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## **Summary of 2014 and 2015 Smokeless Market Surveys**

### **OBJECTIVE:**

The objective of this report is to summarize selected data from two U.S. smokeless market surveys conducted in 2014 and 2015. The results summarized in this report were prepared in support of an anticipated regulatory submission (MRTPA) related to Camel Snus.

### **SUMMARY:**

U.S. smokeless tobacco products were sampled in August 2014 and July 2015 for testing. Quantitative analyses were performed for reportable harmful and potentially harmful constituents (HPHCs) and other selected analytes of interest. This report summarizes those results and provides data for endpoints in common with results from Camel Snus testing. All analytical determinations were conducted at R.J. Reynolds Tobacco Company (RJRT) by Eurofins Lancaster Laboratories-Professional Scientific Services (ELL-PSS).


### **STATUS:**

Complete

### **KEYWORDS:**

Nicotine, free nicotine, moisture, pH, acrylamide, acetaldehyde, formaldehyde, crotonaldehyde, arsenic, cadmium, benzo(a)pyrene, NNN, NNK, benzo(a)pyrene, benzo(a)anthracene, benzo(b/j)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,23-c,d)pyrene, naphthalene

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## INTRODUCTION

Approximately 40 – 50 smokeless tobacco brand styles were investigated in two market surveys (2014 U.S. smokeless tobacco market survey and 2015 U.S. smokeless tobacco market survey). Smokeless samples were obtained either by purchasing at retail (b) (4) retailers (b) (4) 27102) or from the manufacturer in the case of the 2014 Camel Snus brand styles, manufactured for R.J. Reynolds Tobacco Company (RJRT) by Taylor Brothers, and the 2014 American Snuff Company, LLC (ASC) products. Other smokeless tobacco products were purchased on August 2, 2014 and July 9, 2015.

Analytes evaluated in these studies consisted of the smokeless tobacco analytes specified in Table 1 of the FDA Draft Guidance for Industry, “Reporting Harmful and Potentially Harmful Constituents in Tobacco Products and Tobacco Smoke Under Section 904(a)(3) of the Federal Food, Drug, and Cosmetic Act” issued March 2012 and other analytes of interest. This report summarizes those results and provides data for endpoints in common with results from Camel Snus testing.

## EXPERIMENTAL

### Sampling Rationale

The brand styles selected for the 2014 and 2015 surveys provided broad representation of the different smokeless tobacco products available for purchase in the U.S. In the 2014 smokeless market survey, forty-three (43) smokeless tobacco products were selected for analysis. Brand style selection was based upon a combination of factors including market share, manufacturer and elements of the product design. “Marlin” smokeless market share data (i.e., U.S. smokeless market data collected by IRI/Capstone, processed and managed by MSAi) is based on market volumes for dissolvables, moist snuff, snus and tobacco derived product (TDP). The smokeless tobacco products selected included moist snuff, snus, loose leaf and dry snuff products.

Twenty-two (22) moist snuff products were sampled representing a total of 68% of the moist snuff market share (based on full-year 2013 Marlin data). Sampling was also based on the following elements of moist snuff product design: form (loose versus portion pouched), tobacco cut width description (fine cut, long cut, straight cut) and flavor as follows:

- two products were pouched products;
- thirteen products were long cut tobacco;
- four products were fine cut tobacco products;
- three products were straight cut tobacco;
- ten products were wintergreen flavor;
- five products were natural flavor;
- three products were mint flavor.

Thirteen (13) snus products were selected representing 97% of the snus market share based on full-year 2013 Marlin data. All snus products were pouched products; eight of the products were mint flavor and two of the products were wintergreen flavor.

Four loose leaf smokeless tobacco products and four dry snuff tobacco products completed the 2014 commercial selected product list. Selection of the loose leaf and dry snuff tobacco products was based on including a range of manufacturers, as well as consideration of historical sales volumes.

The smokeless tobacco products sampled represent all of the major manufacturers: U.S. Smokeless Tobacco Company (12), American Snuff Company, LLC (8), Swedish Match (7), R.J. Reynolds Tobacco Company (6), Swisher International Inc. (6), National Tobacco Company (2), Philip Morris USA (1) and Pinkerton Tobacco (1).

Also, all four CORESTA smokeless reference products (CRP1, CRP2, CRP3 and CRP4) were included in this study.

In the 2015 smokeless market survey, fifty (50) smokeless tobacco products were selected for analysis based, again, on market share, manufacturer, smokeless category and elements of product design.

Twenty-nine (29) moist snuff products were sampled representing a total of 72% of the moist snuff market share based on 2014 Marlin data. Sampling was also based on the following elements of moist snuff product design: form (loose versus portion pouched), tobacco cut width description (fine cut, long cut, wide cut, straight cut) and flavor as follows:

- three products were pouched products;
- sixteen products were long cut tobacco;
- six products were fine cut tobacco;
- four products were straight cut tobacco products;
- one products was wide cut tobacco;
- eleven products were wintergreen flavor;
- seven products were natural flavor;
- five products were mint flavor.

Thirteen snus (13) products were selected representing a total of 97% of the snus market share based on 2014 Marlin data. All snus products were pouched; seven of the snus were mint flavor and two of the snus were wintergreen flavor.

Four loose leaf smokeless products and four dry snuff products completed the commercial selected product list. Selection of the loose leaf and dry snuff tobacco products was based on including a range of manufacturers, as well as consideration of historical sales volumes.



The smokeless products were represented by manufacturer as follows: U.S. Smokeless Tobacco (15), American Snuff Company, LLC (11), Swedish Match (8), R.J. Reynolds Tobacco Company (6), Swisher International Inc. (4), National Tobacco Company (2), CN Smokeless Company, LLC (2), Philip Morris USA (1) and Pinkerton Tobacco (1).

CORESTA smokeless reference products CRP1 and CRP2 (CORESTA reference snus and CORESTA reference moist snuff) were also analyzed in this study.

### Smokeless Tobacco Product Selected

2014 RJRT and ASC smokeless tobacco products were obtained from manufacturing. Other commercial smokeless tobacco products were purchased through (b) (4) (b) (4) retailers. All the 2015 smokeless tobacco products were purchased from retail through (b) (4). Table 1 shows the smokeless tobacco products sampled and analyzed for the two surveys.

Table 1 Smokeless Tobacco Products Analyzed

2014 Product from Manufacturers	2014 Product from Retail	2015 Product from Retail	2015 Product from Retail
Camel Snus Frost	Beechnut Chewing Tobacco	Camel Snus Frost	Beechnut Wintergreen Chewing Tobacco
Camel Snus Frost Large	Copenhagen Long Cut	Camel Snus Frost Large	Copenhagen Long Cut
Camel Snus Mellow	Copenhagen Long Cut Southern Blend	Camel Snus Mellow	Copenhagen Long Cut Southern Blend
Camel Snus Mint	Copenhagen Long Cut Wintergreen	Camel Snus Mint	Copenhagen Long Cut Wintergreen
Camel Snus Robust	Copenhagen Pouches	Camel Snus Robust	Copenhagen Pouches
Camel Snus Winterchill	Copenhagen Snuff Fine Cut	Camel Snus Winterchill	Copenhagen Pouches Wintergreen
Grizzly Premium Mint Long Cut	General Classic Blend Portion White Large Snus	Grizzly Premium Mint Long Cut	Copenhagen Snuff Fine Cut
Grizzly Premium Natural Fine Cut	General Nordic Mint White Large Snus	Grizzly Premium Natural Fine Cut	General Classic Blend Portion White Large Snus
Grizzly Premium Straight Long Cut	General Original Portion Large Snus	Grizzly Premium Natural Snuff	General Dry Mint Portion Original Mini Snus
Grizzly Premium Wintergreen Long Cut	General Wintergreen Portion White Large Snus	Grizzly Premium Straight Long Cut	General Original Portion Large Snus
Grizzly Premium Wintergreen Pouches	Kayak Long Cut Straight	Grizzly Premium Wintergreen Long Cut	General Wintergreen Portion White Large Snus
Kodiak Premium Wintergreen	Kayak Long Cut Wintergreen	Grizzly Premium Wintergreen Pouches	Kayak Long Cut Straight
Levi Garrett	Longhorn Natural Fine Cut	Grizzly Premium Wintergreen Wide Cut	Kayak Long Cut Wintergreen
	Longhorn Wintergreen Long Cut	Kodiak Premium Wintergreen	Klondike Long Cut Straight
		Levi Garrett	Klondike Long Cut Wintergreen
		Tube Rose Scotch	Longhorn Mint Long Cut

Table 1 Smokeless Tobacco Products Analyzed (cont'd)

2014 Product from Manufacturers	2014 Product from Retail	2015 Product from Retail	2015 Product from Retail
W.E. Garrett & Sons Scotch	Marlboro Snus Mint	W.E. Garrett & Sons Scotch	Longhorn Natural Fine Cut
	Navy Sweet Dry Snuff		Longhorn Wintergreen Long Cut
	Railroad Mills Sweet Scotch		Marlboro Snus Mint
	Red Man Original Chewing Tobacco		Navy Sweet Dry Snuff
	Red Seal Long Cut Wintergreen		Red Man Original Chewing Tobacco
	Skoal Long Cut Mint		Red Seal Fine Cut Wintergreen
	Skoal Long Cut Straight		Red Seal Fine Cut Natural
	Skoal Original Fine Cut Wintergreen		Red Seal Long Cut Wintergreen
	Skoal Snus Mint		Skoal Long Cut Mint
	Skoal Snus Smooth Mint		Skoal Long Cut Straight
	Skoal X-tra Long Cut Mint Blend		Skoal Original Fine Cut Wintergreen
	Starr Chewing Tobacco		Skoal Snus Mint
	Stokers Wintergreen Long Cut		Skoal Snus Smooth Mint
	Superior Dry Snuff		Skoal X-tra Long Cut Mint Blend
	Timber Wolf Wintergreen Long Cut		Stokers Tennessee Chew Original
			Superior Dry Snuff
			Timber Wolf Mint Long Cut

Sample Handling Prior to Testing

All samples were received by RJRT Finished Goods Inventory at Bowman Gray Technical Center in Winston-Salem, North Carolina where they were accepted into inventory and then transported to the laboratory for subsequent analysis. Samples were transported at ambient temperature. Chain-of-custody was established at the time of sample receipt.

For the surveys, CRP2, CRP3 and CRP4 CORESTA smokeless tobacco reference products were received from NCSU Tobacco Analytical Service Laboratory Raleigh, North Carolina and accepted into inventory in July 2014. CRP1 smokeless tobacco reference product was received from NCSU Tobacco Analytical Service Laboratory Raleigh, North Carolina, accepted into inventory in October 2013. All CORESTA smokeless tobacco products were stored at 20 °F in a monitored, temperature controlled walk-in freezer until transported to the laboratory for testing.

## Testing Laboratory

RJRT currently has an outsourced solution for analytical testing using a Professional Staffing Services (PSS) model that is provided by Eurofins Lancaster Laboratories Professional Scientific Services (ELL-PSS). The laboratory facility is on-site at RJRT and the laboratory equipment and testing protocols are developed and/or maintained by RJRT. Operation of the facility and testing is conducted by ELL-PSS personnel on a contract basis. The certificates of ISO 17025 accreditation list R.J. Reynolds Tobacco Company as the accredited facility, and ELL-PSS is contractually required to maintain the Quality System and ensure accreditation while providing analytical services. The RJRT Chemical and Mechanical accreditations are attached as Appendix C (Chemical Accreditation June 2018) and Appendix D (Mechanical Accreditation June 2018). The routine testing in this report is within the scope of that accreditation.

## Testing Condition:

Even though by 2014 it had been determined by RJRT Product Development that Camel Snus was stable at room temperature for up to a year and did not require refrigeration (RDM FKS 2014, 251), as an added precaution all smokeless tobacco products were requested to be held at refrigeration temperature (5-6 °C) by ELL-PSS until sampled by the laboratory.

During testing samples were maintained at room temperature (~ 72 °F) via thermostatic control of the central heat and air conditioning system.

Samples were tested “as-received” for a minimum of three replicates. For pouched products, the pouch material was included as part of the sample with all of the analyses.

## Methods

Smokeless tobacco chemical testing by ELL-PSS involves internal standard operating procedures. [Table A](#) includes a listing of the analytical methods used by per analyte tested. Over time the methods have undergone revision. Document names were changed from ACD prefix to RJRT-WI- prefix with a new document repository system in 2014. A short description of each method follows the table. All analytical methods, including specific revisions applicable at the time of sample analysis, are attached in Appendix B.

Table A: Analytes and Methods

Analyte	Document Name	Method Name	Revision-Date
Nicotine	ACD0042STM	Determination of Specific Alkaloids in Tobacco	Rev 19 05/02/2014
Nicotine	RJRT-WI-004105	Determination of Specific Alkaloids in Tobacco	Rev 20 01/09/2015
Arsenic	ACD1019STM	Determination of Elemental Content by Inductively Coupled Plasma Mass Spectrometry	Rev 14 02/21/2014
Arsenic	RJRT-WI-004210	Determination of Elemental Content by Inductively Coupled Plasma Mass Spectrometry	Rev 15 01/09/2015
Cadmium	ACD1019STM	Determination of Elemental Content by Inductively Coupled Plasma Mass Spectrometry	Rev 14 02/21/2014
Cadmium	RJRT-WI-004210	Determination of Elemental Content by Inductively Coupled Plasma Mass Spectrometry	Rev 15 01/09/2015
Acrylamide	RJRT-WI-004218 ACD1102-2STM	Analysis of acrylamide by UPLC-MS-MS	Rev 04 04/08/2014
Acrylamide	RJRT-WI-004218 ACD1102-2STM	Analysis of acrylamide by UPLC-MS-MS	Rev 05 08/28/2014
Acrylamide	RJRT-WI-004218	Analysis of acrylamide by UPLC-MS-MS	Rev 06 03/17/2015
Benzo(a)pyrene	ACD0337STM	Determination of Benzo(a)pyrene (B(a)P) in Fire Cured and Other Tobaccos and Cigarette Smoke Condensate	Rev 11 07/23/2014
Benzo(a)pyrene	ACD0337STM	Determination of Benzo(a)pyrene (B(a)P) in Tobacco and Cigarette Smoke Condensate	Rev 12 08/27/2014
Benzo(a)pyrene	RJRT-WI-004204	Determination of Benzo(a)pyrene (B(a)P) in Fire Cured and Other Tobaccos	Rev 13 03/17/2015
Benzo(a)anthracene	RJRT-WI-004227 ACD1109-3STM	Standard Operating Procedure for the Quantitation Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by Gas Chromatography Mass Spectrometry	Rev 10 07/29/2014
Benzo(a)anthracene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 11 03/25/2015
Benzo(a)anthracene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 12 10/08/2015
Benzo(b/j)fluoranthene	RJRT-WI-004227 ACD1109-3STM	Standard Operating Procedure for the Quantitation Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by Gas Chromatography Mass Spectrometry	Rev 10 07/29/2014
Benzo(b/j)fluoranthene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 11 03/25/2015
Benzo(b/j)fluoranthene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 12 10/08/2015
Benzo(k)fluoranthene	RJRT-WI-004227 ACD1109-3STM	Standard Operating Procedure for the Quantitation Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by Gas Chromatography Mass Spectrometry	Rev 10 07/29/2014
Benzo(k)fluoranthene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 11 03/25/2015

Table A: Analytes and Methods (cont'd)

Analyte	Document Name	Method Name	Revision-Date
Benzo(k)fluoranthene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 12 10/08/2015
Dibenz(a,h)anthracene	RJRT_WI-004227 ACD1109-3STM	Standard Operating Procedure for the Quantitation Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by Gas Chromatography Mass Spectrometry	Rev 10 07/29/2014
Dibenz(a,h)anthracene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 11 03/25/2015
Dibenz(a,h)anthracene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 12 10/08/2015
Indeno(1,2,3-c,d)pyrene	RJRT-WI-004227 ACD1109-3STM	Standard Operating Procedure for the Quantitation Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by Gas Chromatography Mass Spectrometry	Rev 10 07/29/2014
Indeno(1,2,3-c,d)pyrene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 11 03/25/2015
Indeno(1,2,3-c,d)pyrene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 12 10/08/2015
Naphthalene	RJRT-WI-004227 ACD1109-3STM	Standard Operating Procedure for the Quantitation Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by Gas Chromatography Mass Spectrometry	Rev 10 07/29/2014
Naphthalene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 11 03/25/2015
Naphthalene	RJRT-WI-004227	Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHS) in Cigarettes and Tobacco Products by GC-MS	Rev 12 10/08/2015
NAB	ACD1101-3STM	Quantitative Determination of Tobacco Specific Nitrosamines by High Performance Liquid Chromatography Tandem Mass Spectrometry (HPLC-MS-MS)	Rev 11 02/12/2014
NAB	ACD1101-3STM	Quantitative Determination of Tobacco Specific Nitrosamines by High Performance Liquid Chromatography Tandem Mass Spectrometry (HPLC-MS-MS)	Rev 12 08/28/2014
NAB	RJRT-WI-004216	Determination of Tobacco Specific Nitrosamines by HPLC-MS-MS	Rev 13 03/17/2015
NAT	ACD1101-3STM	Quantitative Determination of Tobacco Specific Nitrosamines by High Performance Liquid Chromatography Tandem Mass Spectrometry (HPLC-MS-MS)	Rev 11 02/12/2014
NAT	ACD1101-3STM	Quantitative Determination of Tobacco Specific Nitrosamines by High Performance Liquid Chromatography Tandem Mass Spectrometry (HPLC-MS-MS)	Rev 12 08/28/2014

Table A: Analytes and Methods (cont'd)

Analyte	Document Name	Method Name	Revision-Date
NAT	RJRT-WI-004216	Determination of Tobacco Specific Nitrosamines by HPLC-MS-MS	Rev 13 03/17/2015
NNK	ACD1101-3STM	Quantitative Determination of Tobacco Specific Nitrosamines by High Performance Liquid Chromatography Tandem Mass Spectrometry (HPLC-MS-MS)	Rev 11 02/12/2014
NNK	ACD1101-3STM	Quantitative Determination of Tobacco Specific Nitrosamines by High Performance Liquid Chromatography Tandem Mass Spectrometry (HPLC-MS-MS)	Rev 12 08/28/2014
NNK	RJRT-WI-004216	Determination of Tobacco Specific Nitrosamines by HPLC-MS-MS	Rev 13 03/17/2015
NNN	ACD1101-3STM	Quantitative Determination of Tobacco Specific Nitrosamines by High Performance Liquid Chromatography Tandem Mass Spectrometry (HPLC-MS-MS)	Rev 11 02/12/2014
NNN	ACD1101-3STM	Quantitative Determination of Tobacco Specific Nitrosamines by High Performance Liquid Chromatography Tandem Mass Spectrometry (HPLC-MS-MS)	Rev 12 08/28/2014
NNN	RJRT-WI-004216	Determination of Tobacco Specific Nitrosamines by HPLC-MS-MS	Rev 13 03/17/2015
Acetaldehyde	ACD1103STM	Standard Operating Procedure for the Determination of Carbonyls in Tobacco and Tobacco Products	Rev 6 03/12/2014
Acetaldehyde	ACD1103STM	Standard Operating Procedure for the Determination of Carbonyls in Tobacco and Tobacco Products	Rev 7 08/26/2014
Acetaldehyde	RJRT-WI-004219	Determination of Carbonyls in Tobacco and Tobacco Products	Rev 8 03/17/2015
Crotonaldehyde	ACD1103STM	Standard Operating Procedure for the Determination of Carbonyls in Tobacco and Tobacco Products	Rev 6 03/12/2014
Crotonaldehyde	ACD1103STM	Standard Operating Procedure for the Determination of Carbonyls in Tobacco and Tobacco Products	Rev 7 08/26/2014
Crotonaldehyde	RJRT-WI-004219	Determination of Carbonyls in Tobacco and Tobacco Products	Rev 8 03/17/2015
Formaldehyde	ACD1103STM	Standard Operating Procedure for the Determination of Carbonyls in Tobacco and Tobacco Products	Rev 6 03/12/2014
Formaldehyde	ACD1103STM	Standard Operating Procedure for the Determination of Carbonyls in Tobacco and Tobacco Products	Rev 7 08/26/2014
Formaldehyde	RJRT-WI-004219	Determination of Carbonyls in Tobacco and Tobacco Products	Rev 8 03/17/2015
pH	ACD0026STM	Standard Operating Procedure for the Determination of pH in Tobacco	Rev 14 07/23/2014
pH	RJRT-WI-004089	Determination of pH in Tobacco	Rev 15 03/24/2015

Table A: Analytes and Methods (cont'd)

Analyte	Document Name	Method Name	Revision-Date
Moisture	ACD0027STM	Standard Operating Procedure for the Determination of Moisture in Tobacco	Rev 8 03/08/2013
Moisture	RJRT-WI-004090	Gravimetric Determination of Moisture in Tobacco	Rev 9 03/20/2015

### Analytical Method Descriptions

#### **Determination of Specific Alkaloids in Tobacco (ACD0042STM, RJRT-WI-004105)**

Smokeless tobacco products were weighed prior to alkalization with sodium hydroxide (NaOH). This solution was extracted with methyl-tert-butyl ether (MTBE) spiked with internal standard using a wrist-action shaker. The mixture was allowed to separate and the resulting MTBE layer transferred to an autosampler vial for analysis of nicotine by gas chromatography using a flame ionization detector (GC-FID). Quantitation was achieved using an internal standard calibration comprised of six points. Data was determined to be acceptable if the correlation coefficient of the calibration curve was greater than 0.9980, the response factors (RF) were consistent, the percent relative standard deviation (%RSD) for RF equal or less than 5%, the check solution values were within 10% of target, values for the Quality Control samples (QC) were within established control limits, and chromatograms had appropriate identification of peaks.

