



PUBLIC WORKS

PO Box 1110 Tampa, FL 33601-1110
(813) 272-5912 | Fax: (813) 272-5811

MEMORANDUM

DATE July 6, 2018

TO: Steve Morgan, Environmental Permitting Manager, FDEP
Maurice Barker, Biosolids Coordinator, FDEP
Lance Kautz, Environmental Specialist I, FDEP

FROM: Ron Wiesman, Manager, Public Works, SWMD

SUBJECT: Hillsborough County Biosolids Composting Monthly Report: June 2018

**BOARD OF COUNTY
COMMISSIONERS**

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Christine M. Beck

INTERNAL AUDITOR

Peggy Caskey

**CHIEF DEVELOPMENT &
INFRASTRUCTURE SERVICES
ADMINISTRATOR**

Lucia E. Garsys

Biosolids Received (wet tons):	No biosolids received for the month. Stopped composting due to excessive rain.
Source of Biosolids:	Hillsborough County Falkenburg AWWTP
Source of Bulking Agent:	Hillsborough County South County Yard Waste Processing Site
General Description of Activities:	Windrow temperatures were monitored daily. 10 windrows has met temperature and time requirements of the Process to Further Reduce Pathogens (PFRP). 15 windrows have been turned. Sampling was performed on June 19, 2018. 493.17 tons of finished compost was picked up by Life Soils.
Attachments:	A-H: Windrow construction and temperature records.

RWW/ya
Attachments

CC: Beth Schinella, Division Director, Utility Operations, PUD
Kim Byer, Division Director, Solid Waste Management Division, PWD
Joseph O'Neill, Professional Engineer II, Solid Waste Management Division, PWD
Larry Ruiz, Section Manager, Public Works, SWMD

Attachment A

MSAP Process Temperature Chart Windrow# 18-5-2																						
Temperature: Shading equals temperature 131 or greater for PFRP.																						
Days	Date	Point 1				Point 2				Point 3				Point 4				Average				Turn
		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40	10"	20"	30"	40"	
1	5/3/18	159	155	151	150	161	160	160	140	157	152	136	126	146	150	138	128	155.75	154.25	146.25	136	
2	5/4/18	160	162	152	152	158	160	158	146	157	159	145	134	157	154	148	136	158	158.75	150.75	142	
3	5/5/18	160	157	154	152	155	158	148	140	149	160	158	148	156	148	140	138	155	155.75	150	144.5	
4	5/6/18																					
5	5/7/18	161	158	158	156	150	161	150	138	150	160	158	141	158	150	132	140	154.75	157.25	149.5	143.75	
6	5/8/18	158	156	160	156	159	158	146	138	148	157	164	149	158	154	134	142	155.75	156.25	151	146.25	
7	5/9/18	156	158	164	160	154	161	163	144	164	166	166	152	159	162	161	156	158.25	161.75	163.5	153	
8	5/10/18	150	158	164	162	153	162	165	146	164	168	169	155	157	161	161	159	156	162.25	164.75	155.5	
9	5/11/18	148	154	156	161	152	158	160	150	152	155	158	157	150	156	161	158	150.5	155.75	158.75	156.5	
10	5/12/18	148	153	158	156	150	161	158	156	149	158	155	158	150	158	158	158	149.25	157.5	157.25	157	
11	5/13/18																					
12	5/14/18	144	152	159	155	145	156	163	160	146	159	162	160	152	158	158	157	146.75	156.25	160.5	158	
13	5/15/18	145	148	152	156	145	149	154	158	143	147	154	159	148	154	156	156	145.25	149.5	154	157.25	
14	5/16/18	147	149	151	157	149	151	154	156	145	149	152	155	147	151	156	150	147	150	153.25	154.5	
15	5/17/18	144	148	152	157	145	150	156	156	142	148	153	156	145	150	156	152	144	149	154.25	155.25	
16	5/18/18	158	162	158	158	150	156	163	157	161	163	163	162	142	150	150	148	152.75	157.75	158.5	156.25	Turn
17	5/19/18	155	158	158	160	152	154	158	155	157	160	161	159	148	156	156	154	153	157	158.25	157	
18	5/20/18																					
19	5/21/18	152	155	163	168	136	148	158	160	151	158	160	162	148	158	162	167	146.75	154.75	160.75	164.25	
20	5/22/18	159	165	165	164	164	168	170	170	148	160	162	163	149	156	158	158	155	162.25	163.75	163.75	
21	5/23/18	157	158	158	157	153	159	164	166	161	165	168	168	145	151	154	154	154	158.25	161	161.25	
22	5/24/18	148	150	151	151	155	160	164	165	148	148	150	148	148	151	152	152	149.75	152.25	154.25	154	
23	5/25/18	153	156	157	157	157	163	166	168	153	158	159	160	142	145	145	146	151.25	155.5	156.75	157.75	Turn
24	5/26/18	150	158	158	154	154	163	162	159	152	160	159	158	145	148	148	153	150.25	157.25	156.75	156	
25	5/27/18																					
26	5/28/18																					
27	5/29/18	152	156	158	158	158	161	161	160	154	158	162	162	147	149	150	152	152.75	156	157.75	158	
28	5/30/18	138	142	158	159	140	145	160	160	146	149	160	161	146	146	152	154	142.5	145.5	157.5	158.5	
29	5/31/18	141	145	158	159	150	154	158	160	146	149	160	160	144	147	155	156	145.25	148.75	157.75	158.75	
30	6/1/18	136	140	152	150	146	148	154	156	138	142	156	158	140	142	148	148	140	143	152.5	153	
31	6/2/18	148	148	150	146	162	157	154	155	158	154	148	143	153	144	140	138	155.25	150.75	148	145.5	Turn
32	6/3/18	160	164	165	164	148	159	163	164	172	171	168	162	156	152	146	144	159	161.5	160.5	158.5	

