UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
5 POST OFFICE SQUARE, SUITE 100
BOSTON, MA 02109-3912

Date: *Dated as shown on electronic signatures*

Subj: Inspection Report
Clean Water Act
Novo Nordisk US Bio Production, Inc.

From: John (Jack) Melcher, Enforcement Officer

JOHN MELCHER Digitally signed by JOHN MELCHER
Date: 2022.11.14 06:50:53 -05'00'

Shannon Shea (Brunelle), Inspector

Brunelle, Shannon Digitally signed by Brunelle, Shannon
Date: 2022.11.14 10:10:53 -05'00'

Appendices:

Appendix A - Draft City Industrial Discharge Permit
Appendix B - Photographs
Appendix C - Combined Wastestream Formula Example from Baseline Monitoring Report
Appendix D - Monitoring and Reporting Procedures
Appendix E - No Exposure Certification Form
Appendix F - Drainage Area Site Plan
Appendix G - Volatile Organic Compounds
Appendix H - Volatile Organic Analytes
Appendix I - Total Cyanide

I. Facility Information

A. *Facility Name:* Novo Nordisk US Bio Production, Inc.

B. *Facility Location*: 9 Technology Drive
Lebanon, NH 03784

C. *Facility Contacts:* Rob Burleson, Environmental Health and Safety Supervisor
(603) 359-4887, RTBS@novonordisk.com

Gert Moberg, Director of Business Support
603-359-6635

D. *NPDES ID No(s).:* NHPIU0011 (wastewater pretreatment)
NHNOEJ015 (stormwater)

II. Background Information

A. *Date(s) of inspection:* September 21, 2022

B. *Weather Conditions:* Clear
Heavy rain during the evening of September 20

C. *US EPA Representative(s):*
John (Jack) Melcher, Enforcement Officer
Michelle Coombs, Inspector
Shannon Shea (Brunelle), Inspector

D. *State/Local Representative(s):*
None

E. *Federally Enforceable Requirements Covered During the Inspection:*
40 C.F.R. Part 403 – General Pretreatment Regulations for Existing and New Sources of Pollution[1]
40 C.F.R. Part 439 – Pharmaceutical Manufacturing Point Source Category, Subpart A – Fermentation Products, § 439.17 – Pretreatment Standards for New Sources ("Pharmaceutical Manufacturing PSNSs")[2]
40 C.F.R § 122.26 – National Pollutant Discharge Elimination System ("NPDES") regulation for the discharge of stormwater

F. *Previous Enforcement Actions:*
No EPA Clean Water Act enforcement actions are on record.

III. Type and Purpose of Inspection

EPA conducted an Industrial User ("IU") Evaluation Inspection and an IU Sampling Inspection to evaluate compliance with the General Pretreatment Regulations at 40 C.F.R. Part 403 and the Pharmaceutical Manufacturing PSNSs at 40 C.F.R. § 439.17.

EPA conducted a Compliance Evaluation Inspection to evaluate compliance with the NPDES regulation for the discharge of stormwater at 40 C.F.R § 122.26.

IV. Facility Description

Novo Nordisk US Bio Production, Inc. ("Novo" or "the Facility") operates a biopharmaceutical facility manufacturing biological products for medical applications utilizing cell culture processes to produce proteins and fermentation to produce peptide hormones.

[1] Available at: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-N/part-403?toc=1

[2] Available at: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-N/part-439?toc=1

EPA's Enforcement Compliance History Online ("ECHO") website provides general environmental compliance data for Novo.[3]

A. Wastewater

Novo discharges to the City of Lebanon Publicly Owned Treatment Works ("POTW"; NPDES Permit No. NH0100366). The City's Wastewater Treatment Facility is an activated sludge plant with a design flow of 3.18 million gallons per day. The City's NPDES Permit does not require the City to implement a federally-approved industrial pretreatment program. Therefore, EPA Region 1 is the pretreatment "Control Authority" for Novo.

