Programmatic Environmental Assessment for Marketing Orders for U.S. Smokeless Tobacco Company, LLC for "Rooster Long Cut Mint, Red Seal Fine Cut, and Rooster Long Cut Wintergreen"

Prepared by Center for Tobacco Products

U.S. Food and Drug Administration

May 17, 2018

Table of Contents

This programmatic environmental assessment (PEA) is for the marketing orders for smokeless tobacco moist snuff products manufactured by U.S. Smokeless Tobacco Company, LLC. Information presented in the PEA is based on the submissions referenced in Appendix 1, unless noted or referenced otherwise. This PEA has been prepared in accordance with 21 CFR 25.40 as part of submissions under section 910(a)(2) of the Federal Food, Drug and Cosmetic Act (FD&C Act).

1. Name of Applicant

U.S. Smokeless Tobacco Company, LLC

2. Address

2325 Bells Road
Richmond, VA 23235

3. Manufacturer

U.S. Smokeless Tobacco Company, LLC

4. Description of Proposed Action

These proposed actions are for FDA to issue three marketing orders under the provisions of section 910 and 905(j) of the FD&C Act for the introduction of the smokeless tobacco products, Rooster Long Cut Mint, Red Seal Fine Cut, and Rooster Long Cut Wintergreen, into interstate commercial distribution in the United States. These authorizations are based on the finding that the new products are substantially equivalent to the corresponding predicate products that were on the market as of February 15, 2007. The predicate products are not currently marketed, and the applicant does not intend to market the new and predicate products simultaneously after receiving a marketing order for the new products.

4.1 Requested Action

Orders finding the listed tobacco products are substantially equivalent to the corresponding predicate products.

4.2 Need for Action

U.S. Smokeless Tobacco Company, LLC wishes to introduce three new tobacco products as described into interstate commerce for commercial distribution in the United States. The applicant claimed that the new products differ from the corresponding predicate products in a product ingredient and packaging (sec 910(a)(3)(A)(ii) of the FD&C Act). After considering the substantial equivalence (SE) Report, the Agency shall issue orders pursuant to section 910(a)(2) of the FD&C Act when finding the new products to be substantially equivalent to the corresponding predicate products.

4.3 Identification of the New Tobacco Products that are the Subject of the Proposed Action

4.3.1 Type of Tobacco Product

Smokeless tobacco product, loose moist snuff

4.3.2 Product Name and Submission Tracking Number

The names of the new products are listed below, along with their original submission tracking number (STN) and the name of the predicate products. See Appendix 1 for additional STNs associated with the new products and the predicate products.

STN	New Product	Predicate Product
SE0014130	Rooster Long Cut Mint	Rooster Long Cut Mint
SE0014131	Red Seal Fine Cut	Red Seal Fine Cut Natural
SE0014132	Rooster Long Cut Wintergreen	Rooster Long Cut Wintergreen

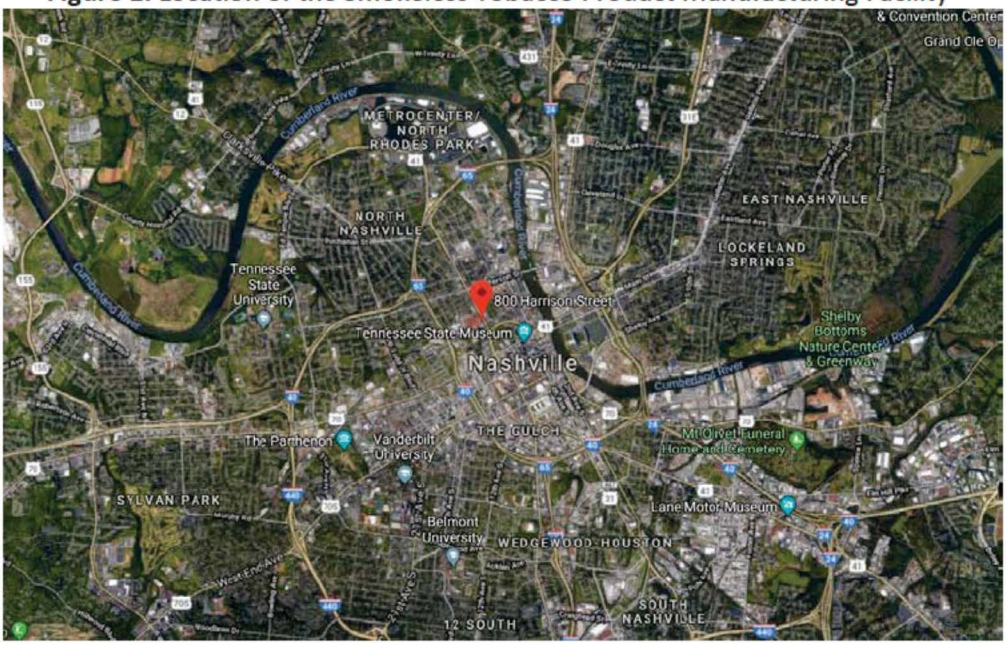
4.3.3 Description of the Product Package

The new products are packaged in individual cans that are shrink-wrapped into log rolls of five cans per roll and placed 18 log rolls to a shipping case. The new products may be purchased at retail locations in individual cans or in five-can log rolls. Details of the package components and weights of each packaging component for the new products are described in Confidential Appendix 1.