Attachment B

MSAP Process Temperature Chart Windrow# 18-5-7																						
Temperature: Shading equals temperature 131 or greater for PFRP.																						
Days	Date	Point 1				Point 2				Point 3				Point 4				Average				Turn
		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40	10"	20"	30"	40"	
1	5/8/18	156	152	140	138	150	148	134	130	160	158	132	130	140	131	120	110	151.5	147.25	131.5	127	
2	5/9/18	158	160	146	141	152	150	141	136	158	158	142	135	145	138	128	124	153.25	151.5	139.25	134	
3	5/10/18	158	158	152	145	150	150	153	148	158	157	150	143	152	146	135	131	154.5	152.75	147.5	141.75	
4	5/11/18	158	156	149	152	140	146	152	159	140	146	149	152	150	149	139	134	147	149.25	147.25	149.25	
5	5/12/18	158	155	148	144	161	157	151	149	153	148	144	138	148	151	146	141	155	152.75	147.25	143	
6	5/13/18																					
7	5/14/18	146	153	154	150	149	148	154	153	147	153	148	142	144	150	152	147	146.5	151	152	148	
8	5/15/18	143	156	158	154	148	158	156	154	158	158	150	146	143	149	152	148	148	155.25	154	150.5	
9	5/16/18	142	154	160	156	150	160	158	155	150	158	150	149	140	148	154	150	145.5	155	155.5	152.5	
10	5/17/18	139	154	163	156	146	156	158	156	146	152	151	152	138	148	154	152	142.25	152.5	156.5	154	
11	5/18/18	136	152	161	158	144	154	160	159	140	149	159	154	138	149	157	154	139.5	151	159.25	156.25	
12	5/19/18	140	152	160	158	141	150	158	162	139	143	160	155	140	148	158	156	140	148.25	159	157.75	
13	5/20/18																					
14	5/21/18	142	150	154	154	144	154	160	162	144	150	156	158	143	152	153	158	143.25	151.5	155.75	158	
15	5/22/18	139	148	151	153	146	165	158	164	144	152	153	157	145	156	156	156	143.5	155.25	154.5	157.5	
16	5/23/18	151	154	155	156	142	148	150	151	145	148	151	151	151	156	158	158	147.25	151.5	153.5	154	
17	5/24/18	159	161	158	156	158	165	154	168	158	162	156	161	148	155	158	158	155.75	160.75	156.5	160.75	
18	5/25/18	154	156	155	153	155	159	160	160	148	158	160	159	148	155	155	154	151.25	157	157.5	156.5	Turn
19	5/26/18	151	161	156	153	156	158	157	158	146	150	157	148	150	154	156	154	150.75	155.75	156.5	153.25	
20	5/27/18																					
21	5/28/18																					
22	5/29/18	156	161	163	162	151	158	158	156	152	156	156	155	148	156	158	160	151.75	157.75	158.75	158.25	
23	5/30/18	151	158	161	161	152	159	162	163	150	154	155	152	143	152	157	159	149	155.75	158.75	158.75	
24	5/31/18	152	158	159	159	151	158	162	163	146	153	158	160	150	154	156	158	149.75	155.75	158.75	160	
25	6/1/18	144	144	142	140	146	147	146	145	141	145	144	142	148	143	140	136	144.75	144.75	143	140.75	
26	6/2/18	140	146	148	144	144	148	148	145	139	146	145	141	142	145	146	140	141.25	146.25	146.75	142.5	Turn
27	6/3/18																					
28	6/4/18	165	163	160	156	161	160	160	160	153	151	147	142	162	160	156	152	160.25	158.5	155.75	152.5	
29	6/5/18	161	167	170	168	164	169	168	163	163	163	157	152	165	165	163	162	163.25	166	164.5	161.25	
30	6/6/18	162	168	169	168	165	165	163	162	160	162	162	159	156	159	160	160	160.75	163.5	163.5	162.25	
31	6/7/18	162	169	170	168	166	171	172	172	168	171	170	166	166	169	166	162	165.5	170	169.5	167	
32	6/8/18	158	160	165	171	166	168	170	170	166	171	170	170	162	170	166	160	163	167.25	167.75	167.75	
33	6/9/18	160	161	160	166	170	171	170	168	168	170	172	169	165	170	171	165	165.75	168	168.25	167	

