DRAGON
PRODUCTS COMPANY

Certified Mail Receipt No. 7014 2120 0000 8201 5205

February 22, 2018

Mr. Michael Parker
Department of Environmental Protection
Division of Solid Waste Management
17 State House Station
Augusta, Maine 04333

Re: Dragon Products Company, LLC
Application for Minor Modification
Fuel Substitution License # S-02851-WV-X-N

Dear Mr. Parker:

Dragon Products Company, LLC (Dragon) is submitting to the Maine Department of Environmental Protection (Department) two copies of an application for a minor modification to Fuel Substitution License S-02851-WV-X-N. Dragon is submitting the application to include recycled asphalt shingles, recycled post-consumer carpet and carpet foam padding, recycled high density polyethylene (No. 2) plastics, and other recycled plastics (No's 1, 2, 3, 4, 5, & 7) as acceptable materials for beneficial fuel substitution for the manufacture of portland cement. Dragon conducted successful trials of these materials from July 2018 through October 2018, pursuant to the trial description provided to the Department in a Letter of Intent submitted on May 21, 2018. A report summary of the trial is included with this submittal and includes draft revisions to Dragon's Alternative Fuels Operations Manual and Fuel Management Plan, for review by the Department. Also included is a check (No. 111852), made payable to the Treasurer, State of Maine, for $322.00 for the application processing fee.

A copy of the application and supporting documentation has been filed at the Thomaston Town Office.

If you have any questions regarding Dragon's minor modification application or the alternative fuel trial results please contact me at (207)-593-0147.

Sincerely,

Michael Martunas
Environmental Manager
Dragon Products Company, LLC

c.c. Stephen P. Holt, P.E. (Dragon)
Thomaston Town Office

P.O. Box 191
Thomaston, ME 04861
Phone (207) 593-0100

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SIGNATURE OF APPLICANT

By signing this application, the applicant certifies that he or she has: (1) filed a complete copy of this application in the municipal office of the municipality in which the project is located, (2) reviewed the instructions contained in this application form, and (3) reviewed the appropriate state laws that relate to the proposed project.

I certify under penalty of law that I have personally examined the information submitted in this document and all attachments thereto and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the information is true, accurate, and complete. I authorize the Department to enter the property that is the subject of this application, at reasonable hours, including buildings, structures or conveyances on the property, to determine the accuracy of any information provided herein. I am aware there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

DATE: 02/22/2019 SIGNATURE: Michael Martunas

PRINTED NAME: Michael Martunas
(Applicant)

TITLE: Environmental Manager
(If other than applicant, attach letter of agent authorization.)

PLEASE SEE ATTACHED FEE SCHEDULE TO DETERMINE THE APPLICATION FEE FOR FOR A MINOR REVISION

MINOR REVISION APPLICATION - REQUIRED INFORMATION

1. **Existing DEP permit number:** S-02851-WV-X-N

2. **DEP Project Analyst for original application (if known):** Michael Parker

3. **Description of Proposed Change:**

Addition of the following materials to Fuel Substitution License S-02851-WV-X-N: recycled asphalt shingles, recycled post-consumer carpet, recycled post-consumer carpet foam padding, recycled high-density polyethylene (HDPE) plastics (No. 2), and recycled plastics (RP) (No. 1, 3, 4, 5 and 7). Details regarding each material are provided in the attached Trial Report.

(Attach additional sheet(s) if necessary.)

4. **Provide all documentation necessary to support the proposed change.** This documentation shall include, as appropriate, revised site plans, construction drawings, operations manual and technical data.

5. **List supporting attachments:**

Trial Report, Revised Alternative Fuel Operations Manual & Management Plan

END

Alternative Fuel
Trial Results

Recycled asphalt shingles
Recycled post-consumer carpet
Recycled post-consumer carpet foam padding
Recycled high-density polyethylene (HDPE) plastics (No. 2)
Recycled Plastics (RP) (No.'s 1, 3, 4, 5, and 7)

Dragon Products Company, LLC
February 2019

PURPOSE

Dragon Product Company, LLC (Dragon) is a manufacturer of portland cement, located in Thomaston, Maine. The cement making process begins with raw feedstock of calcium carbonate bearing rock and other materials including sand (silica) and iron. The calcium carbonate bearing rock is quarried from the onsite limestone quarry in Thomaston, Maine. The limestone is pulverized and mixed with sand and iron to make the raw feedstock. The raw feed is then introduced into the kiln system, where it is heated to near liquid phase in the rotary kiln then cooled quickly to produce clinker, the main ingredient in portland cement. Dragon currently uses petroleum coke (petcoke) as a primary fuel for the thermal energy required to heat the raw feed material. Dragon consumes approximately 10 tons per hour of petcoke in two (2) locations within the kiln system. Approximately five (5) tons per hour is consumed in the rotary kiln and an additional five (5) tons per hour is consumed in the calciner. Dragon is currently licensed (#S-02851-WV-X-N) to use tire chips (tire-derived fuel (TDF)) and recycled carpet material as alternative fuels, which are fired directly in the calciner.

On May 21, 2018, Dragon submitted a Letter of Intent to the Maine Department of Environmental Protection (Department) to conduct alternative fuels trials of the following materials:

1. Recycled asphalt shingles;
2. Recycled post-consumer carpet;
3. Recycled post-consumer carpet foam padding;
4. Recycled high-density polyethylene (HDPE) plastics (No. 2);
5. Recycled Plastics (RP) (No.'s 1, 3, 4, 5, and 7);
6. Recycled conveyor belt material;
7. Fiberform® graphite and carbon material;
8. Coal-tar pitch;
9. Coal-tar pitch coke; and
10. Earthlife® bio-solids.

The purpose of the trials was to fully evaluate the beneficial use and potential limitations of the materials as alternative fuels. Each proposed alternative fuel was trialed separately to evaluate material handling characteristics, impacts to air emission quality, and impacts to clinker chemistry.

The results of the trials indicate the following five (5) materials are acceptable as beneficial fuel substitutes under Dragon's current alternative fuel system:

1. Recycled Asphalt Shingles
2. Recycled post-consumer carpet
3. Recycled post-consumer carpet foam padding
4. Recycled high-density polyethylene (HDPE) plastics (No. 2)
5. Recycled Plastics (RP) (No.'s 1, 3, 4, 5, and 7)

The details of the successful trials are provided in the following sections. Clinker chemistry data and air emissions summaries are included as Attachments.

A separate report detailing the trial results for the materials deemed unsuccessful is included as Attachment No. 7.

TRIAL SUMMARIES

Section 1 – Recycled Asphalt Shingles

Dragon conducted a two-stage trial of the recycled asphalt shingles material to fully evaluate the process handling, clinker chemistry, and air emission impacts to the cement manufacturing process. The first stage of the trial examined the material handling of the product and the efficiency of introducing it into the kiln system, and the second stage of the trial examined clinker chemistry and air emission impacts. As detailed in Dragon's Letter of Intent, the recycled asphalt shingles are processed into flakes or chips by recycling companies prior to being transported to Dragon. The material was stored on site in the same manner and location as approved under Fuel Substitution License S-02851-WV-X-N and the facility's Alternative Fuel Operation's Manual. The material was introduced through the existing tire chip conveying system to the calciner. No modifications to the existing system were required to process the asphalt shingles material.

Dragon processed approximately 22 tons of recycled asphalt shingles. Dragon introduced the asphalt shingle material at a nominal feed rate of 2.4 tons per hour (tph) through the TDF feeder system. The first stage of the trial was approximately 9 hours in length. Strict adherence to air emissions quality and emissions limits were maintained during this stage of the trial.

During the first stage of the trial, Dragon monitored applicable process data to evaluate the thermal benefit of the recycled asphalt shingles, and determine potential impacts (if any) to process conditions while introducing the material into the calciner. The existing TDF conveying system processed the asphalt shingle material without incident and at the desired federate. Prior to entering the Calciner portion of the kiln system the material passes through a series of steel gates designed to reduce false air (i.e., ambient air) into the process and serve as a safety barrier in the event of a process shutdown. Due to the extreme temperatures of the Calciner the steel gates get very hot and Dragon observed some melting and buildup of the asphalt material on the gates. Periodic monitoring and cleaning of the gates will be required when processing asphalt shingles.

The second stage of the trial immediately followed the first, and Dragon processed an additional 22 tons at a feed rate of approximately 2.4 tons per hour. When combined with the first stage, the second stage of the trial processed a sufficient amount of the asphalt shingles to obtain valid air emissions and process data to adequately evaluate the

material. In addition, Dragon evaluated the clinker chemistry during the second stage of the trial to observe potential impacts.

Chemistry and Air Emission Results

Standards

Dragon's onsite Quality Control laboratory analyzed and evaluated any potential changes in clinker chemistry during the asphalt shingle trial. Results were compared to average non-trial clinker chemistry data collected in July 2018. A successful fuel trial results in no adverse impacts to air emissions quality, and clinker chemistry remains consistent with typical daily production quality.

Clinker Chemistry Quality

Laboratory results of the clinker produced during the trial proved to be within normal production specifications. Dragon observed no adverse impact to clinker chemistry quality as a result of combusting the asphalt shingles. A comparative chemical analysis of the clinker chemistry produced during the asphalt shingle trial compared to the average clinker chemistry for July 2018 is included in Attachment No. 1.

Air Emissions

Dragon continuously monitored air emissions during the asphalt shingle trial. Dragon currently operates a Continuous Emission Monitoring Systems (CEMS) for CO, CO_2, NOx, SOx, THC, HCl, and Hg to confirm that emissions do not exceed limits established in Dragon's current Title V air emission license (A-326-70-E-R/A). No adverse impacts to air emission quality were observed during the trial, and all emissions remained within licensed limits. Included in Attachment No. 2 is the emissions data collected during both stages of the asphalt shingle trial.

Conclusion

The two-stage trial of asphalt shingle material demonstrated the material is a viable fuel substitute in the manufacture of portland cement. Dragon has determined the trial of asphalt shingles to be successful based on the following:

- the material handling characteristics allowed for sufficient processing and introduction of the asphalt shingles into the process without modification of the existing system,
- no adverse impacts to air emission quality were observed, and
- no adverse impacts to clinker chemistry quality were observed.

Section 2 – Recycled Post-Consumer Carpet & Recycled Post-Consumer Foam Padding Trial

Dragon conducted a single stage trial of recycled post-consumer carpet and foam padding material to evaluate the process handling, clinker chemistry, and air emission impacts to the cement manufacturing process. The trial examined the material handling of the product and the efficiency of introducing it into the kiln system, and evaluated the clinker chemistry and air emission impacts. As detailed in Dragon's Letter of Intent, the recycled post-consumer carpet and foam padding was collected and processed by recycling companies prior to being transported to Dragon. The material was stored on site in the same manner and location as approved under Fuel Substitution License S-02851-WV-X-N and the facility's Alternative Fuel Operation's Manual.

Dragon processed approximately 11 tons of recycled post-consumer carpet and foam padding. Both materials were introduced into the kiln system through the existing shredding and conveying system as a single, co-mingled, stream. No modifications to the existing system were required to process the post-consumer carpet or foam padding material. Dragon introduced the carpet and foam padding material at an average feed rate of 0.25 – 0.50 tons per hour (tph). Strict adherence to air emissions quality and emissions limits were maintained during the trial.

Dragon's CEMS monitored CO, CO2, NOx, SOx, THC, HCl, and Hg to ensure that emissions were not adversely impacted during the trial. Dragon also monitored applicable process data to evaluate the thermal benefit of the recycled post-consumer carpet and foam padding and observe potential impacts to process conditions.

Chemistry and Air Emission Results

Standards

Dragon's onsite Quality Control laboratory analyzed and evaluated any potential changes in clinker chemistry during the recycled carpet and foam padding trial. Results were compared to average non-trial clinker chemistry data collected in July 2018. The fuel trials would be deemed successful if no negative impacts to air emission quality are observed and clinker chemistry remains consistent with average daily production quality.

Clinker Chemistry Quality

Laboratory results of the clinker produced during this trial were within normal production specifications. No adverse impact to clinker chemistry quality as a result of combusting the post consumer carpet and foam padding was observed. A comparative chemical analysis of the clinker chemistry produced during the recycled carpet trial compared to the average clinker chemistry for July 2018 is included in Attachment No. 3.

Air Emissions

Dragon continuously monitored air emissions during the asphalt shingle trial. Dragon currently operates a CEMS for CO, CO_2, NOx, SOx, THC, HCl, and Hg to confirm that emissions do not exceed limits established in Dragon's current Title V air emission license (A-326-70-E-R/A). No adverse impacts to air emissions quality were observed during the trial, and all emissions remained within licensed limits. Included in Attachment No. 4 is the emissions data collected during the recycled carpet and foam padding trial.

Conclusions

The two-stage trial of the post consumer carpet and foam padding material demonstrated the materials are a viable fuel substitute in the manufacture of portland cement. Dragon has determined the trial of post consumer carpet and foam padding to be successful based on the following:

- the material handling characteristics allowed for sufficient processing and introduction of the post consumer carpet and foam padding into the process without modification of the existing system,
- no adverse impacts to air emission quality were observed, and
- no adverse impacts to clinker chemistry quality were observed.

