

**New Jersey Department of Environmental Protection
Reason for Application**

Permit Being Modified

Permit Class: PCP **Number:** 220001

Description of Modifications: In accordance with N.J.A.C. 7:27-8.18, Shamrock Technologies (Shamrock) is submitting this air permit revision to replace the existing scrubbers (CD601 and CD603) with a new Venturi Scrubber (CD606) that has a 99% control efficiency for Hydrogen Fluoride. Additionally, the existing emission point, PT6, will be replaced with a new emission point PT106. The potential Hydrogen Fluoride emissions, after control, from each piece of equipment in the permit will remain "de minimis."

The enclosed first level risk screening worksheet demonstrates that the risk associated with the HF emissions from emission point PT106 is negligible at the property line.

Since this is a permit revision, only the new control device and emissions point are included in this RADIUS file. Please replace CD601 and CD603 with CD606 in operating scenarios U6 OS1 through OS12 and replace PT6 with PT601 for operating scenarios OS1 through OS12.

**New Jersey Department of Environmental Protection
Facility Profile (General)**

Facility Name (AIMS): Shamrock Technologies, Inc.

Facility ID (AIMS): 06087

Street FOOT OF PACIFIC ST
Address: NEWARK, NJ 07114

Mailing FOOT OF PACIFIC ST
Address: NEWARK, NJ 07114

County: Essex
Location
Description:

State Plane Coordinates:

X-Coordinate:

Y-Coordinate:

Units:

Datum:

Source Org.:

Source Type:

Industry:

Primary SIC:

Secondary SIC:

NAICS: 325998

**New Jersey Department of Environmental Protection
Facility Profile (General)**

Contact Type: Air Permit Information Contact

Organization: Shamrock Technologies, Inc.

Org. Type: Corporation

Name: Kushal Patel

NJ EIN:

Title: Project Engineer

Phone: (973) 242-2999 x1011

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Newark, NJ 07114

Fax: () - x

Other: () - x

Type:

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Contact Type: Fees/Billing Contact

Organization: Shamrock Technologies, Inc.

Org. Type: Corporation

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NJ EIN:

Title: Accounts Payable

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Other: () - x

Type:

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Contact Type: General Contact

Organization: Shamrock Technologies, Inc.

Org. Type: Corporation

Name: Kushal Patel

NJ EIN:

Title: Project Engineer

Phone: (973) 242-2999 x1011

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Newark, NJ 07114

Fax: () - x

Other: () - x

Type:

Email: kpatel@shamrocktechnologies.com

**New Jersey Department of Environmental Protection
Facility Profile (General)**

Contact Type: Responsible Official

Organization: Shamrock Technologies, Inc.

Org. Type: Corporation

Name: Mario Malva

NJ EIN:

Title: Engineering Leader

Phone: (973) 242-2999 x1025

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Newark, NJ 07114

Other: () - x

Type:

Email: mmalva@shamrocktechnologies.com

**New Jersey Department of Environmental Protection
Facility Profile (Permitting)**

- | | |
|---|----|
| 1. Is this facility classified as a small business by the USEPA? | No |
| 2. Is this facility subject to N.J.A.C. 7:27-22? | No |
| 3. Are you voluntarily subjecting this facility to the requirements of Subchapter 22? | No |
| 4. Has a copy of this application been sent to the USEPA? | No |
| 5. If not, has the EPA waived the requirement? | No |
| 6. Are you claiming any portion of this application to be confidential? | No |
| 7. Is the facility an existing major facility? | No |
| 8. Have you submitted a netting analysis? | No |
| 9. Are emissions of any pollutant above the SOTA threshold? | No |
| 10. Have you submitted a SOTA analysis? | No |
| 11. If you answered "Yes" to Question 9 and "No" to Question 10, explain why a SOTA analysis was not required | |
| | |
| 12. Have you provided, or are you planning to provide air contaminant modeling? | No |

**New Jersey Department of Environmental Protection
Control Device Inventory**

CD NJID	Facility's Designation	Description	CD Type	Install Date	Grand- Fathered	Last Mod. (Since 1968)	CD Set ID
CD606	Scrubber	E-beam Venturi Scrubber	Scrubber (Venturi)	10/15/2022			