Attachment C

MSAP Process Temperature Chart Windrow# 18-5-10																						
Temperature: Shading equals temperature 131 or greater for PFRP.																						
Days	Date	Point 1				Point 2				Point 3				Point 4				Average				Turn
		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40	10"	20"	30"	40"	
1	5/11/18	149	144	143	140	162	156	140	136	160	157	155	152	160	158	150	147	157.75	153.75	147	143.75	
2	5/12/18	160	158	145	141	157	155	141	137	151	152	148	140	146	152	145	138	153.5	154.25	144.75	139	
3	5/13/18																					
4	5/14/18	156	160	152	144	143	154	144	136	142	150	150	142	145	149	140	138	146.5	153.25	146.5	140	
5	5/15/18	154	158	152	144	142	152	144	137	148	152	152	142	144	159	147	136	147	155.25	148.75	139.75	
6	5/16/18	154	156	154	146	141	152	144	137	148	152	150	144	144	159	147	136	146.75	154.75	148.75	140.75	
7	5/17/18	146	154	152	148	141	148	142	138	142	152	148	144	154	163	151	142	145.75	154.25	148.25	143	
8	5/18/18	142	152	152	146	138	140	142	138	138	150	148	142	131	148	150	140	137.25	147.5	148	141.5	
9	5/19/18	140	148	150	146	138	143	142	137	141	150	148	142	132	150	148	138	137.75	147.75	147	140.75	
10	5/20/18																					
11	5/21/18	139	140	144	144	140	138	136	136	139	138	144	136	138	136	148	139	139	138	143	138.75	
12	5/22/18	136	141	142	142	136	141	142	142	144	149	140	136	143	145	146	144	139.75	144	142.5	141	
13	5/23/18	147	147	147	145	142	143	142	142	139	140	142	142	146	147	147	147	143.5	144.25	144.5	144	
14	5/24/18	146	148	148	147	146	146	145	144	142	142	141	140	146	146	146	146	145	145.5	145	144.25	
15	5/25/18	136	138	138	138	141	142	142	143	143	143	143	143	141	141	141	140	140.25	141	141	141	Turn
16	5/26/18	153	151	149	148	140	153	156	158	137	141	142	142	142	150	152	152	143	148.75	149.75	150	
17	5/27/18																					
18	5/28/18																					
19	5/29/18	153	151	149	148	140	153	156	158	137	141	142	142	142	150	152	152	143	148.75	149.75	150	
20	5/30/18	148	149	149	147	140	145	145	142	144	152	152	151	138	148	151	150	142.5	148.5	149.25	147.5	
21	5/31/18	136	137	139	140	138	140	142	142	140	141	142	142	138	140	141	141	138	139.5	141	141.25	Turn
22	6/1/18	132	136	132	132	144	138	138	136	142	140	138	138	140	138	136	135	139.5	138	136	135.25	
23	6/2/18	148	152	155	144	146	148	144	140	146	148	150	143	156	156	152	148	149	151	150.25	143.75	
24	6/3/18																					
25	6/4/18	158	160	157	150	147	149	146	144	158	156	154	146	162	162	158	153	156.25	156.75	153.75	148.25	
26	6/5/18	154	153	150	149	148	145	142	140	155	153	154	158	158	155	152	148	153.75	151.5	149.5	148.75	
27	6/6/18	159	158	156	152	150	150	148	147	155	155	153	153	159	159	155	150	155.75	155.5	153	150.5	
28	6/7/18	144	143	142	142	156	156	153	148	140	145	147	147	155	155	152	152	148.75	149.75	148.5	147.25	Turn
29	6/8/18	158	160	165	171	166	168	170	170	166	171	170	170	162	170	166	160	163	167.25	167.75	167.75	
30	6/9/18	160	158	155	148	168	166	161	158	150	148	146	140	151	148	144	141	157.25	155	151.5	146.75	
31	6/10/18																					
32	6/11/18	162	163	161	160	156	157	155	152	158	161	160	157	156	156	153	150	158	159.25	157.25	154.75	

