 10) Section 3.9 (Receptors and Potential Receptors) and the accompanying Figure 7 indicates that there are no known drinking water supply wells within the 500-foot radius of the facility. NHDES notes that were been connected to the Merrimack Village District (MVD) public water system by Saint-Gobain. *The revised report should acknowledge that drinking water*

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<sup>4</sup> Letter re Request for Information, prepared by Archer & Greiner, PC, dated May 6, 2016.



*supply wells were previously in use at these properties. In addition, please confirm if the wells are still active at these properties, or if these wells have been or will be decommissioned.*

- 11) Figure 1 (Site Location Map) does not show the facility property boundary. *The property boundary should be noted on similar figures provided in reports.*
- 12) Wipe samples were collected from portions of the facility building rooftops and analyzed for PFAS. PFOA concentrations in these samples ranged from not detected to 530 nanograms per gram (ng/g, which are equivalent to ppb). PFOS was also detected in two samples. Shorter- and longer-chain perfluoroalkyl carboxylic acids (PFCAs) were also detected. The concentrations of each PFAS, including PFOA, varied from location-to-location. *Please indicate what may be the cause of the variations, and whether PFAS at these concentrations represent a potential source of impacts to the environment. In addition, please update Figure 5 to include the locations of the air emissions stacks.*
- 13) Groundwater elevations presented on Figures 8A, 8B, and 8C are inconsistent with those provided in Appendix C. For example, the approximate water table elevations depicted on Cross-Section B-B' (Figure 8B) appear to be higher than the elevations listed on the Water Level Record tables contained in Appendix C. *NHDES suggests posting the elevations on the cross-sections and noting the date of the measurement. It would also be helpful to show the groundwater elevations for the couplet wells to help understand vertical gradients.*
- 14) Groundwater samples collected during the March 2016 and April 2016 monitoring rounds were analyzed only for the six PFAS required by the USEPA Unregulated Contaminant Monitoring Rule 3 (UCMR 3) program. Reporting limits for these samples were elevated and ranged from 20 to 90 nanograms per liter (ng/L). NHDES understands that until USEPA issued its September 2016 clarification guidance, many laboratories were not quantifying the branched isomers of PFOA, and were reporting only the concentration of the linear isomer of PFOA. NHDES understands based on discussions with CT Male personnel that Eurofins Eaton, who completed the analyses described in the report, may have been such a laboratory. *Please clarify whether the concentrations provided in the report represent quantification of both linear and branched isomers of PFOA. If these concentrations are for linear isomers only, please inquire with the analytical laboratory as to whether revised concentrations can be reported that also include the branched isomers. If reported concentrations are for the linear isomers only, and revised concentrations cannot be reported, notation should be made on analytical data tables submitted with these results (as well as in future reports).*
- 15) Please clarify whether the groundwater samples were submitted for laboratory analysis of sulfonic acids or sulfonates. The analytical laboratory data reports indicate sulfonates, but the data validation reports indicate sulfonic acids, and the CAS numbers reported in both locations are the same. Note that the AGQS is for perfluorooctane sulfonic acid. *Please clarify which compounds were analyzed and reported. In addition, please provide CAS numbers on tables, and order perfluoroalkyl acids in the tables by chain length.*



- 16) *Please revise and submit the data tables to address the following:*
- a) In Tables 3.5a and 3.5b, data should be compared to AGQS, not the EPA Lifetime Health Advisory (LHA), as New Hampshire has adopted the LHA levels of 70 ng/L as regulatory standards in the New Hampshire Code of Administrative Rules Chapter Env-Or 600.
  - b) Provide the primary sample locations associated with the duplicate samples.
  - c) Tables 3.4, 3.5a, and 3.5b contain results for the matrix spike / matrix spike duplicate (MS/MSD) samples. While these are important quality assurance / quality control samples, it is confusing to have them tabulated with the rest of the analytical data without any explanation where they are easily confused with primary soil samples. It is similarly confusing that these samples are listed in the analytical laboratory data reports along with the other soil samples without any explanation.
  - d) It does not appear that the results in Table 3.4 (Soil Sample Analytical Results) include the qualifiers provided in the data validation reports. NHDES notes the PFOS results for the samples collected from SG-MW02 as an example, but did not complete a comprehensive check of the data in the table. *Please check that the table contains the validated data, and if not, please revise to include this information.*
- 17) As summarized on the groundwater field sampling logs in Appendix B, some of the groundwater samples appear to have been turbid, with turbidity readings as high as 40 nephelometric turbidity units (NTU). *Please clarify whether samples were filtered and/or centrifuged at the laboratory prior to analysis, and if so, whether this turbidity has influenced the analytical results.*
- 18) Data validation reports for the soil samples only were provided in Appendix F. Validated data were provided in the above-referenced summary data tables submitted in September 2017 subsequent to submittal of the ISC Report; however, the associated data validation reports were not provided. In addition, data validation report(s) and an updated data table were not provided for the roof wipe and stack tar samples. *Please provide a copy of the data validation reports for the groundwater, roof wipe, and stack tar sample results associated with the sample results presented in the ISC Report.*

