



October 28, 2024

MS. DENICE NELSON
JOHNSON CONTROLS, INC
5757 N. GREEN BAY AVENUE
MILWAUKEE, WI 53209

Via Email Only to denice.karen.nelson@jci.com

SUBJECT: Semi-Annual Operation, Maintenance, and Optimization Progress Report #10
Ditch B Interim Action Treatment System (Jan. 1– June 30, 2024)
JCI/Tyco FTC PFAS, 2700 Industrial Parkway South, Marinette, WI
BRRTS #02-38-580694

Dear Ms. Nelson:

On Oct. 18, 2024, the Wisconsin Department of Natural Resources (DNR) received the *Semi-Annual Operation, Maintenance and Optimization Progress Report #10* (O&M Progress Report #10) for the interim remedial action to treat surface water in Ditch B at the above-referenced site (the "Site"). The report was submitted by Arcadis U.S., Inc. (Arcadis), on behalf of Johnson Controls, Inc., and Tyco Fire Products LP (JCI/Tyco) and was accompanied by the fee required under Wisconsin Administrative Code (Wis. Admin. Code) § NR 749.04(1) for DNR review and response.

The DNR's review of O&M Progress Report #10 finds that the Ditch B system effectively removes per- and polyfluoroalkyl substances (PFAS) from the surface water it captures. However, during times when the streamflow in the ditch is greater than the capacity of the system, some surface water goes untreated. The DNR recommends that JCI/Tyco continue to operate and report on the Ditch B system, but that it also evaluates if optimization or addition of other interim actions are needed to further minimize contaminant migration at the Site (Wis. Admin. Code § NR 708.11(1)(a)).

Background

JCI/Tyco is investigating and responding to the discharge of PFAS to the environment at the JCI/Tyco Fire Technology Center (FTC), located at 2700 Industrial Parkway South in Marinette, Wisconsin.

A surface water drainage feature identified as Ditch B begins north of the FTC and flows east and then southeast and discharges into the Bay of Green Bay. In Oct. 2019, JCI/Tyco began an interim remedial action to treat surface water in Ditch B after testing confirmed it contained perfluorooctanoic acid (PFOA) up to 3,800 parts per trillion (ppt) and perfluorooctanesulfonic acid (PFOS) up to 190 ppt.

The Ditch B system located at 925 Pine Beach Road in Marinette, which is downstream from the FTC property and approximately 1,250 feet upstream from the Bay of Green Bay. The system captures surface water flowing in Ditch B and treats the captured water using suspended solids settling, bag filtration and granular activated carbon (GAC). The treated water is then discharged back to Ditch B under a Wisconsin Pollutant Discharge Elimination System (WPDES) General Permit (WI-0046566-07-0) and the associated coverage letter, which specifies the effluent criteria and monitoring requirements.

The Ditch B system has the capacity to treat up to approximately 700 gallons per minute (gpm); however, the streamflow in the ditch frequently exceeds this flow rate. During times when the streamflow exceeds the system's operating capacity, a portion of the surface water flowing in Ditch B goes untreated; these are frequent events.

JCI/Tyco's on-going site investigation found that much of the PFAS contamination in Ditch B was from seepage of contaminated groundwater. In Nov. 2022, JCI/Tyco began operating another interim remedial action – the groundwater extraction and treatment system (GETS) – with the goal of reducing the PFAS concentrations in Ditch B to the point with operation of the Ditch B treatment system is no longer needed. Surface water monitoring data from Ditch B will be used to help make that determination.

NR 205 WPDES Permit

The effluent from the Ditch B treatment system is regulated under WPDES General Permit No. WI-0046566-07-0 and the associated coverage letter (updated Apr. 29, 2021). The DNR's Wastewater Program administers the WPDES permit and reviews the monthly electronic discharge monitoring reports submitted by JCI/Tyco. A review of the permit reporting is not included with this letter.

Summary and DNR Review of O&M Progress Report #10

JCI/Tyco's O&M Progress Report #10 covered the period from Jan. 1 to June 30, 2024. During this time, the system operated for 180 days and treated approximately 159 million gallons of surface water. However, JCI/Tyco calculated the total flow volume in the ditch during this time to be around 471 million gallons, which means that some 312 million gallons of surface water in Ditch B went untreated. Most of the by-passing of the treatment system occurred starting in April 2024.

System Operation and Performance

During the reporting period, the Ditch B system used approximately 264,000 pounds of GAC and 271,865 kilowatt-hours of electricity to remove 0.30 pounds of PFOA and 0.04 pounds of PFOS from 159 million gallons of captured surface water. Cumulatively, since startup of the system began in Oct. 2019, approximately 10.4 pounds of PFOA and 0.85 pounds of PFOS have been removed from approximately 1.2 billion gallons of surface water.