4.3.4 Location of Manufacturing

The manufacturer of the smokeless tobacco moist snuff is located at 800 Harrison Street, Nashville, TN 37203 (Figure 1).

Figure 1. Location of the Smokeless Tobacco Product Manufacturing Facility[1]



[1] Manufacturer address via Google Maps. Accessed January 9, 2018.

4.3.5 Location of Use

U.S. Smokeless Tobacco Company, LLC intends to distribute and sell the new tobacco products to consumers in the United States.

4.3.6 Location of Disposal

Once used, the new tobacco products will be disposed of in municipal solid waste (MSW) landfills or as litter, in the same manner as the corresponding predicate products and any other smokeless tobacco products. Disposal of the packaging materials will either enter the recycling stream or be disposed of in MSW landfills or as litter. The Agency anticipates that the distribution of waste from disposal will correspond to the pattern of the product use.

4.4 Modification(s) Identified as Compared to the Corresponding Predicate Product

The applicant claims that the new products differ from the corresponding predicate products in a product ingredient and packaging components. Details of product and packaging changes are described in Confidential Appendix 1.

5. Potential Environmental Impacts Due to the Proposed Actions

5.1 Potential Environmental Impacts Due to Manufacturing the New Products

The emission information associated with all tobacco products as reported in the EPA's Toxic Release Inventory (TRI) database is publicly available. The Agency uses TRI data to assess the environmental impacts from the emissions released by tobacco manufacturing facilities. In 2016, the U.S. Smokeless Tobacco Company Nashville facility released 154 pounds of nicotine and salts to the air and 68,479 pounds of nicotine and salts were transferred off-site for landfill disposal and waste management, compared to 253,436 pounds of nicotine and salts released to the air and 463,441 pounds of nicotine and salts transferred off-site by reporting tobacco facilities in the United States.[2]

The applicant stated that the manufacturing facility does not dispose of waste on-site, and all waste generated from the manufacture of the new products will be accommodated by existing waste management and storage practices. The applicant also stated that the nature of the waste generated from manufacturing the new products is not expected to change and therefore no new or additional disposal resources (e.g., landfills or recycling centers) are anticipated.

The applicant stated that manufacturing the new products will not result in emissions of new compounds or increases in the current emissions due to the predicate products or other smokeless tobacco products, because the new products will compete with other currently marketed smokeless tobacco products. The applicant also stated compliance with current federal and state air and wastewater permits, and that manufacturing the new products would not result in revised or new permits. The applicant stated that manufacturing of the new products would not result in an increase in overall permitted manufacturing capacity at the facility. Therefore, no expansion of the manufacturing facility is anticipated due to the authorization of the new products.

---

[2] U.S. Environmental Protection Agency (EPA). *TRI Data Form R & A Download*. Available at: https://www3.epa.gov/enviro/facts/tri/form_ra_download.html. Accessed: May 17, 2018

Lastly, the applicant stated that the potential increase in energy use associated with manufacturing the new products is a minute fraction and therefore would not result in a significant net increase of energy use at the manufacturing facility.

5.2 Potential Environmental Impacts Due to Use of the New Products

According to the TTB Statistical Release reports, the use of chewing tobacco in the United States decreased from 60 million pounds in 1997 to 18.5 million pounds in 2017, while the use of snuff in the United States increased from 61 million pounds in 1997 to 119 million pounds in 2017 (Figure 5).[3] (U.S. Dept of Treasury Alcohol and Tobacco Tax and Trade Bureau, 2018).

To evaluate the environmental impact of the proposed actions due to the use of the new products, the Agency analyzed historical use data for 2001-2017 to forecast the future use of chewing tobacco and snuff in the United States. This was achieved by using best-fit polynomial (order of two) trend lines with R^2 values of 0.9867 and 0.9919, respectively, for snuff and chewing tobacco.[4] Accordingly, the forecasted amount of chewing tobacco to be consumed in the United States is estimated to be 17 million pounds in 2018 and 15 million pounds in 2022, while the forecasted amount of snuff to be consumed in the United States is estimated to be 123 million pounds in 2018 and 133 million pounds in 2022 (Figure 6).

[3] U.S. Department of Treasury Alcohol and Tobacco Tax and Trade Bureau (TTB). Tobacco Statistics. Available at: https://www.ttb.gov/tobacco/tobacco-stats.shtml. Accessed March 16, 2018.

[4] Forecast trend lines extrapolated from TTB data. Available from http://www.ttb.gov/tobacco/tobacco-stats.shtml. Accessed on March 16, 2018.