### ***Draft Site Investigation Work Plan***

Comments below on the draft Site Investigation Work Plan are provided in consideration of NHDES' review of the ISC Report and other relevant data submittals (e.g., Draft Soil Sampling Report<sup>5</sup>, 2017 Annual Groundwater Monitoring Summary Report), data from private supply wells sampled by NHDES in the vicinity of the facility, and historical documents available in NHDES

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<sup>5</sup> *Draft Soil Sampling Report Locations Surrounding Saint-Gobain Performance Plastics*, prepared by CT Male, dated March 3, 2017. NHDES comments on this report will be provided under separate cover.



files, as well as observations made during NHDES site visits to the exterior and interior portions of the facility on July 7, 2017 and July 20, 2017.

As previously discussed, significant revisions to the work plan will be required for the scope of work to satisfy the requirements of Env-Or 606.01. The revised work plan (on-facility SI Work Plan) should address the components outlined in Env-Or 606.04-.08 and include a Site Investigation Report that meets the requirements of Env-Or 606.03. The SI activities should determine the source, nature, location, and extent of contamination, including, but not limited to PFAS, at the facility from current and historical site operations.

NHDES makes the following comments on the scope of work to be included in the on-facility SI Work Plan:

- 1) Additional information is needed about the history of the facility, including the former operations by ChemFab and General Electric (GE), both at the current facility property and at the abutting properties that were formerly associated with the facility. These abutting properties are generally currently undeveloped; however, it is unclear if any operations, such as illicit disposal, may have occurred in these areas. Historical records such as aerial photographs, topographic maps, historical plans and maps, City Directory listings, and other similar information should be used to prepare a detailed summary of the site history and provided in the on-facility SI Work Plan. We understand that SI-related activities on the adjoining properties formerly owned by ChemFab will be included in a separate work plan to be submitted in mid-April.
- 2) Please provide a comprehensive site plan that shows the locations of the key site features, site buildings, air emissions stacks, current and former subgrade structures, current and former chemical storage areas, and potential release areas should be provided in the revised on-facility SI Work Plan.
- 3) The scope of the on-facility investigations should thoroughly assess the potential for releases associated with current and historical facility operations, including prior operations by ChemFab and GE, in both interior and exterior areas. If locations of potential historical releases are unknown, investigations should target suspected release areas, rather than exclude the potential releases from consideration. Specific operations and features that should be shown on figures and targeted for soil and/or groundwater sampling, include, but are not limited to the following:
  - a) *Structures, including the sanitary sewer line and former trenches, that convey wash water generated during the rinsing of dispersion totes and dip pans.* These structures have the potential to have leaked and released PFAS-containing wash water to the subsurface.

Empty totes are washed out in the mixing room of the main building, and wash water is captured in a floor drain and conveyed to settling tanks prior to discharge to the sanitary sewer line. A trench drain in this area extends into the manufacturing area, and is reportedly capped and no longer used. Additional information is needed about the former use of this trench drain, its discharge location, and the integrity of the trench



system. Prior to 2015, sinks were not plumbed to the settling tanks, but discharged directly to the sanitary sewer system. If other similar structures are present at the facility, these should also be evaluated as potential sources of releases to the subsurface.

Analytical results from sanitary effluent samples collected from the facility by the Town of Merrimack indicate the presence of PFAS, including PFOA and PFOS. NHDES understands that Saint-Gobain also collected samples of sanitary sewer effluent and requests that a copy of the analytical results be provided. Please also provide a description of the design and pilot test approach for the proposed wastewater pre-treatment system.