The system effectively removed PFAS from the surface water it captured and treated. Surface water coming into the system had concentrations up to 420 ppt for PFOA and up to 48 ppt for PFOS; the treated water exiting the system had concentrations less than 23 for PFOA and less than the reporting limit for PFOS.

Routine system maintenance that occurred during this reporting period included removal of accumulated sediment, replacement of spent bag filters and replacement of spent GAC. The spent bag filters were collected in drums and disposed by End Point Solutions, and the spent GAC was reactivated by Tetrasolv Filtration, Inc. Documentation of the handling of these waste materials was included in Appendix E. Other maintenance during this reporting period included repair of a leaking pipe fitting; the system was shut down during this repair.

Surface Water Monitoring

JCI/Tyco collected monthly samples of surface water at two points downstream of the Ditch B treatment system – surface water sampling points SW-39 and SW-L03. The results were compared to the Wis. Admin. Code § NR 102.04 surface water standards of 95 ppt for PFOA and 8 ppt for PFOS.

- The concentrations of PFOA and PFOS detected at surface water sampling points SW-39 and SW-L03 were similar during each respective sampling event.
- The concentrations of PFOA and PFOS were below standards of in the Jan., Feb. and Mar. samples.
- The concentrations of PFOA and PFOS exceeded standards in the Apr., May and June samples.

The high downstream concentrations of PFAS measured in Apr., May and June 2024 were attributed to high streamflow during these months, which caused a portion of the surface water in Ditch B to go untreated. The DNR has, and continues, to recommend that JCI/Tyco use its weekly monitoring data to estimate the weekly downstream concentrations of PFAS so as to more accurately document the outcome of these by-pass events. The DNR completed the recommended evaluation using data provided in the report (Wis. Admin. Code § NR 724.17(4)(a)) – see attached Table A.1 and Figures A.1 and A.2.

In Section 5.1 of O&M Progress Report #10, JCI/Tyco stated during high flows from storm events, the PFAS detected in the surface water in Ditch B is primarily from “various non-groundwater sources”. These other sources and migration paths into Ditch B were not specified.

Next Steps

The DNR recognizes that JCI/Tyco is currently updating the GETS, with the goal of reducing the PFAS concentrations in the ditch to the point where the Ditch B treatment system is no longer needed. Meanwhile, the DNR recommends that JCI/Tyco continue to operate the Ditch B system and also evaluate if other interim action(s) to address the “non-groundwater sources” to Ditch B are needed to further minimize contaminant migration from the Site (Wis. Admin. Code § NR 708.11(1)(a)).

While the Ditch B system is being used, JCI/Tyco should continue to submit semi-annual O&M Progress Report in accordance with the approved operation, maintenance and monitoring plan for the Ditch A treatment system (Wis. Admin. Code § NR 724.13 (3)). The DNR recommends that JCI/Tyco include the estimated weekly concentration of PFOA and PFOS (see attached Table A.1 and Figures A.1 and A.2) in each O&M Progress Report.

As a reminder, this Site is subject to an enforcement action and therefore all submittals to the DNR under Wis. Admin. Code chs. NR 700-799 and submittals directed by the DNR must be accompanied by an Wis. Admin. Code ch. NR 749 fee per Wis. Stat. § 292.94. These fees are not pro-ratable or refundable per Wis. Admin. Code § NR 749.04(1). If you have any questions about whether to include a fee with a submittal, please contact DNR staff prior to submitting a document without a fee.

If you have any questions, please contact me at Alyssa.Sellwood@wisconsin.gov or (608) 622-8606.

Sincerely,



Alyssa Sellwood, PE
Water Resources Engineer
Remediation & Redevelopment Program

Attachments Table A.1 – Mass Balance Approach to Estimate Downstream Surface Water Concentrations
 Figure A.1 – Ditch B Downstream Surface Water Concentrations: PFOA
 Figure A.2 – Ditch B Downstream Surface Water Concentrations: PFOS

cc: Jodie Thistle, DNR (via email: Jodie.Thistle@wisconsin.gov)

Table A.1
Ditch B Interim Action - Mass Balance Approach to Estimate Downstream Surface Water Concentrations
Calculations by the DNR Using Data JCI/Tyco Reported in O&M Progress Report #10