Figure 5. Use of Snuff and Chewing Tobacco in the United States in 1997-2017

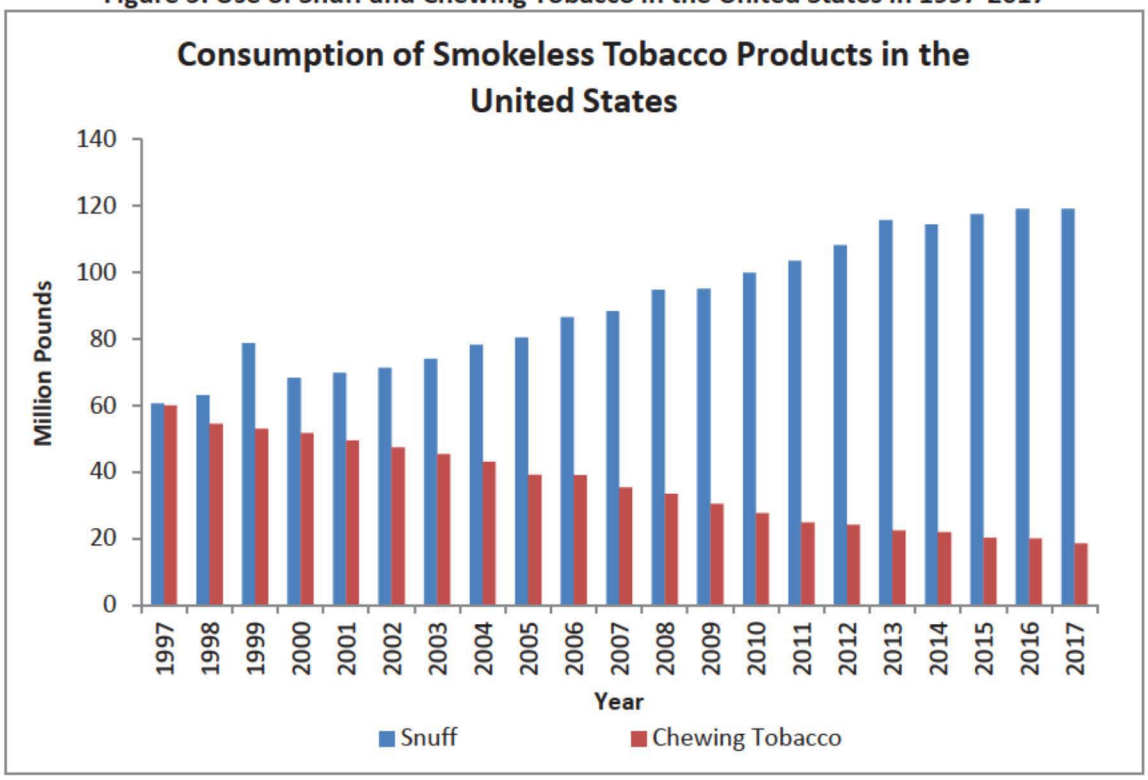
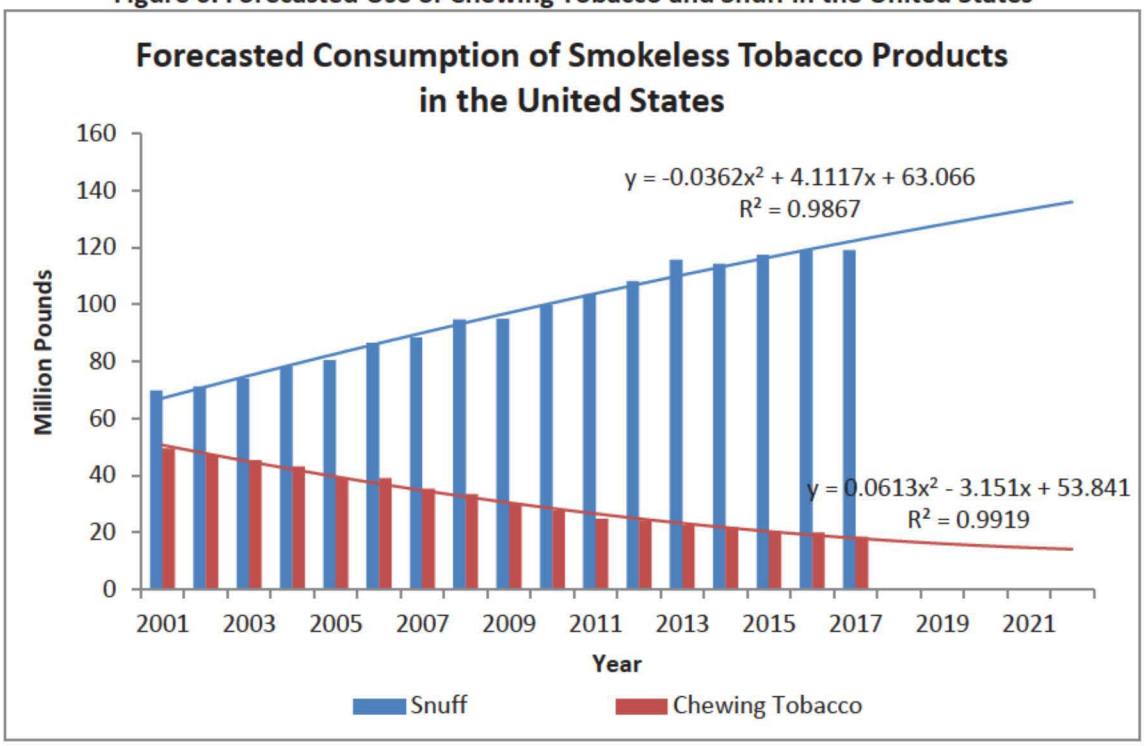


Figure 6. Forecasted Use of Chewing Tobacco and Snuff in the United States



Because the new products are expected to compete with other smokeless tobacco products on the market, the Agency anticipates minimal or no net increase in the use of all smokeless tobacco products.