According to a Baseline Monitoring Report submitted to EPA on July 5, 2022, there are currently three wastewater treatment pH neutralization systems (Building 9, Building 1, and Building 3 systems); however, the Building 9 (also known as "1A") neutralization system is not currently being utilized and flows to this system are being redirected to the Building 1 neutralization system. Since nonregulated (dilution) streams are combined with regulated streams in the Building 1 and Building 3 neutralization systems, the Facility used the combined wastestream formula as specified in 40 C.F.R § 403.6(e)(1)(i) to calculate alternative concentration limits. A combined wastestream formula ration of 0.85 was calculated for Building 1 and a combined wastestream formula ration of 0.61 was calculated for Building 3.

EPA has not previously performed an on-site inspection to evaluate the facility's compliance with the Pretreatment Standards. EPA sent the Facility a Request for Information (Docket No. CWA-308-R01-FY22-32) on March 31, 2022; the Facility provided a response on May 27, 2022.

New Hampshire Department of Environmental Services performed a pretreatment inspection on January 26, 2022.

The City of Lebanon issues Novo an Industrial Discharge Permit and performs annual sampling inspections of the Facility. The City's draft permit, dated July 14, 2022, is included as Appendix A of this report.

Prior to the inspection, Mr. Melcher and Mr. Burleson communicated several times by telephone and email. Mr. Melcher asked Mr. Burleson to confirm that the Facility was subject to the Pharmaceutical Manufacturing Point Source Category and did not fall under the bioengineering exclusion discussed in Section 8.5.5 of the Permit Guidance Document.[4] On September 20, Mr. Burleson told Mr. Melcher that he had consulted with internal process experts and an outside consultant and confirmed that the Facility was subject to the Pharmaceutical Manufacturing Point Source Category, Subpart A – Fermentation Products.

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[3] Available at: https://echo.epa.gov/detailed-facility-report?fid=110070254929

[4] Available at: https://www.epa.gov/sites/default/files/2015-10/documents/pharmaceutical-permit-guidance_2006.pdf

B. Stormwater

The Facility submitted a No Exposure Certification, dated February 14, 2020.

EPA has not previously performed an on-site inspection to evaluate the facility's compliance with the NPDES regulation for the discharge of stormwater.

V. Inspection

Unless otherwise noted, this report describes conditions at the Facility/property as observed by EPA inspector(s), and/or through records provided to and/or information reported to EPA inspector(s) by Facility representatives and as understood by the inspector(s). This report may not capture all operations or activities ongoing at the time of the inspection. This report does not make final determinations on potential areas of concern. Nothing in this report affects EPA's authorities under federal statutes and regulations to pursue further investigation or action.

Observations made and descriptions provided by Facility representatives have been organized according to topic in this report; the report does not necessarily reflect the order in which topics were addressed during the inspection.

Mr. Melcher announced the inspection to the Facility on July 20, 2022.

Mr. Melcher, Ms. Coombs, and Ms. Shea (Brunelle) ("the inspectors") arrived at 09:00 on September 21, 2022.

A. Opening Conference

The inspectors met with Mr. Burleson, Mr. Moberg, and AJ Smith, EHS Associate II. The inspectors presented their credentials and explained the purpose of the inspection.

Mr. Moberg provided a presentation on the company and the Facility. Novo Nordisk is an almost-100-year-old Denmark-based global company with approximately 50,000 employees. The company traditionally has specialized in diabetes medicines but is now producing medicines to treat hemophilia and growth disorders. The Lebanon, New Hampshire facility produces hemophilia and growth disorder medicines and not diabetes medicines.

The Facility was originally built by another biotech company in 1989. Following several purchases of the property and additions to the buildings, Novo acquired the Facility in 2014.