- b) *The floor drain formerly located inside the building.* As noted above, a floor drain was reportedly present inside the building and decommissioned in 2003; however, the location of the drain is unknown based on the information available in NHDES' records. This drain may have resulted in the discharge of PFAS-containing water.
- c) *A former limestone tank that reportedly discharged wash water to the ground.* NHDES inspection records from 1987 indicate that Teflon wash was discharged to sinks, which then discharged to a limestone tank, which discharged to the ground. The location of the tank is unclear.
- d) *Current and former chemical storage areas and waste storage areas.* These areas include, but are not limited to, the current bulk dispersion storage areas inside the building, the Hazardous Waste Storage building on the east side of the facility, and the flammable storage building on the east side of the facility. In addition, a "chip collection area" and "oil house" are noted on the eastern side of the facility on a 1987 Spill Prevention Pollution Control Plan figure.
- e) *Locations where releases of dispersions have occurred at the facility.* As noted above, several releases of dispersions have been documented at the facility in records maintained by NHDES and the Town of Merrimack. These release areas should be evaluated, as well as areas of any other releases that may be identified in records maintained by ChemFab or Saint-Gobain.

During NHDES' site visit, we noted that releases of dispersions in the mixing room resulted in damage to the base of the partition walls of that room. Please evaluate if these releases would have the potential to discharge to the environment. Although located inside the building, they are suggestive of housekeeping practices that are of a concern for potential releases.

- f) *Exterior storage areas on the eastern side of the facility.* The highest concentrations of PFAS in facility groundwater were detected southeast of the facility, side- to down-gradient from the facility buildings. This pattern suggests that there are localized on-facility source areas, in addition to the air emission sources of PFAS. As noted during NHDES' site visits, materials and equipment are stored on the eastern side of the buildings, in connex containers, directly on the asphalt, and under cover in open-sided



structures. We understand that portions of this area were only paved within the past few years. We also understand that empty dispersion totes are transported to this area for storage in shipping containers prior to off-site transport. During our site visit, NHDES observed dispersion that had leaked from one such container to the asphalt in this area. Potential impacts from these activities should be evaluated.

- g) *Leaching from stack char material.* "Stack tar" from one air emission stack sampled as part of the ISC activities contaminated PFOA was detected at 130,000 ng/g, as well as other PFAS at concentrations two-to-three orders of magnitude lower. NHDES understands from our discussions with facility personnel and review of the facility Stormwater Pollution Prevention Plan (SWPPP) that the char material is discharged from the stacks onto the roofs and to the ground around the facility, and that the material is routinely collected and shipped off-facility by a disposal contractor. The visibly observed area of deposition to the ground surface and the potential for leaching of this material should be evaluated as part of the site investigation. Also, please provide a written description as to how the material is managed (e.g., as described in the SWPPP), including estimates of the mass produced and frequency of removals from the facility.
- h) *Infiltration of contaminated runoff (e.g., stormwater, snowmelt, and irrigation water) to the subsurface.* As noted in the Stormwater and Surface Water Sampling Report<sup>6</sup>, PFAS were detected in stormwater samples collected from the on-facility stormwater network. Although the source of the PFAS impacts to stormwater will be evaluated as part of future sampling efforts (as described in the March 30, 2018 work plan submitted to NHDES), the potential for contaminated runoff to impact soil and groundwater quality should be evaluated during the SI. This evaluation should include potential impacts from roof runoff that is not collected directly into a closed stormwater system (e.g., in areas where stormwater from the roof might sheet flow from the building roofs, such as from portions of the New Building and in downspout areas), considering areas where the discharge is to pervious surfaces and/or incompetent impervious surfaces (e.g., cracked pavement). This evaluation should also include snow storage areas, given the potential for snowmelt to have been impacted by deposition from air emission sources, or by particulate matter sourced from the rooftop. Further, if water used for irrigation has been impacted by PFAS, areas of irrigation and potential irrigation runoff should also be included in the evaluation.
- i) *Former railroad tracks.* A railroad turnaround appears to be present on the abutting property to the south of the facility and appears to be connected to the tracks at the facility that are no longer in operation. An assessment of the potential for releases from these areas should be evaluated.
- j) *Current and former loading dock areas.* We understand that a loading dock was formerly located in the area of the "New Building." Given the potential for releases loading and unloading of materials, including dispersion totes, and that used totes are moved out of the facility in the current loading dock area for storage on the exterior of

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<sup>6</sup> *Stormwater and Surface Water Investigation Summary Report, Volumes I and II*, prepared by Golder, dated January 30, 2018.



the building (as shown above), an assessment of potential releases at both the current and former loading dock areas is warranted.