#### **Determination of Elemental Content by Inductively Coupled Plasma Mass Spectrometry (ACD1019STM, RJRT-WI-004210)**

Smokeless tobacco products were digested as-is in ultra-pure nitric acid at 190 °C using closed-vessel microwave digestion. Following digestion, the sample was allowed to cool and then transferred to a 100 mL volumetric flask. Internal standard was added and samples were brought to volume with Type I water and filtered through 0.45 µm surfactant-free cellulose acetate (SFCA) filters. Aliquots were analyzed for cadmium (Cd) and arsenic (As) by inductively coupled plasma mass spectrometry (ICP-MS). Quantitation was achieved using a method of internal standard calibration comprised of six points. A blank sample was prepared and analyzed with the samples to ensure no contamination from the lab environment. Data was determined to be acceptable if the correlation coefficient of the calibration curve was greater than 0.999, reference solution values were within 10% of target, analysis of sample blank was acceptable (below the method level of quantitation (MLOQ)), and the standard reference material (SRM) used as a control sample was within 30% of the certified value. Samples were analyzed in triplicate, and the %RSD of the replicate values were required to be less than 25% for analytes that had statistically significant levels above the MLOQ. If the %RSD was greater than 25%, more replicates were processed for that sample.

**Determination of Acrylamide by UHPLC-MS-MS (ACD1102-2STM, RJRT-WI-004218)**

Smokeless tobacco products were weighed and extracted with water containing internal standard and acetonitrile by shaking on a platform shaker. Inorganic salts were added and the samples centrifuged. Acetonitrile was removed from an aliquot of the extract using a Turbovap. An aliquot of water was added. The remaining aqueous extract samples were filtered through 0.2 um PVDF mini-uniprep amber syringe filters into autosampler vials. Samples were analyzed for acrylamide by ultra-high performance liquid chromatography with tandem mass spectrometry (UHPLC-MS-MS). Quantitation was achieved using internal standard calibration comprised of at least five points. Data was determined to be acceptable if the correlation coefficient for the calibration curve was greater than or equal to 0.990, peak shape was Gaussian, retention time shifts were within 0.3 minutes of expected values, blanks and QC samples were analyzed and all standards and Internal Certified Value (ICV) samples were within 80-120% of expected concentrations.

**Determination of Benzo(a)pyrene (B(a)P) in Fired-Cure and Other Tobaccos and Cigarette Smoke Condensate (ACD0337STM), Determination of Benzo(a)pyrene (B(a)P) in Fire-Cured and Other Tobaccos (RJRT-WI-004204)**

Smokeless tobacco products were weighed and extracted with methanol by shaking on a platform shaker. The extracts were filtered using disposable polyvinylidene difluoride membrane syringe filters (PVDF) into an autosampler vial. Samples were analyzed for B(a)P by High Performance Liquid Chromatography with fluorescence detection (HPLC-FLD). Quantitation was achieved using an external standard calibration comprised of five points. Data was determined to be acceptable if the correlation coefficient for the calibration curve was greater than or equal to 0.990, calibration blank and matrix blank had no observable interferences, chromatograms had no anomalies, values for the QC samples were within established control limits, and check solution values were within 15% of target.

**Standard Operating Procedure for the Quantitation Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Cigarettes and Tobacco Products by Gas Chromatography Mass Spectrometry (ACD1109-3STM), Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Cigarettes and Tobacco Products by GC-MS (RJRT-WI-004227)**

Smokeless tobacco products were weighed and extracted with methanol and internal standard by shaking on a platform shaker. The extracts were filtered using disposable membrane syringe filters as per extraction method RJRT-WI-004226. An aliquot was mixed with water and further purified using solid phase extraction. Quantitation was achieved using an internal standard calibration comprised of five points. Detection was by Selected Ion Monitoring (SIM) of Electron Impact Ionization Mass Spectrometry.



Data was determined to be acceptable if all standards and continuing calibration verification samples (CCVs) were within 75-125% of expected concentration values, except indeno(1,2,3-c,d)pyrene and dibenz(a,h)anthracene which were within 70-130% of expected value. Calibration blank and matrix blank had no observable interferences and chromatograms had no anomalies.

#### **Quantitative Determination of Tobacco Specific Nitrosamines by High Performance Liquid Chromatography Tandem Mass Spectrometry (HPLC-MS-MS) (ACD1101-3STM, RJRT-WI-004216)**

Smokeless tobacco products were extracted in an aqueous ammonium acetate solution and filtered through disposable PVDF syringe filters into autosampler vials. The extract was analyzed for the following tobacco specific nitrosamines (TSNA): N-nitrosonornicotine (NNN), N-nitrosoanatabine (NAT), N-nitrosoanabasine (NAB), and 4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone (NNK). Analysis was performed using high performance liquid chromatography-tandem mass spectrometry (HPLC-MS-MS). Detection was by multiple reaction monitoring (MRM) of the precursor ion to a product ion specific for each compound. Quantitation was achieved using an internal standard calibration comprised of ten points. A separate internal standard was used for each analyte by using a mixture of four stable isotope-labeled analytes. Results are reported in units of ng/g. Data was determined to be acceptable if the correlation coefficient for the calibration curve was greater than 0.99, standards were within 85% to 115% of expected concentration values, check solution values were within 75% to 125% of target, peak shape and resolution were acceptable (based on historical data), and values for the QC samples were within established control limits.

#### **Determination of Carbonyl Compounds in Tobacco and Tobacco Products (RJRT-WI-004219)**

Smokeless tobacco products were extracted in an aqueous solution containing 2,4-dinitrophenylhydrazine (DNPH) by shaking on a platform shaker. The DNPH forms ultraviolet (UV) absorbing derivatives with carbonyl compounds. Quantitation for formaldehyde, acetaldehyde, and crotonaldehyde was performed using liquid chromatography with UV absorbance detection. Quantitation was achieved using an internal standard calibration comprised of five points. Data was determined to be acceptable if the correlation coefficient for the calibration curve was equal to or greater than 0.990, check solution values were within 20% of target, results for the fortified matrix control samples (FMCS) were within 30% of the expected value, and peak shape and resolution were acceptable (based on historical data).

#### **Standard Operating Procedure for the Determination of pH in Tobacco (ACD0026STM, RJRT-WI-004089)**

Smokeless tobacco products were extracted with 30 mL Type I water by stirring and then allowing to stand for one hour before measuring the pH using a combination electrode and potentiometer standardized by buffer solutions. Data was determined to

be acceptable if all the following criteria were met: the slope of the calibration curve fell between 90% to 105%, the check solution values were within the specifications provided on the certificate, the 7.0 buffer solution was between 6.80 and 7.20 pH, and the %RSD for three replicates was less than 3%.

### **Standard Operating Procedure for the Determination of Moisture in Tobacco (ACD0027STM), Gravimetric Determination of Moisture in Tobacco (RJRT-WI-004090)**

The moisture content (oven volatiles) of smokeless tobacco products was determined by measuring the reduction in mass when dried in an oven ( $99 \pm 0.5^\circ$ ) for 3 hours. Samples are allowed to cool in a desiccator for 30 minutes prior to weighing the second time. The results obtained using this method may be greater than the results of a more specific water content analysis (Karl Fischer method) because of the loss of volatile materials other than water from smokeless tobacco products during oven drying. Measurements were made in triplicate.

### **Estimated Free Nicotine Calculation**

Free (un-ionized) nicotine was estimated using a calculation based on the constituent nicotine and pH of tobacco test articles using the Henderson-Hasselbalch equation:

$\text{pH} = \text{pKa} + \log (B/BH^+)$ , where pKa is the acid dissociation constant ( $\text{pKa} = 8.02$ ), B is the free nicotine concentration and  $BH^+$  is the ionized nicotine concentration.

Rearranging the equation:  $B/BH^+ = 10^{(\text{pH}-\text{pKa})}$ .

$\% \text{ un-ionized (free) nicotine} = ((10^{(\text{pH}-\text{pKa})}) / (10^{(\text{pH}-\text{pKa})} + 1)) * 100$

$\text{Total free nicotine (mg/g)} = \text{nicotine} \times (\% \text{ un-ionized (free) nicotine} / 100)$

The limits of quantification (LOQ) are summarized in [Table B](#) below.

**Table B: Analytical Method Limits of Quantification (LOQ)**

Test Method	Analyte	CAS Number	units	Typical LOQ
RJRT-WI-004105	Nicotine	54-11-5	ug/g	424
RJRT-WI-004218	Acrylamide	79-06-1	ng/g	35*
RJRT-WI-004210	Arsenic	7440-38-2	ng/g	8.2
RJRT-WI-004210	Cadmium	7440-43-9	ng/g	3.2
RJRT-WI-004204	Benzo(a)pyrene	50-32-8	ng/g	1
RJRT-WI-004219	Formaldehyde	50-00-0	ng/g	906
RJRT-WI-004219	Acetaldehyde	75-07-0	ng/g	1000
RJRT-WI-004219	Crotonaldehyde	4170-30-3	ng/g	710
RJRT-WI-004227	Benz(a)anthracene	56-55-3	ng/g	4.81
RJRT-WI-004227	Benzo(b/j)fluoranthene	205-99-2 & 205-82-3	ng/g	3.20
RJRT-WI-004227	Benzo(k)fluoranthene	207-08-9	ng/g	3.20
RJRT-WI-004227	Dibenz(a,h)anthracene	53-70-3	ng/g	4.80
RJRT-WI-004227	Indeno(1,2,3-c,d)pyrene	193-39-5	ng/g	0.64
RJRT-WI-004227	Naphthalene	91-20-3	ng/g	32.01
RJRT-WI-004216	N-Nitrosoanabasine (NAB)	37620-20-5	ng/g	10
RJRT-WI-004216	N-Nitrosoanatabine (NAT)	71267-22-6	ng/g	40
RJRT-WI-004216	N-Nitrosonornicotine (NNN)	16543-55-8	ng/g	40
RJRT-WI-004216	4-(nitrosmethylamino)-1-(3-pyridyl)-1-butanone (NNK)	64091-91-4	ng/g	40

\*for a 1.0 gram sample

ELL-PSS uses the lowest standard value as the Limit of Quantification.

LABWARE Laboratory Information Management System (LWLIMS) calculates each replicate by performing a calculation of response divided by sample weight of that replicate. Because of this, the LOQ may vary in value per replicate and it is possible for analytes to be reported as quantified at values below the calculated LOQs of another calibrated run. When the replicate values are below LOQ, the LOQ value is used in the calculated tables.

[Table C](#) shows the smokeless market survey product brands which are included in each smokeless tobacco product category.

Table C Smokeless Products Sampled By Category

Category	Brand Style Name
Moist Snuff	Copenhagen Snuff Fine Cut
	Copenhagen Long Cut
	Copenhagen Pouches
	Copenhagen Pouches Wintergreen
	Copenhagen Long Cut Southern Blend
	Copenhagen Long Cut Wintergreen
	Grizzly Premium Mint Long Cut
	Grizzly Premium Natural Snuff
	Grizzly Premium Natural Fine Cut
	Grizzly Premium Straight Long Cut
	Grizzly Premium Wintergreen Wide Cut
	Grizzly Premium Wintergreen Long Cut
	Grizzly Premium Wintergreen Pouches
	Kayak Long Cut Straight
	Kayak Long Cut Wintergreen
	Klondike Long Cut Straight
	Klondike Long Cut Wintergreen
	Kodiak Premium Wintergreen
	Longhorn Natural Fine Cut



Loose Leaf	Beechnut Chewing Tobacco
	Beechnut Wintergreen Chewing Tobacco
	Levi Garrett
	Red Man Original Chewing Tobacco
	Stokers Tennessee Chew Original
	Starr Chewing Tobacco

Table C Smokeless Products Sampled By Category (cont'd)

Category	Brand Style Name
Dry Snuff	Navy Sweet Dry Snuff
	Railroad Mills Sweet Scotch
	Superior Dry Snuff
	Tube Rose Scotch
	W.E. Garrett & Sons Scotch

## RESULTS

Combined smokeless tobacco survey results are tabulated in Appendix A as follows:

[Table 1](#) provides a listing of all data (by individual replicate) grouped by analyte and arranged alphabetically by product name.

[Table 2](#) provides summary data by year (mean, minimum value, maximum value and number of replicates) based on the replicate data in Table 1.

[Table 3](#) provides Camel Snus (0.6 gram) styles (minimum and maximum values) for the combined 2014 and 2015 datasets as compared to other smokeless tobacco product categories expressed on a 0.6 gram basis;

[Table 4](#) provides Camel Snus (1.0 gram) styles (minimum and maximum values) for the combined 2014 and 2015 datasets as compared to other smokeless tobacco categories expressed on a 1.0 gram basis;

[Table 5](#) provides all six Camel Snus styles combined for the 2014 and 2015 datasets (minimum and maximum values) compared to other smokeless tobacco categories on a per gram basis;

[Table 6](#) provides smokeless reference product data listings (individual replicate data).

[Table 7](#) provides the summary smokeless reference product data (mean, minimum value, maximum value and number of replicates) based on the replicate data in Table 6.

Manufacture and purchase dates are included in the data listings table (Table 1) along with the analysis completion dates. Dates of manufacture are provided for RJRT and ASC products. Purchase dates are provided for all other products.

Minimum and maximum data in Tables 3, 4 and 5 were calculated as follows. First the average of the triplicate replicate data was determined; then the average of those data across years was determined, if the same product was analyzed in both years. A single mean was determined for each unique smokeless product. The minimum and maximum was determined from the range of the unique product means per smokeless market category.

For some samples, chromatographic resolution of benzo(k)fluoranthene and naphthalene was not achieved. In those cases, results are designated N/A for not available as described in the table footnote.

For some samples, a benzo(a)pyrene specific determination was applied without the determination of other polycyclic aromatic hydrocarbons. In those cases, the table shows the analyte data as N/A where data is not available.



## Appendix A

### Smokeless Market Survey Data

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Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Beechnut Chewing Tobacco	06AUG2014	1	7.99	26SEP2014	0.35	0.03	69.0	20AUG2014
		2	8.04	26SEP2014	0.42	0.03	69.7	20AUG2014
		3	7.95	26SEP2014	0.32	0.03	69.1	20AUG2014
Beechnut Wintergreen Chewing Tobacco	10JUL2015	1	5.03	09SEP2015	0.34	0.02	51.5	03AUG2015
		2	5.09	09SEP2015	0.35	0.02	51.8	03AUG2015
		3	5.10	09SEP2015	0.35	0.02	53.5	03AUG2015
Camel Snus Frost	07AUG2014	1	11.48	26SEP2014	34.94	4.01	139.0	20AUG2014
		2	11.22	26SEP2014	34.42	3.86	133.0	20AUG2014
		3	11.19	26SEP2014	34.42	3.85	141.0	20AUG2014
	21MAY2015	1	9.64	03SEP2015	32.88	3.17	56.9	30JUL2015
		2	9.58	03SEP2015	32.37	3.10	55.1	30JUL2015
		3	9.68	03SEP2015	32.37	3.13	54.9	30JUL2015

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Camel Snus Frost Large	07AUG2014	1	12.96	25SEP2014	37.60	4.87	157.0	20AUG2014
		2	13.03	25SEP2014	37.60	4.90	156.0	20AUG2014
		3	13.10	25SEP2014	37.60	4.93	156.0	20AUG2014
	08JUN2015	1	10.62	03SEP2015	30.39	3.23	53.7	31JUL2015
		2	10.72	03SEP2015	30.39	3.26	55.1	31JUL2015
		3	10.82	03SEP2015	30.39	3.29	56.5	31JUL2015
Camel Snus Mellow	20AUG2014	1	11.42	26SEP2014	37.60	4.29	95.4	28AUG2014
		2	11.41	26SEP2014	36.53	4.17	98.7	28AUG2014
		3	11.61	26SEP2014	37.60	4.37	95.2	28AUG2014
	02JUN2015	1	9.71	03SEP2015	28.01	2.72	55.6	31JUL2015
		2	9.77	03SEP2015	27.55	2.69	55.2	31JUL2015
		3	9.76	03SEP2015	27.55	2.69	53.1	31JUL2015

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Camel Snus Mint	30JUL2014	1	9.28	26SEP2014	40.34	3.75	84.6	21AUG2014
		2	9.52	26SEP2014	40.34	3.84	83.6	21AUG2014
		3	10.19	26SEP2014	40.89	4.17	82.5	21AUG2014
	26MAY2015	1	9.86	03SEP2015	20.45	2.02	51.2	31JUL2015
		2	9.90	03SEP2015	19.71	1.95	53.1	31JUL2015
		3	9.95	03SEP2015	20.08	2.00	49.9	31JUL2015
	28JUL2014	1	9.70	26SEP2014	31.37	3.04	61.4	20AUG2014
		2	9.80	26SEP2014	30.88	3.03	60.5	20AUG2014
		3	10.30	26SEP2014	31.87	3.28	62.2	20AUG2014
Camel Snus Robust	18JUN2015	1	10.14	03SEP2015	19.71	2.00	50.4	31JUL2015
		2	10.16	03SEP2015	19.71	2.00	44.1	31JUL2015
		3	10.18	03SEP2015	20.08	2.04	48.7	31JUL2015

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Camel Snus Winterchill	18AUG2014	1	10.41	26SEP2014	40.34	4.20	92.3	28AUG2014
		2	10.44	26SEP2014	40.89	4.27	95.4	28AUG2014
		3	10.43	26SEP2014	39.78	4.15	101.0	28AUG2014
	05JUN2015	1	9.48	03SEP2015	35.99	3.41	53.6	30JUL2015
		2	9.44	03SEP2015	35.46	3.35	49.9	30JUL2015
		3	9.54	03SEP2015	35.46	3.38	54.8	30JUL2015
Copenhagen Long Cut	06AUG2014	1	11.94	22SEP2014	26.19	3.13	410.0	12AUG2014
		2	12.00	22SEP2014	26.19	3.14	435.0	12AUG2014
		3	11.98	22SEP2014	26.19	3.14	432.0	12AUG2014
	10JUL2015	1	12.10	24JUL2015	43.14	5.22	322.0	27JUL2015
		2	11.87	24JUL2015	42.57	5.05	323.0	27JUL2015
		3	11.96	24JUL2015	42.01	5.02	331.0	27JUL2015

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Copenhagen Long Cut Southern Blend	06AUG2014	1	12.42	22SEP2014	28.95	3.60	217.0	12AUG2014
		2	12.62	22SEP2014	28.01	3.53	226.0	12AUG2014
		3	12.61	22SEP2014	28.01	3.53	237.0	12AUG2014
	10JUL2015	1	10.73	24JUL2015	15.10	1.62	181.0	29JUL2015
		2	10.73	24JUL2015	15.70	1.68	184.0	29JUL2015
		3	10.82	24JUL2015	15.10	1.63	183.0	29JUL2015
Copenhagen Long Cut Wintergreen	06AUG2014	1	11.88	22SEP2014	35.46	4.21	240.0	12AUG2014
		2	11.95	22SEP2014	34.94	4.18	259.0	12AUG2014
		3	11.40	22SEP2014	34.42	3.92	259.0	12AUG2014
	10JUL2015	1	10.59	24JUL2015	36.53	3.87	279.0	27JUL2015
		2	10.64	24JUL2015	35.99	3.83	277.0	27JUL2015
		3	10.59	24JUL2015	35.46	3.76	278.0	27JUL2015

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Copenhagen Pouches	06AUG2014	1	10.37	22SEP2014	47.70	4.95	235.0	12AUG2014
		2	10.74	22SEP2014	48.27	5.18	247.0	12AUG2014
		3	9.84	22SEP2014	48.27	4.75	249.0	12AUG2014
	10JUL2015	1	11.02	02SEP2015	39.23	4.32	185.0	29JUL2015
		2	11.00	02SEP2015	39.23	4.32	177.0	29JUL2015
		3	11.04	02SEP2015	38.14	4.21	175.0	29JUL2015
Copenhagen Pouches Wintergreen	10JUL2015	1	10.23	23JUL2015	7.68	0.79	183.0	29JUL2015
		2	9.92	23JUL2015	7.36	0.73	181.0	29JUL2015
		3	10.25	23JUL2015	7.52	0.77	178.0	29JUL2015
Copenhagen Snuff Fine Cut	06AUG2014	1	11.81	22SEP2014	20.08	2.37	356.0	12AUG2014
		2	11.72	22SEP2014	19.71	2.31	315.0	12AUG2014
		3	11.69	22SEP2014	19.35	2.26	341.0	12AUG2014



Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Copenhagen Snuff Fine Cut	10JUL2015	1	12.14	02SEP2015	27.55	3.34	182.0	29JUL2015
		2	12.12	02SEP2015	27.55	3.34	185.0	29JUL2015
		3	12.24	02SEP2015	28.01	3.43	182.0	29JUL2015
Grizzly Premium Mint Long Cut	24JUL2014	1	14.20	18AUG2014	25.31	3.59	333.0	04AUG2014
		2	14.23	18AUG2014	25.31	3.60	319.0	04AUG2014
		3	14.38	18AUG2014	25.31	3.64	319.0	04AUG2014
	31MAR2015	1	13.96	02SEP2015	20.45	2.85	188.0	29JUL2015
		2	13.92	02SEP2015	20.08	2.80	191.0	29JUL2015
		3	13.99	02SEP2015	20.08	2.81	193.0	29JUL2015
Grizzly Premium Natural Fine Cut	24JUL2014	1	15.99	18AUG2014	25.31	4.05	250.0	04AUG2014
		2	16.01	18AUG2014	23.61	3.78	253.0	19AUG2014
		3	15.97	18AUG2014	24.03	3.84	256.0	19AUG2014

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Grizzly Premium Natural Fine Cut	13APR2015	1	13.57	02SEP2015	30.88	4.19	183.0	29JUL2015
		2	13.46	02SEP2015	30.88	4.16	192.0	29JUL2015
		3	13.44	02SEP2015	31.37	4.22	188.0	29JUL2015
Grizzly Premium Natural Snuff	02APR2015	1	13.14	02SEP2015	20.08	2.64	143.0	29JUL2015
		2	13.10	02SEP2015	20.45	2.68	139.0	29JUL2015
		3	13.08	02SEP2015	20.83	2.72	145.0	29JUL2015
Grizzly Premium Straight Long Cut	18JUL2014	1	12.66	18AUG2014	29.90	3.79	221.0	04AUG2014
		2	12.62	18AUG2014	30.39	3.84	218.0	04AUG2014
		3	12.59	18AUG2014	29.90	3.76	224.0	04AUG2014
	14APR2015	1	11.98	23JUL2015	42.01	5.03	156.0	28JUL2015
		2	12.07	23JUL2015	42.01	5.07	162.0	28JUL2015
		3	12.04	23JUL2015	42.01	5.06	161.0	28JUL2015

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Grizzly Premium Wintergreen Long Cut	08JUL2014	1	12.51	18AUG2014	57.43	7.18	294.0	04AUG2014
		2	12.50	18AUG2014	56.86	7.11	298.0	04AUG2014
		3	12.46	18AUG2014	56.86	7.08	291.0	04AUG2014
	06MAY2015	1	11.21	04SEP2015	66.10	7.41	161.0	29JUL2015
		2	11.31	04SEP2015	67.12	7.59	156.0	29JUL2015
		3	11.50	04SEP2015	67.12	7.72	156.0	29JUL2015
Grizzly Premium Wintergreen Pouches	21JUL2014	1	11.30	18AUG2014	65.58	7.41	458.0	04AUG2014
		2	11.33	18AUG2014	63.47	7.19	457.0	04AUG2014
		3	11.23	18AUG2014	64.01	7.19	478.0	04AUG2014
	14MAY2015	1	9.88	04SEP2015	37.60	3.72	201.0	29JUL2015
		2	10.02	04SEP2015	37.60	3.77	201.0	29JUL2015
		3	9.91	04SEP2015	37.06	3.67	199.0	29JUL2015

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Grizzly Premium Wintergreen Wide Cut	09APR2015	1	14.32	04SEP2015	16.32	2.34	133.0	29JUL2015
		2	14.44	04SEP2015	16.32	2.36	132.0	29JUL2015
		3	14.05	04SEP2015	16.00	2.25	131.0	29JUL2015
Kayak Long Cut Straight	06AUG2014	1	9.52	22SEP2014	7.05	0.67	97.6	13AUG2014
		2	9.54	22SEP2014	6.90	0.66	87.0	13AUG2014
		3	9.60	22SEP2014	6.90	0.66	87.0	13AUG2014
	10JUL2015	1	12.24	04SEP2015	3.43	0.42	173.0	30JUL2015
		2	12.53	04SEP2015	3.43	0.43	177.0	30JUL2015
		3	12.52	04SEP2015	3.43	0.43	172.0	30JUL2015
Kayak Long Cut Wintergreen	06AUG2014	1	9.64	22SEP2014	24.45	2.36	121.0	13AUG2014
		2	9.65	22SEP2014	24.45	2.36	123.0	13AUG2014
		3	9.68	22SEP2014	24.45	2.37	122.0	13AUG2014

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Kayak Long Cut Wintergreen	10JUL2015	1	13.23	04SEP2015	13.68	1.81	270.0	30JUL2015
		2	12.48	04SEP2015	13.68	1.71	276.0	30JUL2015
		3	12.76	04SEP2015	13.68	1.75	276.0	30JUL2015
Klondike Long Cut Straight	10JUL2015	1	7.61	02SEP2015	67.12	5.11	129.0	29JUL2015
		2	7.73	02SEP2015	67.12	5.19	126.0	29JUL2015
		3	7.69	02SEP2015	67.12	5.16	131.0	29JUL2015
Klondike Long Cut Wintergreen	10JUL2015	1	7.35	24JUL2015	48.85	3.59	127.0	29JUL2015
		2	7.39	24JUL2015	48.85	3.61	124.0	29JUL2015
		3	7.41	24JUL2015	48.85	3.62	129.0	29JUL2015
Kodiak Premium Wintergreen	11JUL2014	1	11.19	18AUG2014	67.63	7.57	414.0	04AUG2014
		2	11.38	18AUG2014	67.63	7.70	401.0	04AUG2014
		3	11.64	18AUG2014	67.63	7.87	395.0	04AUG2014

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Kodiak Premium Wintergreen	17JUN2015	1	10.57	02SEP2015	59.66	6.31	263.0	29JUL2015
		2	10.46	02SEP2015	60.22	6.30	266.0	29JUL2015
		3	10.42	02SEP2015	60.77	6.33	269.0	29JUL2015
Levi Garrett	24JUL2014	1	5.32	18AUG2014	2.00	0.11	493.0	04AUG2014
		2	5.28	18AUG2014	2.40	0.13	493.0	04AUG2014
		3	5.30	18AUG2014	2.29	0.12	497.0	04AUG2014
	12JUN2015	1	5.74	09SEP2015	0.61	0.04	216.0	03AUG2015
		2	5.63	09SEP2015	0.88	0.05	194.0	03AUG2015
		3	5.59	09SEP2015	0.72	0.04	225.0	03AUG2015
Longhorn Mint Long Cut	10JUL2015	1	12.65	24JUL2015	44.84	5.67	285.0	27JUL2015
		2	12.57	24JUL2015	45.98	5.78	283.0	27JUL2015
		3	12.70	24JUL2015	45.41	5.77	276.0	27JUL2015

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Longhorn Natural Fine Cut	06AUG2014	1	11.64	22SEP2014	38.14	4.44	221.0	12AUG2014
		2	11.89	22SEP2014	38.69	4.60	223.0	12AUG2014
		3	11.55	22SEP2014	38.14	4.41	219.0	12AUG2014
	10JUL2015	1	12.13	24JUL2015	47.12	5.72	212.0	27JUL2015
		2	12.18	24JUL2015	47.12	5.74	205.0	27JUL2015
		3	12.23	24JUL2015	46.55	5.69	207.0	27JUL2015
Longhorn Wintergreen Long Cut	06AUG2014	1	13.61	22SEP2014	38.14	5.19	214.0	13AUG2014
		2	13.61	22SEP2014	38.14	5.19	214.0	13AUG2014
		3	13.73	22SEP2014	38.14	5.24	215.0	13AUG2014
	10JUL2015	1	11.29	24JUL2015	40.34	4.55	196.0	28JUL2015
		2	11.27	24JUL2015	42.01	4.73	198.0	28JUL2015
		3	11.21	24JUL2015	41.45	4.65	193.0	28JUL2015

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Navy Sweet Dry Snuff	06AUG2014	1	18.72	25SEP2014	1.49	0.28	122.0	15AUG2014
		2	19.62	25SEP2014	1.53	0.30	117.0	15AUG2014
		3	18.78	25SEP2014	1.49	0.28	126.0	15AUG2014
	10JUL2015	1	17.56	09SEP2015	2.34	0.41	90.8	03AUG2015
		2	17.59	09SEP2015	2.29	0.40	87.6	03AUG2015
		3	17.77	09SEP2015	2.24	0.40	90.1	03AUG2015
Railroad Mills Sweet Scotch	06AUG2014	1	30.20	25SEP2014	0.79	0.24	122.0	15AUG2014
		2	30.19	25SEP2014	0.77	0.23	124.0	15AUG2014
		3	30.34	25SEP2014	0.77	0.23	122.0	15AUG2014
Red Man Original Chewing Tobacco	06AUG2014	1	8.68	26SEP2014	0.92	0.08	66.4	20AUG2014
		2	8.64	26SEP2014	0.86	0.07	69.2	20AUG2014
		3	8.41	26SEP2014	0.67	0.06	67.3	20AUG2014



Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Red Man Original Chewing Tobacco	10JUL2015	1	7.36	09SEP2015	0.44	0.03	96.5	03AUG2015
		2	8.01	09SEP2015	0.51	0.04	86.7	03AUG2015
		3	7.90	09SEP2015	0.53	0.04	94.2	03AUG2015
Red Seal Fine Cut Natural	10JUL2015	1	12.43	23JUL2015	36.53	4.54	195.0	29JUL2015
		2	12.35	23JUL2015	35.99	4.44	197.0	29JUL2015
		3	12.50	23JUL2015	35.99	4.50	203.0	29JUL2015
Red Seal Fine Cut Wintergreen	10JUL2015	1	12.05	04SEP2015	28.47	3.43	184.0	30JUL2015
		2	12.18	04SEP2015	28.47	3.47	183.0	30JUL2015
		3	12.20	04SEP2015	28.47	3.47	185.0	30JUL2015
Red Seal Long Cut Wintergreen	06AUG2014	1	13.90	22SEP2014	20.45	2.84	331.0	13AUG2014
		2	13.87	22SEP2014	20.45	2.84	345.0	13AUG2014
		3	13.85	22SEP2014	20.45	2.83	330.0	13AUG2014

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Red Seal Long Cut Wintergreen	10JUL2015	1	12.69	04SEP2015	17.61	2.23	235.0	30JUL2015
		2	12.45	04SEP2015	17.61	2.19	232.0	30JUL2015
		3	12.32	04SEP2015	17.95	2.21	236.0	30JUL2015
Skoal Long Cut Mint	06AUG2014	1	12.40	22SEP2014	15.10	1.87	265.0	13AUG2014
		2	12.29	22SEP2014	15.40	1.89	259.0	13AUG2014
		3	12.24	22SEP2014	15.10	1.85	255.0	13AUG2014
	10JUL2015	1	11.37	23JUL2015	11.65	1.32	164.0	28JUL2015
		2	11.32	23JUL2015	11.65	1.32	160.0	28JUL2015
		3	11.35	23JUL2015	11.65	1.32	169.0	28JUL2015
Skoal Long Cut Straight	06AUG2014	1	12.26	22SEP2014	25.31	3.10	337.0	13AUG2014
		2	12.29	22SEP2014	25.31	3.11	340.0	13AUG2014
		3	12.38	22SEP2014	25.75	3.19	356.0	13AUG2014

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Skoal Long Cut Straight	10JUL2015	1	11.63	23JUL2015	36.53	4.25	228.0	28JUL2015
		2	11.63	23JUL2015	36.53	4.25	247.0	28JUL2015
		3	11.61	23JUL2015	36.53	4.24	232.0	28JUL2015
Skoal Original Fine Cut Wintergreen	06AUG2014	1	11.80	22SEP2014	27.09	3.20	158.0	13AUG2014
		2	11.85	22SEP2014	27.09	3.21	165.0	13AUG2014
		3	12.02	22SEP2014	27.09	3.26	156.0	13AUG2014
	10JUL2015	1	12.23	23JUL2015	24.03	2.94	161.0	28JUL2015
		2	12.19	23JUL2015	23.19	2.83	151.0	28JUL2015
		3	12.25	23JUL2015	23.19	2.84	155.0	28JUL2015
Skoal X-tra Long Cut Mint Blend	06AUG2014	1	12.86	22SEP2014	16.00	2.06	236.0	15AUG2014
		2	12.88	22SEP2014	16.00	2.06	234.0	15AUG2014
		3	12.90	22SEP2014	15.70	2.03	233.0	15AUG2014

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Skoal X-tra Long Cut Mint Blend	10JUL2015	1	11.22	23JUL2015	11.41	1.28	190.0	28JUL2015
		2	11.12	23JUL2015	11.65	1.30	203.0	28JUL2015
		3	11.20	23JUL2015	11.41	1.28	200.0	28JUL2015
Starr Chewing Tobacco	06AUG2014	1	7.95	26SEP2014	0.36	0.03	117.0	20AUG2014
		2	7.78	26SEP2014	0.35	0.03	115.0	20AUG2014
		3	7.99	26SEP2014	0.63	0.05	112.0	20AUG2014
Stokers Tennessee Chew Original	10JUL2015	1	3.56	09SEP2015	0.29	0.01	49.8	03AUG2015
		2	3.55	09SEP2015	0.27	0.01	51.2	03AUG2015
		3	3.43	09SEP2015	0.30	0.01	51.4	03AUG2015
Stokers Wintergreen Long Cut	06AUG2014	1	11.31	22SEP2014	35.46	4.01	338.0	15AUG2014
		2	11.46	22SEP2014	35.46	4.06	343.0	15AUG2014
		3	11.46	22SEP2014	35.46	4.06	327.0	15AUG2014

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Superior Dry Snuff	06AUG2014	1	32.40	25SEP2014	1.14	0.37	129.0	20AUG2014
		2	32.82	25SEP2014	1.16	0.38	125.0	20AUG2014
		3	32.59	25SEP2014	1.19	0.39	125.0	20AUG2014
	10JUL2015	1	23.90	09SEP2015	2.51	0.60	117.0	03AUG2015
		2	24.06	09SEP2015	2.56	0.62	116.0	03AUG2015
		3	23.89	09SEP2015	2.51	0.60	118.0	03AUG2015
Timber Wolf Mint Long Cut	10JUL2015	1	12.27	23JUL2015	26.64	3.27	183.0	28JUL2015
		2	12.25	23JUL2015	25.75	3.15	189.0	28JUL2015
		3	12.19	23JUL2015	25.31	3.09	182.0	28JUL2015
Timber Wolf Wintergreen Long Cut	06AUG2014	1	13.42	22SEP2014	46.55	6.25	198.0	15AUG2014
		2	13.47	22SEP2014	45.98	6.19	205.0	15AUG2014
		3	13.38	22SEP2014	46.55	6.23	194.0	15AUG2014

Table 1. Smokeless Product Data Listing (as is)

			Nicotine Analysis				Acrylamide Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Nicotine (mg/g)	Completed Analysis Date	% Un- ionized (Free) Nicotine	Total Free Nicotine (mg/g)	Acrylamide (ng/g)	Completed Analysis Date
Tube Rose Scotch	20MAR2015	1	17.35	03SEP2015	0.50	0.09	207.0	31JUL2015
		2	17.28	03SEP2015	0.51	0.09	202.0	31JUL2015
		3	17.30	03SEP2015	0.52	0.09	207.0	31JUL2015
W.E. Garrett & Sons Scotch	18JUL2014	1	23.19	18AUG2014	1.63	0.38	1430.0	04AUG2014
		2	23.64	18AUG2014	1.56	0.37	1430.0	08AUG2014
		3	23.20	18AUG2014	1.53	0.35	1440.0	08AUG2014
	16JUN2015	1	20.36	03SEP2015	1.91	0.39	1280.0	31JUL2015
		2	20.20	03SEP2015	1.87	0.38	1330.0	31JUL2015
		3	20.26	03SEP2015	1.91	0.39	1280.0	31JUL2015

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			Completed Analysis Date
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	
Beechnut Chewing Tobacco	06AUG2014	1	3400.0	730.0*	896.0*	26AUG2014
		2	3170.0	735.0*	902.0*	26AUG2014
		3	3180.0	732.0*	899.0*	26AUG2014
Beechnut Wintergreen Chewing Tobacco	10JUL2015	1	4530.0	668.0*	850.0*	15SEP2015
		2	4510.0	646.0*	822.0*	15SEP2015
		3	4570.0	664.0*	845.0*	15SEP2015
Camel Snus Frost	07AUG2014	1	1250.0	629.0*	2210.0	26AUG2014
		2	1190.0	609.0*	2160.0	26AUG2014
		3	1150.0	645.0*	2100.0	26AUG2014
	21MAY2015	1	1570.0	625.0*	854.0	03AUG2015
		2	1530.0	600.0*	803.0	03AUG2015
		3	1510.0	636.0*	821.0	03AUG2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Camel Snus Frost Large	07AUG2014	1	1560.0	718.0*	938.0	25AUG2014
		2	1360.0	682.0*	838.0	25AUG2014
		3	1320.0	688.0*	927.0	25AUG2014
	08JUN2015	1	2000.0	747.0*	950.0*	03AUG2015
		2	1810.0	690.0*	877.0*	03AUG2015
		3	1750.0	663.0*	843.0*	03AUG2015
	20AUG2014	1	3010.0	591.0*	1600.0	05SEP2014
		2	2820.0	602.0*	1550.0	05SEP2014
		3	2890.0	617.0*	1660.0	05SEP2014
Camel Snus Mellow	02JUN2015	1	2300.0	557.0*	737.0	03AUG2015
		2	2300.0	594.0*	762.0	03AUG2015
		3	2130.0	545.0*	716.0	03AUG2015
	30JUL2014	1	1460.0	654.0*	1470.0	26AUG2014
		2	1250.0	618.0*	1400.0	26AUG2014
		3	1290.0	624.0*	1310.0	26AUG2014
	26MAY2015	1	1360.0	573.0*	729.0*	03AUG2015
		2	1300.0	577.0*	734.0*	03AUG2015
		3	1250.0	584.0*	743.0*	03AUG2015

N/A=not available

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Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Camel Snus Robust	28JUL2014	1	1430.0	687.0*	843.0*	26AUG2014
		2	1410.0	718.0*	882.0*	26AUG2014
		3	1350.0	728.0*	894.0*	26AUG2014
	18JUN2015	1	1530.0	736.0*	937.0*	03AUG2015
		2	1520.0	803.0*	1020.0*	03AUG2015
		3	1490.0	746.0*	949.0*	03AUG2015
	18AUG2014	1	2150.0	635.0*	779.0*	05SEP2014
		2	2130.0	672.0*	825.0*	05SEP2014
		3	2040.0	614.0*	754.0*	05SEP2014
Camel Snus Winterchill	05JUN2015	1	1570.0	689.0*	876.0*	29JUL2015
		2	1570.0	696.0*	886.0*	29JUL2015
		3	1530.0	733.0*	932.0*	29JUL2015
	06AUG2014	1	1010.0*	731.0*	898.0*	22AUG2014
		2	1010.0*	732.0*	898.0*	22AUG2014
		3	1000.0*	729.0*	894.0*	22AUG2014
	10JUL2015	1	1000.0*	696.0*	885.0*	29JUL2015
		2	999.0*	695.0*	884.0*	29JUL2015
		3	991.0*	689.0*	877.0*	29JUL2015
Copenhagen Long Cut	06AUG2014	1	1010.0*	731.0*	898.0*	22AUG2014
		2	1010.0*	732.0*	898.0*	22AUG2014
		3	1000.0*	729.0*	894.0*	22AUG2014
	10JUL2015	1	1000.0*	696.0*	885.0*	29JUL2015
		2	999.0*	695.0*	884.0*	29JUL2015
		3	991.0*	689.0*	877.0*	29JUL2015
	06AUG2014	1	1010.0*	731.0*	898.0*	22AUG2014
		2	1010.0*	732.0*	898.0*	22AUG2014
		3	1000.0*	729.0*	894.0*	22AUG2014

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			Completed Analysis Date
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	
Copenhagen Long Cut Southern Blend	06AUG2014	1	1010.0*	734.0*	901.0*	21AUG2014
		2	1010.0*	734.0*	902.0*	21AUG2014
		3	1010.0*	731.0*	897.0*	21AUG2014
	10JUL2015	1	988.0*	688.0*	1910.0	27JUL2015
		2	989.0*	688.0*	1900.0	27JUL2015
		3	1010.0*	700.0*	1970.0	27JUL2015
Copenhagen Long Cut Wintergreen	06AUG2014	1	2070.0	732.0*	898.0*	21AUG2014
		2	2100.0	734.0*	901.0*	21AUG2014
		3	1990.0	732.0*	899.0*	21AUG2014
	10JUL2015	1	2390.0	701.0*	1970.0	22JUL2015
		2	2280.0	705.0*	2000.0	22JUL2015
		3	2340.0	703.0*	2000.0	22JUL2015
Copenhagen Pouches	06AUG2014	1	666.0*	484.0*	799.0	21AUG2014
		2	748.0*	544.0*	810.0	21AUG2014
		3	683.0*	496.0*	804.0	21AUG2014
	10JUL2015	1	702.0*	489.0*	622.0*	29JUL2015
		2	739.0*	514.0*	654.0*	29JUL2015
		3	669.0*	466.0*	592.0*	29JUL2015