Attachment D

MSAP Process Temperature Chart Windrow# 18-5-14																						
Temperature: Shading equals temperature 131 or greater for PFRP.																						
Days	Date	Point 1				Point 2				Point 3				Point 4				Average				Turn
		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40	10"	20"	30"	40"	
1	5/15/18	148	142	136	128	141	132	118	115	149	140	120	118	142	135	124	118	145	137.25	124.5	119.75	
2	5/16/18	154	150	134	140	148	136	122	120	156	144	127	121	146	138	130	130	151	142	128.25	127.75	
3	5/17/18	148	150	136	142	152	152	134	134	152	148	136	131	148	140	134	131	150	147.5	135	134.5	
4	5/18/18	150	151	138	140	152	160	142	136	150	148	140	136	146	142	138	135	149.5	150.25	139.5	136.75	
5	5/19/18	148	150	144	139	152	155	148	144	144	154	142	140	143	140	140	138	146.75	149.75	143.5	140.25	
6	5/20/18																					
7	5/21/18	132	135	136	136	131	135	136	138	132	135	140	142	134	138	139	140	132.25	135.75	137.75	139	
8	5/22/18	151	152	150	147	145	146	144	141	142	145	142	142	135	136	139	140	143.25	144.75	143.75	142.5	
9	5/23/18	143	146	146	144	141	143	143	143	141	142	142	141	134	138	139	139	139.75	142.25	142.5	141.75	
10	5/24/18	144	144	143	142	144	144	143	143	144	143	140	140	138	141	139	135	142.5	143	141.25	140	
11	5/25/18	142	144	144	142	137	140	141	141	141	143	143	142	141	142	141	140	140.25	142.25	142.25	141.25	
12	5/26/18	142	144	144	143	138	142	144	142	146	148	146	144	140	142	142	138	141.5	144	144	141.75	
13	5/27/18																					
14	5/28/18																					
15	5/29/18	141	143	144	143	137	145	146	145	149	151	149	145	136	138	136	138	140.75	144.25	143.75	142.75	
16	5/30/18	151	152	150	148	137	140	140	139	141	144	144	143	136	134	136	138	141.25	142.5	142.5	142	
17	5/31/18	143	148	149	149	143	147	148	147	135	139	140	140	138	142	142	140	139.75	144	144.75	144	
18	6/1/18	136	134	144	140	138	136	145	140	140	138	140	140	141	144	143	140	138.75	138	143	140	Turn
19	6/2/18	142	144	146	142	146	148	148	144	143	147	144	142	141	145	144	141	143	146	145.5	142.25	
20	6/3/18																					
21	6/4/18	150	149	147	144	153	153	150	147	152	155	154	152	146	147	144	140	150.25	151	148.75	145.75	
22	6/5/18	164	163	160	153	161	161	158	153	160	158	155	152	153	152	145	140	159.5	158.5	154.5	149.5	
23	6/6/18	162	163	162	158	157	160	160	158	154	148	145	143	152	150	144	139	156.25	155.25	152.75	149.5	
24	6/7/18	156	158	154	149	152	149	145	142	152	154	151	150	150	147	144	142	152.5	152	148.5	145.75	Turn
25	6/8/18	163	161	158	152	160	157	151	148	155	151	148	146	153	150	148	146	157.75	154.75	151.25	148	
26	6/9/18	166	161	158	155	161	158	153	148	155	152	155	155	155	150	148	150	159.25	155.25	153.5	152	
27	6/10/18																					
28	6/11/18	158	156	156	153	157	157	155	152	152	152	153	153	150	152	152	150	154.25	154.25	154	152	
29	6/12/18	154	156	155	154	151	152	152	152	150	154	158	155	146	148	147	147	150.25	152.5	153	152	
30	6/13/18	154	158	158	159	150	152	150	149	152	154	154	155	144	147	147	147	150	152.75	152.25	152.5	