Source		Ditch B Flow Volume (gallons)		
		JCI/Tyco Table 5	JCI/Tyco Table 5	DNR Calculated ⁽¹⁾
Week Start Date	Week End Date	Estimated Stream Flow (V _{stream})	Treated Discharge (V _{treated})	Estimated Untreated Flow (V _{untreated})
Sunday, December 31, 2023	Saturday, January 6, 2024	6,022,200	6,022,200	0
Sunday, January 7, 2024	Saturday, January 13, 2024	6,516,600	6,370,400	146,200
Sunday, January 14, 2024	Saturday, January 20, 2024	7,148,200	5,916,600	1,231,600
Sunday, January 21, 2024	Saturday, January 27, 2024	6,563,400	5,575,600	987,800
Sunday, January 28, 2024	Saturday, February 3, 2024	6,940,200	6,821,900	118,300
Sunday, February 4, 2024	Saturday, February 10, 2024	6,755,100	6,382,600	372,500
Sunday, February 11, 2024	Saturday, February 17, 2024	6,685,500	6,593,500	92,000
Sunday, February 18, 2024	Saturday, February 24, 2024	6,148,900	6,077,700	71,200
Sunday, February 25, 2024	Saturday, March 2, 2024	5,790,400	5,790,400	0
Sunday, March 3, 2024	Saturday, March 9, 2024	7,881,700	6,339,800	1,541,900
Sunday, March 10, 2024	Saturday, March 16, 2024	5,482,200	5,257,400	224,800
Sunday, March 17, 2024	Saturday, March 23, 2024	5,580,600	5,325,600	255,000
Sunday, March 24, 2024	Saturday, March 30, 2024	16,449,600	6,605,700	9,843,900
Sunday, March 31, 2024	Saturday, April 6, 2024	28,102,700	6,289,800	21,812,900
Sunday, April 7, 2024	Saturday, April 13, 2024	17,326,700	6,989,100	10,337,600
Sunday, April 14, 2024	Saturday, April 20, 2024	24,353,700	6,542,200	17,811,500
Sunday, April 21, 2024	Saturday, April 27, 2024	14,065,600	6,593,000	7,472,600
Sunday, April 28, 2024	Saturday, May 4, 2024	34,326,600	6,863,200	27,463,400
Sunday, May 5, 2024	Saturday, May 11, 2024	34,847,100	3,945,800	30,901,300
Sunday, May 12, 2024	Saturday, May 18, 2024	20,962,500	6,413,600	14,548,900
Sunday, May 19, 2024	Saturday, May 25, 2024	22,765,600	5,474,900	17,290,700
Sunday, May 26, 2024	Saturday, June 1, 2024	53,529,000	6,009,800	47,519,200
Sunday, June 2, 2024	Saturday, June 8, 2024	24,494,100	6,210,300	18,283,800
Sunday, June 9, 2024	Saturday, June 15, 2024	12,550,400	6,309,300	6,241,100
Sunday, June 16, 2024	Saturday, June 22, 2024	21,606,300	5,903,500	15,702,800
Sunday, June 23, 2024	Saturday, June 29, 2024	67,882,900	6,456,500	61,426,400
Total (gallons)		470,777,800	159,080,400	311,697,400
Total (million gallons)		471	159	312

Notes:

⁽¹⁾ V_{untreated} = V_{stream} - V_{treated}

Sample Date	PFOS Concentrations (ppt)				PFOA Concentration (ppt)			
	JCI/Tyco Table 4	JCI/Tyco Table 4	JCI/Tyco Table 6	DNR Calculated ⁽²⁾	JCI/Tyco Table 4	JCI/Tyco Table 4	JCI/Tyco Table 6	DNR Calculated ⁽²⁾
	System Influent (Surface Water Pre-treatment)	Effluent (Treated Discharge)	Surface Water Sample (SW-39) Post-Treatment	Estimated Surface Water Post-Treatment	System Influent (Surface Water Pre-treatment)	Effluent (Treated Discharge)	Surface Water Sample (SW-39) Post-Treatment	Estimated Surface Water Post-Treatment
1/5/2024	36	<0.52	<2.0	<0.52	300	< 0.82	<2.0	< 0.85
1/8/2024	30	<0.49		0.7	210	0.90		5.6
1/19/2024	22	<0.51		3.8	110	<0.80		19
1/24/2024	23	<0.48		3.5	130	<0.76		20
2/2/2024	26	<0.51		0.4	200	<0.81		3.4
2/7/2024	44	<0.50	1.6	2.4	230	4.9	17	17
2/12/2024	28	<0.50		0.4	260	21		24
2/20/2024	39	<0.48		0.5	260	8.2		11
3/1/2024	26	<0.55	<1.9	<0.55	180	<0.87	1.5	<0.87
3/6/2024	25	<0.54		4.9	190	10		45
3/15/2024	29	<0.50		1.2	210	<0.78		8.6
3/20/2024	27	<0.47		1.2	180	1.7		9.8
3/29/2024	36	<0.51		22	330	1.3		198
4/4/2024	12	<0.54		9.3	95	4.7		75
4/8/2024	28	<0.51		17	230	1.3		138
4/15/2024	33	<0.52	15	24	260	0.96	110	190
4/22/2024	34	0.71		18	290	19		163
4/29/2024	20	<0.48		16	150	<0.75		120
5/6/2024	38	<0.50		34	310	13		276
5/13/2024	34	0.63		24	260	23		187
5/20/2024	44	<0.47	21	33	370	0.92	160	281
5/28/2024	17	0.88		15	75	13		68
6/6/2024	48	<0.47		36	320	0.74		239
6/10/2024	39	<0.49		19	420	19		218
6/17/2024	41	0.90	40	30	220	20	200	165
6/24/2024	38	<0.47		34	270	7.2		245
Surface Water Criteria = 8 ppt					Surface Water Criteria = 95 ppt			