Section 3 – Recycled High Density Polyethylene (HDPE) Plastics (No. 2) and Recycled Plastics (RP) (No. 1, 3, 4, 5 and 7) Trial

Dragon conducted a two-stage trial of recycled high-density polyethylene (HDPE) plastic and a second two-stage trial for recycled plastics (RP) (No.'s 1, 3, 4, 5, and 7) to fully evaluate the process handling, clinker chemistry, and air emission impacts to the cement manufacturing process. The first stage of each trial examined the material handling of the products and the efficiency of introducing them into the kiln system. The second stage of each trial examined clinker chemistry and air emission impacts. As detailed in Dragon's Letter of Intent, the recycled plastics are sourced from solid waste recycling facilities where it is sorted and compressed into bales before being transported to Dragon. The material was stored on site in the same manner and location as approved under Fuel Substitution License S-02851-WV-X-N and the facility's Alternative Fuel Operation's Manual. The materials were introduced into the kiln system through the existing shredding and conveying system to the calciner. No modifications to the existing system were required to process the HDPE and RP materials.

Dragon processed a total of approximately 29 tons of recycled plastics. Dragon introduced the plastics at an average feed rate of 0.5 tons per hour (tph) through the shredder system. Strict adherence to air emissions quality and emissions limits were maintained during this stage of the trial.

During the first stage of each trial, Dragon processed approximately 1.5 tons of plastics through the shredding and conveying system. As detailed in Dragon's Letter of Intent, the first stage of the trial was to determine if the existing shredding system could process the plastic materials. Dragon monitored the shredding and conveying system and determined no adverse impacts to the system occurred with either the HDPE or the RP materials. Dragon did observe a buildup or "bridging" of material in the shredder feed hopper during the RP trial. Periodic monitoring and cleaning of the shredder hopper will be required to ensure material feeds consistently into the shredder when processing RP material. In addition, a large piece of steel was inadvertently introduced into the shredder with the HDPE material. The shredder was shut down and the steel removed. Dragon will work with HDPE material suppliers to ensure proper screening of the material occurs to eliminate the introduction of improper materials.

The second stage of both trials occurred from October 15, 2018 until October 26, 2018, and Dragon processed approximately 13 tons of HDPE material and 16 tons of the RP material. A sufficient amount of both the HDPE and the RP materials were consumed to evaluate the impact on air emissions and process data and determine if any negative impacts to clinker chemistry occurred. Dragon also monitored applicable process data to evaluate the thermal benefit and determine potential impacts to process conditions when introducing the material into the calciner.

Chemistry and Air Emissions Results

Standards

Dragon's onsite Quality Control laboratory analyzed and evaluated any potential changes in clinker chemistry during the HDPE and RP trials. Results were compared to average non-trial clinker chemistry data collected in July 2018. A successful fuel trialresults in no adverse impacts to air emission quality and clinker chemistry remains consistent with daily production quality.

Clinker Chemistry Quality

Laboratory results of the clinker produced during the trial proved to be within normal production specifications. No adverse impact to clinker chemistry quality as a result of combusting the HDPE and RP was observed. A comparative chemical analysis of the clinker chemistry produced during the HDPE and RP trials compared to the average clinker chemistry for July 2018 is included in Attachment No. 5.

Air Emissions

Dragon continuously monitored air emissions during the HDPE and RP trials. Dragon currently operates a CEMS for CO, CO_2, NOx, SOx, THC, HCl, and Hg to confirm that emissions do not exceed limits set forth by Dragon's current air emission license. No adverse impacts to air emissions quality were observed during the trial, and air emissions remained within licensed limits. Attachment No. 6 is the emissions data collected during both stages of the HDPE and RP trials.

Conclusions

The trials of the recycled materials (HDPE and RP) demonstrated the materials are a viable fuel substitute in the manufacture of portland cement. Dragon has determined the trial of recycled plastics to be a success based on the following:

- the material handling characteristics allowed for sufficient processing and introduction of the plastics into the process without modification of the existing system,
- no adverse impacts to air emission quality were observed, and
- no adverse impacts to clinker chemistry quality were observed.

TRIAL CONCLUSIONS

The alternative fuels trials of recycled asphalt shingles, recycled post-consumer carpet and foam padding, recycled HDPE (No. 2) plastics, and Recycled Plastics (No.'s 1, 3, 4, 5, and 7demonstrated that the materials are viable fuel substitutes in the manufacture of cement. Based on the data contained in this report, Dragon confirms that the trials of

asphalt shingles, recycled post-consumer carpet and foam padding, recycled HDPE (No. 2) plastics, and Recycled Plastics (No.'s 1, 3, 4, 5, and 7were successful. The evaluation of clinker chemistry and air emission quality during the trials confirms the materials pose no adverse impacts to production or air quality. Accordingly, Dragon is requesting the Department include recycled asphalt shingles, recycled post-consumer carpet and foam padding, recycled HDPE (No. 2) plastics, and Recycled Plastics (No.'s 1, 3, 4, 5, and 7as acceptable and permissible fuels under Dragon's Fuel Substitution License S-02851-WV-X-N.

ATTACHMENT No. 1

Clinker Chemistry Analysis – Recycled Asphalt Shingles Trial

Dragon Products Company, LLC
Thomaston, Maine
Cement Laboratory

	Clinker Asphalt Shingle Trial Average		Clinker July 2018 Average	
	Average	StdDev	Average	StdDev
Si	21.27	0.31	21.42	0.34
Al	3.60	0.10	3.83	0.56
Fe	3.25	0.08	3.31	0.08
Ca	63.17	0.40	64.18	0.84
Mg	3.27	0.14	3.35	0.19
S	1.17	0.19	1.40	0.16
K	1.23	0.10	1.22	0.14
Na	0.35	0.01	0.32	0.03
P	0.05	0.01	0.05	0.01
Ti	0.26	0.01	0.24	0.02
Cl	---	---	0.01	0.01
LOI	0.15	0.00	0.76	2.18
Total	97.75	0.46	100.07	2.18
C3S	63.31	2.61	63.73	6.40
C2S	13.23	2.56	13.33	4.87
C3A	4.05	0.19	4.56	1.52
C4AF	9.88	0.24	10.06	0.25
S/R	3.11	0.08	3.02	0.20
Al/Fe	1.11	0.02	1.16	0.18
LSF	95.83	1.19	96.32	1.72
% Liq	21.70	0.47	22.48	1.76
AlkEq	1.16	0.08	1.13	0.10
Sulfur:Alkali	0.77	0.08	0.99	0.11
Wet Fr CaO	0.77	0.14	0.90	0.14

ATTACHMENT No. 2

Air Emission Quality – Recycled Asphalt Shingle Trial

Hour	07/12/2018						07/13/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	1.2	149.3	53.2	3.21	17.082	0	1.1	138.9	122.4	7.29	12.192	0
01:00	1.2	151	30.4	2.49	19.134	0	1	116.5	30.4	2.2	12.14	0
02:00	1.2	150.9	30.7	2.4	18.616	0	1	121.6	37.2	2.65	10.495	0
03:00	1.4	158.4	41.2	3.07	21.812	0	1	121.3	24	2.36	12.644	0
04:00	1.2	154.6	37.4	1.91	22.3	0	1.2	128.3	32.1	1.9	11.473	0
05:00	1.2	154.5	46.5	1.3	23.364	0	1	122.2	44.4	1.48	10.626	0
06:00	1.2	152.2	43.5	2.75	25.35	0	1	123	44.7	3.25	11.765	0
07:00	1.2	154.3	52.3	3.07	23.248	0	1	123.7	40.4	2.53	11.577	0
08:00	1.2	153.1	74.6	3.95	21.487	0	1	123.7	57	4.18	9.302	0
09:00	1.2	156	63.9	2.79	19.954	0	1.5	126.8	59.9	3.6	111.681	0
10:00	1.2	150.9	67.1	3.6	20.118	0	2	130.4	49.9	3.4	104.888	0
11:00	1.2	150.8	64.2	3.53	19.617	0	1.3	154.1	20.6	3	37.074	0
12:00	1.2	149	102.3	5.76	25.031	0	2.1	132.8	43.8	3.49	115.299	0
13:00	1.2	149.2	117.9	7.8	25.93	0	2.2	143.8	43.3	3.4	96.747	0
14:00	1.2	149.6	93.9	6.32	19.059	0	1.9	128.7	41.2	3.58	69.803	0
15:00	1.2	151.2	106	6.73	15.7	0	1	131.2	43.5	3.36	9.202	0
16:00	1.2	144.8	76.3	5.09	12.255	0	1.1	135.2	65.5	6.16	8.753	0
17:00	1.1	146.5	88.4	6.25	12.01	0	1	134.5	57.9	3.7	8.957	0
18:00	1.2	145.8	91.2	6.33	11.765	0	0.9	126.1	55.7	3.81	10.043	0
19:00	1 1	147.7	89.7	6.09	11.383	0	1.3	124.8	51.4	3.72	59.626	0
20:00	1.2	143.3	84.5	4.75	11.902	0	0.9	124.5	82.1	4.78	11.207	0
21:00	1.1	134.8	70.2	4.35	11.835	0	0.9	125.9	75.4	4.5	11.494	0
22:00	1.2	133.6	96.9	5.52	11.995	0	0.9	124.5	80.3	4.6	10.345	0
23:00	1	136.5	111.4	8.05	12.016	0	0.9	126.3	65.7	3.97	10.057	0

* - Highlighted cells indicate trial data

ATTACHMENT No. 3

Clinker Chemistry Analysis – Recycled Post-Consumer Carpet and Foam Padding Trial

Dragon Products Company, LLC
Thomaston, Maine
Cement Laboratory

	Clinker Carpet and Foam Padding Trial Average		Clinker July 2018 Average	
	Average	StdDev	Average	StdDev
Si	21.70	0.56	21.42	0.34
Al	3.76	0.22	3.83	0.56
Fe	3.20	0.15	3.31	0.08
Ca	64.48	0.35	64.18	0.84
Mg	3.30	0.33	3.35	0.19
S	1.50	0.11	1.40	0.16
K	1.31	0.12	1.22	0.14
Na	0.31	0.03	0.32	0.03
P	0.06	0.00	0.05	0.01
Ti	0.25	0.01	0.24	0.02
Cl	0.01	0.00	0.01	0.01
LOI	0.15	0.00	0.76	2.18
Total	100.01	0.04	100.07	2.18
C3S	63.49	5.74	63.73	6.40
C2S	14.31	5.86	13.33	4.87
C3A	4.56	0.71	4.56	1.52
C4AF	9.73	0.45	10.06	0.25
S/R	3.12	0.13	3.02	0.20
Al/Fe	1.18	0.10	1.16	0.18
LSF	95.92	2.68	96.32	1.72
% Liq	22.09	0.69	22.48	1.76
AlkEq	1.17	0.08	1.13	0.10
Sulfur:Alkali	1.00	0.08	0.99	0.11
Wet Fr CaO	1.00	0.38	0.90	0.14

ATTACHMENT No. 4

Air Emission Quality – Recycled Post-Consumer Carpet and Foam Padding Trial

Hour	08/08/2018						08/09/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	0	0	0	0.42	0	19.9123	0	54.2	73.3	3.88	12.422	0
01:00	0.9	256.2	14.9	1.75	88.417	11.14954	0	41.4	117.8	6.08	12.516	0
02:00	1.4	370.9	58.8	5.85	21.305	0	0	67.5	117.2	5.7	14.058	0
03:00	1.9	421.3	54.4	6.68	23.339	0	0	53.4	107.7	3.19	13.089	0
04:00	0.2	58	47.3	4.27	17.203	0	0	54.5	72.9	2.14	12.887	0
05:00	0	27.7	53.9	3.08	16.529	0	0	37.1	41.5	0.9	11.373	0
06:00	0	17.5	46.7	5.93	119.088	0	0	61.3	34.8	1.82	28.816	0
07:00	0	25.8	62.2	6.65	17.344	0	0.4	54.5	37.3	2.73	118.147	0
08:00	0	25	43.1	2.75	39.787	0	0.6	46.1	58.3	4.2	74.236	0
09:00	0	32.3	62.7	7	32.945	0.38949	11.2	152.3	168.7	11.12	20.31	0.95816
10:00	0	43.6	72.2	7.61	12.283	0	0.8	76.6	70.6	9.17	21.806	0
11:00	0	58.3	70.2	7.24	10.563	0	1.3	48	88.7	6.58	17.103	0
12:00	0	43.9	56.6	5.89	9.655	0	0.2	48.6	85	4.97	65.136	0
13:00	0	31	75.8	7.36	9.89	0	1.2	82.5	77.8	6.94	184.195	0
14:00	0	28.8	78.1	7.22	11.86	0	1.1	73.6	94.4	8.76	152	0
15:00	0	42.9	78.9	6.63	13.978	0	0.2	87.7	89.4	8.19	74.278	0
16:00	0	53.3	76.5	7.08	14.801	0	0	82.4	72	6.04	20.339	0
17:00	0	64.5	79.2	6.29	13.493	0	0	107	79.8	7.03	19.67	0
18:00	0	92.1	74.9	5.82	10.314	0	0	145.1	75.2	7.32	23.407	0
19:00	0	73.7	76.9	4.66	11.264	0	0.3	188.5	71.9	8.07	25.882	0
20:00	0	67.1	74.8	5.1	12.25	0	0.2	167.9	68.2	7.37	27.424	0
21:00	0	60.9	92.2	4.22	13.54	0	0.2	133.4	49	6.12	30.702	0
22:00	0	63.8	110.4	5.93	14.552	0	0.2	142.1	43	6.13	27.939	0
23:00	0	31.1	105.7	5.19	14.534	0	0.2	157.3	61.1	7.34	26.438	0