Additionally, the new products are used in a similar manner to the corresponding predicate products and other moist snuff products. Subsequently, the Agency does not anticipate new substances to be released into the environment from the use of the new smokeless tobacco products, relative to the substances released by other similar products already on the market.

5.3 Potential Environmental Impacts Due to Disposal of the New Products

The environmental consequences resulting from disposal of smokeless tobacco products are related to a) disposal of packaging material, b) discarding of the used smokeless tobacco products, and c) users' excretion of ingredients other than tobacco in smokeless products.

5.3.1 Disposal of Packaging Material

Disposal of the packaging materials would either enter the recycling stream or be disposed of in MSW landfills or as litter. Information about trash generation in the United States, including details about disposal of materials comparable to those used in smokeless tobacco products, can be informative about the disposal of packaging materials associated with smokeless tobacco products. In 2014, approximately 258.46 million tons (234.47 million metric tons) of trash was generated in the United States, and roughly 89.4 million tons of this material was recycled and composted, equivalent to a 34.6% recycling rate (Figures 7 and 8). Paper and paperboard account for 68.61 million tons (26.5%) of the total MSW generated in 2014. Containers and packaging comprised the largest portion of total MSW generated at 76.67 million tons (29.7%), out of which 39.13 million tons was made of paper and paperboard. Of the total paper and paperboard MSW generated, 44.4 million tons (64.7%) was recycled, 19.47 million tons (28.4%) was disposed of in landfills, and 4.74 million tons (6.9%) was combusted with energy recovery. Of the total metal MSW generated, specifically steel at 17.69 million tons, 5.84 million tons (33.0%) was recycled, 9.83 million tons (55.6%) was disposed of in landfills, and 2.02 million tons (11.4%) was combusted with energy recovery. Of the total plastic MSW generated at 33.25 million tons, 3.17 million tons (9.5%) was recycled, 25.10 million tons (75.5%) was disposed of in landfills, and 4.98 million tons (15.0%) was combusted with energy recovery. On average, 4.4 pounds per person of waste was generated, of which 2.1 pounds was recycled, composted, or combusted for energy recovery in the United States in 2014 (U.S. Environmental Protection Agency, 2016).

Figure 7. Municipal Solid Waste (MSW) Generation Rates in the United States, 1960-2014

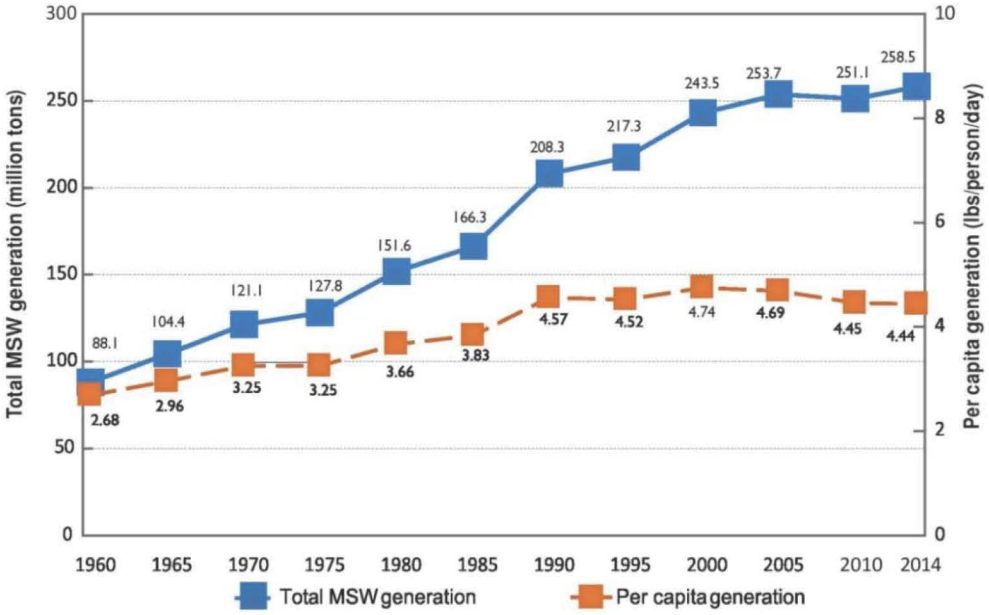


Figure excerpted from the U.S. EPA's "Advancing Sustainable Materials Management: 2014 Fact Sheet"