Attachment E

MSAP Process Temperature Chart Windrow# 18-5-18																						
Temperature: Shading equals temperature 131 or greater for PFRP.																						
Days	Date	Point 1				Point 2				Point 3				Point 4				Average				Turn
		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40	10"	20"	30"	40"	
1	5/19/18	110	110	108	106	124	118	112	108	146	138	127	124	147	144	120	114	131.75	127.5	116.75	113	
2	5/20/18																					
3	5/21/18	148	144	138	132	159	155	152	148	154	150	148	136	152	150	144	140	153.25	149.75	145.5	139	
4	5/22/18	142	140	140	134	150	148	145	142	138	140	146	140	148	146	140	140	144.5	143.5	142.75	139	
5	5/23/18	134	134	142	136	142	142	140	139	148	148	144	143	138	140	139	140	140.5	141	141.25	139.5	
6	5/24/18	133	135	142	136	144	143	140	140	147	148	145	143	148	147	144	140	143	143.25	142.75	139.75	
7	5/25/18	135	137	142	136	148	149	145	143	147	147	142	142	144	146	142	138	143.5	144.75	142.75	139.75	
8	5/26/18	136	138	144	136	148	150	148	146	146	148	144	144	142	146	140	138	143	145.5	144	141	
9	5/27/18																					
10	5/28/18																					
11	5/29/18	134	134	142	136	152	155	157	157	142	144	141	139	140	140	137	135	142	143.25	144.25	141.75	
12	5/30/18	138	136	142	136	151	153	151	148	138	138	136	134	138	140	140	138	141.25	141.75	142.25	139	
13	5/31/18	134	135	140	136	145	149	152	156	143	146	145	142	135	137	135	133	139.25	141.75	143	141.75	
14	6/1/18	134	136	140	138	134	133	137	138	142	144	138	136	145	140	138	136	138.75	138.25	138.25	137	
15	6/2/18	134	133	140	138	148	148	145	142	141	137	140	138	135	135	138	136	139.5	138.25	140.75	138.5	Turn
16	6/3/18																					
17	6/4/18	145	143	142	141	162	164	161	157	139	137	142	140	142	143	138	140	147	146.75	145.75	144.5	
18	6/5/18	145	140	135	133	147	145	145	143	156	152	147	146	155	152	145	141	150.75	147.25	143	140.75	
19	6/6/18	147	145	140	136	150	146	145	144	164	158	156	152	156	156	151	145	154.25	151.25	148	144.25	
20	6/7/18	144	142	139	137	158	157	155	148	158	154	157	148	156	155	152	146	154	152	150.75	144.75	
21	6/8/18	150	148	144	140	161	159	150	148	165	161	158	155	160	159	153	150	159	156.75	151.25	148.25	
22	6/9/18	160	156	151	148	161	160	161	158	165	161	154	155	142	150	155	157	157	156.75	155.25	154.5	
23	6/10/18																					
24	6/11/18	152	152	149	148	161	161	158	155	163	162	158	154	148	152	152	152	156	156.75	154.25	152.25	Turn
25	6/12/18	151	149	145	141	158	160	159	157	150	158	158	155	143	147	146	146	150.5	153.5	152	149.75	
26	6/13/18	146	146	145	143	158	160	161	160	163	160	157	154	163	162	159	157	157.5	157	155.5	153.5	
27	6/14/18	154	155	153	149	158	160	157	156	156	156	158	156	160	161	160	158	157	158	157	154.75	
28	6/15/18	152	156	154	150	156	158	158	158	155	157	159	158	160	160	159	158	155.75	157.75	157.5	156	
29	6/16/18	153	157	155	152	157	160	158	158	156	158	158	158	160	160	158	158	156.5	158.75	157.25	156.5	
30	6/17/18																					
31	6/18/18	155	158	155	152	160	161	158	159	160	155	158	158	162	160	158	160	159.25	158.5	157.25	157.25	