In addition to 9 Technology Drive, where pharmaceutical manufacturing is performed and the main offices are located, the Facility includes 5 Technology Drive, where a Quality Control lab and a warehouse are located. Mr. Burleson said that no pharmaceutical manufacturing wastewaters are produced at 5 Technology Drive.

The Facility operates 24 hours a day and seven days per week, but the majority of production occurs during the first shift. The day of the inspection was planned to be a typical production day.

Mr. Burleson said that the majority of wastewaters were wastes generated by production, but that cleaning wastewater were also present. Mr. Smith said that the Facility's "Sporcleanse" process uses hydrogen peroxide, acetic acid, and peroxyacetic acid. The Facility uses closed-loop Clean-In-Pace ("CIP") systems by the Steris company. CIP 100 uses potasium hydroxide and tetrasodium EDTA. CIP 200 uses phosphoric acid and citric acid.

Mr. Burleson said that wastewater compliance sampling for the City's permit is typically performed by Pathways Consulting, LLC.

Mr. Burleson said that the Facility has two active wastewater treatment systems: Building 1 and Building 3. The systems are very similar, providing two-stage neutralization. A sampling port is available on each system to draw samples. A treatment system exists in Building 9, but it has not been used in approximately one year; likely the system will be removed.

B. Wastewater Tour

Select photographs taken during the inspection are included as Appendix B of this report. The time and date stamp on the photographs provides the incorrect month in the date. All photographs were taken on September 21, 2022.

1. Building 3 Wastewater Treatment System

At approximately 09:45, the inspectors, Mr. Burleson, and Mr. Smith visited the Building 3 wastewater treatment system. They were joined by the following Facility representatives:

- Thomas Philbin, EHS Technician;
- Allen Pifer, Process Utility Technician; and
- Shawn Aubin, Process Utility Technician.

Mr. Pifer explained that wastewaters were collected in two 2,500-gallon tanks located on the floor below the treatment system (Photo 1). The collection tanks are operated as lead and lag, with one tank used at a time and the other serving as a back-up.

Mr. Pifer explained that wastewaters were treated in serial in two 1,000-gallon neutralization tanks (Photo 2). Phosphoric acid and sodium hydroxide are added to each neutralization tank. Mr. Burleson said that, after contacting a former employee, phosphoric acid was used (rather than, for example, sulfuric acid) because it was believed that phosphoric acid presented less of a health and safety risk for employees.

Mr. Pifer overrode a set-point in the Programable Logic Control ("PLC") panel for the treatment system to activate the pumps in Collection Tank B and begin treatment and discharge. A flow of 25.6 gallons per minute ("gpm") was displayed on the PLC panel. At 09:55, a hydrogen ion concentration ("pH") of 7.6 Standard Units ("S.U.") was displayed

for Neutralization Tank 1 and a pH of 7.4 was displayed for Neutralization Tank 2. An effluent pH of 7.35 S.U. was displayed.

Mr. Pifer said that if pH and temperature effluent probes detect out-of-specification effluent, then the system closes the discharge valve and opens a diversion valve to direct wastewaters back to the collection tank.

Mr. Pifer said that treatment typically begins when the lead collection tank reaches 45% of its capacity. Should the water level in a collection tank rise significantly, because, for example, out-of-specification wastewater is being directed back to the collection tank while additional wastewaters continue to enter the collection tank from production, a high level alarm will notify operators with telephone calls.

Mr. Pifer showed a "Chemical Waste Collection" screen on the PLC display. "Biokill Skid," "Chem Waste," and "CS Cond" are the three wastestreams shown entering the Building 3 wastewater treatment system. Mr. Pifer says that Chem Waste include manufacturing wastewaters and mop waters. CS Cond stands for Clean Steam Condensate.

Mr. Pifer showed a "Waste System" screen on the PLC display. "N2 Waste" and "Biowaste" flow through the Biokill Skid. These wastewaters contain *E. coli* bacteria used to make products so heat is used to sanitize these wastewaters prior to discharge. Wastewaters may be warm when they are sent to wastewater treatment and so can be sent through a heat exchanger between the collection tanks and the neutralization tanks. N2 Wastes are directed to a holding tank and not to the wastewater treatment system.