* - Highlighted cells indicate trial data

(Attachment No. 4 – cont.)
Air Emission Quality – Recycled Post-Consumer Carpet and Foam Padding Trial

Hour	08/14/2018						08/15/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	0	71.2	96.2	4.91	16.393	0	0	119	77.5	6.43	18.275	0
01:00	0	94.4	93.3	4.67	17.817	0	0	121.5	106.7	7.73	17.884	0
02:00	0	87.2	78.3	3.67	18.882	0	0	106.7	96.7	7.36	16.645	0
03:00	0	92.2	59.5	4.76	18.742	0	0	110	155.9	6.95	15.513	0
04:00	0	91.5	95.8	3.17	19.853	0	0	100.5	119	5.91	16.23	0
05:00	0	93.8	49.6	1.3	96.936	0.09961	0	97.3	84.9	2.87	17.06	0
06:00	0	77.6	81.9	3.72	111.52	0	0	102.4	94.1	6.99	23.147	0
07:00	0	49.9	108.2	4.7	106.821	0	0	109.7	121.5	7.78	23.444	0
08:00	0	73.6	123.4	9.38	14.199	0	0	112.8	88.5	6.72	24.314	0
09:00	0	77.3	88.4	4.44	17.291	0	0	128.4	129.5	9.4	24.254	0
10:00	0	89.1	98.3	5.76	18.599	0	0	110	92.6	7.19	26.52	0
11:00	0	60.1	249.2	9.96	16.22	0	0.7	118.2	108.1	7.94	111.067	0
12:00	12.4	181.3	8	1.79	117.143	0	0.2	73	93.7	7.99	114.691	0
13:00	11	542.1	113.1	12.6	106.947	0.15041	0.2	81.4	103.4	9.06	123.567	0
14:00	0	144.2	101	7.01	18.266	0	0	103	89.6	8.12	50.381	0
15:00	0	84.3	106.6	6.92	14.641	0	0	78.2	70.4	6.38	20.275	0
16:00	0	95.7	95.7	6.25	15.957	0	0	74.9	112.6	6.25	18.905	0
17:00	0	85	79.6	4.93	60.567	0	0	58.9	107.8	6.74	17.698	0
18:00	0.2	97.8	85.3	6.83	109.794	0	0	68.6	121.7	6.28	17.684	0
19:00	1.4	112.9	89.5	6.48	105.928	0	0	77.2	190.1	12.16	18.765	0
20:00	0.2	106.5	80	6.51	86.376	0	0	87.9	111.9	6.84	21.208	0
21:00	0	58.9	86.9	6.72	13.761	0	0	52.9	92.1	5.22	18.452	0
22:00	0	92.3	92.6	6.04	12.585	0	0	51.1	140.4	6.08	20.712	0
23:00	0	112.5	76.7	6.01	15.625	0	39.4	58.6	172.8	22.19	18.411	0

* - Highlighted cells indicate trial data

(Attachment No. 4 – cont.)
Air Emission Quality – Recycled Post-Consumer Carpet and Foam Padding Trial

Hour	08/24/2018					
	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	0.4	150	63.7	1.76	17.912	0
01:00	0.4	154.4	70.3	2.68	18.17	0
02:00	0.4	151.8	74.5	2.12	18.323	0
03:00	1.5	185.2	112.8	4.07	24.356	0
04:00	0.9	215.1	79	2.44	24.613	0
05:00	0.4	151.5	93.9	1.4	19.459	0.10722
06:00	0.4	156.3	64.9	1.81	32.216	0
07:00	0.4	163.8	73.2	2.28	27.706	0
08:00	0.4	146.4	72.8	2.3	22.384	0
09:00	0.3	131.2	23	0.36	11.621	0
10:00	0.5	149.1	36.1	0.69	8.174	0
11:00	0.8	151.9	54.2	2.26	6.333	0
12:00	0.8	167.7	52.8	2.37	20.685	0
13:00	3.3	200.3	94.3	4.81	118.703	0
14:00	3.5	227.2	144	6.25	115.796	0
15:00	3.5	231.1	111.2	4.22	111.314	0
16:00	1	220.7	117.8	3.7	9.329	0
17:00	0.7	183.3	128.9	5.45	8.077	0
18:00	0.7	168.4	71.4	2.78	7.503	0
19:00	0.7	155.5	96	4.27	8.575	0
20:00	0.7	167	99.6	4.03	9.618	0
21:00	0.7	157.2	119.5	7.29	10.902	0
22:00	0.5	160.1	115.8	8.75	10.507	0
23:00	0.7	156.2	76.6	3.06	10.559	0

* - Highlighted cells indicate trial data

ATTACHMENT No. 5

Clinker Chemistry Analysis – Recycled High-Density Polyethylene (HDPE) Plastics (No.2) and Recycled Plastics (RP) (No.'s 1, 3, 4, 5 and 7)

Dragon Products Company, LLC
Thomaston, Maine
Cement Laboratory

	Clinker Recycled Plastics Trial Average		Clinker July 2018 Average	
	Average	StdDev	Average	StdDev
Si	21.35	0.32	21.42	0.34
Al	3.86	0.18	3.83	0.56
Fe	3.27	0.12	3.31	0.08
Ca	64.69	0.55	64.18	0.84
Mg	3.55	0.23	3.35	0.19
S	1.53	0.24	1.40	0.16
K	1.02	0.12	1.22	0.14
Na	0.29	0.03	0.32	0.03
P	0.05	0.01	0.05	0.01
Ti	0.22	0.02	0.24	0.02
Cl	0.01	0.00	0.01	0.01
LOI	0.15	0.02	0.76	2.18
Total	99.97	0.38	100.07	2.18
C3S	66.18	4.21	63.73	6.40
C2S	11.27	3.81	13.33	4.87
C3A	4.69	0.45	4.56	1.52
C4AF	9.94	0.37	10.06	0.25
S/R	3.00	0.12	3.02	0.20
Al/Fe	1.18	0.06	1.16	0.18
LSF	97.39	1.83	96.32	1.72
% Liq	22.23	0.72	22.48	1.76
AlkEq	0.96	0.09	1.13	0.10
Sulfur:Alkali	1.23	0.13	0.99	0.11
Wet Fr CaO	0.95	0.31	0.90	0.14

ATTACHMENT No. 6

Air Emission Quality – Recycled High-Density Polyethylene (HDPE) Plastics (No.2) and Recycled Plastics (RP) (No.'s 1, 3, 4, 5 and 7)

Hour	10/15/2018						10/16/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	1.7	162.4	23	2.64	6.375	0	10	142.3	36.9	1.67	10.932	0
01:00	1.3	143.9	10.4	2.13	7.714	0	35.5	114.1	47.3	3.95	144.631	1.79209
02:00	1.8	161.1	11.5	2.29	8.493	0	21.5	111.8	12.6	1.4	112.704	6.255
03:00	2.7	156.6	14.8	2.41	10.847	0	1.2	106	14.4	1.15	8.272	0
04:00	1.5	165.3	16	1.69	9.185	0	1.1	124	12.3	0.75	7.072	0
05:00	1.2	154.1	10.3	0.87	8.828	0	1.1	130.1	13.2	0.45	5.793	0
06:00	1.4	153	10.3	2.11	8.828	0.16794	1.3	140.1	15.4	0.84	6.72	0
07:00	1.5	148.8	14.4	2.08	8.545	0	1.4	134.3	17.9	0.95	7.227	0
08:00	1.7	147.8	13.3	2.06	8.499	0	3.3	133.1	36.4	1.01	7.848	0
09:00	1.6	149.1	11.4	2.14	10.818	0	3.1	131.5	34.4	0.88	8.82	0
10:00	1.4	146.3	13.3	2.15	10.43	0	1.9	131.9	38.1	0.73	8.005	0
11:00	1.7	151.6	18.6	2.13	11.598	0	2.6	130.6	35	0.44	7.925	0
12:00	2.1	153.4	29.6	2.63	9.536	0	2.9	138.4	44.9	0.73	9.814	0
13:00	2	156	49.7	3.24	9.278	0	2.4	132.5	62.3	0.86	10.559	0
14:00	2	149.8	10.2	0.96	9.278	0	2	142.6	55.1	0.87	10.794	0
15:00	1.9	153.9	13.6	0.91	7.959	0	2.3	138	106.2	3.85	11.7	0
16:00	2.1	172.9	17.5	1	7.809	0	2	149.8	58.5	0.71	10.662	0
17:00	2.6	167.7	19.4	1.03	6.801	0	1.7	133.1	62.7	0.73	10.741	0
18:00	3.9	168.6	16.5	0.91	9.332	0	1.8	147.8	49.5	0.58	11.816	0
19:00	3.8	172.3	18	1.07	9.068	0	2	147.8	61.6	0.73	13.772	0
20:00	3.4	163.5	11.3	0.75	9.079	0	1.8	154.5	48.5	0.58	12.716	0
21:00	3.5	148	16.6	0.91	8.978	0	1.7	149.4	45.7	0.58	16.564	0
22:00	3.1	165	16.8	0.91	8.933	0	2.1	170.2	39.3	0.58	21.368	0
23:00	4	161.7	20.7	0.74	7.843	0	2.6	165.7	37.7	0.58	18.37	0

* - Highlighted cells indicate trial data

(Attachment No. 6 – cont.)
Air Emission Quality – Recycled High-Density Polyethylene (HDPE) Plastics (No.2) and Recycled Plastics (RP) (No.'s 1, 3, 4, 5 and 7)

Hour	10/17/2018						10/18/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	2.9	169.8	39.2	0.57	17.312	0	3	139.6	66.8	2.18	23.077	0
01:00	3.4	166.5	40.8	0.43	17.229	0	2.9	139.6	65.1	2.04	22.995	0
02:00	3.7	167.6	77.3	1.72	16.11	0	3	138.2	63.7	2.02	22.941	0
03:00	3.6	182	49.4	0.59	16.627	0	2.5	135.6	69.5	2.33	21.948	0
04:00	1.2	146.6	34.3	0.66	12.5	0	2.9	142.1	132.8	4.36	20.794	0
05:00	1.5	178.2	33.5	0.32	10.323	0	3.7	137.9	71	0.84	22.78	0
06:00	1.5	161.8	34.7	0.35	11.193	2.51617	3	139.1	64.9	1.87	21.612	0
07:00	2.8	159	46.5	0.61	10.407	0	10	111.4	50.4	2.92	95.297	0
08:00	4.3	172.7	56.1	0.74	10.345	0	30	123.2	17.7	2.97	201.395	2.97424
09:00	5.1	156.9	56.8	0.78	11.372	0	56.6	133.7	52.7	2.32	214.452	6.06432
10:00	3 7	159.2	164	11.04	13.785	0	59.1	156.9	49.3	1.83	181.054	5.87954
11:00	4	168.9	80.3	1.37	15.771	0	54.8	164.3	51.1	1.86	138.528	4.03887
12:00	4.6	161.1	64.9	1.04	15.771	0	12.5	153.4	67.6	2.68	36.518	1.00989
13:00	5.3	162.3	69.1	0.91	15.771	0	5.3	143.9	72.4	2.64	16.747	0
14:00	5.7	156.9	66.3	0.9	14.836	0	6	147.2	131.2	3.6	17.351	0
15:00	9.4	155	84.6	1.17	14.836	0	7.2	141.2	100.5	3.48	19.645	0
16:00	13	141.6	169.3	4.94	14.72	0	3.6	148.6	90.8	4.19	22.128	0
17:00	10.4	140.2	124.4	1.77	16.589	0	2	146.5	79.2	4.41	18.863	0
18:00	8.2	138.9	105.8	1.81	19.393	0	1.5	148.7	75.5	4.1	18.863	0
19:00	7.9	138.2	86.4	1.5	20.495	0	1.5	143.2	83.6	3.91	18.863	0
20:00	4.5	136.3	74.7	1.83	23.242	0	1.7	146.8	76.8	3.56	18.841	0
21:00	4.1	140.2	83.4	2.77	25.149	0	1.5	139.4	102.1	3.67	19.355	0
22:00	4	135.1	72	2.79	25.089	0	1.7	169.3	73.9	3.54	20.398	0
23:00	4.1	142.1	68.5	2.06	25.089	0	0.3	182	101.8	3.84	19.048	0

* - Highlighted cells indicate trial data

(Attachment No. 6 – cont.)
Air Emission Quality – Recycled High-Density Polyethylene (HDPE) Plastics (No.2) and Recycled Plastics (RP) (No.'s 1, 3, 4, 5 and 7)