Attachment F

MSAP Process Temperature Chart Windrow# 18-5-21																						
Temperature: Shading equals temperature 131 or greater for PFRP.																						
Days	Date	Point 1				Point 2				Point 3				Point 4				Average				Turn
		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40	10"	20"	30"	40"	
1	5/22/18	124	120	116	113	147	145	140	122	135	132	131	131	111	108	104	101	129.25	126.25	122.75	116.75	
2	5/23/18	132	130	124	118	133	132	128	125	139	141	138	136	124	118	110	107	132	130.25	125	121.5	
3	5/24/18	131	131	135	120	133	133	130	127	140	141	139	137	132	120	125	114	134	131.25	132.25	124.5	
4	5/25/18	136	142	140	137	143	143	138	135	140	142	140	139	138	135	134	131	139.25	140.5	138	135.5	
5	5/26/18	142	146	142	138	148	144	140	138	145	144	142	142	147	144	140	136	145.5	144.5	141	138.5	
6	5/27/18																					
7	5/28/18																					
8	5/29/18	140	139	135	136	151	149	144	137	148	148	148	148	147	145	142	138	146.5	145.25	142.25	139.75	
9	5/30/18	134	138	140	138	144	148	141	137	138	144	148	146	142	144	140	138	139.5	143.5	142.25	139.75	
10	5/31/18	134	140	142	142	148	149	146	145	136	140	148	148	138	142	142	140	139	142.75	144.5	143.75	
11	6/1/18	135	140	142	142	144	148	146	145	142	144	148	148	144	140	142	140	141.25	143	144.5	143.75	
12	6/2/18	136	142	144	142	140	144	146	146	138	146	148	148	135	140	142	140	137.25	143	145	144	
13	6/3/18																					
14	6/4/18	151	148	144	144	152	148	148	146	154	148	141	148	142	142	142	142	149.75	146.5	143.75	145	
15	6/5/18	150	149	149	149	154	156	156	152	146	144	140	150	139	136	140	142	147.25	146.25	146.25	148.25	
16	6/6/18	151	156	150	144	160	156	154	150	147	143	140	150	145	143	144	142	150.75	149.5	147	146.5	
17	6/7/18	161	158	154	150	162	160	158	157	158	150	148	144	146	143	144	144	156.75	152.75	151	148.75	Turn
18	6/8/18	163	160	158	155	165	161	159	155	161	158	158	152	157	151	148	146	161.5	157.5	155.75	152	
19	6/9/18	170	167	163	160	150	154	159	161	155	151	148	149	153	150	148	145	157	155.5	154.5	153.75	
20	6/10/18																					
21	6/11/18	166	167	166	163	156	158	161	161	154	152	150	147	147	145	142	142	155.75	155.5	154.75	153.25	
22	6/12/18	165	166	165	161	156	158	160	160	155	156	152	149	143	144	142	140	154.75	156	154.75	152.5	
23	6/13/18	167	170	168	162	161	161	161	160	154	153	149	146	146	146	145	142	157	157.5	155.75	152.5	
24	6/14/18	164	164	160	158	153	156	156	156	165	166	156	152	141	142	142	142	155.75	157	153.5	152	Turn
25	6/15/18	162	164	162	160	156	158	160	159	161	162	160	158	152	156	148	144	157.75	160	157.5	155.25	
26	6/16/18	163	166	166	162	159	160	160	159	158	160	160	158	150	154	150	148	157.5	160	159	156.75	
27	6/17/18																					
28	6/18/18	165	171	170	169	163	166	166	165	158	155	150	148	150	151	150	148	159	160.75	159	157.5	
29	6/19/18	165	170	171	171	161	165	164	161	154	154	151	149	148	151	150	146	157	160	159	156.75	
30	6/20/18	169	173	173	172	164	166	164	161	156	156	154	152	148	148	148	149	159.25	160.75	159.75	158.5	