Ms. Coombs and Ms. Shea (Brunelle) took samples from the wastewater treatment system. Details are provided in Section VI, below.

2. Building 1 Wastewater Treatment System

At approximately 10:15, the group visited the Building 1 wastewater treatment system. Mr. Burleson said that the systems are very similar, with two 2,500-gallon collection tanks, two 1,000-gallon neutralization tanks, and phosphoric acid and sodium hydroxide chemical addition.

Mr. Pifer overrode the PLC panel for the treatment system to activate the pumps in Collection Tank B, the system began treatment and discharge. In-situ effluent measurements of flow and pH were displayed on the treatment system PLC panel. At approximately 10:20 hours, the PLC panel displayed an effluent pH of 10.59 S.U. and a flow rate of 37.4 gpm.

As in Building 3, the neutralization chemicals are stored in separate secondary containment structures (Photo 3).

As in Building 3, a sampling port with a red handle is available to collect samples following treatment (Photo 4).

Mr. Burleson said that the "Metrology Department" calibrates the effluent pH. A "Calibration labeling board" contains a printed record that the last calibration was performed on August 15, 2022, and the next calibration is planned for November 30, 2022.

Mr. Burleson said that rather than *E. coli* bacteria, processes in Building 1 use Chinese Hamster Ovary ("CHO") cells for production and so heat treating of wastewaters is not necessary.

Ms. Coombs and Ms. Shea (Brunelle) took samples from the wastewater treatment system. Details are provided in Section VI, below.

3. Wastewater Sampling Manhole

At approximately 10:50, the inspectors, Mr. Burleson, Mr. Smith, and Mr. Philbin visited the wastewater sampling manhole identified as "Outfall 001" by the City of Lebanon (Photo 5). The manhole is located near the end of the northern driveway of 9 Technology Drive.

Ms. Coombs and Ms. Shea (Brunelle) collected an instantaneous grab sample at approximately 11:05 from the effluent. The sample was field tested for pH using an Oakton "pHtester" pH meter and was 7.05 S.U.

Ms. Coombs and Ms. Shea (Brunelle) departed at approximately 11:10.

C. Wastewater Records Review

Mr. Melcher, Mr. Burleson, and Mr. Smith went to the conference room to review wastewater records.

Mr. Melcher asked how the Combined Wastestream Formula ratios provided in the Baseline Monitoring Report were calculated. Mr. Smith used Building 3 Daily Average Flows as an example (Appendix C). The following flows were included as regulated process flows in the calculation:

- Media Preparation, Upstream;
- Fermentation, Upstream;
- Purification, Upstream;
- Purification, Downstream;
- Buffer Preparation;
- Parts Preparation, Upstream;
- Clean In Place, Upstream;
- Parts Preparation, Downstream; and
- Clean In Place, Downstream.

The following flows were treated as non-process flows in the calculation:

- Trench Drain/Janitors Sink,
- Utility Room,
- EH&S Sink, and

- Water Room.

Mr. Melcher noted that the only parameter listed in the Pharmaceutical Manufacturing PSNSs detected in monitoring for the Baseline Monitoring Report was chloroform. Mr. Burleson said that the Facility had performed an investigation and found that the only chloroform in the building was a conductivity standard used for equipment calibration. Although the written procedure for the calibration process directed staff to ship waste standard offsite rather than discharge to the POTW, Mr. Burleson found that the standard had been dumped down the drain. Mr. Burleson had submitted a request for a product substitution to prevent reoccurrence of this situation. Mr. Melcher noted that the concentration observed in the discharge had been within the Pharmaceutical Manufacturing PSNSs and that another potential source of chloroform was intake water, as chloroform is a byproduct of drinking water chlorination.