Hour	10/19/2018						10/20/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	0	0	0	4.61	0	0	0.9	135.3	30	2.62	9.959	0
01:00	0	0	0	3.66	0	0	1.1	144.5	31.3	3.02	11.892	0
02:00	0	0	0	3.66	0	0	1.1	144.9	35.7	3.11	12.766	0
03:00	0	0	0	10.32	0	0	1.1	142.6	43.1	3.08	11.503	0
04:00	0	0	0	0.77	0	0	1.1	147.2	37.1	2.35	13.29	0
05:00	0	0	0	0.25	0	7.40456	1.1	147.4	47.4	1.6	21.456	0
06:00	0	0	0	0.64	0	21.68947	1.1	144.5	37.1	3.44	26.024	0
07:00	30.7	80.7	4.3	0.82	920	20.77527	1	141.7	35.8	2.99	21.551	0
08:00	21.4	213.6	44.8	17.29	120	6.35279	3.6	144.5	38.5	3.09	49.805	0
09:00	14.8	161	63.7	10.33	122.686	0.61527	1.1	144.5	44.2	3.32	21.926	0
10:00	3.7	91.5	15.5	5.9	95.845	0	1.1	143.8	52.3	2.92	20.781	0
11:00	0.3	17	1	4.8	200	0	1.1	143.5	51.1	2.79	19.647	0
12:00	0	4.6	0.7	1.3	180	0	1.2	147.8	58.6	2.74	22.573	0
13:00	14.1	17.8	0	0.67	270	9.93314	1.5	153.4	57.5	2.64	19.27	0
14:00	0.8	240.7	0.9	1.89	209.091	15.97628	1.7	171.5	54.9	2.5	19.054	0
15:00	14	307.3	24.7	3.06	181.424	3.16838	1.4	167.8	23.9	2.7	19.502	0
16:00	22.7	148.2	52.9	3.83	183.462	1.41898	1.3	166.4	22.8	2.43	15.223	0
17:00	6.8	165.9	24.1	2.86	54.074	0.95293	6.1	157.9	55.2	6.94	15.006	0.27279
18:00	0.9	137.2	28.5	2.48	6.628	0	2.1	157.8	57.7	3.83	13.969	0
19:00	0.9	145.9	39.8	2.41	7.616	0	1.8	159.8	50	2.63	14.484	0
20:00	0.9	144.9	75.5	3.43	7.49	0	1.4	145.1	39.6	2.39	13.753	0
21:00	0.9	143.8	55.4	2.52	7.397	0	1.6	144.3	51.2	1.98	13.753	0
22:00	1.1	147.5	105.6	3.87	8.345	0	1.6	159.2	42.1	1.99	13.806	0
23:00	1.1	142.3	73.5	2.77	9.626	0	1.4	154.3	43.9	1.99	16	0

* - Highlighted cells indicate trial data

(Attachment No. 6 – cont.)
Air Emission Quality – Recycled High-Density Polyethylene (HDPE) Plastics (No.2) and Recycled Plastics (RP) (No.'s 1, 3, 4, 5 and 7)

Hour	10/21/2018						10/22/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	1.6	157.2	35.8	2.01	17.165	0	2.3	107.4	18.5	1.91	14.744	0
01:00	2.1	161.4	49.9	1.98	17.076	0	5.8	111.3	22.9	1.92	17.519	0
02:00	3.8	159.2	55.9	2.09	19.565	0	10.8	117.9	36.3	1.84	19.697	0
03:00	2.4	127.5	63.7	3.39	17.062	0	17.7	119.9	31.5	1.8	22.911	0
04:00	1.6	144.3	26	1.51	13.872	0	13.5	132.6	25.2	1.52	24.282	0
05:00	1.7	137.6	27	1.02	11.887	0	13.3	124	32.5	0.92	22.747	0
06:00	1.4	134.8	23.3	2.12	13.373	0	66	134	34	2	220.588	1.43899
07:00	1.1	113.9	21.6	2.13	13.522	0	65.1	149.2	37.7	2.19	207.724	4.16299
08:00	1	115.1	23.8	2.3	12.596	0	5.7	124.7	62.5	2.2	11.628	0.13377
09:00	0.9	113.8	35.2	3.41	11.111	0	35	126.9	72.2	2.29	55.191	0
10:00	1.3	115.5	45.1	3.13	8.498	0	19.9	136.6	72.1	1.96	20.774	0
11:00	3.2	121.1	50.2	2.65	9.677	0	20.8	137.2	62.8	2.12	20.619	0
12:00	3.8	124.1	45.2	2.17	9.663	0	7.5	104.4	81.3	2.11	21.319	0
13:00	1.8	117.1	29.3	2.08	9.807	0	4.3	133.6	36.7	1.82	16.089	0
14:00	5.5	125.9	44.6	2	9.483	0	5.3	129.6	63.4	5.22	13.154	0.28055
15:00	15.4	120.8	60	2.24	10.379	0	5.5	132.8	55.7	2.31	13.856	0
16:00	17.3	126.8	60.4	2.26	11.31	0	4.2	140.1	55	2.43	16.387	0
17:00	3.7	110.2	57.8	3.7	11.315	0	5.1	141.9	57.1	2.36	17.526	0
18:00	2.1	107.6	52.8	3.83	8.682	0	5.6	141.9	53.4	2.21	17.526	0
19:00	9.8	103.3	55.9	3.15	8.64	0	6.8	146.1	49.4	2.17	19.974	0
20:00	19.1	111.8	67.8	2.12	10.143	0	10.8	140.8	62.4	2.17	26.82	0
21:00	2.5	106.4	21.7	1.85	11.52	0	9.6	149.9	78.3	2.07	21.855	0
22:00	2.2	115.6	28.5	2.08	13.102	0	9	153.3	71.3	2.07	20.839	0
23:00	1.4	108.9	12.9	1.87	13.826	0	7.7	172.4	72.9	2.09	21.527	0

* - Highlighted cells indicate trial data

(Attachment No. 6 – cont.)
Air Emission Quality – Recycled High-Density Polyethylene (HDPE) Plastics (No.2) and Recycled Plastics (RP) (No.'s 1, 3, 4, 5 and 7)

Hour	10/23/2018						10/24/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	6.2	173	67.7	2.09	21.652	0	2.5	191.5	88.7	4.71	30.113	0.14303
01:00	4.9	157.4	61.5	2.09	21.652	0	9.3	141.2	88	3.03	87.768	0
02:00	5.3	161.8	47.6	2.05	22.609	0	31.4	157.3	80.9	2.7	297.332	0
03:00	5.2	152.9	49.7	1.93	25.802	0	36.5	157.6	82.1	2.7	241.89	0
04:00	5.4	167.6	63.7	1.73	25.802	0	33.6	154.3	104.4	3.34	187.245	0
05:00	6.7	157.3	67.9	1.02	26.683	0	9.4	220	53.2	1.68	55.703	0
06:00	26.2	184.4	72.8	2.09	27.702	0	1.4	133.2	50.8	3.99	14.939	0
07:00	9.3	154.2	92.3	2.05	30.617	0	1.1	132.1	55.5	3.29	17.131	0
08:00	14.6	158.3	143.3	2.24	28.642	0	1.1	134.7	63	3.25	18.254	0
09:00	24.5	148.9	166.2	2.22	28.571	0	1.1	137.4	132.6	3.56	18.444	0
10:00	21.7	158.4	131.4	2.27	31.197	0	1.3	142.8	170.6	5.74	18.408	0
11:00	20.8	155.2	125.6	2.38	31.923	0	1.2	138.8	165.9	3.4	19.083	0
12:00	14.7	148.1	100.8	2.56	29.988	0	1.4	138.7	132.9	3.68	18.08	0
13:00	9.8	147.3	105.9	2.39	25.03	0	1.1	131.8	55.1	4.2	17.928	0
14:00	9.4	149.6	128.7	2.57	29.075	0	1.2	131.9	55.7	4.43	17.928	0
15:00	19.8	141.2	177.4	2.91	77.643	0	1.1	133.2	44.7	3.79	17.096	0
16:00	2.6	162	166.8	3.29	25.998	0	1.2	127.1	44.3	3.51	17.517	0
17:00	2.4	160.2	210.3	3.38	28.053	0	1.2	130.2	57.2	3.51	16.757	0
18:00	2.6	160.9	200.4	3.5	27.251	0	19.7	135.5	91.5	3.69	152.918	0
19:00	1.9	151.7	152.8	3.48	29.975	0	27.5	141.6	144.8	4.49	148.755	0
20:00	1.6	157.6	144.3	3.2	28.589	0	10.8	109.9	34.4	4.66	142.966	0
21:00	1.9	144.8	113.9	2.99	30.175	0	6.4	108.6	26	4.37	133.904	0
22:00	7.7	159	65.5	2.91	74.333	0	3.6	96.1	17.1	3.24	126.519	0
23:00	2.3	167.1	60	2.77	31.512	0	3.2	98.6	19.1	3.27	131.734	0

* - Highlighted cells indicate trial data

(Attachment No. 6 – cont.)
Air Emission Quality – Recycled High-Density Polyethylene (HDPE) Plastics (No.2) and Recycled Plastics (RP) (No.'s 1, 3, 4, 5 and 7)

Hour	10/25/2018						10/26/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPMVD @7%O2)
00:00	1.2	96.6	16.2	3.61	52.399	0	1.5	194.9	71.9	7.57	12.651	0
01:00	0.6	96.9	14	4.24	7.143	0	1.7	196.7	93.3	7.97	13.368	0
02:00	0.6	102.2	22.5	5.29	6.431	0	1.2	152.3	68.7	7.79	13.595	0
03:00	0.8	104.2	25	6.36	9.164	0	1	127.6	30.3	7.78	15.53	0
04:00	0.8	104.3	15.6	4.04	7.878	0	0.9	103.7	36.4	4.96	15.75	0
05:00	0.8	102.5	17.3	2.21	7.878	0	5.8	125.9	41.7	3.59	57.305	0
06:00	0.6	103.7	18.4	5.97	9.164	2.11039	0.1	10.2	0.3	4.02	270	0.80474
07:00	0.8	104	30.8	1.53	10.078	0.27089	0	6.8	0.2	1.08	170	4.24187
08:00	0.9	107.2	79.8	7.87	10.847	0	0	4.8	0.4	1.4	170	9.38972
09:00	1.1	111.5	70.6	7.83	11.739	0	0	0	0	2.21	0	0.22753
10:00	1.3	110.6	130.1	9.61	12.899	0	0	0	0	7.02	0	0
11:00	1.3	129.2	132.2	9.77	12.813	0	0	0.5	0.3	6.95	150	0
12:00	1	101.1	141.1	10.17	12.69	0	0	0	0	38.85	0	0
13:00	0.8	85.5	119	10.47	13.793	0	0	0	0	5.84	0	0
14:00	1	116.2	94.4	8.89	13.793	0	0	0	0	1.99	0	0
15:00	0.8	93	84.5	8.14	13.755	0	0	0	0	1.2	0	5.39858
16:00	0.8	101.3	118	8.78	13.957	0	0	0	0	0.9	0	17.98824
17:00	1	118.7	52.4	8.65	14.069	0	0	0	0	0.74	0	14.66095
18:00	1.5	181.7	48.4	9.08	13.973	0	0	0	0	0.61	0	15.17523
19:00	1.5	192.9	53.5	9.5	13.477	0	0	0	0	0.74	0	14.98377
20:00	1.5	188.7	65.4	8.32	12.264	0	0.4	317.7	19.2	2.34	139.216	15.8514
21:00	1.8	217.3	61.7	7.76	13.351	0	18.5	394.2	67.8	6.54	211.084	3.82216
22:00	1.6	196.8	50.2	7.6	13.543	0	9.3	517.1	24.5	5.19	180.874	3.55723
23:00	2	244.7	77.1	7.71	13.193	0	8	590.7	37.5	7.36	81.043	1.14376

* - Highlighted cells indicate trial data

ATTACHMENT No.7

Alternative Fuel Trial Results

Recycled conveyor belt material
Earthlife® bio-solids
FiberForm® graphite and carbon material
Coal-tar pitch
Coal-tar pitch coke

Dragon Products Company, LLC
February 2019

PURPOSE

Dragon Product Company, LLC (Dragon) is a manufacturer of portland cement, located in Thomaston, Maine. The cement making process begins with raw feedstock of calcium carbonate bearing rock and other materials including sand (silica) and iron. The calcium carbonate bearing rock is quarried from the onsite limestone quarry in Thomaston, Maine. The limestone is pulverized and mixed with sand and iron to make the raw feedstock. The raw feed is then introduced into the kiln system, where it is heated to near liquid phase in the rotary kiln then cooled quickly to produce clinker, the main ingredient in portland cement. Dragon currently uses petroleum coke (petcoke) as a primary fuel for the thermal energy required to heat the raw feed material. Dragon consumes approximately 10 tons per hour of petcoke in two (2) locations within the kiln system. Approximately five (5) tons per hour is consumed in the rotary kiln and an additional five (5) tons per hour is consumed in the calciner. Dragon is currently licensed (#S-02851-WV-X-N) to use tire chips (tire-derived fuel (TDF)) and recycled carpet material as alternative fuels, which are fired directly in the calciner.

On May 21, 2018, Dragon submitted a Letter of Intent to the Maine Department of Environmental Protection (Department) to conduct alternative fuels trials of the following materials:

1. Recycled asphalt shingles;
2. Recycled post-consumer carpet;
3. Recycled post-consumer carpet foam padding;
4. Recycled high-density polyethylene (HDPE) plastics (No. 2);
5. Recycled Plastics (RP) (No.'s 1, 3, 4, 5, and 7);
6. Recycled conveyor belt material;
7. FiberForm® graphite and carbon material;
8. Coal-tar pitch;
9. Coal-tar pitch coke; and
10. Earthlife® bio-solids.

The purpose of the trials was to fully evaluate the beneficial use and potential limitations of the materials as alternative fuels. Each proposed alternative fuel was trialed separately to evaluate material handling characteristics, impacts to air emission quality, and impacts to clinker chemistry.

The results of the trials demonstrated the following two (2) materials are unacceptable as beneficial fuel substitutes under Dragon's current alternative fuel system:

1. Recycled Conveyor Belting
2. Earthlife® Bio-Solids

The evaluation of the recycled conveyor belt material and the Earthlife® bio-solids trials indicated these materials are not viable fuels using Dragon's current alternative fuels

handling systems. The details of the recycled conveyor belt material and bio-solids trials are provided in the following sections.