Figure 8. MSW Recycling Rates in the United States, 1960-2014

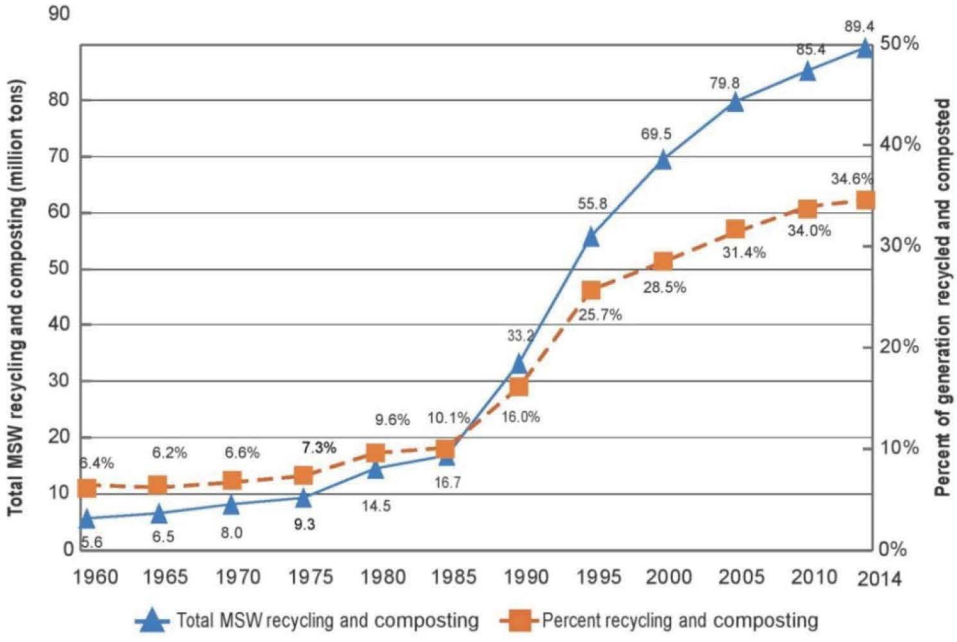


Figure excerpted from the U.S. EPA's "Advancing Sustainable Materials Management: 2014 Fact Sheet"

The Agency believes that the disposal of the packaging materials associated with the new products will be the same as the disposal conditions of other smokeless tobacco products that are currently being marketed. After using the new products, users may recycle or dispose of the packaging material as MSW or litter.

To determine the amount of waste due to disposal of the packaging material, the Agency used the projected market volumes in the first and fifth years after issuance of marketing orders for the new products. The calculated waste of the packaging materials of the new products were determined to be miniscule compared to the forecasted MSW to be generated in the United States (Confidential Appendix 4).

As previously discussed, because the new smokeless tobacco products will compete with other similar smokeless tobacco products on the market and based on the above-mentioned information regarding waste, construction of new publicly owned treatment works (POTWs) or landfills as a result of disposal of the new products packaging material are not anticipated due to the proposed actions.

5.3.2 Discarding of the Used Smokeless Tobacco Product

Used smokeless tobacco products are usually disposed of in MSW landfills or as litter. When discarded as litter, the spent product is likely to move by run-off to the ocean. When discarded as MSW, the tobacco would enter landfills. The Agency utilized the historical data for use of smokeless tobacco products in the United States to forecast the future use of smokeless products and calculate the projected tobacco waste accordingly (Figures 5 and 6 in Section 5.2). Assuming that all used smokeless or snuff products will be disposed of as MSW, the estimated waste of used smokeless or snuff products is a miniscule fraction of a percent of the total 258.46 million tons (234.47 million metric tons; 516,920 million pounds) of projected MSW to be generated in the United States (Table 1) (U.S. Environmental Protection Agency, 2016).

Table 1. Forecast of Waste Generated from Used Smokeless Tobacco Products as Compared to Total MSW Forecast in the United States

Year	Total U.S. Smokeless Tobacco Products (million pounds)	Total Smokeless Tobacco Products as a Percent of Total MSW in the United States	Total U.S. Snuff (million pounds)	Total Snuff as a Percent of Total MSW in the United States
2017	143	0.028%	120	0.023%
First Year (2018)	143	0.028%	124	0.024%
Fifth Year (2022)	155	0.030%	136	0.026%

Introducing the new products into the U.S. market is not expected to increase the nationwide use of smokeless tobacco; instead, they would compete for market share with existing products. Therefore, marketing orders for the new products are not expected to affect the overall level of snuff waste in the United States due to use of the new products, but it may displace the level of waste from other smokeless products.

5.3.3 Users' Excretion of Ingredients other than Tobacco in Smokeless Products

In addition to the disposal of the products in MSW or as litter, users will excrete ingredients and constituents which are part of the smokeless products, as well as their metabolites, excluding the tobacco itself, into the waste stream. For instance, studies have shown that nicotine metabolites can be

detected in excreted waste of smokeless tobacco users (Hecht, 2002; Jacob, 1999; Stepanov I. a., 2005). These metabolites and other constituents may enter the sewage system as components in human excreted waste, which is transferred to and treated at POTWs in the same manner as other wastewater. The excreted waste may also be digested by microbial systems in residential septic systems.