Mr. Melcher provided a copy of EPA Region 1's Monitoring and Reporting Procedures document (Appendix D). Mr. Melcher explained that the Facility's semiannual compliance reports should include copies of laboratory analytic reports and a chain of custody for sampling events. Mr. Melcher said that, in the future, semiannual compliance reports should be submitted in hard copy and electronically to the addresses provided in the Monitoring and Reporting Procedures document. Mr. Melcher said that notifications required by the General Pretreatment Regulations, including non-compliance notifications, should be sent to the email address included in the Monitoring and Reporting Procedures document.

Mr. Burleson said that, since the City of Lebanon required reports in January and July, it would be convenient for the Facility if semiannual reports to EPA followed this schedule.

D. Stormwater Records Review

Mr. Melcher, Mr. Burleson, and Mr. Smith reviewed stormwater records. The No Exposure Certification form, included as Appendix E of this report, indicates that the Facility does not require permit authorization under EPA's Stormwater Multi Sector General Permit for its stormwater discharges associated with industrial activity because no industrial activities are exposed to stormwater.

Mr. Melcher showed a "SWPPP Drainage Area Site Plan" that Novo provided in its May 2022 response to EPA's Request for Information (Appendix F). Mr. Burleson said that there was not actually a Stormwater Pollution Prevention Plan, since the Facility has a No Exposure Certification.

Mr. Smith said that there were no processes in the building that generated particulates and there was a low likelihood of any of the vents on the roof to discharge stormwater pollutants.

Mr. Smith said that the area immediately north of the 9 Technology Drive building was the "chiller yard." Non-toxic propylene glycol was piped between the building and the chiller units. Crushed stone surrounded the yard, with some capacity to capture liquids in the event

of a spill. An alarm system is present in the chilling system, with alerts to operators in the event of a pipe breakage.

Mr. Burleson said that the City had requested an updated stormwater operations and maintenance plan in anticipation of a potential addition to 9 Technology Drive. Mr. Melcher requested a copy of the plan when it was completed.

E. Closing Conference

Mr. Melcher, Mr. Burleson, Mr. Moberg, and Mr. Smith held a closing conference at approximately 12:30.

Mr. Melcher reminded the facility representatives that, in addition to compliance with the Pharmaceutical Manufacturing PSNSs, the Facility is required to ensure compliance with the General Pretreatment Standards, including the prohibition on discharges with a pH of less than 5 S.U. In addition, the Facility is prohibited from discharging wastewaters that inhibit or disrupts the POTW and is a cause of a violation of any requirement of the POTW's NPDES permit.

Mr. Moberg and Mr. Burleson said that Novo was commitment to being in complete compliance with all regulatory requirements.

Mr. Melcher said that an inspection report would be provided within 70 days.

Mr. Melcher departed at approximately 12:45.

VI. Sampling and Analytical Results

EPA conducted sampling of the facility's pretreated effluent discharged to the Lebanon Wastewater Treatment Facility during the inspection on September 21, 2022. Mr. Burleson directed EPA representatives to two of the three treatment systems located at the facility for sample collection. Mr. Burleson directed EPA representatives to "Outfall 001", a manhole located at the end of the facility driveway, to measure the facility's effluent pH. EPA offered to take split samples for the facility to analyze. The facility opted to collect their own sample at each sample point immediately after the EPA sampling team.

Building 3 and Building 1 wastewater treatment systems were active at the time of the inspection. Mr. Burleson said both active systems were comprised of two 2,500-gallon collection tanks, two 1,000-gallon neutralization tanks, and phosphoric acid and sodium hydroxide chemical addition. In Building 3, the neutralization chemicals are stored in separate secondary containment structures. Mr. Burleson said Building 9 had not been active for approximately a year and is likely to be removed. Wastestreams from Building 9 were being diverted to the Building 1 wastewater treatment system.