The trials of the FiberForm® graphite and carbon material, coal-tar pitch and coal-tar pitch coke were inconclusive. Dragon was not able to process the FiberForm® materials using the current alternative fuels handling system. However, Dragon believes the FiberForm® materials can be processed through the existing solid fuel handling system and used in conjunction with Dragon's primary fuel, petroleum coke. Dragon intends to submit an additional Notice of Intent to the Department to trial an alternative method of introducing the fuels into the process. In this report, the evaluation of the FiberForm® material as a viable alternative fuel is inconclusive, and additional trials are warranted.

TRIAL SUMMARIES

Section 1 – Recycled Conveyor Belt Material Trial

Dragon proposed a two-stage trial of the recycled conveyor belt material to fully evaluate the process handling, clinker chemistry, and air emission impacts to the cement manufacturing process. The first stage of the trial examined the material handling of the product and the efficiency of introducing it into the kiln system, and the second stage of the trial examined clinker chemistry and air emission impacts. As noted in Dragon's Letter of Intent, the recycled material was sourced from removed or replaced conveyor belts used in Dragon's manufacturing process. The material was stored on site in the same manner and location as approved under Fuel Substitution License S-02851-WV-X-N and the facility's Alternative Fuel Operation's Manual. The material was processed and introduced into the kiln system with the existing conveying and shredding system. No modifications to the existing system were necessary to process the recycled conveyor belt material. Dragon proposed to introduce the recycled conveyor belt material at a nominal feed rate.

The first stage of the trial was designed to evaluate the performance of Dragon's shredder and its ability to adequately process the conveyor belt material. Due to the durability and composition of the conveyor belt material, the shredder was unable to adequately process the belt. The belts caused the shredder system to bind, and the shredder failed to reduce the size of the material. Since the conveyor belt material could not be processed with the existing shredding system the trial was abandoned.

The first stage of the recycled conveyor belt trial was unsuccessful; therefore, Dragon did not conduct the second stage of the trial. Dragon processed less than 1 ton of recycled conveyor belt material. Dragon performed no further evaluation of the conveyor belt material.

Section 2 - Earthlife® Bio-Solids Trial

Dragon proposed a two-stage trial of the Earthlife® Bio-Solids material to evaluate the process handling, clinker chemistry, and air emission impacts to the cement

manufacturing process on July 30, 2018 and July 31, 2018. The first stage of the trial examined the material handling of the product and the efficiency of introducing it into the kiln system, and the second stage of the trial examined clinker chemistry and air emission impacts. As noted in Dragon's Letter of Intent, the bio-solids material is a heat-dried granulated material processed at New England Fertilizer Company's (NEFCO) plant prior to being transported to Dragon. The material was stored on site in the same manner and location as approved under Fuel Substitution License S-02851-WV-X-N and the facility's Alternative Fuel Operation's Manual. The material was processed and introduced into the kiln system with the existing tire chip conveying system. No modifications to the existing system were required to process the Earthlife® Bio-Solids material. Dragon introduced the bio-solids material at a nominal feed rate of 0.5 tons per hour (tph). Strict adherence to air emissions quality and emissions limits were maintained during this stage of the trial.

The first stage of the trial evaluated the processing of the Earthlife® Bio-Solids through Dragon's existing tire chip conveying system. Dragon monitored applicable process data to evaluate the potential impacts to process conditions while introducing the material into the calciner. The tire chip conveying system consists of a steel hopper equipped with a drag chain transport system that moves material from the hopper to the long conveyor belt that feeds material into the Calciner. Dragon determined that the size of the bio-solids pellets were too small to be effectively transported through the tire chip conveying system, resulting in material spillage at the drag chain ingress and egress points. In addition, buildup of the bio-solids material resulted in "bridging" in the hopper, preventing effective transportation onto the long conveyor.

Strict adherence to air emissions quality and emissions limits were maintained during this stage of the trial. The emissions results for the first stage of the Earthlife® Bio-Solids trial are provided in Attachment No. 1

Conclusions

The trial of Earthlife® Bio-Solids material demonstrated that the material cannot be utilized as a viable fuel substitute using Dragon's existing alternative fuels handling system Dragon determined the trial of Earthlife® bio-solids to be unsuccessful based on the following;

- the material handling characteristics prevented sufficient transport of the material into the process; and

- an increase in mercury emissions raises concerns regarding the viability of the bio-solids material as a long term fuel source.

Section 3 - FiberForm® Graphite and Carbon, Coal-tar Pitch, and Coal-tar Pitch Coke

Dragon proposed a two-stage trial of the Fiberform®, coal-tar pitch and coal-tar pitch coke material to fully evaluate the process handling, clinker chemistry, and air emission impacts to the cement manufacturing process on August 31, 2018. The first stage of the trial examined the material handling of the product and the efficiency of introducing it into the kiln system, and the second stage of the trial proposed to examine clinker chemistry and air emission impacts. As noted in Dragon's Letter of Intent, the materials were sourced from Fiber Materials, Inc. (FMI) in Biddeford, Maine. The material was stored on site in the same manner and location as approved under Fuel Substitution License S-02851-WV-X-N and the facility's Alternative Fuel Operation's Manual. The material was processed and introduced into the kiln system with the existing conveying and shredding system.

The first stage of the trial was designed to evaluate the performance of Dragon's shredder and its ability to adequately process the FiberForm® material. Dragon's shredding system adequately processed the FiberForm® material; however the process created a nuisance dust issue at the exit transfer point from the shredder. Potentially combustible dust created by the shredder is a significant safety concern, so the trial was immediately abandoned.

The first stage of the FiberForm® trial was deemed unsuccessful using Dragon's current alternative fuels system. Dragon did not conduct the second stage of the trial. Dragon processed less than 0.25 tons of material. Therefore, analysis of the clinker chemistry and evaluation of the air emissions were not performed.

However, as noted in Dragon's Letter of Intent, the FiberForm® materials are good candidates for fuel substitution. Laboratory analysis indicates sufficient thermal energy (14,000 – 16,000 Btu/lb) and low ash content. Dragon believes the FiberForm® materials can be processed through the existing solid fuel handling system that currently processes petroleum coke. Additional analysis of the material's hardness is required to determine if the material can be sufficiently processed through the solid fuel milling system. If the FiberForm® materials are adequate for processing through the milling system, Dragon will submit an amended Letter of Intent to conduct a trial utilizing the solid fuel feed system to evaluate the use of this material as an alternative fuel.

FiberForm® Conclusions

The trial of Fiberform®, coal-tar pitch and coal-tar pitch coke materials demonstrated that the material cannot be utilized using Dragon's existing alternative fuels handling system Dragon has determined the trial of these materials to be inconclusive, and intends to re-evaluate the material for introduction into the kiln process via an alternative method. Dragon will submit an amended Letter of Intent for additional trialing of these materials.

TRIAL CONCLUSIONS

The alternative fuels trials of recycled conveyor belting and Earthlife® Bio-Solids demonstrated that the materials cannot be utilized using Dragon's current alternative fuels handling systems. Based on the data contained in this report, Dragon confirms that the trials of recycled conveyor belting and Earthlife® Bio-Solids were unsuccessful. In addition, the trial of the FiberForm® materials was deemed inconclusive, and additional evaluation of the materials is warranted. FiberForm® If future modifications to Dragon's alternative fuels handling system provide the opportunity to adequately process these materials, Dragon may re-evaluate their use at the facility.

ATTACHMENT No. 1

Air Emission Quality – Stage 1 Earthlife ® Bio-Solids

Hour	07/30/2018						07/31/2018					
	SO2	NOX	CO	THC	Hg	HCL	SO2	NOX	CO	THC	Hg	HCL
	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mmton)	(PPM VD@7 %O2)	(PPH)	(PPH)	(PPH)	(PPMVD @7% O2)	(Lb/Mm ton)	(PPM VD@7 %O2)
00:00	1.4	188	33.1	2.87	140	0	1.2	193.8	146.2	4.11	26.838	0
01:00	1.4	198	40.3	2.89	41.793	0	1.1	185.1	124.3	2.68	33.701	0
02:00	1	179.7	37.7	2.36	12.259	0	1.2	191.1	88.8	2.24	43.415	0
03:00	1.2	161.7	30.9	2.58	15.467	0	1.6	212.9	99.5	2.56	51.812	0
04:00	0.9	164.9	52.5	2.32	14.598	0	1.2	198.6	111.1	2.24	59.827	0
05:00	0.9	159.7	25.7	1.02	13.517	0	1.4	217.7	69.8	1.08	72.661	0
06:00	1	163.1	29.8	2.24	34.11	0	1.4	220.4	67.8	1.88	115.148	0
07:00	0.9	160.7	45.1	2.63	14.678	0	1.6	220.2	53.4	2.37	139.255	0
08:00	0.9	165.3	71.6	4.17	14.718	0	3.3	367.4	47.6	2.56	443.176	0
09:00	0.9	160.3	52.4	3.61	11.93	0	2.6	284.4	86.2	4.14	463.12	0
10:00	0.9	164	74.6	4.05	10.568	0	4.1	281.4	91.5	3.56	460.507	0
11:00	1.1	173.3	54.7	3.1	11.648	0	4.8	258.2	79.4	3.06	468.478	0
12:00	1.2	213.7	51.9	2.94	23.677	0	2.3	349.7	82.4	3.38	60.145	0
13:00	1.4	229.5	63.7	3.41	34.124	0	1.6	249.5	77.3	3.16	70.609	0
14:00	1.7	221	59.5	3.5	31.225	0	1.8	258.2	82.8	3.43	82.318	0
15:00	1.4	225.9	50.3	2.82	37.789	0	1.8	274.1	60.3	2.64	67.152	0
16:00	1.2	213	57.2	2.88	37.644	0	1.8	283.3	45.9	2.62	130.193	0
17:00	1.4	211.9	44	2.39	38.039	0	1.8	272.9	48.4	2.5	56.28	0
18:00	1.8	208.3	59.5	3.06	112.371	0	1.6	258.4	40.4	2.65	50.665	0
19:00	3	235	103.9	4.54	378.055	0	1.5	219.7	45.5	2.74	47.153	0
20:00	12.8	238.6	112.6	4.49	376.77	0	1.3	211.9	31.9	2.39	42.857	0
21:00	15.1	247.1	123.4	5.3	389.312	0	1.3	204.6	50.9	3.41	38.529	0
22:00	8.7	233.2	100.1	4.35	380.76	0	1.1	175.3	19.7	2.53	267.407	0
23:00	4.3	216.3	125.3	4.43	153.922	0	1.3	197.9	21.8	2.38	45.481	0

* - Highlighted cells indicate trial data

OPERATIONS MANUAL

ALTERNATIVE FUELS

DRAFT

Dragon Products Company, LLC.

Revised January 2019

ALTERNATIVE FUELS, USE OF OPERATIONS MANUAL

Table Of Contents

1.0 GENERAL OPERATIONS

1.1 Scope of Operation

This manual describes the procedures for the acceptance, storage, and recordkeeping requirements for alternative fuels (ALTF) as a fuel substitute in the manufacture of cement at the Dragon Products Company, LLC (Dragon) in Thomaston, Maine. Dragon operates a four stage pre-heater/pre-calciner rotary kiln. Dragon does not operate any boilers at the Thomaston facility. ALTF are used to substitute the kiln system's primary fuel, petroleum coke. The procedures identified in the manual are designed to meet the requirements of Chapter 418, Section 8, of the Maine Solid Waste Management Regulations (MSWMR). A copy of Chapter 418 is included as Appendix A. All individuals with supervisory responsibility in plant operations are required to be familiar with this manual and to facilitate the processing of ALTF in accordance with its guidelines.

1.2 Personnel

The Plant Manager, aided by the Environmental Manager, has the overall responsibility for Dragon's Alternative Fuels Program. Operation of the material handling, conveying, and feed delivery systems are the responsibility of the Operations Department. Maintenance and repairs of all components of the ALTF system is the responsibility of Dragon's Maintenance Department. Recordkeeping and reporting is the responsibility of the Environmental Department.

It is the responsibility of all supervisors and employees who are involved with the delivery, storage, transfer, and processing of ALTF to know and understand the operating requirements set forth within this manual.

1.3 Residue and Waste

Dragon will consume 100% of the ALTF material received. No residues or wastes will be generated. Dragon will maintain a contract with the generator/supplier of the ALTF material to return any unused material to the generator/supplier or it will otherwise arrange for proper disposal.

1.4 Dust, Litter, and Odor Control

The alternative fuels used at Dragon are comprised of solid, non-friable materials. The ALTF used by Dragon does not pose a threat of excess fugitive emissions or odors. Dragon personnel routinely maintain the general cleanliness of the ALTF storage and processing area. Storage is designed to prevent material from wind migration and aid in the prevention of dust.

1.5 Storage

Dragon Products Company, LLC (Dragon) has designed an Alternative Fuels Program for the use of secondary solid waste materials (ALTF) for fuel substitution in the manufacture of cement at the Thomaston, Maine facility. The program includes a dedicated storage area for temporary storage and stockpiling of various ALTF.

The ALTF storage area is located on the western end of the Thomaston facility, in an area formerly known as the "Old Scrubber Section." The area contains approximately 40,000 square feet of paved concrete. The area is adjacent to the receiving hopper designed to feed fuel material to a conveying system that transports the fuel material to the calciner portion of Dragon's kiln system. The ALTF storage area is depicted in Figure 1.