Attachment G

MSAP Process Temperature Chart Windrow# 18-5-24																						
Temperature: Shading equals temperature 131 or greater for PFRP.																						
Days	Date	Point 1				Point 2				Point 3				Point 4				Average				Turn
		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40	10"	20"	30"	40"	
1	5/25/18	162	154	142	126	162	160	158	140	163	158	156	142	158	149	134	126	161.25	155.25	147.5	133.5	
2	5/26/18	161	164	156	139	160	162	160	153	161	160	158	142	158	152	142	136	160	159.5	154	142.5	
3	5/27/18																					
4	5/28/18																					
5	5/29/18	159	162	156	138	150	151	147	144	150	153	151	142	151	159	162	150	152.5	156.25	154	143.5	
6	5/30/18	153	150	140	135	161	164	164	160	153	153	150	140	151	154	154	151	154.5	155.25	152	146.5	
7	5/31/18	141	141	136	134	148	149	144	140	154	154	151	146	159	164	165	164	150.5	152	149	146	
8	6/1/18	132	131	138	136	132	136	140	144	134	136	143	150	144	147	144	141	135.5	137.5	141.25	142.75	
9	6/2/18	141	142	142	141	145	147	143	146	152	154	151	150	160	162	159	157	149.5	151.25	148.75	148.5	
10	6/3/18																					
11	6/4/18	140	141	146	144	158	159	157	155	158	159	158	156	160	162	161	159	154	155.25	155.5	153.5	
12	6/5/18	150	152	150	149	149	148	144	142	153	153	152	150	160	165	164	161	153	154.5	152.5	150.5	
13	6/6/18	148	146	146	144	154	154	154	152	161	162	161	159	164	164	163	161	156.75	156.5	156	154	
14	6/7/18	151	150	148	147	154	154	153	151	162	162	162	161	160	162	163	162	156.75	157	156.5	155.25	
15	6/8/18	160	156	151	148	161	158	155	148	160	158	148	142	161	165	167	168	160.5	159.25	155.25	151.5	
16	6/9/18	150	144	143	141	153	150	146	150	150	151	150	148	150	147	144	141	150.75	148	145.75	145	
17	6/10/18																					
18	6/11/18	142	142	140	139	146	148	146	152	148	151	150	150	145	146	147	146	145.25	146.75	145.75	146.75	
19	6/12/18	142	143	141	139	149	152	155	152	146	158	152	151	149	160	150	148	146.5	153.25	149.5	147.5	
20	6/13/18	134	135	135	136	135	135	135	150	135	136	151	151	139	135	148	148	135.75	135.25	142.25	146.25	
21	6/14/18	144	143	140	138	147	146	142	152	140	140	150	151	140	147	148	150	142.75	144	145	147.75	
22	6/15/18	140	148	150	146	148	151	152	148	144	146	148	145	146	150	152	149	144.5	148.75	150.5	147	Turn
23	6/16/18	142	148	151	148	150	156	154	152	152	157	154	150	154	158	158	156	149.5	154.75	154.25	151.5	
24	6/17/18																					
25	6/18/18	158	155	150	148	155	161	158	155	165	161	155	151	171	170	168	161	162.25	161.75	157.75	153.75	
26	6/19/18	153	151	148	145	159	158	154	150	162	160	157	154	174	173	170	165	162	160.5	157.25	153.5	
27	6/20/18	150	146	142	139	164	161	156	153	164	161	157	153	168	168	166	162	161.5	159	155.25	151.75	
28	6/21/18	148	149	146	143	156	155	152	150	158	159	158	155	166	167	167	164	157	157.5	155.75	153	
29	6/22/18	150	148	148	146	150	155	160	159	152	155	161	161	150	152	155	161	150.5	152.5	156	156.75	Turn
30	6/23/18	165	169	168	166	158	163	166	164	160	163	166	162	161	160	161	158	161	163.75	165.25	162.5	
31	6/24/18																					
32	6/25/18	156	157	154	152	158	158	156	154	163	163	161	160	168	171	172	172	161.25	162.25	160.75	159.5	