**New Jersey Department of Environmental Protection
Emission Points Inventory**

PT NJID	Facility's Designation	Description	Config.	Equiv. Diam. (in.)	Height (ft.)	Dist. to Prop. Line (ft)	Exhaust Temp. (deg. F)			Exhaust Vol. (acfm)			Discharge Direction	PT Set ID
							Avg.	Min.	Max.	Avg.	Min.	Max.		
PT106	E-Beam	E-Beam Scrubber	Round	48	40	75	70.0	40.0	110.0	10,000.0	400.0	30,000.0	Up	

000000 CD606 (Scrubber (Venturi))
Print Date: 8/15/2022

Make:	Bionomics Industries
Manufacturer:	Bionomics Industries
Model:	211197
Is the Scrubber Used for Particulate Control?	☒ Yes ☐ No
Is the Scrubber Used for Gas Control?	☒ Yes ☐ No
Is the Scrubber Equipped with a Mist Eliminator?	☒ Yes ☐ No
Minimum Pump Discharge Pressure (in. H2O):	
Maximum Pump Discharge Pressure (in. H2O):	
Method of Monitoring Pump Discharge Pressure:	
Minimum Pump Current (amps):	
Maximum Pump Current (amps):	
Method of Monitoring Pump Current:	
Minimum Scrubber Medium Inlet Pressure (in. H2O):	
Minimum Operating Liquid Flow Rate (gpm):	
Maximum Operating Liquid Flow Rate (gpm):	
Method of Monitoring Liquid Flow Rate:	
Minimum Operating Gas Flow Rate (acfm):	
Maximum Operating Gas Flow Rate (acfm):	30,000.00
Method of Monitoring Gas Flow Rate:	none
Minimum Operating Pressure Drop (in. H2O):	
Maximum Operating Pressure Drop (in. H2O):	
Method of Monitoring Pressure Drop:	
Relative Direction of the Gas-Liquid Flow:	Counter-Current
Description:	
Throat Length (in):	
Throat Diameter (in):	
Maximum Inlet Gas Temperature (°F):	300.0
Maximum Outlet Gas Temperature (°F):	80.0
Inlet Particle Grain Loading (gr/dscf):	
Maximum Number of Sources Using this Apparatus as a Control Device (Include Permitted and Non-Permitted Sources):	10
Alternative Method to Demonstrate Control Apparatus is Operating Properly:	pH monitor/controller
Have you attached data from recent performance testing?	☐ Yes ☒ No
Have you attached any manufacturer's data or specifications in support of the feasibility and/or effectiveness of this control apparatus?	☐ Yes ☒ No
Have you attached a diagram showing the location and/or configuration of this control apparatus?	☐ Yes ☒ No

000000 CD606 (Scrubber (Venturi))
Print Date: 8/15/2022

Comments:

U6 - E-Beam - Particulate and Hydrogen Fluoride Emissions

PCP220001

Particulate Emissions Calculations

OS ID	Equipment Description	Throughput (lbs./hr)	Particulate Emission Factor (lb./ton)*	Particulate UC (lbs./hr)
OS1	E-Beam (E601)	2000	0.039	0.039
OS2	E-Beam Blender (E602)	2000	8.08	8.080
OS7	Blender Conveyor (E607)	603	2.20	0.663

OS ID	Equipment Description	Particulate C (lbs./hr)	Particulate (tpy) Controlled
OS1	E-Beam (E601)	0.0390	0.171
OS2	E-Beam Blender (E602)	0.0404	0.177
OS7	Blender Conveyor (E607)	0.0033	0.015

0.362 TOTAL

E-Beam Emission Factors is based upon AP-42 Section 11.19.2 (8/04) Table 11.19.2-2

Mixing/Blending Emission Factor is based upon AP-42 Section 11.19.2 (8/04) Table 11.19.2-4

Blender Conveyor Emission Factor is based upon AP-42 Section 11.17 (2/98) Table 11.17-4

Annual emissions are based upon 8,760 hours of operation per year

UC: uncontrolled (w/o particulate control)

C: controlled (w/ baghouse dust collector 99.5% efficient)

Hydrogen Fluoride (HF) Emissions Calculations

OS ID	Equipment Description	Hydrogen Fluoride UC (lbs./hr)	Hydrogen Fluoride C (lbs./hr)	Hydrogen Fluoride (tpy) Controlled
OS1	E-Beam (E601)	0.969	0.0097	0.042
OS2	E-Beam Blender (E602)	0.969	0.0097	0.042
OS4	Oven 1 (E604)	0.043	0.0004	0.002
OS5	Oven 2 (E605)	0.043	0.0004	0.002
OS6	Oven 3 (E606)	0.065	0.0006	0.003
OS7	Blender Conveyor (E607)	0.097	0.0010	0.004
OS9	Oven 4 (E609)	0.065	0.0006	0.003
OS10	Blender Oven 1 (E610)	0.065	0.0006	0.003
OS11	Oven 5 (E611)	0.055	0.0006	0.002
OS12	Oven 6 (E612)	0.055	0.0006	0.003

0.0243 0.106 TOTAL

Uncontrolled missions are based upon informational stack testing. The Scrubber has a 99% removal efficiency for Hydrogen Fluoride.