The ALTF is typically delivered to Dragon in bulk trailers. Recycled carpet, recycled post-consumer carpet and foam padding and recycled plastics are delivered in bales, and the bales are removed from the trailers via a fork truck in the unloading area. The bales are staged in the Alternative Fuels Storage Location identified on the Site Plan included as Figure 1. Tire Derived Fuel (TDF) and asphalt shingles materials are stored in the TDF storage location. This location is bermed on 3 sides with concrete barriers. This storage method reduces fugitive dust emissions from wind blown fines. Stormwater runoff from the ALTF storage locations is managed under Dragon's Stormwater Pollution Prevention Plan (SWPPP). Any material deposited in this storage area will be removed via a front end loader or skid steer and loaded into the receiving hopper.

The Alternative Fuel Storage Location holds approximately 10,000 tons of material. Material is stored in a manner that facilitates the processing of the oldest material first.

1.5.1 Ash Storage

No residual ash is generated from the combustion of ALTF at Dragon. Due to the nature of cement manufacturing, all ash from the combustion of ALTF is contained within the clinker formed within the kiln system. No additional storage or disposal of ash is required.

1.5.2 Fuel Management Plan

Dragon's Fuel Management Plan is included as Appendix B of this manual.

1.5.3 Environmental Monitoring Program

Initial acceptance requirements for a potential ALTF source are identified in section 3.1 of this manual. In addition, Dragon has included an Environmental Monitoring program for the outside storage of ALTF in the Fuel Management Plan included as Appendix B of this manual.

1.6 Fire Protection

Dragon has not identified any significant or unusual risks of fire associated with the storage of the recycled carpet or the chipped tire material. However, Dragon has taken appropriate precautions to minimize the potential risk of fire associated with storing and handling these materials. Dragon has installed a fire suppression system with the carpet shredding system. All areas of the ALTF system contain signage notifying employees of potential fire risk. Dragon provides site specific task training on fire awareness and prevention. Dragon maintains a "hot work permit" safety system for any work being performed in or around the ALTF system. The Rockland and Thomaston Fire Departments are familiar with the Dragon facility and will receive site specific task training for the ALTF system.

1.7 Material Flow

Alternative fuels are delivered to the plant in bulk trailers. Recycled carpet, recycled post-consumer carpet and foam padding, and recycled plastics are delivered in bales, and the bales are removed from the trailers via a fork truck in the unloading area. The bales are fed onto the shedder loading conveyor and processed through the shredder. From the shredder the material is transported onto the long feed conveyor which transports material to the kiln. Tire Derived Fuel (TDF) and asphalt shingles materials are stored in the TDF storage location. This location is bermed on 3 sides with concrete barriers. TDF and asphalt shingles are loaded into a receiving hopper via a lull. The hopper transports the materials via conveyor to a weigh scale feed belt. The scale measures and records the fuel being delivered to the kiln's calciner. A material flow diagram illustrating this process is attached as Figure 2.

2.0 ACCESS TO FACILITY

This section will highlight the measures taken by Dragon in the areas of security, safety and access.

2.1 Security

Security consists of a posted perimeter fence with access gates that are locked during nighttime hours. The Operations Department maintains 24 hours a day, 7 days a week personnel coverage and is responsible for routine inspections of all plant operating areas when daytime employees are not on-site.

2.2 Safety

It is the responsibility of Dragon to see that all required safety features have been installed and are maintained. Dragon is regulated by the Mine Safety and Health Administration (MSHA) and all equipment and work practices associated with the ALTF program is in compliance with MSHA regulations. Personnel are trained in the safety procedures of the ALTF system and trained to identify any hazards in the work place.

Employee's are trained to report any required maintenance or safety modifications required. The public is not allowed in the operational areas of the cement plant site unless accompanied by plant personnel.

2.3 Access Roads

The Site Plan included as Figure 1 illustrates the route that ALTF will be delivered for storage and use. These roads are designed and currently used by vehicles similar to those transporting ALTF. All road maintenance is the responsibility of Dragon.

2.4 Signs and Directions

The ALTF storage area is clearly identifiable at the facility. Signage indicating the receiving area is clearly visible to incoming traffic. Dragon provides appropriate site specific training for all drivers delivering fuels to the receiving area. All contractors working at the Dragon facility are compliant with Dragon's Contractor Safety Regulations and MSHA requirements.

2.5 Emergency Access

All roads to the ALTF receiving and handling area and throughout the plant are maintained for easy access by emergency vehicles and personnel.

3.0 ACCEPTABLE SECONDARY MATERIALS – ALTERNATIVE FUELS

This section summarizes the procedures for acceptance and distribution of ALTF.

3.1 Acceptable Alternative Fuels

ALTF must meet three conditions to be acceptable for processing:

Condition 1 - Chemical Requirements:

Potential alternative fuels must be analyzed in conformance with and documented to meet the applicable standards in Chapter 418, Appendix A of the MSWMR to be deemed acceptable for use. In addition, ALTF must be non-hazardous based on the following required analysis.

Total RCRA 8 Metals
Polychlorinated Biphenyls (PCBs)
Corrosivity (as pH)
Reactivity

Once the preliminary screening of ALTF has been completed, it will be assumed that the stream of materials generated by that source will continue to meet the approval limits.

The generator is responsible for notifying Dragon in the event of significant process changes that may affect the ALTF composition or chemistry. The Environmental Manager determines satisfaction of this condition.

Dragon will not accept ALTF that is considered hazardous waste under state and federal regulations.

Condition 2 - Physical Requirements:

Acceptable ALTF must not include metal or other debris, and it must not contain free liquids (such that it will yield leachate). Visual inspection will be conducted by Dragon personnel. Final approval by the Operations Supervisor or the Environmental Department will determine satisfaction of Condition 2.

Condition 3 - Certification:

Acceptable ALTF must be analyzed in conformance with and documented to meet the applicable allowable standards in Chapter 418, Appendix A of the MSWMR. Documentation will include at minimum, signed analytical results from an approved laboratory and a signed statement from the generator. Each load of material delivered to Dragon will be accompanied by a Bill of Lading (BOL). Each BOL will be collected and kept on file at Dragon.

Satisfaction of Condition 3 is determined by the Dragon's Environmental Department.

3.2 Hazardous and Special Waste Handling and Exclusion Plan

Acceptance will be limited to non-hazardous ALTF. Dragon will not accept ALTF which is considered hazardous waste under state and federal regulations.

3.3 Waste Not Acceptable for Processing

If Dragon receiving personnel are unsatisfied with the physical state of the ALTF or with the completeness or accuracy of the accompanying documentation, the Operations Supervisor, Environmental Department, or Plant Manager is to be contacted. The material will remain within the delivery trailer until the matter is resolved.

Alternative fuels which are not physically suitable (if it contains debris, for example) or which has not been given final authorization for receiving, is not to be accepted for processing. The driver is to be directed to return the ALTF to the generator.

3.4 Waste Disposal

Waste disposal does not apply to ALTF. 100% of the fuel will be consumed. Ash generated from the combustion of ALTF will be contained in the clinker formed in the kiln system.

3.5 Construction or Demolition Debris (CDD)

Dragon will not accept wood from construction or demolition debris (CDD). Research on the heat value (Btu/lb) of CDD material demonstrates that CDD is not a sufficient fuel for use in Dragon's kiln system.

4.0 RECORD KEEPING

This section summarizes the record-keeping procedures that will be used to ensure that the ALTF accepted for processing meets the criteria detailed in 3.0 of this manual. Also described is the process by which ALTF use is tracked. All records, including analytical data, will be kept on file and available for DEP for inspection.

4.1 Pre-approval

Prior to accepting a potential ALTF source, Dragon will request, at a minimum, a sample of the material for on and offsite laboratory analysis. Dragon will also obtain all analytical data collected by the generator, including Material Safety Data Sheets (MSDS). If the results of the data demonstrate compliance with section 3.0 of this manual the fuel will be acceptable for use. All pertinent data will be kept on file in the Environmental Department.

4.2 Verification

ALTF deliveries are to be visually inspected prior to acceptance. Dragon personnel will confirm the load is physically acceptable for delivery, as detailed in section 3.1, Condition 2 of this manual.

4.3 Record of Use

Alternative fuels received by Dragon will be recorded using generator/supplier information and weigh scale tickets.

Alternative fuels consumed in the kiln will be recorded electronically and stored in Dragon's Operations data logger. The ALTF system used at Dragon utilizes a weigh scale feeding system capable of accurately measuring the feed rate of ALTF into the calciner. This information is electronically recorded.

4.4 Operations Manual Updates

The Environmental Department will update the Alternative Fuels Operations Manual as needed. Changes in operation, fuel source/type, or recordkeeping requirements will be updated in the Operations Manual and Fuel Management Plan.

5.0 ANNUAL REPORT

Each year, the Environmental Department shall prepare and submit to the DEP an annual ALTF beneficial use report. This report will contain a summary of activity during the previous year, including the quantity of ALTF received for beneficial use, the sources of the ALTF, remaining inventory, and the results of any required testing or on-going characterization.

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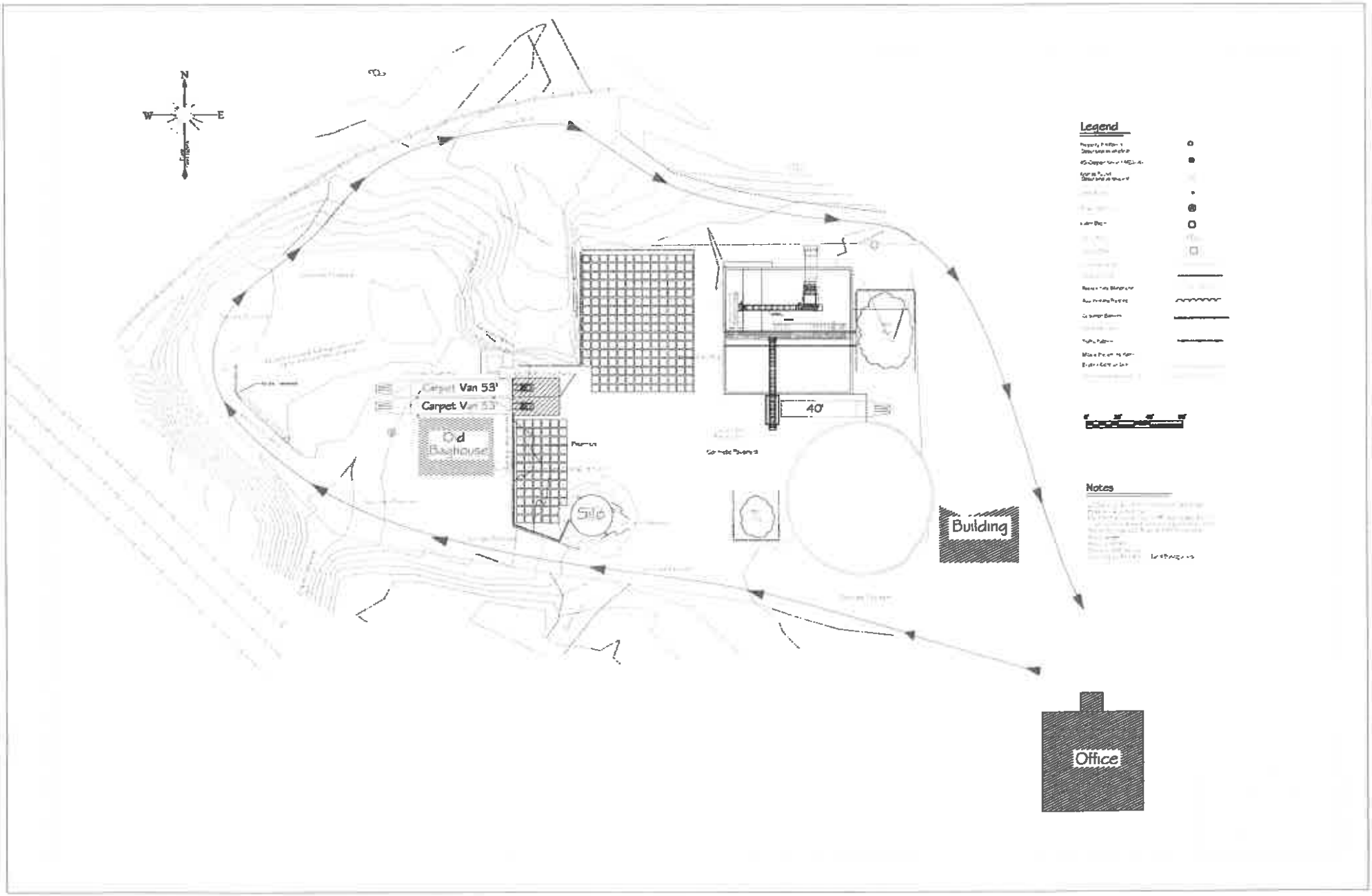
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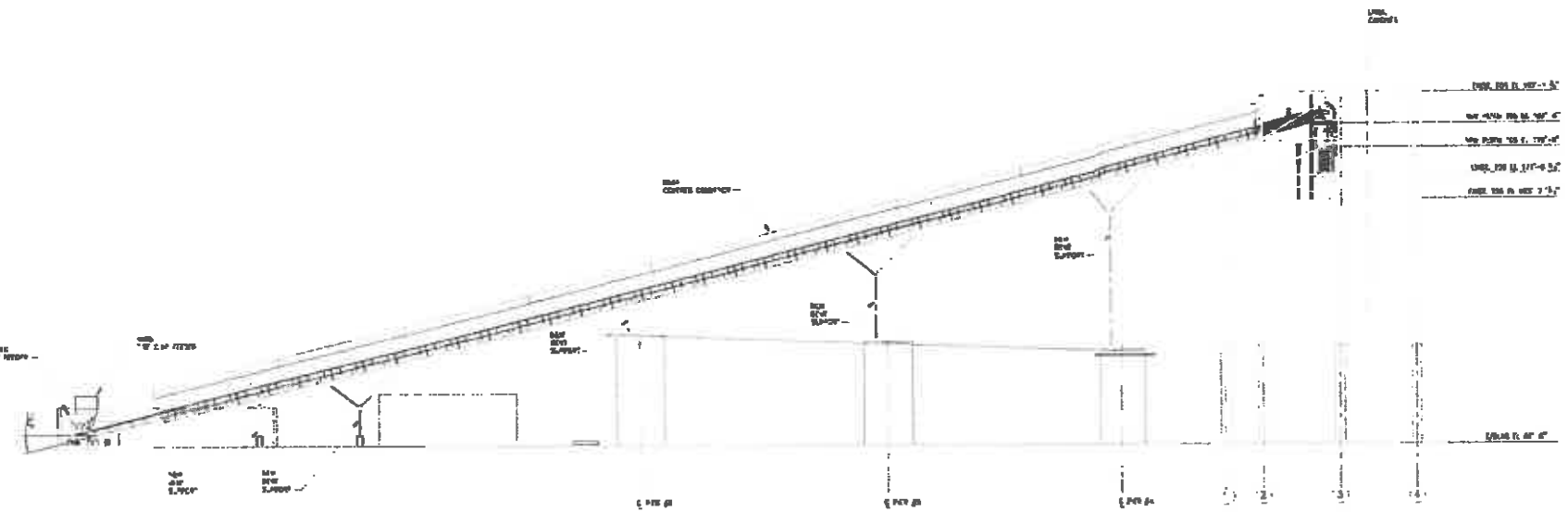