N/A=not available

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Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Copenhagen Pouches Wintergreen	10JUL2015	1	675.0*	470.0*	1090.0	27JUL2015
		2	688.0*	478.0*	1090.0	27JUL2015
		3	661.0*	460.0*	1060.0	27JUL2015
Copenhagen Snuff Fine Cut	06AUG2014	1	1000.0*	730.0*	896.0*	22AUG2014
		2	1010.0*	731.0*	897.0*	22AUG2014
		3	1010.0*	734.0*	901.0*	22AUG2014
	10JUL2015	1	1010.0*	699.0*	890.0*	29JUL2015
		2	991.0*	689.0*	877.0*	29JUL2015
		3	980.0*	682.0*	867.0*	29JUL2015
Grizzly Premium Mint Long Cut	24JUL2014	1	8040.0	733.0*	1100.0	11AUG2014
		2	7700.0	732.0*	1090.0	11AUG2014
		3	7530.0	732.0*	1140.0	11AUG2014
	31MAR2015	1	971.0*	676.0*	860.0*	29JUL2015
		2	981.0*	682.0*	868.0*	29JUL2015
		3	975.0*	679.0*	863.0*	29JUL2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Grizzly Premium Natural Fine Cut	24JUL2014	1	52100.0	733.0*	2030.0	04AUG2014
		3	48600.0	733.0*	2060.0	04AUG2014
		2	50900.0	731.0*	2080.0	14AUG2014
	13APR2015	1	1410.0	689.0*	1050.0	29JUL2015
		2	1340.0	687.0*	1010.0	29JUL2015
		3	1320.0	680.0*	970.0	29JUL2015
Grizzly Premium Natural Snuff	02APR2015	1	1020.0	674.0*	857.0*	29JUL2015
		2	1000.0	679.0*	864.0*	29JUL2015
		3	1010.0	700.0*	890.0*	29JUL2015
Grizzly Premium Straight Long Cut	18JUL2014	1	3630.0	735.0*	2160.0	11AUG2014
		2	3520.0	734.0*	2100.0	11AUG2014
		3	3450.0	731.0*	2190.0	11AUG2014
	14APR2015	1	989.0*	688.0*	875.0*	27JUL2015
		2	967.0*	673.0*	856.0*	27JUL2015
		3	979.0*	681.0*	867.0*	27JUL2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Grizzly Premium Wintergreen Long Cut	08JUL2014	1	6160.0	729.0*	2420.0	11AUG2014
		2	6040.0	733.0*	2420.0	11AUG2014
		3	6050.0	734.0*	2380.0	11AUG2014
	06MAY2015	1	2110.0	722.0*	1800.0	29JUL2015
		2	2230.0	706.0*	1870.0	29JUL2015
		3	2050.0	741.0*	1890.0	29JUL2015
Grizzly Premium Wintergreen Pouches	21JUL2014	1	5400.0	526.0*	3570.0	11AUG2014
		2	5790.0	563.0*	3590.0	11AUG2014
		3	5670.0	541.0*	3580.0	11AUG2014
	14MAY2015	1	3700.0	546.0*	2720.0	29JUL2015
		2	3550.0	541.0*	2750.0	29JUL2015
		3	3750.0	521.0*	2670.0	29JUL2015
Grizzly Premium Wintergreen Wide Cut	09APR2015	1	3150.0	688.0*	954.0	29JUL2015
		2	2930.0	676.0*	933.0	29JUL2015
		3	2950.0	681.0*	944.0	29JUL2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Kayak Long Cut Straight	06AUG2014	1	1390.0	733.0*	900.0*	22AUG2014
		2	1350.0	732.0*	898.0*	22AUG2014
		3	1280.0	735.0*	902.0*	22AUG2014
	10JUL2015	1	1020.0	652.0*	829.0*	29JUL2015
		2	1050.0	700.0*	890.0*	29JUL2015
		3	944.0*	657.0*	835.0*	29JUL2015
Kayak Long Cut Wintergreen	06AUG2014	1	1010.0*	733.0*	899.0*	21AUG2014
		2	1010.0*	735.0*	902.0*	21AUG2014
		3	1000.0*	728.0*	1030.0*	21AUG2014
	10JUL2015	1	1510.0	709.0*	950.0	29JUL2015
		2	1390.0	697.0*	899.0	29JUL2015
		3	1550.0	736.0*	937.0*	29JUL2015
Klondike Long Cut Straight	10JUL2015	1	6680.0	692.0*	881.0*	27JUL2015
		2	6680.0	704.0*	895.0*	27JUL2015
		3	6530.0	706.0*	898.0*	27JUL2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Klondike Long Cut Wintergreen	10JUL2015	1	6130.0	704.0*	1600.0	27JUL2015
		2	6010.0	682.0*	1580.0	27JUL2015
		3	5850.0	700.0*	1630.0	27JUL2015
Kodiak Premium Wintergreen	11JUL2014	1	3850.0	734.0*	3190.0	04AUG2014
		2	3750.0	730.0*	3250.0	04AUG2014
		3	3720.0	734.0*	3140.0	04AUG2014
	17JUN2015	1	3310.0	689.0*	4250.0	29JUL2015
		2	3240.0	690.0*	4280.0	29JUL2015
		3	3200.0	676.0*	4260.0	29JUL2015
Levi Garrett	24JUL2014	1	1930.0	729.0*	895.0*	04AUG2014
		2	1960.0	733.0*	900.0*	04AUG2014
		3	1850.0	730.0*	896.0*	04AUG2014
	12JUN2015	1	1690.0	675.0*	858.0*	15SEP2015
		2	1710.0	678.0*	863.0*	15SEP2015
		3	1690.0	668.0*	850.0*	15SEP2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Longhorn Mint Long Cut	10JUL2015	1	1880.0	705.0*	897.0*	22JUL2015
		2	1770.0	705.0*	897.0*	22JUL2015
		3	1740.0	705.0*	897.0*	22JUL2015
Longhorn Natural Fine Cut	06AUG2014	1	2510.0	731.0*	897.0*	21AUG2014
		2	2550.0	731.0*	898.0*	21AUG2014
		3	3190.0	733.0*	900.0*	21AUG2014
	10JUL2015	1	1010.0*	706.0*	898.0*	22JUL2015
		2	1010.0*	701.0*	892.0*	22JUL2015
		3	1010.0*	702.0*	893.0*	22JUL2015
Longhorn Wintergreen Long Cut	06AUG2014	1	4840.0	731.0*	920.0	21AUG2014
		2	4790.0	731.0*	938.0	21AUG2014
		3	4880.0	733.0*	925.0	21AUG2014
	10JUL2015	1	3050.0	703.0*	1930.0	22JUL2015
		2	2790.0	707.0*	1890.0	22JUL2015
		3	2710.0	706.0*	1890.0	22JUL2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.



Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Navy Sweet Dry Snuff	06AUG2014	1	2860.0	734.0*	1560.0	25AUG2014
		2	2720.0	731.0*	1540.0	25AUG2014
		3	2700.0	730.0*	1580.0	25AUG2014
	10JUL2015	1	3250.0	677.0*	2450.0	05SEP2015
		2	3130.0	687.0*	2430.0	05SEP2015
		3	3190.0	674.0*	2440.0	05SEP2015
Railroad Mills Sweet Scotch	06AUG2014	1	2100.0	729.0*	988.0	25AUG2014
		2	1890.0	729.0*	990.0	25AUG2014
		3	1600.0	731.0*	976.0	25AUG2014
Red Man Original Chewing Tobacco	06AUG2014	1	2750.0	731.0*	897.0*	26AUG2014
		2	2660.0	735.0*	902.0*	26AUG2014
		3	2660.0	734.0*	901.0*	26AUG2014
	10JUL2015	1	2200.0	696.0*	885.0*	15SEP2015
		2	2230.0	707.0*	900.0*	15SEP2015
		3	2200.0	684.0*	870.0*	15SEP2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			Completed Analysis Date
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	
Red Seal Fine Cut Natural	10JUL2015	1	1000.0*	696.0*	885.0*	27JUL2015
		2	1010.0*	700.0*	891.0*	27JUL2015
		3	978.0*	681.0*	866.0*	27JUL2015
Red Seal Fine Cut Wintergreen	10JUL2015	1	2750.0	656.0*	899.0	29JUL2015
		2	2790.0	728.0*	936.0	29JUL2015
		3	2670.0	708.0*	917.0	29JUL2015
Red Seal Long Cut Wintergreen	06AUG2014	1	4150.0	729.0*	895.0*	22AUG2014
		2	4220.0	732.0*	899.0*	22AUG2014
		3	4310.0	730.0*	897.0*	22AUG2014
	10JUL2015	1	1770.0	716.0*	911.0*	29JUL2015
		2	1850.0	719.0*	915.0*	29JUL2015
		3	1770.0	744.0*	947.0*	29JUL2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Skoal Long Cut Mint	06AUG2014	1	1010.0*	732.0*	898.0*	22AUG2014
		2	1010.0*	733.0*	900.0*	22AUG2014
		3	1010.0*	733.0*	900.0*	22AUG2014
	10JUL2015	1	979.0*	681.0*	867.0*	27JUL2015
		2	988.0*	688.0*	875.0*	27JUL2015
		3	970.0*	675.0*	859.0*	27JUL2015
	06AUG2014	1	1010.0*	734.0*	901.0*	22AUG2014
		2	1000.0*	730.0*	896.0*	22AUG2014
		3	1010.0*	734.0*	902.0*	22AUG2014
Skoal Long Cut Straight	10JUL2015	1	961.0*	669.0*	851.0*	27JUL2015
		2	978.0*	680.0*	865.0*	27JUL2015
		3	960.0*	668.0*	849.0*	27JUL2015
	06AUG2014	1	2190.0	730.0*	896.0*	22AUG2014
		2	2190.0	731.0*	898.0*	22AUG2014
		3	2140.0	734.0*	900.0*	22AUG2014
	10JUL2015	1	2280.0	705.0*	1420.0	22JUL2015
		2	2440.0	701.0*	1330.0	22JUL2015
		3	2340.0	704.0*	1340.0	22JUL2015
Skoal Original Fine Cut Wintergreen	06AUG2014	1	2190.0	730.0*	896.0*	22AUG2014
		2	2190.0	731.0*	898.0*	22AUG2014
		3	2140.0	734.0*	900.0*	22AUG2014
	10JUL2015	1	2280.0	705.0*	1420.0	22JUL2015
		2	2440.0	701.0*	1330.0	22JUL2015
		3	2340.0	704.0*	1340.0	22JUL2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Skoal X-tra Long Cut Mint Blend	06AUG2014	1	1000.0*	729.0*	895.0*	26AUG2014
		2	1010.0*	734.0*	901.0*	26AUG2014
		3	1000.0*	730.0*	897.0*	26AUG2014
	10JUL2015	1	965.0*	671.0*	854.0*	27JUL2015
		2	1000.0*	698.0*	889.0*	27JUL2015
		3	1010.0*	699.0*	890.0*	27JUL2015
Starr Chewing Tobacco	06AUG2014	1	3490.0	734.0*	901.0*	26AUG2014
		2	3400.0	731.0*	897.0*	26AUG2014
		3	3460.0	733.0*	900.0*	26AUG2014
Stokers Tennessee Chew Original	10JUL2015	1	6340.0	653.0*	831.0*	15SEP2015
		2	6690.0	652.0*	830.0*	15SEP2015
		3	6600.0	667.0*	849.0*	15SEP2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Stokers Wintergreen Long Cut	06AUG2014	1	4330.0	731.0*	1180.0	26AUG2014
		2	4500.0	733.0*	1260.0	26AUG2014
		3	4640.0	735.0*	1280.0	26AUG2014
Superior Dry Snuff	06AUG2014	1	1160.0	733.0*	1670.0	25AUG2014
		2	1150.0	729.0*	1660.0	25AUG2014
		3	1140.0	731.0*	1640.0	25AUG2014
	10JUL2015	1	961.0*	668.0*	N/A	11SEP2015
		2	971.0*	676.0*	2150.0	11SEP2015
		3	955.0*	665.0*	2130.0	11SEP2015
Timber Wolf Mint Long Cut	10JUL2015	1	N/A	N/A	2120.0	26JAN2016
		2	1510.0	705.0*	898.0*	22JUL2015
		3	1420.0	705.0*	898.0*	22JUL2015
		3	1450.0	703.0*	895.0*	22JUL2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Carbonyl Analysis			
			Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	Completed Analysis Date
Timber Wolf Wintergreen Long Cut	06AUG2014	1	3390.0	733.0*	900.0*	26AUG2014
		2	3470.0	730.0*	896.0*	26AUG2014
		3	3320.0	729.0*	894.0*	26AUG2014
Tube Rose Scotch	20MAR2015	1	2610.0	649.0*	5140.0	05SEP2015
		2	3180.0	703.0*	6000.0	05SEP2015
		3	2740.0	677.0*	5430.0	05SEP2015
W.E. Garrett & Sons Scotch	18JUL2014	1	2180.0	731.0*	6930.0	05AUG2014
		2	2080.0	730.0*	7020.0	05AUG2014
		3	2010.0	733.0*	6850.0	05AUG2014
	16JUN2015	1	2440.0	702.0*	6270.0	05SEP2015
		2	2410.0	701.0*	6300.0	05SEP2015
		3	2350.0	670.0*	6150.0	05SEP2015

N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Metal Analysis		
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Beechnut Chewing Tobacco	06AUG2014	1	123.2	713.4	25AUG2014
		2	208.8	515.3	25AUG2014
		3	95.1	392.0	25AUG2014
		4	112.6	370.8	27AUG2014
		5	122.6	388.2	27AUG2014
		6	104.4	359.2	27AUG2014
Beechnut Wintergreen Chewing Tobacco	10JUL2015	1	139.4	336.7	28AUG2015
		2	262.5	549.2	28AUG2015
		3	217.2	533.4	28AUG2015
		4	217.9	N/A	02SEP2015
		5	174.6	N/A	02SEP2015
		6	126.3	N/A	02SEP2015
Camel Snus Frost	07AUG2014	1	76.1	403.7	21AUG2014
		2	76.8	394.2	21AUG2014
		3	82.4	389.1	21AUG2014
	21MAY2015	1	65.6	383.6	05AUG2015
		2	65.5	405.7	05AUG2015
		3	63.0	410.2	05AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Metal Analysis		
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Camel Snus Frost Large	07AUG2014	1	77.6	405.3	21AUG2014
		2	76.0	400.1	21AUG2014
		3	74.3	403.9	21AUG2014
	08JUN2015	1	57.6	458.5	13AUG2015
		2	59.2	474.2	13AUG2015
		3	56.3	455.7	13AUG2015
Camel Snus Mellow	20AUG2014	1	65.6	386.2	09SEP2014
		2	68.2	391.5	09SEP2014
		3	63.3	388.4	09SEP2014
	02JUN2015	1	47.6	399.6	13AUG2015
		2	52.8	393.5	13AUG2015
		3	54.8	390.3	13AUG2015
Camel Snus Mint	30JUL2014	1	69.6	392.1	26AUG2014
		2	76.0	389.1	26AUG2014
		3	76.0	388.5	26AUG2014
	26MAY2015	1	57.5	452.6	13AUG2015
		2	55.3	443.8	13AUG2015
		3	62.2	427.3	13AUG2015

N/A=not available



Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Metal Analysis		
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Camel Snus Robust	28JUL2014	1	69.2	391.8	21AUG2014
		2	74.4	399.0	21AUG2014
		3	72.3	393.6	21AUG2014
	18JUN2015	1	72.8	377.2	05AUG2015
		2	72.4	371.2	05AUG2015
		3	70.2	381.7	05AUG2015
Camel Snus Winterchill	18AUG2014	1	65.8	365.0	09SEP2014
		2	63.6	364.8	09SEP2014
		3	74.1	365.9	09SEP2014
	05JUN2015	1	66.5	383.6	28AUG2015
		2	67.3	382.9	28AUG2015
		3	64.5	389.1	28AUG2015
Copenhagen Long Cut	06AUG2014	1	88.6	400.7	20AUG2014
		2	93.6	388.9	20AUG2014
		3	91.4	396.9	20AUG2014
	10JUL2015	1	99.1	466.4	12AUG2015
		2	88.7	460.5	12AUG2015
		3	96.9	470.4	12AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Metal Analysis		
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Copenhagen Long Cut Southern Blend	06AUG2014	1	123.6	464.9	20AUG2014
		2	124.5	462.9	20AUG2014
		3	120.3	467.6	20AUG2014
	10JUL2015	1	115.3	522.3	12AUG2015
		2	112.3	524.5	12AUG2015
		3	114.4	501.0	12AUG2015
Copenhagen Long Cut Wintergreen	06AUG2014	1	91.6	426.5	20AUG2014
		2	97.9	421.5	20AUG2014
		3	93.7	424.6	20AUG2014
	10JUL2015	1	88.7	375.1	04AUG2015
		2	91.2	386.6	04AUG2015
		3	94.7	380.7	04AUG2015
Copenhagen Pouches	06AUG2014	1	133.9	585.4	20AUG2014
		2	130.5	625.0	20AUG2014
		3	129.0	589.3	20AUG2014
	10JUL2015	1	71.3	N/A	13AUG2015
		2	105.8	N/A	13AUG2015
		3	102.7	506.5	13AUG2015
		4	N/A	507.8	14AUG2015
		5	N/A	533.9	14AUG2015
		6	N/A	489.7	14AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Metal Analysis		
			Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Copenhagen Pouches Wintergreen	10JUL2015	1	103.5	450.3	12AUG2015
		2	98.6	447.8	12AUG2015
		3	92.9	447.3	12AUG2015
Copenhagen Snuff Fine Cut	06AUG2014	1	129.0	542.9	20AUG2014
		2	116.4	536.3	20AUG2014
		3	114.7	533.7	20AUG2014
	10JUL2015	2	118.8	542.5	13AUG2015
		3	127.0	523.8	13AUG2015
		4	117.7	533.7	14AUG2015
		5	112.1	554.1	14AUG2015
		6	115.8	531.6	14AUG2015
Grizzly Premium Mint Long Cut	24JUL2014	1	119.4	502.0	07AUG2014
		2	103.0	490.3	07AUG2014
		3	97.0	498.3	07AUG2014
	31MAR2015	1	112.1	644.9	13AUG2015
		2	86.6	654.5	13AUG2015
		3	88.7	665.0	13AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Metal Analysis		
			Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Grizzly Premium Natural Fine Cut	24JUL2014	1	117.2	590.6	05AUG2014
		2	103.8	575.0	05AUG2014
		3	112.9	570.8	05AUG2014
	13APR2015	1	95.9	591.8	13AUG2015
		2	107.3	585.7	13AUG2015
		3	97.8	605.8	13AUG2015
Grizzly Premium Natural Snuff	02APR2015	1	133.0	521.9	13AUG2015
		2	115.1	523.4	13AUG2015
		3	109.5	535.2	13AUG2015
Grizzly Premium Straight Long Cut	18JUL2014	1	182.4	684.4	07AUG2014
		2	178.5	683.2	07AUG2014
		3	211.1	669.0	07AUG2014
	14APR2015	1	188.4	625.3	04AUG2015
		2	171.9	621.3	04AUG2015
		3	189.8	617.0	04AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Metal Analysis		
			Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Grizzly Premium Wintergreen Long Cut	08JUL2014	1	141.1	535.5	07AUG2014
		2	164.0	535.2	07AUG2014
		3	137.9	524.4	07AUG2014
	06MAY2015	1	111.8	589.3	04AUG2015
		2	144.7	592.6	04AUG2015
		3	109.7	592.5	04AUG2015
Grizzly Premium Wintergreen Pouches	21JUL2014	1	118.9	490.9	07AUG2014
		2	108.6	497.4	07AUG2014
		3	109.7	498.8	07AUG2014
	14MAY2015	1	106.8	553.8	13AUG2015
		2	127.2	521.8	13AUG2015
		3	116.5	544.1	13AUG2015
Grizzly Premium Wintergreen Wide Cut	09APR2015	1	113.1	509.0	13AUG2015
		2	106.4	517.8	13AUG2015
		3	105.1	499.6	13AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Metal Analysis		
			Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Kayak Long Cut Straight	06AUG2014	1	119.7	582.4	25AUG2014
		2	133.2	589.2	25AUG2014
		3	128.7	598.9	25AUG2014
	10JUL2015	1	93.6	456.2	12AUG2015
		2	105.5	461.8	12AUG2015
		3	101.1	457.2	12AUG2015
Kayak Long Cut Wintergreen	06AUG2014	1	150.5	727.5	25AUG2014
		2	134.5	712.9	25AUG2014
		3	130.9	717.3	25AUG2014
	10JUL2015	1	128.6	536.7	12AUG2015
		2	117.1	514.6	12AUG2015
		3	125.3	528.1	12AUG2015
Klondike Long Cut Straight	10JUL2015	1	42.3	364.4	13AUG2015
		2	48.7	371.7	13AUG2015
		3	45.6	361.0	13AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Metal Analysis		
			Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Klondike Long Cut Wintergreen	10JUL2015	1	43.3	347.4	12AUG2015
		2	46.9	353.1	12AUG2015
		3	54.4	350.7	12AUG2015
Kodiak Premium Wintergreen	11JUL2014	1	134.5	546.1	07AUG2014
		2	151.5	573.4	07AUG2014
		3	148.3	583.9	07AUG2014
	17JUN2015	1	124.9	654.1	13AUG2015
		2	120.3	658.9	13AUG2015
		3	122.8	662.1	13AUG2015
Levi Garrett	24JUL2014	1	127.3	396.9	05AUG2014
		2	171.4	269.6	05AUG2014
		3	94.9	1068.0	05AUG2014
		4	101.0	950.7	18AUG2014
		5	191.0	553.9	18AUG2014
		6	137.1	709.7	18AUG2014
	12JUN2015	1	152.7	688.0	28AUG2015
		2	123.6	173.4	28AUG2015
		3	114.9	571.2	28AUG2015
		4	N/A	1989.0	02SEP2015
		5	N/A	391.6	02SEP2015
		6	N/A	711.3	02SEP2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Metal Analysis		
			Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Longhorn Mint Long Cut	10JUL2015	1	102.8	529.7	04AUG2015
		2	111.5	538.2	04AUG2015
		3	112.0	549.6	04AUG2015
Longhorn Natural Fine Cut	06AUG2014	1	87.1	526.1	20AUG2014
		2	81.6	519.4	20AUG2014
		3	90.1	528.5	20AUG2014
	10JUL2015	1	89.9	483.4	04AUG2015
		2	81.8	478.4	04AUG2015
		3	85.8	482.2	04AUG2015
Longhorn Wintergreen Long Cut	06AUG2014	1	82.1	539.2	20AUG2014
		2	81.6	534.1	20AUG2014
		3	78.0	551.2	20AUG2014
	10JUL2015	1	98.6	487.7	04AUG2015
		2	105.7	498.2	04AUG2015
		3	105.5	497.3	04AUG2015