Annual emissions are based upon 8,760 hours of operation per year

UC: uncontrolled (w/o scrubber)

C: controlled (w/ scrubbers - 99.0% efficiency)

June 2020

Date
Facility ID No.
Activity ID No.
Facility name
Facility location
File name (.xls)

8/11/2022			
06087			
PCP220001			
Shamrock Technologies			
Foot of Pacific St., Newark, NJ 07114			
Risk2020 - new scrubber.xls			
Emission Unit/Batch Process ID No.	U6	Stack height ¹	40.0 ft
Emission Point ID No.	PT106	Distance to property line	75 ft
Equipment ID No(s).	E601-E612	Annual air impact value, C_a	16.64901 (ug/m ³)/(ton/yr)
Operating Scenario(s)	OS1-OS12	1-hour air impact value, C_{1h}	954.3544 (ug/m ³)/(lb/hr)

Long-Term Effects

Short-Term Effects

Q_0 = Hourly emission rate (in pounds per hour)
 $C_{st} = C_{st} \times Q_0$ = Short-term average ambient air concentration
 rfC_{st} = Short-term reference concentration (for noncarcinogenic effects)
 $HQ_{st} = C_{st}/rfC_{st}$ = Hazard quotient for short-term noncarcinogenic effects
Rst = The result of comparing the HQ_{st} to the negligible threshold (FER if > threshold, Negl. if <= threshold)
FER = Further Evaluation Required (See Notes for thresholds)
negl. = Negligible (See Notes for thresholds)

¹ When evaluating risk for diesel engines, use the equivalent stack height consistent with the memo dated June 10, 2009. Click here to view the "Stack Height Equivalents for Use in First Level Screening Analyses for Diesel Engines" memo.