⁽²⁾ Estimated Surface Water Concentration = [(V_{untreated} * Influent Concentration) + (V_{treated} * Effluent Concentration)] / V_{stream}

BOLD = Surface water concentration greater than surface water criteria

ppt = parts per trillion or nanograms per liter

Figure A.1
Ditch B Downstream Surface Water Concentrations: **PFOA**
(Compare to Figure 6 in Progress Report #10)

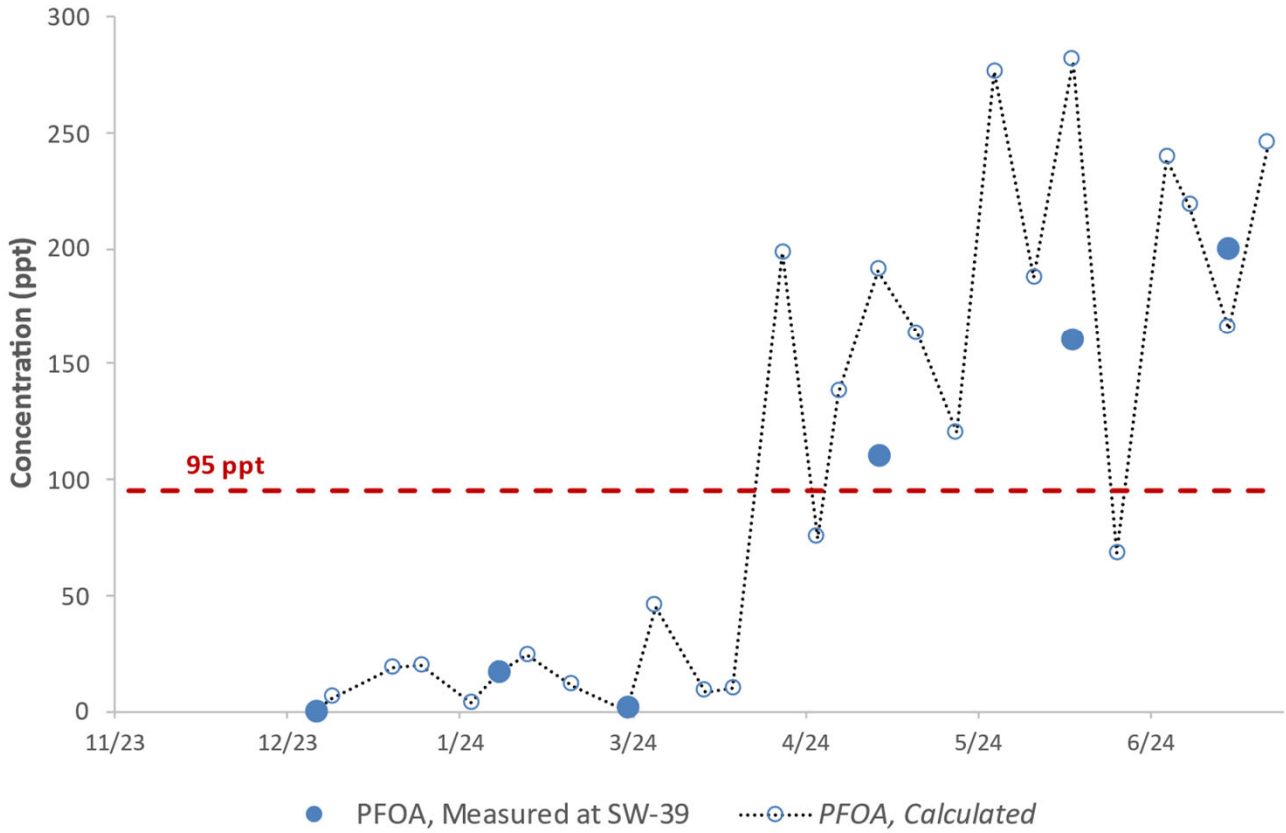


Figure A.2
Ditch B Downstream Surface Water Concentrations: **PFOS**
(Compare to Figure 6 in Progress Report #10)