Attachment H

MSAP Process Temperature Chart Windrow# 18-5-26																						
Temperature: Shading equals temperature 131 or greater for PFRP.																						
Days	Date	Point 1				Point 2				Point 3				Point 4				Average				Turn
		10	20	30	40	10	20	30	40	10	20	30	40	10	20	30	40	10"	20"	30"	40"	
1	5/27/18																					
2	5/28/18																					
3	5/29/18	147	144	136	136	141	137	132	128	148	148	145	142					145.33	143	137.67	135.33	
4	5/30/18	147	145	140	134	145	140	137	134	148	149	148	148					146.67	144.67	141.67	138.67	
5	5/31/18	147	147	144	142	141	141	138	136	151	149	145	143					146.33	145.67	142.33	140.33	
6	6/1/18	144	143	140	141	148	147	147	146	152	150	148	150					148	146.67	145	145.67	
7	6/2/18	152	155	153	152	150	154	152	152	150	151	153	154					150.67	153.33	152.67	152.67	
8	6/3/18																					
9	6/4/18	147	148	147	146	156	157	155	155	152	156	156	158					151.67	153.67	152.67	153	
10	6/5/18	151	151	150	150	146	148	151	151	161	163	163	156					152.67	154	154.67	152.33	
11	6/6/18	156	156	154	153	148	149	149	149	155	156	156	155					153	153.67	153	152.33	
12	6/7/18	160	161	159	157	156	156	155	154	153	153	153	154					156.33	156.67	155.67	155	
13	6/8/18	163	164	161	160	162	161	160	160	158	155	151	153					161	160	157.33	157.67	
14	6/9/18	150	151	155	153	150	151	151	148	160	160	158	144					153.33	154	154.67	148.33	
15	6/10/18																					
16	6/11/18	150	153	154	156	148	151	151	150	158	158	158	157					152	154	154.33	154.33	
17	6/12/18	144	144	142	140	146	149	152	152	144	151	154	156					144.67	148	149.33	149.33	
18	6/13/18	138	138	137	137	138	138	136	135	140	140	141	141					138.67	138.67	138	137.67	
19	6/14/18	144	141	140	138	150	150	147	143	155	156	155	154					149.67	149	147.33	145	
20	6/15/18	152	156	152	148	154	158	158	155	158	161	160	158					154.67	158.33	156.67	153.67	
21	6/16/18	158	160	162	160	156	162	162	160	161	164	162	162					158.33	162	162	160.67	
22	6/17/18																					
23	6/18/18	170	171	171	170	160	168	172	170	168	171	172	171					166	170	171.67	170.33	
24	6/19/18	173	173	171	168	166	170	170	168	170	173	173	171					169.67	172	171.33	169	
25	6/20/18	174	176	170	166	170	170	168	165	171	174	176	176					171.67	173.33	171.33	169	
26	6/21/18	171	171	168	165	164	168	168	167	170	172	173	172					168.33	170.33	169.67	168	
27	6/22/18	148	155	161	167	153	160	162	167	160	166	165	164					153.67	160.33	162.67	166	
28	6/23/18	150	152	160	166	151	166	165	170	161	165	166	164					154	161	163.67	166.67	
29	6/24/18																					
30	6/25/18	165	169	171	171	165	168	170	171	165	172	175	176					165	169.67	172	172.67	
31	6/26/18	164	169	171	170	167	168	170	170	166	172	174	175					165.67	169.67	171.67	171.67	
32	6/27/18	164	169	170	170	171	172	170	166	166	172	174	174					167	171	171.33	170	