		H A P	CAS No.	Air Toxic	LONG-TERM EFFECTS							SHORT-TERM EFFECTS					
					Q (ton/yr)	C (ug/m ³)	URF [(ug/m ³) ⁻¹]	IR	Rslt	RfC (ug/m ³)	HQ	Rslt	Q ₀ (lb/hr)	C _{st} (ug/m ³)	RfC _{st} (ug/m ³)	HQ _{st}	Rslt
1	*		75070	Acetaldehyde			2.2E-06			9						470	
2	*		60355	Acetamide			2.0E-05										
3	*		67641	Acetone						31000						62000	
4	*		75865	Acetone cyanohydrin						2							
5	*		75058	Acetonitrile						60							
6	*		98862	Acetophenone						0.02							
7	*		53963	Acetylaminofluorene (2-)			1.3E-03										
8	*		107028	Acrolein						0.02						2.5	
9	*		79061	Acrylamide			1.0E-04			6							
10	*		79107	Acrylic acid						1						6000	
11	*		107131	Acrylonitrile			6.8E-05			2							
12	*		309002	Aldrin			4.9E-03										
13	*		107051	Allyl chloride			6.0E-06			1							
14	*		117793	Aminoanthraquinone (2-)			9.4E-06										
15	*		92671	Aminobiphenyl (4-)			6.0E-03										
16	*		7664417	Ammonia						100						3200	
17	*		62533	Aniline			1.6E-06			1						3000	
18	*		90040	Anisidine (o-)			4.0E-05										
19	**		1309644	Antimony trioxide						0.2							
20	*		140578	Aramite			7.1E-06										
21	*			Arsenic (inorganic)			4.3E-03			0.015						0.2	
22	**		7784421	Arsine						0.05							
23	*		1332214	Asbestos			7.7E-03										
24	*		103333	Azobenzene			3.1E-05										
25	*			Barium												0.5	
26	*		71432	Benzene			7.8E-06			3						27	
27	*		92875	Benidine			6.7E-02										
28	**		50328	Benzo(a)pyrene			6.0E-04			0.002							
29	*		98077	Benzotrichloride			3.7E-03			1							
30	*		100447	Benzyl chloride			4.9E-05									240	
31	*			Beryllium			2.4E-03			0.02							
32	*		92524	Biphenyl (1,1-)						0.4							
33	*		108601	Bis(2-chloroisopropyl)ether			1.0E-05										
34	*		117817	Bis(2-ethylhexyl)phthalate			2.4E-06										
35	*		542881	Bis(chloromethyl)ether			6.2E-02										
36	*		7440428	Boron (elemental)						20							
37	*		7637072	Boron trifluoride						0.7							
38	*		74975	Bromochloromethane						40							
39	*		75274	Bromodichloromethane			3.7E-05										
40	*		75252	Bromoform			1.1E-06										
41	*		106945	Bromopropane (1-)						101						5030	
42	*		106990	Butadiene (1,3-)			3.0E-05			2						660	
43	*			Cadmium			4.2E-03			0.02							
44	*		105602	Caprolactam						2.2						50	
45	*		133062	Captan			6.6E-07										
46	*		75150	Carbon disulfide						700						6200	
47	*		56235	Carbon tetrachloride			6.0E-06			40						1900	
48	*		463581	Carbonyl sulfide						10						660	
49	*		57749	Chlordane			1.0E-04			0.02							
50	*		108171262	Chlorinated paraffins			2.0E-05										
51	*		7782505	Chlorine						0.2						210	
52	*		10049044	Chlorine dioxide						0.2						28	
53	*		75683	Chloro-1,1-difluoroethane (1-) (HCFC-142b)						50000							
54	*		532274	Chloroacetophenone (2-)						0.03							
55	*		108907	Chlorobenzene						1000							
56	*		510156	Chlorobenzilate			3.1E-05										
57	*		75456	Chlorodifluoromethane (HCFC-22)						50000							
58	*		67663	Chloroform			2.3E-05			300						150	
59	*		107302	Chloromethyl methyl ether			6.9E-04										
60	*		95830	Chloro-o-phenylenediamine (4-)			4.6E-06										
61	*		95692	Chloro-o-toluidine (p-)			7.7E-05										
62	*		76062	Chloropicrin						0.4						29	
63	*		126998	Chloroprene			5.0E-04			20							
64	*		75296	Chloropropane (2-)						100							
65	**			Chromic acid mists (Cr VI)						0.008							
66	**		18540299	Chromium VI (total)			1.2E-02										
67	**			Chromium VI dissolved aerosols						0.008							
68	**			Chromium VI particulates						0.1							
69	*			Cobalt			9.0E-03			0.006							
70	*		8007452	Coke oven emissions			6.2E-04										
71	*			Copper													
72	*		120718	Cresidine (p-)			4.3E-05									100	
73	*			Cresol mixtures						600							
74	*		98828	Cumene						400							
75	*		135206	Cupferron			6.3E-05										
76	*		110827	Cyclohexane												6000	

[illegible]