- 4) Based on groundwater flow directions presented in the ISC Report, there appears to be a gap in the location of monitoring wells in the southwestern portion of the facility. An additional monitoring well, or well couplet, would help better understand groundwater flow in this area.
- 5) The concentrations of PFAS detected in samples collected from the shallow monitoring wells are greater than those collected from their paired deep monitoring wells, with the exception of the couplet MW-06/-06S. The vertical gradients calculated from groundwater elevation data presented in the ISC Report suggest a very flat, to slightly upward vertical gradient, with the largest vertical gradient observed at monitoring wells MW-06/-06S. A better understanding of vertical gradients and potential differences in water quality between shallow and deep overburden groundwater is needed.
- 6) As noted above, drilling refusal assumed to be till, boulders, and/or bedrock was encountered in each of the borings at depths ranging from 23.8 to 28 ft bgs when the existing monitoring wells were installed. Better characterization of the low recovery zones and reason for refusal is needed. In addition, the ISC Report indicates that a bedrock rise on the eastern side of the facility is inhibiting groundwater flow to the east and driving groundwater flow towards the south. However, NHDES notes that in the northern portion of the facility property, bedrock is highest on the western side of the facility (at monitoring well MW-02/-02S), and yet groundwater flow in that area of the facility is still shown to be towards the south on the groundwater contour plans provided as Figures 3 and 4 of the ISC Report. Additional assessment of the site hydrogeology, including evaluation of the controls on groundwater flow directions at and in the vicinity of the property, is needed.
- 7) Deep overburden groundwater at the facility has been impacted with PFAS. In addition, bedrock supply wells sampled by NHDES in the vicinity of the facility are also impacted with PFAS, including wells located both upgradient and downgradient from the facility. As such, an assessment of bedrock groundwater quality at the facility is warranted, and an understanding of the interactions between overburden and bedrock groundwater quality is needed.
- 8) Additional assessment of the correlation between predicted PFOA deposition from air emissions and resulting soil and groundwater concentrations is warranted. The highest concentration of PFOA detected in soil samples collected as part of the ISC activities was from location MW-06/-06S, at a concentration of 30 ng/g in a sample collected from 5 ft bgs. The highest concentrations of PFOA detected in samples from other exploration locations ranged from 0.46 to 5.1 ng/g. NHDES recommends collecting soil samples from those areas of the facility with the highest predicted deposition of PFOA to correlate PFOA (and other PFAS) deposition with observed soil and groundwater detections. Please provide an assessment of the potential correlation in the on-facility SI report.



- 9) Based on a review of the soil analytical data presented in the ISC Report, NHDES notes that of the 35 soil samples analyzed for PFAS, almost half of the samples had detections of PFOS at concentrations greater than PFOA, compared with approximately one third of the samples that had PFOA detections greater than PFOS. The highest levels of PFOS were detected in soil samples collected from the eastern side of the facility property, where detections ranged from 18 to 31 ng/g, compared to 3.1 to 7.2 ng/g in samples collected from the western side of the facility. In comparison, PFOS concentrations detected in groundwater samples from the on-facility wells were generally an order of magnitude lower than PFOA, or not detected above laboratory reporting limits. An assessment as to the source of the PFOS should be provided, as well as an explanation for the differences in concentrations between PFOS and PFOA in soil versus groundwater.
- 10) To better understand the vertical distribution of PFAS in soils at locations where soil borings are completed, NHDES recommends that soil samples be collected from the following intervals down to the water table or bedrock: from 0-2 inches bgs, 2-12 inches bgs, 3-4 feet bgs, 6-8 feet bgs and if necessary at subsequent 5 foot intervals until the bottom of the boring at the water table or bedrock, whichever is shallower. The soil samples below 1 ft bgs should also be adjusted so that they are collected from any mottling observed in the soil horizons, and any changes in soil type / lithology observed during drilling. In select drilling locations, samples should also be collected from depths up to ten feet below the water table, with samples collected from intervals that indicate a change in the stratigraphy.
- 11) More information is needed about the potential for continued leaching of PFAS from soil to groundwater, including an estimate of the mass of PFAS present in on-facility soils that will continue to leach to groundwater. As such, an approach for this evaluation should be included in the scope of work. NHDES recommends consideration of submittal of soil samples for analysis of synthetic precipitation leaching procedure (SPLP) for PFAS at conditions typical of rainwater, and/or parameters that may be relevant in controlling the distribution and migration of PFAS, including total organic carbon (TOC), pH, major cations, moisture, and grain size. A comparison of these parameters with the detected PFAS concentrations should be provided in the on-facility SI report.
- 12) NHDES recommends that field instruments used to measure pH and other geochemical parameters during groundwater sampling be calibrated at a minimum at the beginning of each field day, and a calibration check performed in the middle and at the end of each field day. Documentation to this effect should be provided in the on-facility SI report.
- 13) Two rounds of groundwater monitoring should be included in the SI scope of work. One of these rounds can be concurrent with the quarterly sampling of the existing monitoring wells.
- 14) The draft work plan contained a Quality Assurance Project Plan (QAPP). Please note that NHDES does not review and approve QAPPs as part of SI activities for state lead managed sites such as this one. SI activities should be completed using industry-standard practices, and the field and sampling methods described in the on-facility SI Work Plan.