Recent efforts have been made to detect and measure nicotine metabolites in wastewater, groundwater and surface waters (Castiglioni, 2014; Katz, 2009; Buerge, 2008; Rodriguez-Alvarez, 2014). Although, to date, some studies have demonstrated deleterious effects of nicotine exposure on zebrafish, such as abnormal neural and muscle development and behavioral changes, but have not linked these effects directly to nicotine metabolites (Stewart, 2015; Klee, 2011). The ecotoxicological risks associated with nicotine metabolites are still unknown. Therefore, marketing orders for the new products are not expected to affect the overall excretory waste produced by users in the United States.

6. Use of Resources and Energy

The applicant stated that the potential increase in energy use associated with manufacturing the new products is a minute fraction and therefore would not result in a significant net increase of energy use at the manufacturing facility, which does not generate its own energy or use renewable energy, fuels or alternative green energy resources. Furthermore, because the new products will compete with other currently marketed smokeless tobacco products, no differences or increases in greenhouse gas (GHG) emissions are anticipated from the proposed actions.

The applicant stated and provided evidence that the manufacturing facility is not within or in close proximity to a known critical habitat of a threatened or endangered species, as listed by the Endangered Species Act (ESA). The applicant also stated that none of the materials or ingredients used to manufacture the new products originate from threatened or endangered species, as defined by the U.S. Fish and Wildlife Service and the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES).

7. Mitigation

During the review of the available data and information, the Agency did not identify adverse environmental effects for manufacturing, use, and disposal of the new products. Therefore, no mitigation measures are discussed.

8. Alternatives to the Proposed Action

Alternative A (No-action alternative): The no-action alternative is to not authorize the marketing of the new tobacco products in the United States. The environmental impact of the no-action alternative would not change the existing condition of the manufacturing, use, and disposal of smokeless tobacco products, as many other similar smokeless tobacco products will continue to be marketed.

Alternative B (Proposed action): There is no substantial environmental effect due to the proposed actions of authorizing the new products (Confidential Appendices 2 and 3) and associated manufacturing, use, and disposal of the new tobacco products.

9. List of Preparers

In accordance with 40 CFR 1502.17, this section includes a list of names and qualifications (including education, experience, and expertise) of individuals who were primarily responsible for preparing and reviewing this environmental assessment.

Preparer:

William E. Brenner, B.S., Center for Tobacco Products
- Education: B.S. in Biology
- Experience: 4 years in various scientific activities
- Expertise: NEPA analysis, environmental risk assessment, air quality analysis, archaeological and archival preservation

Reviewer:

Hoshing W. Chang, Ph.D., Center for Tobacco Products
- Education: M.S. in Environmental Science and Ph.D. in Biochemistry
- Experience: 9 years in NEPA practice
- Expertise: NEPA analysis, environmental risk assessment, wastewater treatment

10. List of Agencies and Persons Consulted

Not applicable.

11. Appendix List

Appendix 1: Submission Tracking Numbers and Related Amendments for the SE Report and Package Sizes of the New and Predicate Products Covered Under this Programmatic Environmental Assessment (PEA)

12. Confidential Appendix List

Confidential Appendix 1: Modifications between the New Products and Corresponding Predicate Products
Confidential Appendix 2: The First- and Fifth-Year Market Volume Projections of the New Products
Confidential Appendix 3: Comparison of the First- and Fifth-Year Market Volume Projections for the New Products with Total Smokeless Tobacco Products Used in the United States
Confidential Appendix 4: The First- and Fifth-Year Projection of Waste of Packaging Materials Associated with Marketing the New Products

13. References

Buerge, I. K.-R. (2008). Nicotine derivatives in wastewater and surface waters: application as chemical markers for domestic wastewater. *Environmental Science & Technology*, 42: 6354-6360.

Castiglioni, S. S. (2014). A novel approach for monitoring tobacco use in local communities by wastewater analysis. *Tobacco Control*, 0: 1-5.

Hecht, S. C. (2002). Quantificatnoi of metabolites of 4-(methylnitrosamine)-1-(3-pyridyl)-1-butanone after cessation of smokeless tobacco use. *Cancer Research*, 62: 129-134.

Jacob, P. Y. (1999). Minor tobacco alkaloids as biomarkers for tobacco use: Comparison of users of cigarettes, smokeless tobacco, cigars, and pipes. *American Journal of Public Health*, 89(5): 731-736.

Katz, B. G. (2009). Groundwater quality impacts from land application of treated municipal wastewater in a large karstic spring basin: chemical and microbiological indicators. *Science of Total Environment*, 407: 2872-2886.

Klee, E. E. (2011). Zebrafish for the study of the biological effects of nicotine. *Nicotine & Tobacco Research*, 13(5): 301-312.