186		55185	Nitrosodiethylamine (N-)		4.3E-02												
187	*	62759	Nitrosodimethylamine (N-)		1.4E-02												
188		924163	Nitrosodi-n-butylamine (N-)		1.6E-03												
189		621647	Nitrosodi-n-propylamine (N-)		2.0E-03												
190		86306	Nitrosodiphenylamine (N-)		2.6E-06												
191		156105	Nitrosodiphenylamine (p-)		6.3E-06												
192		10595956	Nitrosomethylethylamine (N-)		6.3E-03												
193	*	59892	Nitrosomorpholine (N-)		1.9E-03												
194		759739	Nitroso-n-ethylurea (N-)		7.7E-03												
195	*	684935	Nitroso-n-methylurea (N-)		3.4E-02												
196		100754	Nitrosopiperidine (N-)		2.7E-03												
197		930552	Nitrosopyrrolidine (N-)		6.1E-04												
198	*	87865	Pentachlorophenol		5.1E-06												
199	*	108952	Phenol			200									5800		
200	*	75445	Phosgene			0.3									4		
201	*	7803512	Phosphine			0.3									70		
202	*	7664382	Phosphoric acid			10											
203	*		Phosphorus (white)			0.07											
204	*	85449	Phthalic anhydride			20											
205	*	1336363	Polychlorinated biphenyls (PCBs)		1.0E-04												
206	*		Polycyclic aromatic hydrocarbons (PAHs)														
207	*		Polycyclic organic matter (POM)														
208		7758012	Potassium bromate		1.4E-04												
209	*	1120714	Propane sultone (1,3-)		6.9E-04												
210	*	57578	Propiolactone (beta-)		4.0E-03												
211	*	123386	Propionaldehyde			8											
212		115071	Propylene			3000											
213	*	78875	Propylene dichloride		1.0E-05	4											
214		107982	Propylene glycol monomethyl ether			2000											
215	*	75569	Propylene oxide		3.7E-06	30									3100		
216	**		Selenium and compounds			20											
217		7631869	Silica (crystalline, respirable)			3											
218		1310732	Sodium hydroxide												8		
219	*	100425	Styrene		5.7E-07	1000									21000		
220	*	96093	Styrene oxide		4.6E-05												
221			Sulfates												120		
222		7664939	Sulfuric acid			1									120		
223	*	1746016	Tetrachlorodibenzo(p)dioxin (2,3,7,8-)		3.8E+01	0.00004											
224		630206	Tetrachloroethane (1,1,1,2-)		7.4E-06												
225	*	79345	Tetrachloroethane (1,1,2,2-)		5.8E-05												
226	*	127184	Tetrachloroethylene		6.1E-06	40									20000		
227		811972	Tetrafluoroethane (1,1,1,2-)			80000											
228		109999	Tetrahydrofuran			2000											
229		62555	Thioacetamide		1.7E-03												
230	*	7550450	Titanium tetrachloride			0.1											
231	*	108883	Toluene			3760									7520		
232	*	584849	Toluene diisocyanate (2,4-)		1.1E-05	0.008									2		
233	*	26471625	Toluene diisocyanate (2,4-/2,6-)		1.1E-05	0.008									2		
234	*	91087	Toluene diisocyanate (2,6-)		1.1E-05	0.008									2		
235	*	95807	Toluene-2,4-diamine		1.1E-03												
236	*	95534	Toluidine (o-)		5.1E-05												
237	*	8001352	Toxaphene		3.2E-04												
238		76131	Trichloro-1,2,2-trifluoroethane (1,1,2-)			30000											
239	*	120821	Trichlorobenzene (1,2,4-)			2											
240	*	79005	Trichloroethane (1,1,2-)		1.6E-05												
241	*	79016	Trichloroethylene		4.8E-06	2									2		
242		75694	Trichlorofluoromethane			700											
243	*	88062	Trichlorophenol (2,4,6-)		3.1E-06												
244	*	121448	Triethylamine			7									2800		
245	*	1582098	Trifluralin		2.2E-06												
246		526738	Trimethylbenzene (1,2,3-)			60											
247		95636	Trimethylbenzene (1,2,4-)			60											
248		108678	Trimethylbenzene (1,3,5-)			60											
249		25551137	Trimethylbenzene (1,2,3-/1,2,4-/1,3,5-)			60											
250		7440622	Vanadium			0.1									0.8		
251		1314621	Vanadium pentoxide												30		
252	*	108054	Vinyl acetate			200											
253	*	593602	Vinyl bromide		3.2E-05	3											
254	*	75014	Vinyl chloride		8.8E-06	100									180000		
255	*	75354	Vinylidene chloride			200											
256	*		Xylene (m-, o-, p-, or mixed isomers)			100									22000		

If any calculated long-term or short-term effects for an air toxic result in "Further Evaluation Required" (FER) on this Risk Screening Worksheet, a Refined Risk Assessment is required for that air toxic.

NOTE:

*

Clean Air Act hazardous air pollutant

**

Clean Air Act hazardous air pollutant, but not listed individually (part of a group)

a

Dioxins may be considered to be all 2,3,7,8-tetrachlorodibenzo(p)dioxin), or separated into congeners (contact AQEv).

b

PAH or POM may be considered to be all benzo(a)pyrene, or separated into individual PAHs (contact AQEv).

The results are determined by comparing the long-term and short-term effects to the single-source thresholds, listed below.

The threshold value of negligible risk for incremental risk (IR) is 1 in a million (1.0E-06). An IR value less than or equal to 1 in million is considered negligible.

The threshold value of negligible risk for long-term hazard quotient (HQ) for non-carcinogenic risk is 1.0. An HQ less than or equal to 1.0 is considered negligible.

The threshold value of negligible risk for short-term hazard quotient (HQ_s) for non-carcinogenic risk is 1.0. An HQ_s less than or equal to 1.0 is considered negligible.