- 15) A total of 23 PFAS have been detected in the samples of various media collected from the facility and surrounding areas (i.e., groundwater from the on-facility monitoring wells and nearby private drinking water supply wells, on-facility and off-facility soils, roof wipes, stack char, surface water, wet weather stormwater discharge, facility air emissions, and facility dispersions<sup>7</sup>). In addition to PFOA and PFOS, which were detected in groundwater samples collected from the on-facility monitoring wells at concentrations up to 7,300 and 440 ng/L, respectively, other detected PFAS include PFCAs (for example perfluorohexanoic acid [PFHxA], perfluoroheptanoic acid [PFHpA], and perfluorononanoic acid [PFNA]); perfluorosulfonic acids (PFSAs); and precursor compounds that have the potential to break down into perfluoroalkyl acids (PFAAs) in the environment.

Given the detections of these PFAS, and the potential for the presence of precursor compounds that may break down into PFOA or PFOS, NHDES strongly recommends that samples collected during the SI activities be submitted for analysis of a longer list of PFAS than what is currently used for the quarterly groundwater monitoring of the on-facility wells. NHDES understands that many commercial laboratories with PFAS capabilities currently report between 20 to 30 PFAS. NHDES recommends that samples be analyzed for this expanded list.

More information is needed to better understand the potential mass of PFAS that could transform into PFOA, PFOS, and other PFAAs once released into the environment (i.e., "precursors"). As such, NHDES recommends that a subset of samples be submitted for analysis Total Oxidizable Precursor (TOP) Assay to get general understanding of potential precursor mass.

NHDES understands that fluorinated replacement compounds have been substituted for PFOA in the newer formulations used by the facility since the phase out of production of PFOA in the United States. Perfluoro-2-propoxypropanoic acid (HFPO-DA/"GenX") was detected in one of the dispersion samples and in a stack char sample collected from the facility. GenX has not been detected in the samples collected from private drinking water supply wells in the area by NHDES, but is not known if this compound is present in soil and groundwater at the facility. As such, NHDES would like to see the SI include assessment for GenX and any other potential replacement compounds (e.g., 4,8-dioxa-3H-perfluorononanoic acid/"ADONA") that may have been used at the facility.

Based on a review of data collected during the SI, Saint-Gobain could include a recommendation in the report for NHDES to consider a more limited analyte list for subsequent monitoring and testing.

- 16) In general, the list of PFAS detected in groundwater, soil, stormwater, surface water, stack char, roof wipe samples, and dispersions is generally similar; however, some differences in the detected compounds are noted. For example, longer-chain PFAS compounds have been detected in soil and stormwater, but less frequently and at lower concentrations or not

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<sup>7</sup> Data from the facility's air emissions and dispersions are available in *Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids Testing Program Report*, prepared by Weston Solutions, dated July 2016



at all in groundwater samples. The site investigation should compare the PFAS detected in various site media and explain potential causes for these differences.

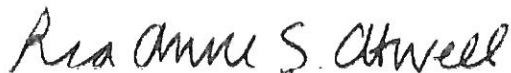
### **Closing**

In closing, please provide two submittals that address the comments provided above:

- 1) A revised ISC Report should be provided that addresses comments 1 through 18 in the **Draft Initial Site Characterization Report** section above. Please provide the revised report by May 14, 2018.
- 2) A revised on-facility SI Work Plan should be provided that addresses comments 1 through 17 in the **Draft Site Investigation Work Plan** section above. Please provide the work plan by June 8, 2018. The work plan should include a schedule for implementation of the field work and report preparation, as well as upload of data to NHDES' Environmental Monitoring Database (EMD). NHDES expects that all field work for this investigation will be completed in calendar year 2018.

NHDES appreciates the work completed to date by Saint-Gobain related to the on-facility site investigation activities. We would be happy to arrange a meeting to discuss the proposed scope of work prior to submittal to facilitate our review and approval process. Please contact me if you would like to discuss further or if you have questions regarding this letter.

Sincerely,



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Kate Emma Schlosser, PE, NHDES HWRB  
Eileen Cabanel, Town Manager, Town of Merrimack  
Attention Health Officer, Town of Merrimack  
Richard Sawyer, Town Manager, Town of Bedford  
Attention Health Officer, Town of Bedford  
Troy Brown, Town Administrator, Town of Litchfield  
Attention Health Officer, Town of Litchfield  
Attention Health Officer, City of Manchester