Rodriguez-Alvarez, T. R. (2014). Assessment of local tobacco consumption by liquid chromatography-tandem mass spectrometry sewage analysis of nicotine and its metabolites, cotinine and trans-3'-hydroxycotinine, after enzymatic deconjugation. *Analytical Chemistry*, 86: 10274-10281.

Stepanov, I. a. (2005). Tobacco-specific nitrosamines and their pyridine-N-glucuronides in the urine of smokers and smokeless tobacco users. *Cancer Epidemiology, Biomarkers & Prevention*, 14(4): 885-891.

Stepanov, I. J. (2008). New and traditional smokeless tobacco: comparison of toxicant and carcinogen levels. *Nicotine & Tobacco Research*, 10(2): 1773-1782.

Stewart, A. G. (2015). Anxiogenic-like effects of chronic nicotine exposure in zebrafish. *Pharmacology, Biochemistry and Behavior*, 139: 112-120.

U.S. Dept of Treasury Alcohol and Tobacco Tax and Trade Bureau. (2018, January 9). *Tobacco Statistics*. Retrieved from http://www.ttb.gov/tobacco/tobacco-stats.shtml

U.S. Environmental Protection Agency. (2016). *Advancing Sustainable Material Management: Facts and Figures*. Retrieved from https://www.epa.gov/sites/production/files/2016-11/documents/2014_smmfactsheet_508.pdf

U.S. Environmental Protection Agency. (2017). *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2015*. Retrieved from https://www.epa.gov/sites/production/files/2017-02/documents/2017_complete_report.pdf

APPENDIX 1

Submission Tracking Numbers and Related Amendments for the SE Report and Package Sizes of the New and Predicate Products Covered Under this Programmatic Environmental Assessment (PEA)

STN	Product Name	Product	Amendments
SE0014130	Rooster Long Cut Mint	New	SE0014389 and SE0014540
	Rooster Long Cut Mint	Predicate	
SE0014131	Red Seal Fine Cut	New	
	Red Seal Fine Cut Natural	Predicate	
SE0014132	Rooster Long cut Wintergreen	New	
	Rooster Long Cut Wintergreen	Predicate	

CONFIDENTIAL APPENDIX 1

Modifications between the New Products and Corresponding Predicate Products

STN	Modification
SE0014130	Plastic Lid Replaced with a Metal Lid
SE0014131	Removal of "(b) (4) [redacted]" ingredient and replaced with equal amounts of "(b) (4) [redacted]" ingredient
SE0014132	Plastic Lid Replaced with a Metal Lid

CONFIDENTIAL APPENDIX 2

The First- and Fifth-Year Market Volume Projections of the New Products

STN	Unit	New Product First-Year Market Volume	New Product Fifth-Year Market Volume
SE0014130	Pounds	(b) (4)	
	Metric Tons		
SE0014131	Pounds		
	Metric Tons		
SE0014132	Pounds		
	Metric Tons		

The applicant stated that the manufacturing facility operated below 55% of its permitted capacity in 2016 and the five-year projection of the manufacturing at this facility, including the manufacturing of the new product, is within existing capacity.

Power at the manufacturing facility is supplied by Nashville Electric Service, which purchases electric power from the Tennessee Valley Authority. The applicant stated that the manufacturing facility does not generate power onsite and does not use any alternative energy sources.

CONFIDENTIAL APPENDIX 3

Comparison of the First- and Fifth-Year Market Volume Projections for the New Products with Total Smokeless Tobacco and Snuff Products Used in the United States

The first- and fifth-year market volumes of the new products to occupy the U.S. market were determined by comparing the projected market volumes of the new products to the forecasted use of total smokeless tobacco and snuff in the United States (Figure 6 and Confidential Appendix 2). The percent of the total smokeless tobacco and snuff market occupied in the projected first and fifth year of marketing of the new products was calculated using the equations below.

First Year Market Occupation of New Product (%)

$$= \frac{\text{First–Year Market Volume Projection}}{\text{Forecasted Use of Smokeless or Snuff in the U.S.for 2018}} \times 100\%$$

Fifth Year Market Occupation of New Product (%)

$$= \frac{\text{Fifth–Year Market Volume Projection}}{\text{Forecasted Use of Smokeless or Snuff in the U.S.for 2022}} \times 100\%$$

STN	Year	Forecasted Use of Total Smokeless Tobacco in the U.S.[5] (Pounds)	Forecasted Use of Snuff in the U.S.[9] (Pounds)	Projected Market Volume of New Product[6] (Pounds)	Projected Smokeless Market Occupation of New Product (%)	Projected Snuff Market Occupation of New Product (%)
SE0014130	First	140,492,800	122,503,100	(b) (4) [redacted]		
	Fifth	148,150,800	133,447,500			
SE0014131	First	140,492,800	122,503,100			
	Fifth	148,150,800	133,447,500			
SE0014132	First	140,492,800	122,503,100			
	Fifth	148,150,800	133,447,500			

[5] See Figure 6.

[6] See Confidential Appendix 2.