A. Building 3 Wastewater Treatment System:

EPA representatives collected grab samples for analysis of ~~v~~Volatile ~~o~~Organic ~~c~~Compounds ("VOCs"), Volatile Organic Analytes ("VOAs"), and total cyanide from a

discharge valve located behind the neutralization tank following treatment. A sample ("Bldg 3") was collected for each parameter. No duplicates were collected during the sampling. An instantaneous grab sample was collected for the in-situ measurement of pH and Total Residual Chlorine (TRC). The sample was field tested for pH using an Oakton "pHtester" pH meter and TRC using a HACH "DR300" colorimeter. The pH was 7.37 S.U. and the TRC was 0.0 milligrams per liter ("mg/L").

B. Building 1 Wastewater Treatment System

EPA representatives collected grab samples for analysis of VOCs, VOAs, and total cyanide from a discharge valve located behind the neutralization tank following treatment (photo 4). A sample ("Bldg 1") was collected for each parameter. No duplicates were collected during the sampling. An instantaneous grab sample was collected for the in-situ measurement of pH and TRC. The sample was field tested for pH using an Oakton "pHtester" pH meter and TRC using a HACH "DR300" colorimeter. The pH was 10.63 S.U. and the TRC was 0.0 mg/L.

All VOC samples were collected in 40-mL amber vials and preserved with hydrochloric acid to attain a pH of less than 2 S.U. The total cyanide samples were collected in 250-mL HDPE containers and preserved with sodium hydroxide to attain a pH of above 12 S.U. All samples were then placed in coolers with ice to maintain an internal temperature of less than 4 degrees Celsius. Total cyanide and VOC samples were delivered to the EPA New England Regional Laboratory in North Chelmsford, MA to be analyzed. Additional VOC samples (for EPA Analytical Methods 1666A and EPA 1671 analyses) were delivered to Alpha Analytical subcontractor laboratory in Westboro, MA to be analyzed.

The table below provides a summary of the laboratory analytical results and field parameters collected during the inspection. For a full list of compounds analyzed for each parameter and their results, refer to the laboratory reports in Appendices G, H, and I.

C. Sampling and Analytical Results Summary

Table 1: Summary of Novo Nordisk 09/21/2022 Inspection

Sample #	Sample Date and Time	Sample Type	pH (S.U.)	TRC (mg/L)	Analytical Results (mg/L unless otherwise noted)		Pretreatment Standards at 40 CFR 439.17		Combined Wastestream Formula Ratio	Alternative Daily Maximum (mg/L)	Alternative Monthly Average (mg/L)
							Daily Maximum (mg/L)	Monthly Average (mg/L)			
Bldg1	9/21/22 10:25 HRS	Grab	10.63	0.0	**VOCs[1,2]**	ND	-	-	0.85	-	-
					VOAs[1,2] Acetone Chloroform	 0.065 0.0016	 20.7 0.1	 8.2 0.03		 17.5 0.085	 6.9 0.026
					Total Cyanide[3]	ND	33.5	9.4		28.3	7.9
Bldg 3	9/21/22 09:58 HRS	Grab	7.37	0.0	**VOCs[1,2]**	ND	-	-	0.61	-	-
					VOAs[1,2] Acetone Chloroform	 ND ND	 20.7 0.1	 8.2 0.03		 12.6 0.061	 5.0 0.018
					Total Cyanide[3]	ND	33.5	9.4		20.4	5.7

Notes:
1: Compounds that were analyzed but not listed in this table are Not Detected above Reporting Limit (ND).
2. Compounds listed are subject to the Pharmaceutical Manufacturing Point Source Category, 40 CFR 439.17, which references 40 CFR 439.16. Additional compounds not subject to the standard were detected but are not listed in this table
3: Compounds listed are subject to Total Cyanide pretreatment standards under the Pharmaceutical Manufacturing Point Source Category, Subpart A - Fermentation Products, Pretreatment Standards under 40 CFR 439.17.