ELEVATION LOOKING NORTH
SCALE 1/8"=1'-0"

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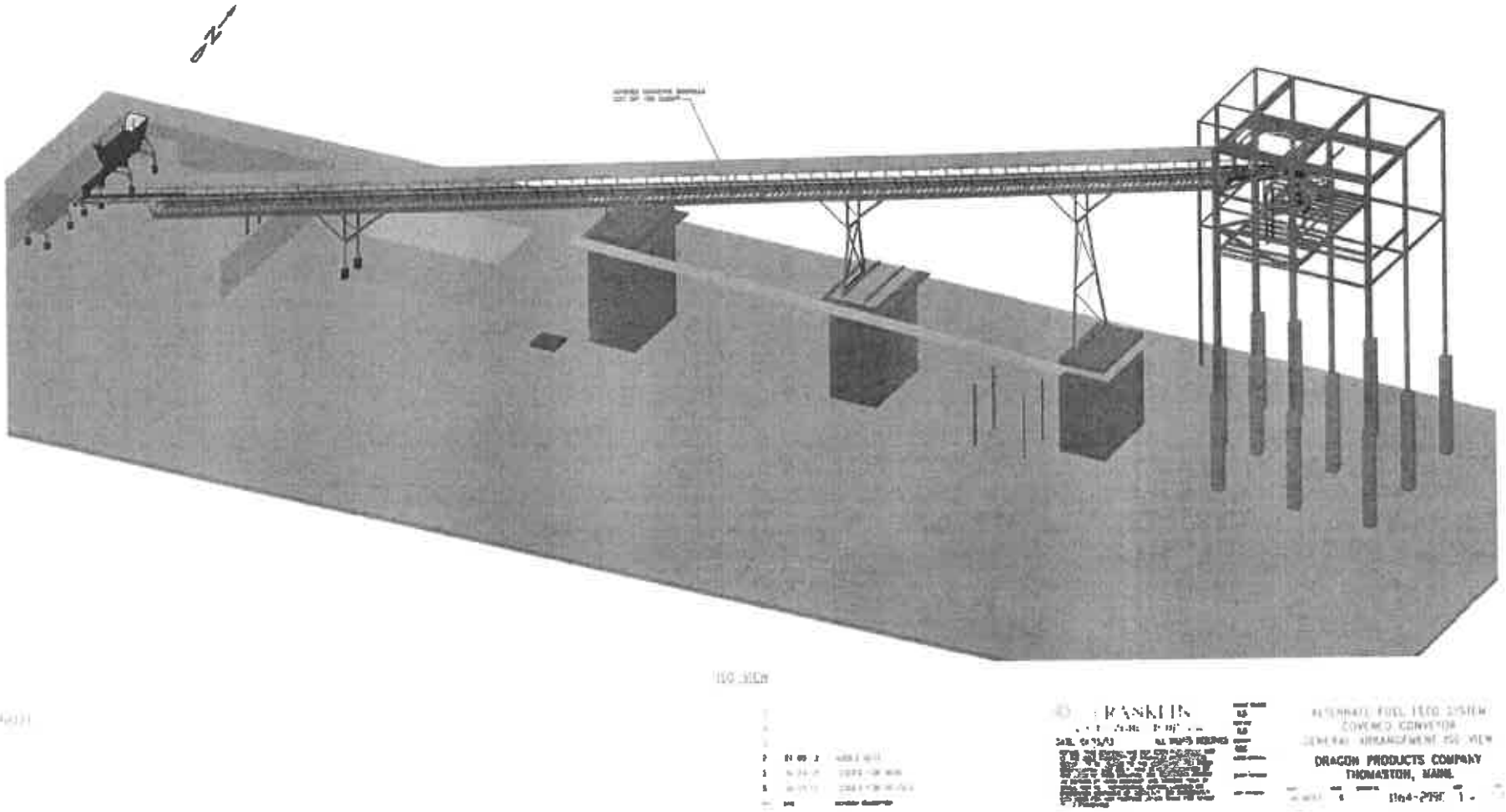
ALTERNATIVE FUEL FEED SYSTEM
COVERED CONVEYOR
GENERAL ARRANGEMENT-LKG NORTH

DRAGON PRODUCTS COMPANY
THOMASTON, MAINE

Figure 2. Material Flow Diagram



APPENDIX B

FUEL MANAGEMENT PLAN

ALTERNATIVE FUELS

DRAFT

Dragon Products Company, LLC.

Revised January 2019

ALTERNATIVE FUELS
FUELS MANAGEMENT PLAN

Table Of Contents

1.0 GENERAL DESCRIPTION – FUELS STORAGE AREA

1.1 Fuel Storage Area

Dragon Products Company, LLC (Dragon) has designed an Alternative Fuels Program for the use of secondary solid waste materials (ALTF) for fuel substitution in the manufacture of cement at the Thomaston, Maine facility. The program includes a dedicated storage area for temporary storage and stockpiling of various ALTF.

The ALTF storage area is located on the western end of the Thomaston facility, in an area formerly known as the "Old Scrubber Section." The area contains approximately 40,000 square feet of paved concrete. The area is adjacent to the receiving hopper designed to feed fuel material to a conveying system that transports the fuel material to the calciner portion of Dragon's kiln system. The ALTF storage area is depicted in Figure 1.

The ALTF is typically delivered to Dragon in bulk trailers. Recycled carpet, recycled post-consumer carpet and foam padding and recycled plastics are typically delivered in bales, and the bales are removed from the trailers via a fork truck in the unloading area. The bales are staged in the Alternative Fuels Storage Location identified on the Site Plan included as Figure 1. Tire Derived Fuel (TDF) and asphalt shingles materials are stored in the TDF storage location. This location is bermed on 3 sides with concrete barriers. This storage method reduces fugitive dust emissions from wind blown fines. Stormwater runoff from the ALTF storage locations is managed under Dragon's Stormwater Pollution Prevention Plan (SWPPP). Any material deposited in this storage area will be removed via a front end loader or skid steer and loaded into the receiving hopper.

The Alternative Fuel Storage Location holds approximately 10,000 to 15,000 tons of material depending on the density. Material is typically stored in a manner that facilitates the processing of the oldest material first.

1.2 Leachate Management

Based on Toxic Characteristic Leachate Potential (TCLP) data, none of the licensed alternative fuel materials present any significant leachate potential. Stormwater runoff from the fuel storage area is managed under Dragon's Stormwater Pollution Prevention Plan (SWPPP).

1.3 Wind Control

The fuel material arrives at the Dragon facility via bulk trailers. Recycled materials are typically delivered in bale form, and stored in the ALTF storage location. Due to the compressive nature of materials stored in bales, it is unlikely the materials will be affected by wind. The TDF and asphalt shingle storage location is bermed on 3 sides by concrete blocks, mitigating any migration of material by wind. These storage methods reduce fugitive dust emissions from wind blown fines.

The fuels Dragon utilizes are typically solid, non-friable materials that do not pose a significant threat for wind migration. Materials temporarily stockpiled outside will be stored on a concrete pad bermed on three sides with concrete barriers. The storage area will be monitored by Dragon personnel for the presence of wind blown material. If material is observed migrating from the storage area due to high winds Dragon will mitigate the problem by covering the stockpiled material.

2.0 ALTERNATIVE FUELS USED AT FACILITY

2.1 Recycled Automotive Carpet

Dragon utilizes a recycled polyester/polypropylene carpet material. This material is typically used in the auto industry to provide interior upholstery for the floors and trunks of automobiles. The carpet material averages 14,000 British Thermal Units (Btu) per pound.

2.2 Tires

Dragon utilizes chipped tire derived fuel (TDF) collected by reputable tire recyclers that have been processed into 1.5 inch to 2 inch pieces. The pieces are delivered to Dragon in bulk trailers. Chipped tires average 12,500 Btu/lb. In addition to the thermal benefit of the tire, the tire pieces may contain iron in the form of steel belting. The belting provides structural support for the tire. Iron is a key ingredient to the manufacture of cement. Dragon is capable of beneficially re-using the iron within the tire chips.

2.3 Construction and Demolition Debris

Dragon does not utilize wood from construction and demolition debris (CDD). Research on CDD has shown that the Btu/lb of CDD is too low to be effectively used in Dragon's process.

2.4 Recycled Asphalt Shingles

Dragon utilizes recycled asphalt shingles collected by various reputable recycling facilities. The material is processed into chips or flakes prior to being delivered to Dragon in bulk trailers. The material averages 7,477 British Thermal Units (Btu) per pound.

2.5 Recycled Post-Consumer Carpet

Dragon utilizes a recycled post-consumer carpet material collected and processed by reputable recycling companies in the New England market. The post-consumer carpet material averages 7,816 British Thermal Units (Btu) per pound.

2.6 Recycled Post-Consumer Carpet Foam Padding

Dragon utilizes a recycled post-consumer carpet foam padding material collected and processed along with recycled post-consumer carpet by reputable recycling company in New England. The post-consumer carpet foam padding material averages 12,109 British Thermal Units (Btu) per pound.

2.7 Recycled High-Density Polyethylene (HDPE) Plastics (No. 2)

Dragon utilizes recycled high-density polyethylene collected and processed by reputable recycling facilities in Maine. The recycled high-density polyethylene averages 21,156 British Thermal Units (Btu) per pound.

2.8 Recycled Plastics (RP) (No. 1, 3, 4, 5 and 7)

Dragon utilizes recycled plastics No. 1, 3, 4, 5 and 7 collected and processed by reputable municipal recycling facilities in Maine. The recycled plastics No. 1, 3, 4, 5 and 7 averages 9,854, 12,338, 20,228, 20,778 and 19,958 British Thermal Units (Btu) per pound, respectively.

3.0 DESCRIPTION OF FUEL FLOW

Alternative fuels are delivered to the plant in bulk trailers. Recycled carpet, recycled post-consumer carpet and foam padding, and recycled plastics are delivered in bales, and the bales are removed from the trailers via a fork truck in the unloading area. The bales are fed onto the shedder loading conveyor and processed through the shredder. From the shredder the material is transported onto the long feed conveyor which transports material to the kiln. Tire Derived Fuel (TDF) and asphalt shingles materials are stored in the TDF storage location. This location is bermed on 3 sides with concrete barriers. TDF and asphalt shingles are loaded into a receiving hopper via a lull. The hopper transports the materials via conveyor to a weigh scale feed belt. The scale measures and records the fuel being delivered to the kiln's calciner. A material flow diagram illustrating this process is attached as Figure 2.

Dragon stores materials onsite in a manner to ensure the oldest material is used first.

4.0 FUEL BLENDING PROCEDURES

4.1 Recycled Automotive Carpet and Tire Chips

The alternative fuel conveying equipment is designed to deliver each material onto the long belt to the calciner in series. This design allows for the combination of recycled products and TDF on the long belt which feeds the calciner. The recycled materials and the chipped TDF can be fed to the calciner individually or in combination.

4.2 Other Fuels

In the event Dragon utilizes other ALTF that require blending with chipped TDF or recycled materials, the blending will be done mechanically via the material feed hoppers. Materials will be blended together on the conveying system that feeds material into the kiln's calciner. If material requires blending prior to entering the feed hopper it will be done on the designated storage pad location. The material will be blended and then delivered to the receiving hopper via a front end loader or skid steer.

5.0 STOCKPILE MINIMIZATION PROCEDURES

Dragon does not intend to provide any long term storage of material onsite, and to use the material as received, however provisions for storage of material have been provided. The Alternative Fuels Storage location, depicted on Figure 1, holds an estimated 10,000 tons of material. Material is stored in a manner that facilitates the processing of the oldest material first.