CONFIDENTIAL APPENDIX 4

The First- and Fifth-Year Projection of Waste of Packaging Materials Associated with Marketing the New Products

To analyze the environmental effects from waste due to the proposed actions, the Agency estimated the first- and fifth-year weights of the projected packaging materials waste (in metric tons) that are generated from disposal after use of the new products in 2018 and 2022. Projected total waste is the summation of the projected paper, plastic, and metal waste generation of the products. Projected total paper waste is the summation of the projected recyclable (shipping case) and non-recyclable (coated paper side label) paper waste generation of the products. Projected total plastic waste is the summation of the projected recyclable (can bottom) and non-recyclable (shrink wrap) plastic waste generation of the products.

$$\sum_{i=1}^{3} A_i = \sum_{i=1}^{3} (B_i + C_i + D_i)$$

$$B_i = \sum_{i=1}^{3} (G_i + H_i)$$

$$C_i = \sum_{i=1}^{3} (E_i + F_i)$$

$$D_i = J_i \times M \times Z$$

$$E_i = J_i \times N \times Z$$

$$F_i = \frac{J_i}{K} \times P \times Z$$

$$G_i = \frac{J_i}{L_i \times K_i} \times Q \times Z$$

$$H_i = J_i \times O \times Z$$

A_i: Projected total waste generation of the product (metric tons)
B_i: Projected paper waste generation of the product (metric tons)
C_i: Projected plastic waste generation of the product (metric tons)
D_i: Projected metal waste of the product (metric tons)
E_i: Projected recyclable plastic waste generation of the product (metric tons)
F_i: Projected non-recyclable plastic waste generation of the product (metric tons)
G_i: Projected recyclable paper waste generation of the product (metric tons)
H_i: Projected non-recyclable paper waste generation of the product (metric tons)
I_i: Projected market volume of the product (pounds)
J_i: Number of individual units (each unit comprises of one can bottom, one can lid, and one coated side label)
K: Number of individual units per log roll
L: Number of log rolls per shipping case
M: Weight of metal (tin-plated steel) can lid (grams)
N: Weight of plastic (polypropylene) can bottom, and top for SE0014131 (grams)
O: Weight of coated paper side label, and lid label for SE0014131 (grams)
P: Weight of plastic shrink wrap (grams)
Q: Weight of shipping case (grams)
Z: 1.0×10^{-6} metric tons/gram

STN	Year	Q	P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A
SE0014130	First	196	2.08	0.373	8.98	6.82	18	5	(b) (4)									
	Fifth	196	2.08	0.373	8.98	6.82	18	5										
SE0014131	First	220	2.10	0.718	12.42	N/A	18	5										
	Fifth	220	2.10	0.718	12.42	N/A	18	5										
SE0014132	First	196	2.08	0.373	8.98	6.82	18	5										
	Fifth	196	2.08	0.373	8.98	6.82	18	5										

Total Waste. The shipping case is disposed of, recycled, or both, as paper waste; the coated paper side label is disposed of as waste or litter. Estimation of generated total paper waste for the new products are (b) (4) metric tons in the first year and (b) (4) metric tons in the fifth year. A portion of the shipping case waste is likely to be recycled; there is an overall recycling rate for paper products of 64.7% in the United States, according to U.S. EPA (U.S. Environmental Protection Agency, 2016). Therefore, if 100% of the coated paper side label and 35.3% of the shipping cases are disposed of as waste based on the 2014 waste generation data in the United States, the estimated cumulative paper waste will be (b) (4) metric tons in the first year and (b) (4) metric tons in the fifth year of marketing the new products. The plastic can bottom is disposed of, recycled, or both, as plastic waste; the shrink wrap is disposed of as waste or litter. Estimation of generated total plastic waste for the new products are (b) (4) metric tons in the first year and (b) (4) metric tons in the fifth year. A portion of the plastic can bottom is likely to be recycled; there is an overall recycling rate for plastic products of 9.5% in the United States (U.S. Environmental Protection Agency, 2016). Therefore, if 100% of the shrink wrap and 90.5% of the plastic can bottoms are disposed of as waste based on the 2014 waste generation data in the United States, the estimated cumulative plastic waste will be (b) (4) metric tons in the first year and (b) (4) metric tons in the fifth year of marketing the new products. The metal can lid is disposed of, recycled, or both as metal waste. Estimation of generated total metal waste for the new products are (b) (4) metric tons in the first year and (b) (4) metric tons in the fifth year. A portion of the metal can lid is likely to be recycled; there is an overall recycling rate for metal products of 33.0% in the United States (U.S. Environmental Protection Agency, 2016). Therefore, if 67.0% of the metal can lids are disposed of as waste based on the 2014 waste generation data in the United States, the estimated cumulative metal waste will be (b) (4) metric tons in the first year and (b) (4) metric tons in the fifth year of marketing the new products.

If the entire packaging paper, plastic, and metal components are disposed of as waste, which is a more conservative approach, the projected cumulative paper, plastic, and metal waste in the first and fifth years of marketing the new products are (b) (4) metric tons and (b) (4) metric tons, respectively. This is a negligible fraction of the 234.47 million metric tons of total waste reported in the United States in 2014.