Dragon has not identified any significant or unusual risks of fire associated with the storage of the recycled automotive or post-consumer carpet or foam padding, recycled plastics (No. 1 – 5, & 7), recycled asphalt shingles, or the chipped tire material. However, Dragon has taken appropriate precautions to minimize the potential risk of fire associated with storing and handling these materials. Dragon has installed a fire suppression system adjacent to the carpet shredding system. All areas of the ALTF system contain signage notifying employees of potential fire risk. Dragon provides site specific task training on fire awareness and prevention. Dragon maintains a "hot work permit" safety system for any work being performed in or around the ALTF system. The Rockland and Thomaston Fire Departments are familiar with the Dragon facility and will receive site specific task training for the ALTF system.

6.0 ENVIRONMENTAL MONITORING PROGRAM

Initial acceptance requirements for a potential alternative fuel source are identified in section 3.1 of the Alternative Fuels Operations Manual. All potential ALTF are subject to the characterization requirements identified in MSWMR Ch. 405. Dragon will notify the Maine DEP of the potential use of a new alternative fuel, prior to acceptance and processing, and provide analytical data identified in section 3.1 of the Operations Manual. Additional analysis will be performed if requested by the Department.

Dragon currently monitors all stormwater outfalls in accordance with the Maine Mulit-Sector General Permit for Stormwater (MSGP) and Sector E of the MSGP. In addition, Dragon conducts tri-annual groundwater and surface water analysis pursuant to Solid Waste Board Order #S-020777-WO-B-N and #S-202778-WO-C-N associated with the Waste CKD and Waste Clinker piles. The ALTF storage location is up-gradient of the Waste CKD pile.

7.0 STORAGE PAD MAINTENANCE PROGRAM

The fuel storage pad will be inspected at least annually by Dragon's Environmental Department. The pad and concrete barriers will be inspected for damage. All concrete

barriers will be inspected to ensure they are properly positioned on three sides of the storage area and effectively barricading material from spilling outside of the storage area. Additional inspections of the area surrounding the storage area will be conducted and documented under Dragon's SWPPP.

8.0 REVISIONS – FUELS MANAGEMENT PLAN

The Fuels Management Plan will be updated as required. Changes in operation, fuel source/type, or recordkeeping requirements will be documented and file by the Environmental Department.

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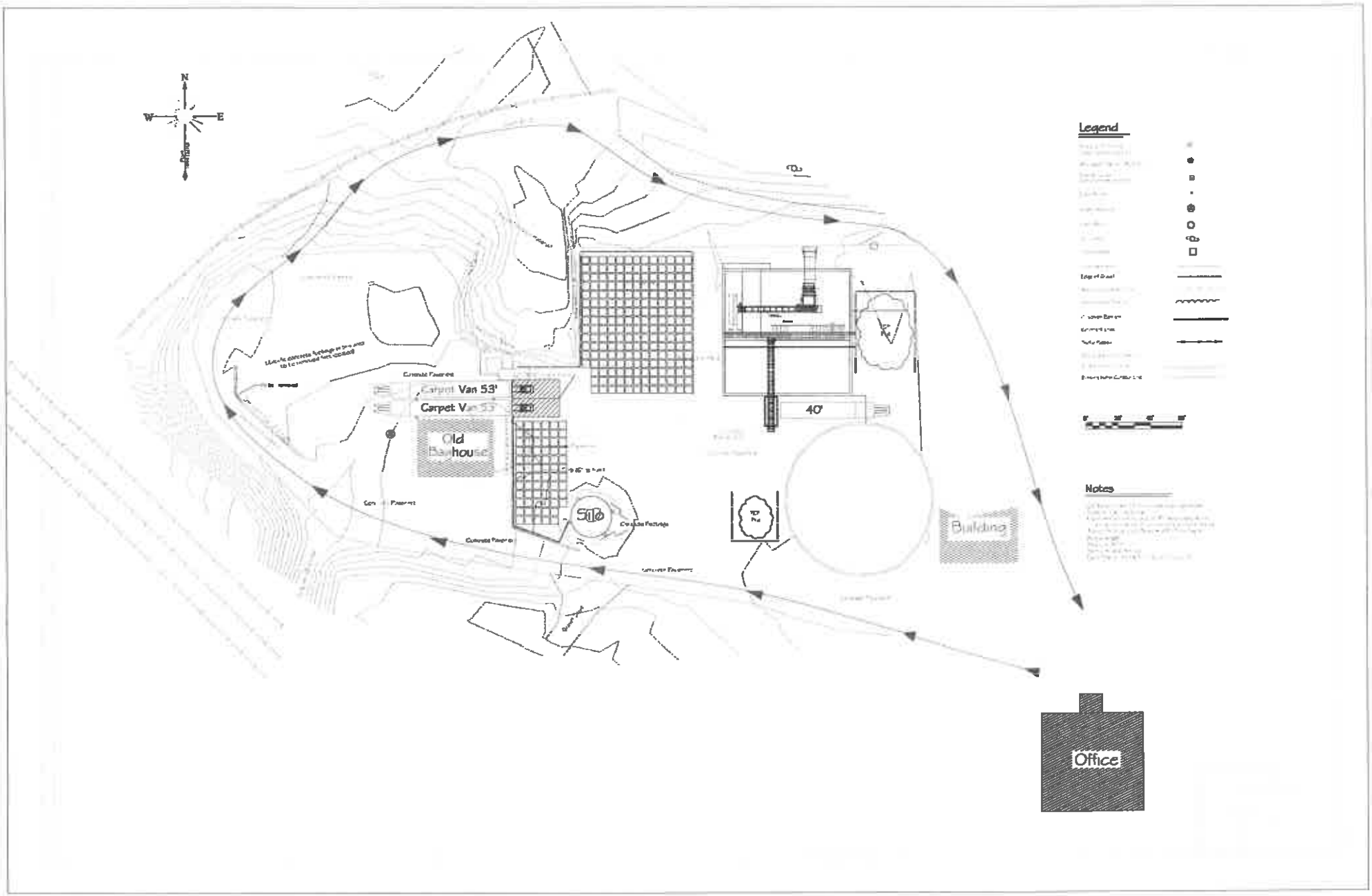
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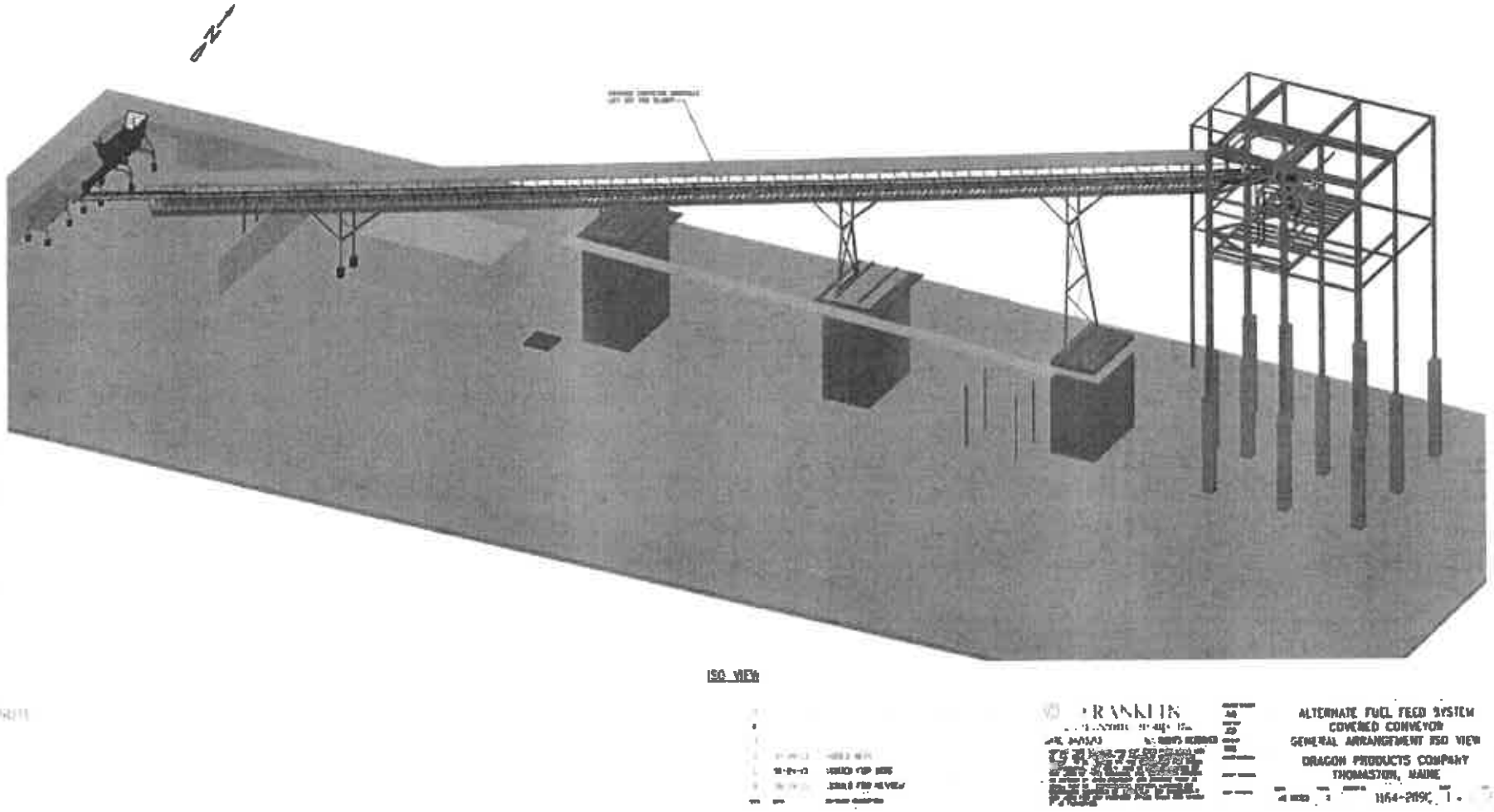
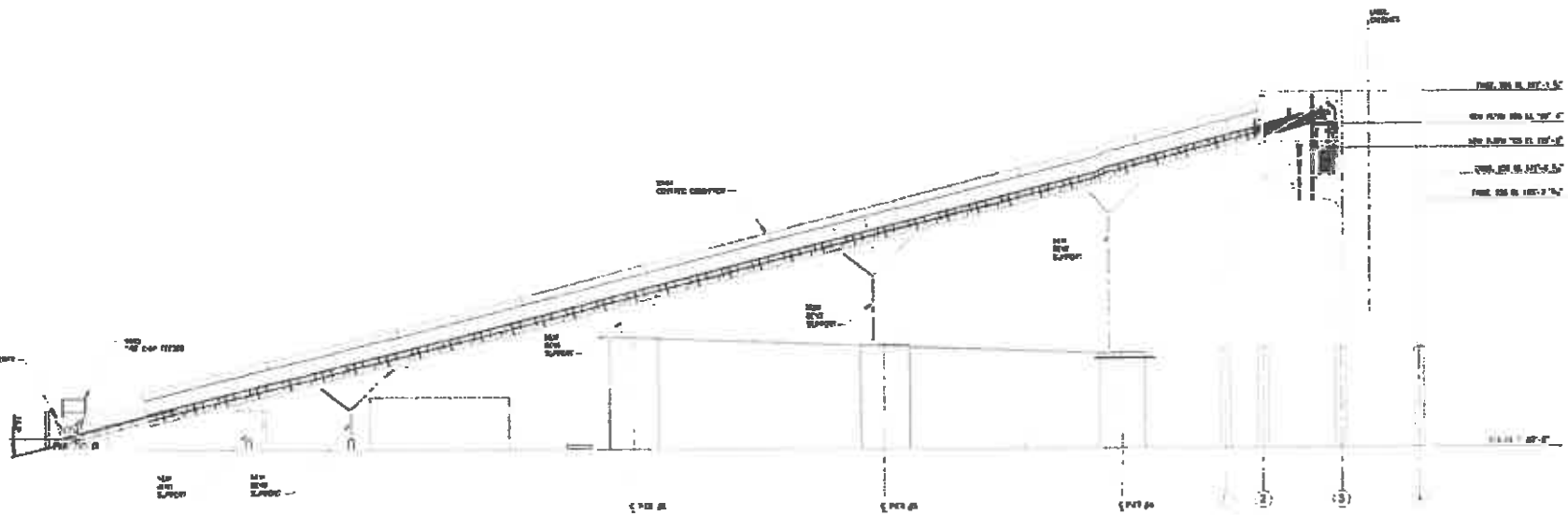
Carpet Van 53'
Old Barhouse
40'
Building
Office
Notes

Figure 2. Material Flow Diagram





ELEVATION LOOKING NORTH
SCALE 1/4"=1'-0"

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ALTERNATIVE FUEL FEED SYSTEM
COVERED CONVEYOR
GENERAL ARRANGEMENT—LKG NORTH

DRAGON PRODUCTS COMPANY
THOMASTON, MAINE

DRAGON PRODUCTS COMPANY

ALTERNATIVE FUELS PROGRAM

Annual Pad Inspection and Maintenance Form

Inspection Date: _____ Inspection Time: _____

Inspector: _____

Inspection:
Decribe overall condition of fuel storage pad. Note, in detail, any damage to pad including cracks.

_____

_____

_____

_____

_____

Corrective Action Needed:

_____

_____

_____

Work Order #: _____

Corrective Action taken:

_____

_____

_____

Correction action completion date: _____

Responsible official:

Name: _____ Title: _____

Signature: _____

Date: _____