N/A=not available



Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Metal Analysis		
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Navy Sweet Dry Snuff	06AUG2014	1	134.7	1122.0	25AUG2014
		2	132.1	1098.0	25AUG2014
		3	128.1	1098.0	25AUG2014
	10JUL2015	1	133.7	1037.0	28AUG2015
		2	133.5	986.1	28AUG2015
		3	162.3	1051.0	28AUG2015
Railroad Mills Sweet Scotch	06AUG2014	1	121.7	1505.0	25AUG2014
		2	128.7	1519.0	25AUG2014
		3	124.8	1526.0	25AUG2014
Red Man Original Chewing Tobacco	06AUG2014	1	89.0	489.4	25AUG2014
		2	101.8	493.4	25AUG2014
		3	82.0	318.2	25AUG2014
	10JUL2015	1	119.8	402.0	28AUG2015
		2	67.6	683.3	28AUG2015
		3	102.9	469.2	28AUG2015
		4	108.0	N/A	02SEP2015
		5	105.6	N/A	02SEP2015
		6	91.2	N/A	02SEP2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Metal Analysis		
			Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Red Seal Fine Cut Natural	10JUL2015	1	104.1	552.3	12AUG2015
		2	95.9	546.0	12AUG2015
		3	101.3	551.8	12AUG2015
Red Seal Fine Cut Wintergreen	10JUL2015	1	102.2	515.7	04AUG2015
		2	106.8	514.4	04AUG2015
		3	101.3	515.5	04AUG2015
Red Seal Long Cut Wintergreen	06AUG2014	1	93.2	447.7	25AUG2014
		2	99.4	449.8	25AUG2014
		3	97.3	442.3	25AUG2014
	10JUL2015	1	91.4	481.8	12AUG2015
		2	97.4	495.3	12AUG2015
		3	94.3	493.0	12AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Metal Analysis		
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Skoal Long Cut Mint	06AUG2014	1	103.6	428.7	25AUG2014
		2	96.9	430.7	25AUG2014
		3	93.8	409.1	25AUG2014
	10JUL2015	1	100.1	392.8	04AUG2015
		2	105.1	401.0	04AUG2015
		3	96.1	404.4	04AUG2015
Skoal Long Cut Straight	06AUG2014	1	89.7	375.7	25AUG2014
		2	100.4	395.7	25AUG2014
		3	91.4	413.5	25AUG2014
	10JUL2015	1	83.0	393.1	04AUG2015
		2	87.9	381.7	04AUG2015
		3	98.5	383.9	04AUG2015
Skoal Original Fine Cut Wintergreen	06AUG2014	1	136.5	569.2	25AUG2014
		2	122.7	567.2	25AUG2014
		3	133.3	561.8	25AUG2014
	10JUL2015	1	109.8	487.2	04AUG2015
		2	125.4	487.2	04AUG2015
		3	128.6	494.8	04AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Metal Analysis		
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Skoal X-tra Long Cut Mint Blend	06AUG2014	1	104.2	409.1	21AUG2014
		2	114.8	389.4	21AUG2014
		3	107.2	367.0	21AUG2014
	10JUL2015	1	99.2	373.3	04AUG2015
		2	110.4	403.5	04AUG2015
		3	105.4	399.3	04AUG2015
Starr Chewing Tobacco	06AUG2014	1	77.3	632.2	25AUG2014
		2	79.5	449.3	25AUG2014
		3	70.0	561.0	25AUG2014
Stokers Tennessee Chew Original	10JUL2015	1	72.5	491.6	28AUG2015
		2	80.9	324.5	28AUG2015
		3	60.5	281.6	28AUG2015
		4	N/A	505.3	02SEP2015
		5	N/A	730.6	02SEP2015
		6	N/A	357.5	02SEP2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Metal Analysis		
			Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Stokers Wintergreen Long Cut	06AUG2014	1	94.7	541.2	21AUG2014
		2	78.6	531.9	21AUG2014
		3	86.7	528.1	21AUG2014
Superior Dry Snuff	06AUG2014	1	214.7	1605.0	21AUG2014
		2	211.2	1593.0	21AUG2014
		3	206.4	1574.0	21AUG2014
	10JUL2015	1	235.6	1441.0	28AUG2015
		2	230.9	1445.0	28AUG2015
		3	233.0	1421.0	28AUG2015
Timber Wolf Mint Long Cut	10JUL2015	1	99.5	512.0	04AUG2015
		2	100.8	517.8	04AUG2015
		3	87.6	528.4	04AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Metal Analysis		
			Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date
Timber Wolf Wintergreen Long Cut	06AUG2014	1	92.5	601.6	21AUG2014
		2	101.0	601.0	21AUG2014
		3	103.6	607.7	21AUG2014
Tube Rose Scotch	20MAR2015	1	189.0	1188.0	05AUG2015
		2	212.3	1197.0	05AUG2015
		3	202.0	1214.0	05AUG2015
W.E. Garrett & Sons Scotch	18JUL2014	1	175.0	1129.0	07AUG2014
		2	164.3	1149.0	07AUG2014
		3	178.0	1180.0	07AUG2014
	16JUN2015	1	211.7	1235.0	05AUG2015
		2	193.5	1225.0	05AUG2015
		3	219.1	1281.0	05AUG2015

N/A=not available

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Beechnut Chewing Tobacco	06AUG2014	1	N/A	26.8*	35.7*	20AUG2014
		2	N/A	28.2*	37.6*	20AUG2014
		3	N/A	26.9*	35.9*	20AUG2014
		1	4.95	N/A	N/A	02SEP2014
		2	5.00	N/A	N/A	02SEP2014
		3	5.15	N/A	N/A	02SEP2014
Beechnut Wintergreen Chewing Tobacco	10JUL2015	1	4.35	N/A	N/A	08SEP2015
		2	4.70	N/A	N/A	08SEP2015
		3	3.67	N/A	N/A	08SEP2015
		1	N/A	26.2*	34.8*	26JAN2016
		2	N/A	28.4*	37.8*	26JAN2016
		3	N/A	27.7*	36.8*	26JAN2016
Camel Snus Frost	07AUG2014	1	N/A	26.2*	34.9*	20AUG2014
		2	N/A	24.4*	32.5*	20AUG2014
		3	N/A	23.7*	31.5*	20AUG2014
		1	1.18	N/A	N/A	02SEP2014
		2	1.02	N/A	N/A	02SEP2014
		3	1.08	N/A	N/A	02SEP2014
	21MAY2015	1	0.90	N/A	N/A	03AUG2015
		2	0.81*	N/A	N/A	03AUG2015
		3	0.98	N/A	N/A	03AUG2015

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Camel Snus Frost	21MAY2015	1	N/A	48.0*	63.8*	16DEC2015
		2	N/A	48.0*	63.9*	16DEC2015
		3	N/A	43.9*	58.5*	16DEC2015
Camel Snus Frost Large	07AUG2014	1	N/A	26.6*	35.5*	20AUG2014
		2	N/A	29.0*	38.7*	20AUG2014
		3	N/A	27.9*	37.2*	20AUG2014
		1	1.24	N/A	N/A	02SEP2014
		2	1.30	N/A	N/A	02SEP2014
		3	1.20	N/A	N/A	02SEP2014
	08JUN2015	1	1.01*	N/A	N/A	03AUG2015
		2	1.07*	N/A	N/A	03AUG2015
		3	1.06*	N/A	N/A	03AUG2015
		1	N/A	30.1*	40.0*	08JAN2016
		2	N/A	32.4*	43.2*	08JAN2016
		3	N/A	29.1*	38.8*	08JAN2016
Camel Snus Mellow	20AUG2014	1	1.26	N/A	N/A	29AUG2014
		2	1.13	N/A	N/A	29AUG2014
		3	1.22	N/A	N/A	29AUG2014
		1	N/A	23.7*	31.6*	30JAN2015
		2	N/A	23.5*	31.4*	30JAN2015
		3	N/A	21.7*	29.0*	30JAN2015

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.



Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Camel Snus Mellow	20AUG2014	1	N/A	22.5*	30.0*	02NOV2015
		2	N/A	23.5*	31.3*	02NOV2015
		3	N/A	25.2*	33.6*	02NOV2015
	02JUN2015	1	0.78	N/A	N/A	03AUG2015
		2	0.84	N/A	N/A	03AUG2015
		3	0.80	N/A	N/A	03AUG2015
		1	N/A	46.1*	61.3*	08JAN2016
		2	N/A	49.8*	66.2*	08JAN2016
		3	N/A	49.2*	65.4*	08JAN2016
Camel Snus Mint	30JUL2014	1	N/A	26.6*	35.5*	20AUG2014
		2	N/A	25.6*	34.1*	20AUG2014
		3	N/A	25.1*	33.5*	20AUG2014
		1	1.35	N/A	N/A	25AUG2014
		2	1.38	N/A	N/A	25AUG2014
		3	1.31	N/A	N/A	25AUG2014
	26MAY2015	1	0.91	N/A	N/A	03AUG2015
		2	0.94	N/A	N/A	03AUG2015
		3	0.90	N/A	N/A	03AUG2015
		1	N/A	43.8*	58.2*	26JAN2016
		2	N/A	47.3*	62.9*	26JAN2016
		3	N/A	41.0*	54.5*	26JAN2016

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 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Camel Snus Robust	28JUL2014	1	1.08	N/A	N/A	02SEP2014
		2	1.07	N/A	N/A	02SEP2014
		3	1.03	N/A	N/A	02SEP2014
		1	N/A	27.3*	36.5*	02NOV2015
		2	N/A	27.4*	36.5*	02NOV2015
		3	N/A	29.3*	39.0*	02NOV2015
	18JUN2015	1	1.02*	N/A	N/A	03AUG2015
		2	0.96*	N/A	N/A	03AUG2015
		3	0.99*	N/A	N/A	03AUG2015
		1	N/A	31.9*	42.4*	08JAN2016
		2	N/A	27.8*	37.0*	08JAN2016
		3	N/A	28.0*	37.2*	08JAN2016
Camel Snus Winterchill	18AUG2014	1	1.32	N/A	N/A	29AUG2014
		2	1.23	N/A	N/A	29AUG2014
		3	1.19	N/A	N/A	29AUG2014
		1	N/A	29.1*	38.9*	02NOV2015
		2	N/A	28.5*	38.0*	02NOV2015
		3	N/A	35.7*	47.6*	02NOV2015
	05JUN2015	1	2.05	N/A	N/A	03AUG2015
		2	1.22	N/A	N/A	03AUG2015
		3	1.07*	N/A	N/A	03AUG2015

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Camel Snus Winterchill	05JUN2015	1	N/A	28.3*	37.7*	16DEC2015
		2	N/A	32.0*	42.6*	16DEC2015
		3	N/A	35.5*	47.3*	16DEC2015
Copenhagen Long Cut	06AUG2014	1	85.18	N/A	N/A	19AUG2014
		2	82.87	N/A	N/A	19AUG2014
		3	85.48	N/A	N/A	19AUG2014
		1	N/A	77.1	36.6*	30JAN2015
		2	N/A	79.0	36.8*	30JAN2015
		3	N/A	74.7	35.9*	30JAN2015
	10JUL2015	1	58.04	N/A	N/A	03AUG2015
		2	59.38	N/A	N/A	03AUG2015
		3	59.09	N/A	N/A	03AUG2015
		1	N/A	68.3	38.0*	15SEP2015
		2	N/A	68.3	38.1*	15SEP2015
		3	N/A	70.5	37.9*	15SEP2015
Copenhagen Long Cut Southern Blend	06AUG2014	1	31.43	N/A	N/A	21AUG2014
		2	31.65	N/A	N/A	21AUG2014
		3	30.87	N/A	N/A	21AUG2014
		1	N/A	32.3	36.6*	30JAN2015
		2	N/A	32.1	35.8*	30JAN2015
		3	N/A	32.4	37.2*	30JAN2015

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Copenhagen Long Cut Southern Blend	10JUL2015	1	31.68	N/A	N/A	22JUL2015
		2	31.34	N/A	N/A	22JUL2015
		3	29.96	N/A	N/A	22JUL2015
		1	N/A	35.1	35.0*	30SEP2015
		2	N/A	34.0	36.4*	30SEP2015
		3	N/A	33.8	35.0*	30SEP2015
	06AUG2014	1	46.59	N/A	N/A	19AUG2014
		2	52.25	N/A	N/A	19AUG2014
		3	51.20	N/A	N/A	19AUG2014
Copenhagen Long Cut Wintergreen		1	N/A	47.1	36.4*	30JAN2015
		2	N/A	49.9	35.2*	30JAN2015
		3	N/A	48.7	36.4*	30JAN2015
	10JUL2015	1	54.78	N/A	N/A	21JUL2015
		2	50.60	N/A	N/A	21JUL2015
		3	47.89	N/A	N/A	21JUL2015
		1	N/A	72.2	38.0*	15SEP2015
		2	N/A	70.0	37.9*	15SEP2015
		3	N/A	69.6	37.3*	15SEP2015
	06AUG2014	1	67.77	N/A	N/A	19AUG2014
		2	61.33	N/A	N/A	19AUG2014
		3	63.54	N/A	N/A	19AUG2014

B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Copenhagen Pouches	06AUG2014	1	N/A	88.5	33.8	30JAN2015
		2	N/A	83.2	32.0	30JAN2015
		3	N/A	73.5	28.4	30JAN2015
	10JUL2015	1	54.15	N/A	N/A	22JUL2015
		2	52.62	N/A	N/A	22JUL2015
		3	48.72	N/A	N/A	22JUL2015
		1	N/A	83.5	32.8	11SEP2015
		2	N/A	81.6	32.3	11SEP2015
		3	N/A	73.1	29.8	11SEP2015
Copenhagen Pouches Wintergreen	10JUL2015	1	50.91	N/A	N/A	22JUL2015
		2	44.13	N/A	N/A	22JUL2015
		3	42.08	N/A	N/A	22JUL2015
		1	N/A	66.8	25.8*	30SEP2015
		2	N/A	71.4	24.0*	30SEP2015
		3	N/A	70.2	24.2*	30SEP2015
Copenhagen Snuff Fine Cut	06AUG2014	1	87.20	N/A	N/A	19AUG2014
		2	88.79	N/A	N/A	19AUG2014
		3	84.25	N/A	N/A	19AUG2014
		1	N/A	75.1	37.1*	30JAN2015
		2	N/A	71.9	37.5*	30JAN2015
		3	N/A	75.7	36.2*	30JAN2015

B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Copenhagen Snuff Fine Cut	10JUL2015	1	71.67	N/A	N/A	22JUL2015
		2	71.84	N/A	N/A	22JUL2015
		3	70.86	N/A	N/A	22JUL2015
		1	N/A	80.4	33.1	11SEP2015
		2	N/A	78.7	34.2*	11SEP2015
		3	N/A	80.9	32.1	11SEP2015
Grizzly Premium Mint Long Cut	24JUL2014	1	95.00	N/A	N/A	11AUG2014
		2	99.58	N/A	N/A	11AUG2014
		3	96.64	N/A	N/A	11AUG2014
		1	N/A	96.4	40.5	27JAN2015
		2	N/A	95.0	38.6	27JAN2015
		3	N/A	93.4	38.1	27JAN2015
	31MAR2015	1	102.46	N/A	N/A	03AUG2015
		2	97.92	N/A	N/A	03AUG2015
		3	97.38	N/A	N/A	03AUG2015
		1	N/A	108.2	46.4	21JAN2016
		2	N/A	112.3	45.6	21JAN2016
		3	N/A	115.6	47.5	21JAN2016
Grizzly Premium Natural Fine Cut	24JUL2014	1	56.38	N/A	N/A	11AUG2014
		2	71.19	N/A	N/A	11AUG2014
		3	70.88	N/A	N/A	11AUG2014

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Grizzly Premium Natural Fine Cut	24JUL2014	1	N/A	72.1	37.8*	27JAN2015
		2	N/A	71.3	36.1*	27JAN2015
		3	N/A	70.6	34.9*	27JAN2015
	13APR2015	1	88.78	N/A	N/A	22JUL2015
		2	83.99	N/A	N/A	22JUL2015
		3	84.14	N/A	N/A	22JUL2015
		1	N/A	82.6	34.0	11SEP2015
		2	N/A	85.7	33.7	11SEP2015
		3	N/A	79.6	32.7*	11SEP2015
Grizzly Premium Natural Snuff	02APR2015	1	74.21	N/A	N/A	03AUG2015
		2	72.41	N/A	N/A	03AUG2015
		3	71.77	N/A	N/A	03AUG2015
		1	N/A	76.0	34.1*	11SEP2015
		2	N/A	75.4	30.7	11SEP2015
		3	N/A	77.6	32.7*	11SEP2015
Grizzly Premium Straight Long Cut	18JUL2014	1	87.15	N/A	N/A	11AUG2014
		2	83.55	N/A	N/A	11AUG2014
		3	88.15	N/A	N/A	11AUG2014
		1	N/A	83.7	37.9*	27JAN2015
		2	N/A	87.7	36.5*	27JAN2015
		3	N/A	83.1	35.5*	27JAN2015

B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Grizzly Premium Straight Long Cut	14APR2015	1	1.00*	N/A	N/A	31JUL2015
		2	1.02*	N/A	N/A	03AUG2015
		3	1.04*	N/A	N/A	03AUG2015
		1	N/A	91.5	35.5*	30SEP2015
		2	N/A	91.3	34.7*	30SEP2015
		3	N/A	92.7	33.3*	30SEP2015
	08JUL2014	1	130.03	N/A	N/A	11AUG2014
		2	131.37	N/A	N/A	11AUG2014
		3	128.63	N/A	N/A	11AUG2014
Grizzly Premium Wintergreen Long Cut		1	N/A	110.9	44.8	27JAN2015
		2	N/A	110.6	45.3	27JAN2015
		3	N/A	108.8	44.6	27JAN2015
	06MAY2015	1	98.14	N/A	N/A	03AUG2015
		2	96.72	N/A	N/A	03AUG2015
		3	109.50	N/A	N/A	03AUG2015
		1	N/A	163.6	61.8	07JAN2016
		2	N/A	165.6	58.9	07JAN2016
		3	N/A	166.8	61.5	07JAN2016
	21JUL2014	1	117.09	N/A	N/A	11AUG2014
		2	124.38	N/A	N/A	11AUG2014
		3	119.36	N/A	N/A	11AUG2014

B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.



Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Grizzly Premium Wintergreen Pouches	21JUL2014	1	N/A	128.5	53.3	27JAN2015
		2	N/A	130.9	52.0	27JAN2015
		3	N/A	131.3	53.2	27JAN2015
	14MAY2015	1	90.79	N/A	N/A	31JUL2015
		2	82.48	N/A	N/A	03AUG2015
		3	81.65	N/A	N/A	03AUG2015
		1	N/A	149.5	58.4	11SEP2015
		2	N/A	157.3	61.7	11SEP2015
		3	N/A	146.1	57.2	11SEP2015
Grizzly Premium Wintergreen Wide Cut	09APR2015	1	82.49	N/A	N/A	03AUG2015
		2	74.44	N/A	N/A	03AUG2015
		3	73.86	N/A	N/A	03AUG2015
		1	N/A	105.4	35.8	07JAN2016
		2	N/A	114.2	32.5	07JAN2016
		3	N/A	114.8	33.1	07JAN2016
Kayak Long Cut Straight	06AUG2014	1	102.43	N/A	N/A	21AUG2014
		2	109.06	N/A	N/A	21AUG2014
		3	107.88	N/A	N/A	21AUG2014
		1	N/A	102.0	39.3	30JAN2015
		2	N/A	102.2	38.7	30JAN2015
		3	N/A	103.7	40.0	30JAN2015

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Kayak Long Cut Straight	10JUL2015	1	60.61	N/A	N/A	03AUG2015
		2	66.78	N/A	N/A	03AUG2015
		3	64.54	N/A	N/A	03AUG2015
		1	N/A	113.8	41.9	02SEP2015
		2	N/A	113.1	42.9	02SEP2015
		3	N/A	116.1	43.0	02SEP2015
Kayak Long Cut Wintergreen	06AUG2014	1	128.46	N/A	N/A	21AUG2014
		2	117.24	N/A	N/A	21AUG2014
		3	117.11	N/A	N/A	21AUG2014
		1	N/A	100.6	40.3	30JAN2015
		2	N/A	105.5	42.7	30JAN2015
		3	N/A	111.0	44.8	30JAN2015
	10JUL2015	1	90.40	N/A	N/A	03AUG2015
		2	91.00	N/A	N/A	03AUG2015
		3	89.44	N/A	N/A	03AUG2015
		1	N/A	166.3	58.7	07JAN2016
		2	N/A	170.4	60.9	07JAN2016
		3	N/A	168.5	59.7	07JAN2016
Klondike Long Cut Straight	10JUL2015	1	3.84*	N/A	N/A	22JUL2015
		2	3.94*	N/A	N/A	22JUL2015
		3	3.84*	N/A	N/A	22JUL2015

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Klondike Long Cut Straight	10JUL2015	1	N/A	19.8*	26.4*	11SEP2015
		2	N/A	20.4*	27.2*	11SEP2015
		3	N/A	20.8*	27.7*	11SEP2015
Klondike Long Cut Wintergreen	10JUL2015	1	3.85*	N/A	N/A	22JUL2015
		2	3.90*	N/A	N/A	22JUL2015
		3	3.90*	N/A	N/A	22JUL2015
		1	N/A	22.1*	29.4*	30SEP2015
		2	N/A	25.0*	33.4*	30SEP2015
		3	N/A	22.6*	30.1*	30SEP2015
Kodiak Premium Wintergreen	11JUL2014	1	187.68	N/A	N/A	11AUG2014
		2	193.20	N/A	N/A	11AUG2014
		3	190.34	N/A	N/A	11AUG2014
		1	N/A	160.6	61.1	27JAN2015
		2	N/A	159.0	61.3	27JAN2015
		3	N/A	162.8	61.6	27JAN2015
	17JUN2015	1	185.45	N/A	N/A	22JUL2015
		2	180.38	N/A	N/A	22JUL2015
		3	179.93	N/A	N/A	22JUL2015
		1	N/A	190.9	75.3	21JAN2016
		2	N/A	180.4	72.1	21JAN2016
		3	N/A	185.2	74.9	21JAN2016

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Levi Garrett	24JUL2014	1	5.03	N/A	N/A	11AUG2014
		2	4.81	N/A	N/A	11AUG2014
		3	5.17	N/A	N/A	11AUG2014
		1	N/A	27.8*	37.1*	27JAN2015
		2	N/A	28.1*	37.5*	27JAN2015
		3	N/A	26.5*	35.4*	27JAN2015
	12JUN2015	1	3.50	N/A	N/A	08SEP2015
		2	3.56	N/A	N/A	08SEP2015
		3	3.29	N/A	N/A	08SEP2015
		1	N/A	27.9*	37.1*	26JAN2016
		2	N/A	26.3*	35.0*	26JAN2016
		3	N/A	27.0*	36.0*	26JAN2016
Longhorn Mint Long Cut	10JUL2015	1	48.26	N/A	N/A	21JUL2015
		2	61.91	N/A	N/A	21JUL2015
		3	48.38	N/A	N/A	21JUL2015
		1	N/A	61.8	37.1*	15SEP2015
		2	N/A	65.4	36.7*	15SEP2015
		3	N/A	59.9	35.9*	15SEP2015
Longhorn Natural Fine Cut	06AUG2014	1	48.80	N/A	N/A	21AUG2014
		2	49.92	N/A	N/A	21AUG2014
		3	48.11	N/A	N/A	21AUG2014

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Longhorn Natural Fine Cut	06AUG2014	1	N/A	47.0	37.5*	30JAN2015
		2	N/A	46.3	37.1*	30JAN2015
		3	N/A	46.8	36.5*	30JAN2015
	10JUL2015	1	51.92	N/A	N/A	21JUL2015
		2	52.26	N/A	N/A	21JUL2015
		3	52.17	N/A	N/A	21JUL2015
		1	N/A	66.7	35.7*	15SEP2015
		2	N/A	64.2	35.8*	15SEP2015
		3	N/A	63.8	35.1*	15SEP2015
Longhorn Wintergreen Long Cut	06AUG2014	1	59.02	N/A	N/A	21AUG2014
		2	56.53	N/A	N/A	21AUG2014
		3	56.72	N/A	N/A	21AUG2014
		1	N/A	58.3	37.4*	30JAN2015
		2	N/A	57.7	35.7*	30JAN2015
		3	N/A	57.8	36.5*	30JAN2015
	10JUL2015	1	41.98	N/A	N/A	21JUL2015
		2	45.62	N/A	N/A	21JUL2015
		3	42.13	N/A	N/A	21JUL2015
		1	N/A	61.3	30.2*	15SEP2015
		2	N/A	60.4	29.5*	15SEP2015
		3	N/A	60.5	30.0*	15SEP2015

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 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Navy Sweet Dry Snuff	06AUG2014	1	N/A	68.2	36.4*	20AUG2014
		2	N/A	67.5	36.8*	20AUG2014
		3	N/A	68.1	36.6*	20AUG2014
		1	27.07	N/A	N/A	22AUG2014
		2	26.78	N/A	N/A	22AUG2014
		3	27.04	N/A	N/A	22AUG2014
	10JUL2015	1	27.67	N/A	N/A	03AUG2015
		2	27.92	N/A	N/A	03AUG2015
		3	27.66	N/A	N/A	03AUG2015
		1	N/A	84.8	36.5*	08JAN2016
		2	N/A	77.7	36.4*	08JAN2016
		3	N/A	73.3	36.4*	08JAN2016
Railroad Mills Sweet Scotch	06AUG2014	1	N/A	152.2	62.1	20AUG2014
		2	N/A	151.4	64.7	20AUG2014
		3	N/A	157.4	67.6	20AUG2014
		1	52.44	N/A	N/A	22AUG2014
		2	52.54	N/A	N/A	22AUG2014
		3	52.90	N/A	N/A	22AUG2014
Red Man Original Chewing Tobacco	06AUG2014	1	N/A	26.2*	35.0*	20AUG2014
		2	N/A	26.9*	35.9*	20AUG2014
		3	N/A	26.1*	34.8*	20AUG2014

B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Red Man Original Chewing Tobacco	06AUG2014	1	3.82	N/A	N/A	02SEP2014
		2	4.23	N/A	N/A	02SEP2014
		3	4.21	N/A	N/A	02SEP2014
	10JUL2015	1	2.53	N/A	N/A	08SEP2015
		2	2.59	N/A	N/A	08SEP2015
		3	2.52	N/A	N/A	08SEP2015
		1	N/A	28.1*	37.4*	26JAN2016
		2	N/A	28.0*	37.3*	26JAN2016
		3	N/A	27.5*	36.6*	26JAN2016
Red Seal Fine Cut Natural	10JUL2015	1	66.59	N/A	N/A	22JUL2015
		2	66.77	N/A	N/A	22JUL2015
		3	66.56	N/A	N/A	22JUL2015
		1	N/A	70.7	28.9*	30SEP2015
		2	N/A	69.2	30.9*	30SEP2015
		3	N/A	71.3	29.0*	30SEP2015
Red Seal Fine Cut Wintergreen	10JUL2015	1	53.47	N/A	N/A	03AUG2015
		2	58.51	N/A	N/A	03AUG2015
		3	53.86	N/A	N/A	03AUG2015
		1	N/A	97.1	34.2	07JAN2016
		2	N/A	97.3	36.0	07JAN2016
		3	N/A	93.6	34.3	07JAN2016

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Red Seal Long Cut Wintergreen	06AUG2014	1	83.79	N/A	N/A	21AUG2014
		2	76.14	N/A	N/A	21AUG2014
		3	73.66	N/A	N/A	21AUG2014
		1	N/A	84.8	37.9*	30JAN2015
		2	N/A	83.2	35.4*	30JAN2015
		3	N/A	80.6	37.3*	30JAN2015
	10JUL2015	1	66.79	N/A	N/A	03AUG2015
		2	61.09	N/A	N/A	03AUG2015
		3	59.66	N/A	N/A	03AUG2015
		1	N/A	121.5	43.6	07JAN2016
		2	N/A	120.7	42.9	07JAN2016
		3	N/A	120.7	43.4	07JAN2016
Skoal Long Cut Mint	06AUG2014	1	62.07	N/A	N/A	21AUG2014
		2	61.71	N/A	N/A	21AUG2014
		3	62.31	N/A	N/A	21AUG2014
		1	N/A	62.5	36.5*	30JAN2015
		2	N/A	65.1	36.9*	30JAN2015
		3	N/A	63.5	36.9*	30JAN2015
	10JUL2015	1	46.59	N/A	N/A	22JUL2015
		2	45.79	N/A	N/A	22JUL2015
		3	47.67	N/A	N/A	22JUL2015

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.



Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Skoal Long Cut Mint	10JUL2015	1	N/A	49.5	34.8*	30SEP2015
		2	N/A	49.7	30.0*	30SEP2015
		3	N/A	51.6	32.1*	30SEP2015
Skoal Long Cut Straight	06AUG2014	1	73.57	N/A	N/A	21AUG2014
		2	73.11	N/A	N/A	21AUG2014
		3	70.61	N/A	N/A	21AUG2014
		1	N/A	74.1	34.9*	30JAN2015
		2	N/A	78.2	35.9*	30JAN2015
		3	N/A	76.4	36.4*	30JAN2015
	10JUL2015	1	1.05*	N/A	N/A	03AUG2015
		2	1.02*	N/A	N/A	03AUG2015
		3	0.99*	N/A	N/A	03AUG2015
		1	N/A	62.2	36.9*	30SEP2015
		2	N/A	62.7	36.6*	30SEP2015
		3	N/A	58.8	37.5*	30SEP2015
Skoal Original Fine Cut Wintergreen	06AUG2014	1	75.67	N/A	N/A	21AUG2014
		2	70.84	N/A	N/A	21AUG2014
		3	75.57	N/A	N/A	21AUG2014
		1	N/A	79.3	35.3*	30JAN2015
		2	N/A	79.8	34.4*	30JAN2015
		3	N/A	78.5	34.9*	30JAN2015

B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Skoal Original Fine Cut Wintergreen	10JUL2015	1	49.32	N/A	N/A	21JUL2015
		2	52.72	N/A	N/A	21JUL2015
		3	47.65	N/A	N/A	21JUL2015
		1	N/A	66.3	36.6*	15SEP2015
		2	N/A	64.0	36.9*	15SEP2015
		3	N/A	65.1	36.0*	15SEP2015
	06AUG2014	1	53.48	N/A	N/A	22AUG2014
		2	50.78	N/A	N/A	22AUG2014
		3	56.60	N/A	N/A	22AUG2014
Skoal X-tra Long Cut Mint Blend		1	N/A	53.9	37.1*	30JAN2015
		2	N/A	53.6	36.8*	30JAN2015
		3	N/A	54.3	35.9*	30JAN2015
	10JUL2015	1	56.22	N/A	N/A	21JUL2015
		2	56.52	N/A	N/A	21JUL2015
		3	55.62	N/A	N/A	21JUL2015
		1	N/A	54.2	35.6*	30SEP2015
		2	N/A	55.9	32.4*	30SEP2015
		3	N/A	54.8	33.3*	30SEP2015
	06AUG2014	1	N/A	26.6*	35.5*	20AUG2014
		2	N/A	27.5*	36.6*	20AUG2014
		3	N/A	27.8*	37.1*	20AUG2014

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Starr Chewing Tobacco	06AUG2014	1	4.32	N/A	N/A	02SEP2014
		2	4.23	N/A	N/A	02SEP2014
		3	4.42	N/A	N/A	02SEP2014
Stokers Tennessee Chew Original	10JUL2015	1	4.33	N/A	N/A	08SEP2015
		2	4.04	N/A	N/A	08SEP2015
		3	4.18	N/A	N/A	08SEP2015
		1	N/A	26.6*	35.4*	26JAN2016
		2	N/A	21.9*	29.1*	26JAN2016
		3	N/A	28.1*	37.3*	26JAN2016
Stokers Wintergreen Long Cut	06AUG2014	1	78.37	N/A	N/A	22AUG2014
		2	74.37	N/A	N/A	22AUG2014
		3	74.89	N/A	N/A	22AUG2014
		1	N/A	79.6	36.7*	30JAN2015
		2	N/A	83.2	36.8*	30JAN2015
		3	N/A	70.3	35.5*	30JAN2015
Superior Dry Snuff	06AUG2014	1	N/A	289.5	120.0	20AUG2014
		2	N/A	291.5	119.7	20AUG2014
		3	N/A	294.2	123.5	20AUG2014
		1	128.50	N/A	N/A	02SEP2014
		2	128.80	N/A	N/A	02SEP2014
		3	129.43	N/A	N/A	02SEP2014

B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Superior Dry Snuff	10JUL2015	1	129.14	N/A	N/A	03AUG2015
		2	129.63	N/A	N/A	03AUG2015
		3	133.21	N/A	N/A	03AUG2015
		1	N/A	333.1	112.4	26JAN2016
		2	N/A	335.6	111.4	26JAN2016
		3	N/A	334.8	111.7	26JAN2016
Timber Wolf Mint Long Cut	10JUL2015	1	49.09	N/A	N/A	21JUL2015
		2	50.04	N/A	N/A	21JUL2015
		3	45.95	N/A	N/A	21JUL2015
		1	N/A	57.5	36.4*	30SEP2015
		2	N/A	56.4	36.0*	30SEP2015
		3	N/A	56.7	35.0*	30SEP2015
Timber Wolf Wintergreen Long Cut	06AUG2014	1	64.40	N/A	N/A	22AUG2014
		2	61.71	N/A	N/A	22AUG2014
		3	61.86	N/A	N/A	22AUG2014
		1	N/A	56.3	36.6*	30JAN2015
		2	N/A	56.8	35.3*	30JAN2015
		3	N/A	56.7	35.7*	30JAN2015
Tube Rose Scotch	20MAR2015	1	43.82	N/A	N/A	31JUL2015
		2	43.51	N/A	N/A	31JUL2015
		3	44.27	N/A	N/A	31JUL2015

B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons			
			B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	Completed Analysis Date
Tube Rose Scotch	20MAR2015	1	N/A	121.4	37.8*	08JAN2016
		2	N/A	127.5	37.7*	08JAN2016
		3	N/A	120.4	37.7*	08JAN2016
W.E. Garrett & Sons Scotch	18JUL2014	1	254.42	N/A	N/A	11AUG2014
		2	252.53	N/A	N/A	11AUG2014
		3	253.71	N/A	N/A	11AUG2014
		1	N/A	488.0	192.7	27JAN2015
		2	N/A	496.1	190.2	27JAN2015
		3	N/A	493.1	192.6	27JAN2015
	16JUN2015	1	151.46	N/A	N/A	03AUG2015
		2	164.96	N/A	N/A	03AUG2015
		3	163.50	N/A	N/A	03AUG2015
		1	N/A	463.5	174.5	08JAN2016
		2	N/A	383.1	188.0	08JAN2016
		3	N/A	452.2	163.7	08JAN2016

B(a)P= Benzo(a)pyrene    B(a)A= Benz(a)anthracene    B(b/j)FL= Benzo(b/j)fluoranthene    N/A=not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Beechnut Chewing Tobacco	06AUG2014	1	17.9*	26.77*	3.57*	178.5*	20AUG2014
		2	18.8*	28.18*	3.76*	187.8*	20AUG2014
		3	17.9*	26.91*	3.59*	179.4*	20AUG2014
Beechnut Wintergreen Chewing Tobacco	10JUL2015	1	17.4*	26.10*	3.48*	174.0*	26JAN2016
		2	18.9*	28.36*	3.78*	189.1*	26JAN2016
		3	18.4*	27.61*	3.68*	184.1*	26JAN2016
Camel Snus Frost	07AUG2014	1	17.5*	26.17*	3.49*	174.5*	20AUG2014
		2	16.2*	24.35*	3.25*	162.3*	20AUG2014
		3	15.8*	23.65*	3.15*	157.7*	20AUG2014
	21MAY2015	1	31.9*	47.85*	6.38*	319.1*	16DEC2015
		2	31.9*	47.90*	6.39*	319.5*	16DEC2015
		3	29.2*	43.84*	5.85*	292.4*	16DEC2015

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Camel Snus Frost Large	07AUG2014	1	17.8*	26.62*	3.55*	177.5*	20AUG2014
		2	19.3*	29.01*	3.87*	193.4*	20AUG2014
		3	18.6*	27.89*	3.72*	185.9*	20AUG2014
	08JUN2015	1	N/A	30.00*	4.38	200.1*	08JAN2016
		2	N/A	32.37*	5.06	215.8*	08JAN2016
		3	N/A	29.08*	4.73	193.9*	08JAN2016
Camel Snus Mellow	20AUG2014	1	N/A	23.72*	3.85	158.1*	30JAN2015
		2	N/A	23.54*	4.95	157.0*	30JAN2015
		3	N/A	21.73*	4.80	144.9*	30JAN2015
		1	N/A	22.48*	4.40	149.8*	02NOV2015
		2	N/A	23.48*	5.28	156.5*	02NOV2015
		3	N/A	25.18*	4.20	167.9*	02NOV2015
	02JUN2015	1	N/A	46.00*	6.13*	306.8*	08JAN2016
		2	N/A	49.65*	6.62*	331.1*	08JAN2016
		3	N/A	49.08*	6.54*	327.3*	08JAN2016
Camel Snus Mint	30JUL2014	1	17.8*	26.64*	3.55*	177.6*	20AUG2014
		2	17.1*	25.58*	3.41*	170.6*	20AUG2014
		3	16.7*	25.11*	3.35*	167.4*	20AUG2014
	26MAY2015	1	29.1*	43.66*	5.82*	291.1*	26JAN2016
		2	31.4*	47.17*	6.29*	314.5*	26JAN2016
		3	27.3*	40.90*	5.45*	272.8*	26JAN2016

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene

BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Polycyclic Aromatic Hydrocarbons				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	Completed Analysis Date
Camel Snus Robust	28JUL2014	1	N/A	27.33*	5.35	182.2*	02NOV2015
		2	N/A	27.41*	5.20	182.7*	02NOV2015
		3	N/A	29.25*	5.30	195.0*	02NOV2015
	18JUN2015	1	N/A	31.83*	4.31	212.2*	08JAN2016
		2	N/A	27.78*	3.70	185.2*	08JAN2016
		3	N/A	27.89*	3.72*	186.0*	08JAN2016
Camel Snus Winterchill	18AUG2014	1	N/A	29.14*	5.77	194.2*	02NOV2015
		2	N/A	28.49*	6.53	189.9*	02NOV2015
		3	N/A	35.66*	5.94	237.7*	02NOV2015
	05JUN2015	1	18.8*	28.24*	3.77*	188.3*	16DEC2015
		2	21.3*	31.97*	4.26*	213.2*	16DEC2015
		3	23.6*	35.46*	4.73*	236.5*	16DEC2015
Copenhagen Long Cut	06AUG2014	1	N/A	27.48*	6.13	183.2*	30JAN2015
		2	N/A	27.60*	6.38	184.0*	30JAN2015
		3	N/A	26.93*	4.99	179.5*	30JAN2015
	10JUL2015	1	N/A	28.52*	5.05	190.1*	15SEP2015
		2	N/A	28.58*	4.41	190.5*	15SEP2015
		3	N/A	28.41*	5.39	189.4*	15SEP2015

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene

BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.



Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Polycyclic Aromatic Hydrocarbons				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	Completed Analysis Date
Copenhagen Long Cut Southern Blend	06AUG2014	1	N/A	27.47*	3.66*	183.1*	30JAN2015
		2	N/A	26.87*	3.58*	179.2*	30JAN2015
		3	N/A	27.88*	3.72*	185.9*	30JAN2015
	10JUL2015	1	N/A	26.27*	3.50*	175.2*	30SEP2015
		2	N/A	27.29*	3.64*	182.0*	30SEP2015
		3	N/A	26.27*	3.50*	175.2*	30SEP2015
Copenhagen Long Cut Wintergreen	06AUG2014	1	N/A	27.33*	4.27	182.2*	30JAN2015
		2	N/A	26.41*	5.01	176.1*	30JAN2015
		3	N/A	27.33*	5.18	182.2*	30JAN2015
	10JUL2015	1	N/A	28.47*	6.88	N/A	15SEP2015
		2	N/A	28.43*	5.69	N/A	15SEP2015
		3	N/A	27.94*	7.04	N/A	15SEP2015
Copenhagen Pouches	06AUG2014	1	N/A	19.87*	7.33	132.5*	30JAN2015
		2	N/A	17.51*	6.90	116.8*	30JAN2015
		3	N/A	16.16*	6.70	107.7*	30JAN2015
	10JUL2015	1	N/A	19.43*	6.60	129.6*	11SEP2015
		2	N/A	18.86*	6.60	125.7*	11SEP2015
		3	N/A	18.40*	6.44	122.6*	11SEP2015

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Copenhagen Pouches Wintergreen	10JUL2015	1	N/A	19.35*	5.08	N/A	30SEP2015
		2	N/A	18.00*	5.44	N/A	30SEP2015
		3	N/A	18.13*	5.33	N/A	30SEP2015
Copenhagen Snuff Fine Cut	06AUG2014	1	N/A	27.81*	6.26	185.4*	30JAN2015
		2	N/A	28.09*	6.14	187.2*	30JAN2015
		3	N/A	27.18*	6.34	181.2*	30JAN2015
	10JUL2015	1	N/A	24.80*	6.66	165.3*	11SEP2015
		2	N/A	25.62*	7.15	170.8*	11SEP2015
		3	N/A	23.20*	6.91	154.7*	11SEP2015
Grizzly Premium Mint Long Cut	24JUL2014	1	N/A	28.24*	6.77	188.3*	27JAN2015
		2	N/A	27.47*	6.93	183.2*	27JAN2015
		3	N/A	26.19*	7.80	174.6*	27JAN2015
	31MAR2015	1	15.3*	23.02*	9.30	N/A	21JAN2016
		2	16.0*	23.96*	9.58	N/A	21JAN2016
		3	16.3*	24.48*	10.35	N/A	21JAN2016

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene

BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Grizzly Premium Natural Fine Cut	24JUL2014	1	N/A	28.33*	5.61	188.8*	27JAN2015
		2	N/A	27.07*	5.58	180.4*	27JAN2015
		3	N/A	26.14*	5.12	174.3*	27JAN2015
	13APR2015	1	N/A	23.25*	7.51	155.0*	11SEP2015
		2	N/A	23.73*	7.66	158.2*	11SEP2015
		3	N/A	24.52*	7.05	163.5*	11SEP2015
Grizzly Premium Natural Snuff	02APR2015	1	N/A	25.54*	5.96	170.3*	11SEP2015
		2	N/A	22.63*	6.69	150.8*	11SEP2015
		3	N/A	24.50*	6.53	163.3*	11SEP2015
Grizzly Premium Straight Long Cut	18JUL2014	1	N/A	28.44*	6.99	189.6*	27JAN2015
		2	N/A	27.34*	7.40	182.2*	27JAN2015
		3	N/A	26.63*	7.16	177.6*	27JAN2015
	14APR2015	1	N/A	26.63*	6.94	177.5*	30SEP2015
		2	N/A	26.00*	6.77	173.3*	30SEP2015
		3	N/A	24.99*	6.40	166.6*	30SEP2015

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Grizzly Premium Wintergreen Long Cut	08JUL2014	1	N/A	27.86*	8.88	185.8*	27JAN2015
		2	N/A	27.62*	9.55	184.1*	27JAN2015
		3	N/A	28.55*	8.98	190.4*	27JAN2015
	06MAY2015	1	64.2	27.82*	13.68	non-reportable	07JAN2016
		2	63.3	28.63*	13.36	non-reportable	07JAN2016
		3	63.4	26.00*	12.46	non-reportable	07JAN2016
Grizzly Premium Wintergreen Pouches	21JUL2014	1	N/A	26.80*	11.22	178.7*	27JAN2015
		2	N/A	28.67*	10.57	191.1*	27JAN2015
		3	N/A	28.45*	10.67	189.6*	27JAN2015
	14MAY2015	1	N/A	22.14*	13.14	N/A	11SEP2015
		2	N/A	22.77*	13.66	N/A	11SEP2015
		3	N/A	22.92*	11.84	N/A	11SEP2015
Grizzly Premium Wintergreen Wide Cut	09APR2015	1	46.7	23.91*	8.62	non-reportable	07JAN2016
		2	48.5	22.69*	9.12	non-reportable	07JAN2016
		3	48.1	23.70*	8.84	non-reportable	07JAN2016

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Polycyclic Aromatic Hydrocarbons				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	Completed Analysis Date
Kayak Long Cut Straight	06AUG2014	1	N/A	26.94*	8.92	179.6*	30JAN2015
		2	N/A	27.21*	8.84	181.4*	30JAN2015
		3	N/A	27.47*	9.33	183.2*	30JAN2015
	10JUL2015	1	43.4	21.31*	9.41	142.1*	02SEP2015
		2	44.3	20.52*	8.94	136.9*	02SEP2015
		3	43.6	20.25*	9.11	135.0*	02SEP2015
Kayak Long Cut Wintergreen	06AUG2014	1	N/A	27.49*	8.76	183.3*	30JAN2015
		2	N/A	27.99*	9.91	186.6*	30JAN2015
		3	N/A	27.73*	10.28	184.9*	30JAN2015
	10JUL2015	1	60.8	27.18*	11.89	non- reportable	07JAN2016
		2	62.4	24.66*	12.02	non- reportable	07JAN2016
		3	61.5	24.14*	11.57	non- reportable	07JAN2016
Klondike Long Cut Straight	10JUL2015	1	N/A	19.76*	2.80	131.8*	11SEP2015
		2	N/A	20.43*	2.72*	136.2*	11SEP2015
		3	N/A	20.75*	2.77*	138.3*	11SEP2015

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Polycyclic Aromatic Hydrocarbons				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	Completed Analysis Date
Klondike Long Cut Wintergreen	10JUL2015	1	N/A	22.06*	2.94*	N/A	30SEP2015
		2	N/A	25.02*	3.34*	N/A	30SEP2015
		3	N/A	22.56*	3.01*	N/A	30SEP2015
Kodiak Premium Wintergreen	11JUL2014	1	N/A	27.44*	12.86	182.9*	27JAN2015
		2	N/A	28.53*	13.14	190.2*	27JAN2015
		3	N/A	28.27*	13.84	188.5*	27JAN2015
	17JUN2015	1	15.8*	23.62*	17.03	N/A	21JAN2016
		2	16.3*	24.40*	15.96	N/A	21JAN2016
		3	16.6*	24.87*	15.75	N/A	21JAN2016
Levi Garrett	24JUL2014	1	N/A	27.80*	3.71*	185.3*	27JAN2015
		2	N/A	28.09*	3.75*	187.3*	27JAN2015
		3	N/A	26.51*	3.54*	176.8*	27JAN2015
	12JUN2015	1	18.6*	27.84*	3.71*	185.6*	26JAN2016
		2	17.5*	26.26*	3.50*	175.1*	26JAN2016
		3	18.0*	26.99*	3.60*	180.0*	26JAN2016

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available  
 \*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Longhorn Mint Long Cut	10JUL2015	1	N/A	27.80*	5.68	N/A	15SEP2015
		2	N/A	27.52*	5.33	N/A	15SEP2015
		3	N/A	26.91*	5.66	N/A	15SEP2015
Longhorn Natural Fine Cut	06AUG2014	1	N/A	28.14*	4.22	187.6*	30JAN2015
		2	N/A	27.82*	3.71*	185.5*	30JAN2015
		3	N/A	27.40*	4.80	182.6*	30JAN2015
	10JUL2015	1	N/A	26.80*	5.81	178.7*	15SEP2015
		2	N/A	26.83*	5.70	178.9*	15SEP2015
		3	N/A	26.31*	5.15	175.4*	15SEP2015
Longhorn Wintergreen Long Cut	06AUG2014	1	N/A	28.08*	6.38	187.2*	30JAN2015
		2	N/A	26.78*	6.08	178.5*	30JAN2015
		3	N/A	27.39*	5.82	182.6*	30JAN2015
	10JUL2015	1	N/A	22.63*	5.56	N/A	15SEP2015
		2	N/A	22.10*	5.11	N/A	15SEP2015
		3	N/A	22.51*	5.11	N/A	15SEP2015

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene

BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Navy Sweet Dry Snuff	06AUG2014	1	18.2*	27.27*	5.79	181.8*	20AUG2014
		2	18.4*	27.61*	6.21	184.0*	20AUG2014
		3	18.3*	27.43*	5.20	182.9*	20AUG2014
	10JUL2015	1	N/A	27.37*	13.29	182.5*	08JAN2016
		2	N/A	27.31*	10.41	182.1*	08JAN2016
		3	N/A	27.30*	10.92	182.1*	08JAN2016
Railroad Mills Sweet Scotch	06AUG2014	1	17.5*	26.28*	8.92	175.2*	20AUG2014
		2	18.5*	27.78*	8.86	185.2*	20AUG2014
		3	17.9*	26.89*	8.40	179.3*	20AUG2014
Red Man Original Chewing Tobacco	06AUG2014	1	17.5*	26.23*	3.50*	174.9*	20AUG2014
		2	18.0*	26.93*	3.59*	179.5*	20AUG2014
		3	17.4*	26.12*	3.48*	174.1*	20AUG2014
	10JUL2015	1	18.7*	28.08*	3.74*	187.3*	26JAN2016
		2	18.7*	27.97*	3.73*	186.5*	26JAN2016
		3	18.3*	27.47*	3.66*	183.2*	26JAN2016

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.



Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Red Seal Fine Cut Natural	10JUL2015	1	N/A	21.63*	5.45	144.2*	30SEP2015
		2	N/A	23.20*	4.88	154.7*	30SEP2015
		3	N/A	21.77*	5.17	145.2*	30SEP2015
Red Seal Fine Cut Wintergreen	10JUL2015	1	36.9	24.26*	7.03	non- reportable	07JAN2016
		2	37.6	25.02*	7.56	non- reportable	07JAN2016
		3	37.1	24.09*	7.23	non- reportable	07JAN2016
Red Seal Long Cut Wintergreen	06AUG2014	1	N/A	28.39*	7.10	189.3*	30JAN2015
		2	N/A	26.54*	5.47	176.9*	30JAN2015
		3	N/A	27.96*	5.54	186.4*	30JAN2015
	10JUL2015	1	44.8	20.86*	8.82	non- reportable	07JAN2016
		2	44.6	21.55*	9.16	non- reportable	07JAN2016
		3	44.4	21.90*	8.67	non- reportable	07JAN2016

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Skoal Long Cut Mint	06AUG2014	1	N/A	27.39*	4.91	182.6*	30JAN2015
		2	N/A	27.69*	5.42	184.6*	30JAN2015
		3	N/A	27.69*	5.60	184.6*	30JAN2015
	10JUL2015	1	N/A	26.08*	4.02	173.9*	30SEP2015
		2	N/A	22.50*	4.08	150.0*	30SEP2015
		3	N/A	24.08*	3.81	160.5*	30SEP2015
Skoal Long Cut Straight	06AUG2014	1	N/A	26.19*	4.86	174.6*	30JAN2015
		2	N/A	26.95*	5.62	179.7*	30JAN2015
		3	N/A	27.27*	5.11	181.8*	30JAN2015
	10JUL2015	1	N/A	27.68*	4.84	184.5*	30SEP2015
		2	N/A	27.44*	4.75	183.0*	30SEP2015
		3	N/A	28.09*	4.27	187.3*	30SEP2015
Skoal Original Fine Cut Wintergreen	06AUG2014	1	N/A	26.48*	7.34	176.5*	30JAN2015
		2	N/A	25.77*	7.89	171.8*	30JAN2015
		3	N/A	26.20*	7.10	174.7*	30JAN2015
	10JUL2015	1	N/A	27.46*	6.35	N/A	15SEP2015
		2	N/A	27.66*	4.96	N/A	15SEP2015
		3	N/A	26.99*	5.74	N/A	15SEP2015

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Skoal X-tra Long Cut Mint Blend	06AUG2014	1	N/A	27.81*	4.00	185.4*	30JAN2015
		2	N/A	27.59*	3.68*	183.9*	30JAN2015
		3	N/A	26.96*	4.21	179.7*	30JAN2015
	10JUL2015	1	N/A	26.67*	4.22	177.8*	30SEP2015
		2	N/A	24.33*	4.16	162.2*	30SEP2015
		3	N/A	24.96*	4.21	166.4*	30SEP2015
Starr Chewing Tobacco	06AUG2014	1	17.8*	26.64*	3.55*	177.6*	20AUG2014
		2	18.3*	27.45*	3.66*	183.0*	20AUG2014
		3	18.5*	27.80*	3.71*	185.4*	20AUG2014
Stokers Tennessee Chew Original	10JUL2015	1	17.7*	26.54*	3.54*	177.0*	26JAN2016
		2	14.5*	21.82*	2.91*	145.5*	26JAN2016
		3	18.7*	28.00*	3.73*	186.7*	26JAN2016

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene

BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Stokers Wintergreen Long Cut	06AUG2014	1	N/A	27.49*	6.36	183.3*	30JAN2015
		2	N/A	27.56*	7.64	183.7*	30JAN2015
		3	N/A	26.61*	6.54	177.4*	30JAN2015
Superior Dry Snuff	06AUG2014	1	19.4	27.89*	17.32	186.0*	20AUG2014
		2	22.0	27.23*	16.05	181.5*	20AUG2014
		3	21.7	27.88*	15.86	185.9*	20AUG2014
	10JUL2015	1	40.8	28.72*	38.23	191.5*	26JAN2016
		2	42.3	N/A	37.78	191.4*	26JAN2016
		3	43.3	28.57*	40.06	190.6*	26JAN2016
Timber Wolf Mint Long Cut	10JUL2015	1	N/A	27.29*	4.32	181.9*	30SEP2015
		2	N/A	26.99*	4.11	180.0*	30SEP2015
		3	N/A	26.22*	4.21	174.8*	30SEP2015

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Polycyclic Aromatic Hydrocarbons				Completed Analysis Date
			B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	
Timber Wolf Wintergreen Long Cut	06AUG2014	1	N/A	27.45*	5.09	183.0*	30JAN2015
		2	N/A	26.47*	5.41	176.5*	30JAN2015
		3	N/A	26.76*	4.13	178.4*	30JAN2015
Tube Rose Scotch	20MAR2015	1	N/A	28.37*	18.73	189.2*	08JAN2016
		2	N/A	28.27*	19.97	188.6*	08JAN2016
		3	N/A	28.25*	16.95	188.4*	08JAN2016
W.E. Garrett & Sons Scotch	18JUL2014	1	N/A	28.38*	30.04	189.2*	27JAN2015
		2	N/A	28.45*	31.30	189.7*	27JAN2015
		3	N/A	27.62*	31.88	184.1*	27JAN2015
	16JUN2015	1	N/A	27.88*	41.35	185.9*	08JAN2016
		2	N/A	27.79*	40.29	185.3*	08JAN2016
		3	N/A	27.85*	38.41	185.7*	08JAN2016

B(k)FL= benzo(k)fluoranthene    Dibenz(a,h)A=dibenzo(a,h)anthracene    Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 BLQ=below limit of quantification    N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Beechnut Chewing Tobacco	06AUG2014	1	39.3	678.0	351.0	1270.0	29AUG2014
		2	39.3	697.0	341.0	1240.0	29AUG2014
		3	36.4	702.0	320.0	1290.0	29AUG2014
Beechnut Wintergreen Chewing Tobacco	10JUL2015	1	44.7	769.0	335.0	1020.0	29JUL2015
		2	44.5	784.0	339.0	1060.0	29JUL2015
		3	41.7	751.0	343.0	1050.0	29JUL2015
Camel Snus Frost	07AUG2014	1	60.2	412.0	435.0	1460.0	26AUG2014
		2	72.3	557.0	504.0	1610.0	26AUG2014
		3	75.1	521.0	461.0	1560.0	26AUG2014
	21MAY2015	1	46.0	444.0	239.0	1280.0	24JUL2015
		2	44.5	458.0	255.0	1330.0	24JUL2015
		3	48.5	451.0	252.0	1320.0	24JUL2015

NAB= N'-nitrosoanabasine    NAT= N'-nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'-nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Camel Snus Frost Large	07AUG2014	1	80.0	639.0	482.0	1670.0	26AUG2014
		2	78.1	646.0	478.0	1650.0	26AUG2014
		3	80.9	623.0	466.0	1580.0	26AUG2014
	08JUN2015	1	41.0	410.0	192.0	1130.0	29JUL2015
		2	43.4	389.0	197.0	1120.0	29JUL2015
		3	41.3	400.0	193.0	1060.0	29JUL2015
Camel Snus Mellow	20AUG2014	1	64.5	377.0	452.0	1120.0	04SEP2014
		2	69.4	403.0	440.0	1150.0	04SEP2014
		3	64.5	416.0	454.0	1150.0	04SEP2014
	02JUN2015	1	42.2	425.0	218.0	1110.0	28JUL2015
		2	30.7	339.0	191.0	993.0	28JUL2015
		3	30.8	350.0	180.0	1000.0	28JUL2015
Camel Snus Mint	30JUL2014	1	93.3	492.0	577.0	1370.0	29AUG2014
		2	95.5	531.0	609.0	1400.0	29AUG2014
		3	93.2	521.0	587.0	1410.0	29AUG2014
	26MAY2015	1	49.0	410.0	280.0	1260.0	29JUL2015
		2	48.4	418.0	285.0	1310.0	29JUL2015
		3	50.7	389.0	274.0	1300.0	29JUL2015

NAB= N'nitrosoanabasine   NAT= N'nitrosoanatabine   NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Camel Snus Robust	28JUL2014	1	45.1	342.0	323.0	1030.0	26AUG2014
		2	50.1	372.0	326.0	1050.0	26AUG2014
		3	50.3	374.0	334.0	1040.0	26AUG2014
	18JUN2015	1	34.2	370.0	148.0	856.0	29JUL2015
		2	34.7	330.0	151.0	887.0	29JUL2015
		3	35.1	357.0	151.0	873.0	29JUL2015
Camel Snus Winterchill	18AUG2014	1	56.5	403.0	397.0	1100.0	04SEP2014
		2	60.0	384.0	413.0	1070.0	04SEP2014
		3	56.4	402.0	386.0	1060.0	04SEP2014
	05JUN2015	1	39.6	436.0	198.0	953.0	24JUL2015
		2	39.4	437.0	188.0	996.0	24JUL2015
		3	41.6	454.0	187.0	990.0	24JUL2015
Copenhagen Long Cut	06AUG2014	1	85.6	1140.0	318.0	1260.0	25AUG2014
		2	80.4	1160.0	318.0	1260.0	25AUG2014
		3	79.6	1130.0	313.0	1280.0	25AUG2014
	10JUL2015	1	59.1	984.0	242.0	1020.0	20JUL2015
		2	58.4	1020.0	243.0	1020.0	20JUL2015
		3	59.9	1000.0	232.0	1020.0	20JUL2015

NAB= N'nitrosoanabasine   NAT= N'nitrosoanatabine   NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine



Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Copenhagen Long Cut Southern Blend	06AUG2014	1	58.9	926.0	408.0	1220.0	25AUG2014
		2	60.5	933.0	408.0	1190.0	25AUG2014
		3	57.9	907.0	402.0	1180.0	25AUG2014
	10JUL2015	1	52.8	864.0	220.0	1010.0	22JUL2015
		2	51.5	848.0	221.0	1010.0	22JUL2015
		3	51.7	844.0	222.0	957.0	22JUL2015
Copenhagen Long Cut Wintergreen	06AUG2014	1	50.2	769.0	222.0	943.0	25AUG2014
		2	51.2	800.0	230.0	992.0	25AUG2014
		3	53.0	803.0	219.0	987.0	25AUG2014
	10JUL2015	1	59.0	1010.0	255.0	1070.0	22JUL2015
		2	55.5	1040.0	246.0	1050.0	22JUL2015
		3	61.4	1090.0	250.0	1080.0	22JUL2015
Copenhagen Pouches	06AUG2014	1	188.0	2440.0	713.0	2360.0	25AUG2014
		2	187.0	2380.0	666.0	2340.0	25AUG2014
		3	189.0	2420.0	727.0	2420.0	25AUG2014
	10JUL2015	1	95.1	1230.0	325.0	1510.0	22JUL2015
		2	98.7	1290.0	330.0	1480.0	22JUL2015
		3	101.0	1370.0	327.0	1530.0	22JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Copenhagen Pouches Wintergreen	10JUL2015	1	69.9	1070.0	339.0	1410.0	22JUL2015
		2	68.6	1050.0	321.0	1400.0	22JUL2015
		3	72.0	1060.0	349.0	1520.0	22JUL2015
Copenhagen Snuff Fine Cut	06AUG2014	1	180.0	2580.0	813.0	2370.0	25AUG2014
		2	180.0	2660.0	856.0	2430.0	25AUG2014
		3	182.0	2620.0	824.0	2410.0	25AUG2014
	10JUL2015	1	103.0	1420.0	378.0	1520.0	22JUL2015
		2	102.0	1370.0	377.0	1520.0	22JUL2015
		3	103.0	1450.0	388.0	1530.0	22JUL2015
Grizzly Premium Mint Long Cut	24JUL2014	1	116.0	1970.0	427.0	1680.0	04AUG2014
		2	112.0	1940.0	431.0	1650.0	04AUG2014
		3	110.0	1910.0	407.0	1650.0	04AUG2014
	31MAR2015	1	97.0	1690.0	308.0	1620.0	22JUL2015
		2	99.9	1650.0	301.0	1650.0	22JUL2015
		3	96.2	1690.0	296.0	1680.0	22JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Grizzly Premium Natural Fine Cut	24JUL2014	1	481.0	11500.0	1110.0	5530.0	06AUG2014
		2	514.0	11200.0	1120.0	5710.0	19AUG2014
		3	498.0	10800.0	1090.0	5660.0	19AUG2014
	13APR2015	1	351.0	6550.0	1090.0	4970.0	22JUL2015
		2	328.0	6640.0	1110.0	4870.0	22JUL2015
		3	344.0	6710.0	1090.0	4590.0	22JUL2015
Grizzly Premium Natural Snuff	02APR2015	1	128.0	2150.0	716.0	2010.0	22JUL2015
		2	138.0	2040.0	712.0	2000.0	22JUL2015
		3	126.0	2050.0	748.0	2040.0	22JUL2015
Grizzly Premium Straight Long Cut	18JUL2014	1	158.0	2500.0	651.0	1820.0	04AUG2014
		2	159.0	2600.0	620.0	1790.0	04AUG2014
		3	157.0	2620.0	635.0	1820.0	04AUG2014
	14APR2015	1	83.9	1360.0	259.0	1130.0	22JUL2015
		2	87.3	1440.0	247.0	1110.0	22JUL2015
		3	84.0	1350.0	242.0	1070.0	22JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Grizzly Premium Wintergreen Long Cut	08JUL2014	1	91.5	1310.0	285.0	1400.0	06AUG2014
		2	96.7	1350.0	293.0	1430.0	06AUG2014
		3	94.3	1380.0	281.0	1380.0	06AUG2014
	06MAY2015	1	125.0	1970.0	469.0	1680.0	23JUL2015
		2	125.0	1910.0	456.0	1640.0	23JUL2015
		3	120.0	1890.0	461.0	1600.0	23JUL2015
	21JUL2014	1	148.0	2150.0	464.0	1990.0	06AUG2014
		2	151.0	2100.0	512.0	2070.0	06AUG2014
		3	154.0	2150.0	467.0	2050.0	06AUG2014
Grizzly Premium Wintergreen Pouches	14MAY2015	1	116.0	1920.0	537.0	1750.0	22JUL2015
		2	112.0	2020.0	560.0	1710.0	22JUL2015
		3	118.0	2030.0	541.0	1760.0	22JUL2015
	09APR2015	1	100.0	1600.0	193.0	1340.0	22JUL2015
		2	93.1	1550.0	192.0	1280.0	22JUL2015
		3	101.0	1570.0	189.0	1330.0	22JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Kayak Long Cut Straight	06AUG2014	1	729.0	6770.0	2070.0	5480.0	25AUG2014
		2	707.0	6700.0	2170.0	5480.0	25AUG2014
		3	727.0	6810.0	2080.0	5540.0	25AUG2014
	10JUL2015	1	147.0	1830.0	567.0	1540.0	24JUL2015
		2	138.0	1850.0	542.0	1630.0	24JUL2015
		3	140.0	1900.0	534.0	1520.0	24JUL2015
Kayak Long Cut Wintergreen	06AUG2014	1	696.0	6360.0	3040.0	6300.0	25AUG2014
		2	716.0	6180.0	2980.0	6130.0	25AUG2014
		3	695.0	6210.0	3060.0	6110.0	25AUG2014
	10JUL2015	1	123.0	1560.0	476.0	1340.0	24JUL2015
		2	114.0	1630.0	480.0	1290.0	24JUL2015
		3	120.0	1620.0	471.0	1370.0	24JUL2015
Klondike Long Cut Straight	10JUL2015	1	26.0	268.0	101.0	542.0	22JUL2015
		2	28.6	274.0	100.0	571.0	22JUL2015
		3	26.4	256.0	88.5	544.0	22JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Klondike Long Cut Wintergreen	10JUL2015	1	26.4	294.0	111.0	554.0	22JUL2015
		2	25.6	277.0	108.0	562.0	22JUL2015
		3	26.6	281.0	111.0	557.0	22JUL2015
Kodiak Premium Wintergreen	11JUL2014	1	129.0	1820.0	395.0	1690.0	06AUG2014
		2	131.0	1800.0	394.0	1720.0	06AUG2014
		3	130.0	1820.0	397.0	1660.0	06AUG2014
	17JUN2015	1	190.0	3310.0	618.0	2190.0	22JUL2015
		2	190.0	3240.0	642.0	2170.0	22JUL2015
		3	181.0	3200.0	636.0	2200.0	22JUL2015
Levi Garrett	24JUL2014	1	243.0	1260.0	790.0	3590.0	06AUG2014
		2	266.0	1230.0	765.0	3690.0	19AUG2014
		3	277.0	1290.0	788.0	3820.0	19AUG2014
	12JUN2015	1	180.0	1850.0	988.0	3000.0	29JUL2015
		2	187.0	1810.0	945.0	2940.0	29JUL2015
		3	180.0	1790.0	928.0	2890.0	29JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Longhorn Mint Long Cut	10JUL2015	1	74.3	1310.0	300.0	1150.0	22JUL2015
		2	72.9	1210.0	286.0	1130.0	22JUL2015
		3	73.9	1300.0	292.0	1240.0	22JUL2015
Longhorn Natural Fine Cut	06AUG2014	1	62.2	980.0	285.0	1090.0	25AUG2014
		2	66.8	990.0	282.0	1060.0	25AUG2014
		3	67.6	992.0	286.0	1060.0	25AUG2014
	10JUL2015	1	58.1	1020.0	267.0	1030.0	22JUL2015
		2	61.4	1040.0	282.0	1040.0	22JUL2015
		3	58.4	1010.0	291.0	1070.0	22JUL2015
Longhorn Wintergreen Long Cut	06AUG2014	1	60.3	1000.0	179.0	969.0	25AUG2014
		2	61.1	991.0	190.0	932.0	25AUG2014
		3	59.7	1000.0	182.0	934.0	25AUG2014
	10JUL2015	1	73.6	1120.0	291.0	1120.0	22JUL2015
		2	76.0	1230.0	294.0	1140.0	22JUL2015
		3	74.6	1230.0	304.0	1210.0	22JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Navy Sweet Dry Snuff	06AUG2014	1	298.0	5720.0	1480.0	6850.0	26AUG2014
		2	292.0	6000.0	1410.0	6870.0	26AUG2014
		3	299.0	5690.0	1420.0	6810.0	26AUG2014
	10JUL2015	1	497.0	8660.0	4520.0	12500.0	29JUL2015
		2	535.0	9070.0	4400.0	12400.0	29JUL2015
		3	518.0	8860.0	4710.0	12300.0	29JUL2015
Railroad Mills Sweet Scotch	06AUG2014	1	408.0	6300.0	2550.0	7560.0	26AUG2014
		2	418.0	5820.0	2620.0	7530.0	26AUG2014
		3	419.0	6140.0	2600.0	7580.0	26AUG2014
Red Man Original Chewing Tobacco	06AUG2014	1	55.0	926.0	535.0	1780.0	29AUG2014
		2	56.8	946.0	564.0	1660.0	29AUG2014
		3	56.9	921.0	545.0	1730.0	29AUG2014
	10JUL2015	1	21.8	393.0	161.0	913.0	29JUL2015
		2	23.7	396.0	156.0	893.0	29JUL2015
		3	24.9	401.0	186.0	1030.0	29JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine



Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Red Seal Fine Cut Natural	10JUL2015	1	90.5	1250.0	347.0	1460.0	22JUL2015
		2	89.9	1320.0	344.0	1440.0	22JUL2015
		3	92.0	1310.0	344.0	1470.0	22JUL2015
Red Seal Fine Cut Wintergreen	10JUL2015	1	86.9	1260.0	333.0	1420.0	23JUL2015
		2	83.3	1260.0	336.0	1420.0	23JUL2015
		3	88.8	1320.0	337.0	1410.0	23JUL2015
Red Seal Long Cut Wintergreen	06AUG2014	1	75.6	1210.0	305.0	1240.0	25AUG2014
		2	74.0	1160.0	300.0	1280.0	25AUG2014
		3	74.1	1160.0	291.0	1240.0	25AUG2014
	10JUL2015	1	74.4	1200.0	354.0	1330.0	23JUL2015
		2	77.9	1310.0	381.0	1320.0	23JUL2015
		3	75.9	1290.0	357.0	1290.0	23JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Skoal Long Cut Mint	06AUG2014	1	63.0	987.0	327.0	1170.0	25AUG2014
		2	64.3	975.0	319.0	1150.0	25AUG2014
		3	66.3	946.0	325.0	1170.0	25AUG2014
	10JUL2015	1	47.6	882.0	236.0	921.0	22JUL2015
		2	45.3	852.0	232.0	905.0	22JUL2015
		3	48.3	876.0	243.0	959.0	22JUL2015
Skoal Long Cut Straight	06AUG2014	1	68.2	1040.0	306.0	1140.0	25AUG2014
		2	67.5	1020.0	312.0	1180.0	25AUG2014
		3	67.1	1030.0	306.0	1180.0	25AUG2014
	10JUL2015	1	68.2	1230.0	316.0	1290.0	22JUL2015
		2	68.1	1180.0	317.0	1280.0	22JUL2015
		3	60.3	1170.0	295.0	1280.0	22JUL2015
Skoal Original Fine Cut Wintergreen	06AUG2014	1	163.0	2080.0	657.0	2330.0	25AUG2014
		2	164.0	2030.0	663.0	2270.0	25AUG2014
		3	161.0	2050.0	650.0	2310.0	25AUG2014
	10JUL2015	1	75.0	1010.0	307.0	1440.0	22JUL2015
		2	72.3	1090.0	309.0	1350.0	22JUL2015
		3	75.1	1070.0	310.0	1380.0	22JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Skoal X-tra Long Cut Mint Blend	06AUG2014	1	66.4	985.0	432.0	1200.0	26AUG2014
		2	66.0	918.0	420.0	1210.0	26AUG2014
		3	64.9	941.0	420.0	1200.0	26AUG2014
	10JUL2015	1	54.4	963.0	292.0	974.0	22JUL2015
		2	53.5	1010.0	281.0	961.0	22JUL2015
		3	52.3	968.0	276.0	973.0	22JUL2015
Starr Chewing Tobacco	06AUG2014	1	27.0	502.0	181.0	846.0	29AUG2014
		2	24.5	458.0	188.0	866.0	29AUG2014
		3	27.2	496.0	183.0	840.0	29AUG2014
Stokers Tennessee Chew Original	10JUL2015	1	47.3	514.0	357.0	1110.0	29JUL2015
		2	50.8	540.0	363.0	1130.0	29JUL2015
		3	47.3	552.0	351.0	1100.0	29JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Stokers Wintergreen Long Cut	06AUG2014	1	108.0	1660.0	357.0	1430.0	26AUG2014
		2	109.0	1690.0	357.0	1450.0	26AUG2014
		3	113.0	1660.0	376.0	1430.0	26AUG2014
Superior Dry Snuff	06AUG2014	1	418.0	7660.0	1380.0	7740.0	26AUG2014
		2	402.0	7640.0	1360.0	7840.0	26AUG2014
		3	393.0	7630.0	1350.0	7750.0	26AUG2014
	10JUL2015	1	894.0	13600.0	5350.0	15500.0	29JUL2015
		2	942.0	13500.0	5150.0	15700.0	29JUL2015
		3	899.0	13300.0	5200.0	16500.0	29JUL2015
Timber Wolf Mint Long Cut	10JUL2015	1	69.8	1200.0	293.0	1150.0	22JUL2015
		2	72.9	1220.0	308.0	1140.0	22JUL2015
		3	68.5	1180.0	295.0	1220.0	22JUL2015

NAB= N'nitrosoanabasine    NAT= N'nitrosoanatabine    NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Tobacco Specific Nitrosamines Analysis				
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	Completed Analysis Date
Timber Wolf Wintergreen Long Cut	06AUG2014	1	79.5	1240.0	286.0	1200.0	26AUG2014
		2	77.3	1190.0	271.0	1240.0	26AUG2014
		3	74.2	1200.0	273.0	1230.0	26AUG2014
Tube Rose Scotch	20MAR2015	1	5880.0	66300.0	100000.0	46800.0	29JUL2015
		2	5850.0	66900.0	99700.0	48400.0	29JUL2015
		3	5890.0	66600.0	98400.0	48000.0	29JUL2015
W.E. Garrett & Sons Scotch	18JUL2014	1	440.0	6150.0	2650.0	5560.0	06AUG2014
		2	443.0	5870.0	2690.0	5660.0	08AUG2014
		3	435.0	6170.0	2680.0	5570.0	08AUG2014
	16JUN2015	1	439.0	6700.0	4310.0	6400.0	29JUL2015
		2	441.0	6650.0	4290.0	6220.0	29JUL2015
		3	444.0	5960.0	4200.0	6200.0	29JUL2015

NAB= N'nitrosoanabasine   NAT= N'nitrosoanatabine   NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NNN = N'nitrosonornicotine

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Beechnut Chewing Tobacco	06AUG2014	1	29.25	19AUG2014	5.56	19AUG2014
		2	28.44	19AUG2014	5.64	19AUG2014
		3	28.96	19AUG2014	5.52	19AUG2014
Beechnut Wintergreen Chewing Tobacco	10JUL2015	1	26.80	11SEP2015	5.55	10SEP2015
		2	27.12	11SEP2015	5.57	10SEP2015
		3	26.94	11SEP2015	5.56	10SEP2015
Camel Snus Frost	07AUG2014	1	31.59	19AUG2014	7.75	11AUG2014
		2	31.47	19AUG2014	7.74	11AUG2014
		3	31.50	19AUG2014	7.74	11AUG2014
	21MAY2015	1	31.79	30JUL2015	7.71	31JUL2015
		2	30.99	30JUL2015	7.70	31JUL2015
		3	31.42	30JUL2015	7.70	31JUL2015
Camel Snus Frost Large	07AUG2014	1	31.87	19AUG2014	7.80	11AUG2014
		2	31.80	19AUG2014	7.80	11AUG2014
		3	31.71	19AUG2014	7.80	11AUG2014
	08JUN2015	1	32.79	11SEP2015	7.66	31JUL2015
		2	33.14	11SEP2015	7.66	31JUL2015
		3	33.08	11SEP2015	7.66	31JUL2015

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Camel Snus Mellow	20AUG2014	1	32.39	28AUG2014	7.80	26AUG2014
		2	31.90	28AUG2014	7.78	26AUG2014
		3	31.93	28AUG2014	7.80	26AUG2014
	02JUN2015	1	32.55	11SEP2015	7.61	31JUL2015
		2	32.67	11SEP2015	7.60	31JUL2015
		3	32.53	11SEP2015	7.60	31JUL2015
Camel Snus Mint	30JUL2014	1	31.77	19AUG2014	7.85	19AUG2014
		2	31.53	19AUG2014	7.85	19AUG2014
		3	31.40	19AUG2014	7.86	19AUG2014
	26MAY2015	1	32.50	11SEP2015	7.43	10SEP2015
		2	32.49	11SEP2015	7.41	10SEP2015
		3	32.33	11SEP2015	7.42	10SEP2015
Camel Snus Robust	28JUL2014	1	32.66	19AUG2014	7.68	11AUG2014
		2	32.14	19AUG2014	7.67	11AUG2014
		3	32.25	19AUG2014	7.69	11AUG2014
	18JUN2015	1	33.52	11SEP2015	7.41	10SEP2015
		2	33.46	11SEP2015	7.41	10SEP2015
		3	33.57	11SEP2015	7.42	10SEP2015

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Camel Snus Winterchill	18AUG2014	1	32.76	21AUG2014	7.85	26AUG2014
		2	32.62	21AUG2014	7.86	26AUG2014
		3	33.01	21AUG2014	7.84	26AUG2014
	05JUN2015	1	32.91	11SEP2015	7.77	31JUL2015
		2	33.04	11SEP2015	7.76	31JUL2015
		3	32.79	11SEP2015	7.76	31JUL2015
Copenhagen Long Cut	06AUG2014	1	57.10	19AUG2014	7.57	18AUG2014
		2	57.19	19AUG2014	7.57	18AUG2014
		3	57.12	19AUG2014	7.57	18AUG2014
	10JUL2015	1	55.95	29JUL2015	7.90	31JUL2015
		2	56.07	29JUL2015	7.89	31JUL2015
		3	56.05	29JUL2015	7.88	31JUL2015
Copenhagen Long Cut Southern Blend	06AUG2014	1	56.91	19AUG2014	7.63	18AUG2014
		2	57.16	19AUG2014	7.61	18AUG2014
		3	56.97	19AUG2014	7.61	18AUG2014
	10JUL2015	1	55.75	29JUL2015	7.27	31JUL2015
		2	55.92	29JUL2015	7.29	31JUL2015
		3	55.77	29JUL2015	7.27	31JUL2015



Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Copenhagen Long Cut Wintergreen	06AUG2014	1	56.81	19AUG2014	7.76	18AUG2014
		2	56.71	19AUG2014	7.75	18AUG2014
		3	56.63	19AUG2014	7.74	18AUG2014
	10JUL2015	1	56.61	29JUL2015	7.78	30JUL2015
		2	56.36	29JUL2015	7.77	30JUL2015
		3	56.10	29JUL2015	7.76	30JUL2015
Copenhagen Pouches	06AUG2014	1	53.76	19AUG2014	7.98	18AUG2014
		2	52.45	19AUG2014	7.99	18AUG2014
		3	53.46	19AUG2014	7.99	18AUG2014
	10JUL2015	1	55.45	30JUL2015	7.83	10SEP2015
		2	55.70	30JUL2015	7.83	10SEP2015
		3	55.48	30JUL2015	7.81	10SEP2015
Copenhagen Pouches Wintergreen	10JUL2015	1	55.15	30JUL2015	6.94	31JUL2015
		2	56.06	30JUL2015	6.92	31JUL2015
		3	55.63	30JUL2015	6.93	31JUL2015
Copenhagen Snuff Fine Cut	06AUG2014	1	55.64	19AUG2014	7.42	18AUG2014
		2	55.73	19AUG2014	7.41	18AUG2014
		3	55.53	19AUG2014	7.40	18AUG2014

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Copenhagen Snuff Fine Cut	10JUL2015	1	55.09	11SEP2015	7.60	10SEP2015
		2	55.48	11SEP2015	7.60	10SEP2015
		3	55.03	11SEP2015	7.61	10SEP2015
Grizzly Premium Mint Long Cut	24JUL2014	1	52.69	31JUL2014	7.55	06AUG2014
		2	52.65	31JUL2014	7.55	06AUG2014
		3	52.58	31JUL2014	7.55	06AUG2014
	31MAR2015	1	52.81	30JUL2015	7.43	10SEP2015
		2	52.90	30JUL2015	7.42	10SEP2015
		3	52.84	30JUL2015	7.42	10SEP2015
Grizzly Premium Natural Fine Cut	24JUL2014	1	52.26	14AUG2014	7.55	06AUG2014
		2	52.19	14AUG2014	7.51	06AUG2014
		3	52.18	14AUG2014	7.52	06AUG2014
	13APR2015	1	53.15	11SEP2015	7.67	10SEP2015
		2	53.10	11SEP2015	7.67	10SEP2015
		3	53.45	11SEP2015	7.68	10SEP2015
Grizzly Premium Natural Snuff	02APR2015	1	51.94	30JUL2015	7.42	10SEP2015
		2	52.08	30JUL2015	7.43	10SEP2015
		3	52.05	30JUL2015	7.44	10SEP2015

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Grizzly Premium Straight Long Cut	18JUL2014	1	52.80	31JUL2014	7.65	06AUG2014
		2	52.81	31JUL2014	7.66	06AUG2014
		3	52.96	31JUL2014	7.65	06AUG2014
	14APR2015	1	53.50	29JUL2015	7.88	31JUL2015
		2	53.49	29JUL2015	7.88	31JUL2015
		3	53.41	29JUL2015	7.88	31JUL2015
Grizzly Premium Wintergreen Long Cut	08JUL2014	1	51.98	31JUL2014	8.15	06AUG2014
		2	52.06	31JUL2014	8.14	06AUG2014
		3	52.13	31JUL2014	8.14	06AUG2014
	06MAY2015	1	51.61	30JUL2015	8.31	10SEP2015
		2	51.89	30JUL2015	8.33	10SEP2015
		3	51.75	30JUL2015	8.33	10SEP2015
Grizzly Premium Wintergreen Pouches	21JUL2014	1	48.68	31JUL2014	8.30	06AUG2014
		2	48.85	31JUL2014	8.26	06AUG2014
		3	49.40	31JUL2014	8.27	06AUG2014
	14MAY2015	1	48.70	30JUL2015	7.80	10SEP2015
		2	49.50	30JUL2015	7.80	10SEP2015
		3	50.14	30JUL2015	7.79	10SEP2015

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Grizzly Premium Wintergreen Wide Cut	09APR2015	1	52.42	30JUL2015	7.31	10SEP2015
		2	52.26	30JUL2015	7.31	10SEP2015
		3	52.27	30JUL2015	7.30	10SEP2015
Kayak Long Cut Straight	06AUG2014	1	53.92	19AUG2014	6.90	11AUG2014
		2	54.18	19AUG2014	6.89	11AUG2014
		3	54.37	19AUG2014	6.89	11AUG2014
	10JUL2015	1	55.69	30JUL2015	6.57	10SEP2015
		2	55.08	30JUL2015	6.57	10SEP2015
		3	55.10	30JUL2015	6.57	10SEP2015
Kayak Long Cut Wintergreen	06AUG2014	1	52.84	19AUG2014	7.53	11AUG2014
		2	52.78	19AUG2014	7.53	11AUG2014
		3	52.81	19AUG2014	7.53	11AUG2014
	10JUL2015	1	52.85	30JUL2015	7.22	10SEP2015
		2	52.84	30JUL2015	7.22	10SEP2015
		3	53.00	30JUL2015	7.22	10SEP2015
Klondike Long Cut Straight	10JUL2015	1	56.53	30JUL2015	8.33	31JUL2015
		2	55.97	30JUL2015	8.33	31JUL2015
		3	55.17	30JUL2015	8.33	31JUL2015

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Klondike Long Cut Wintergreen	10JUL2015	1	56.47	29JUL2015	8.00	31JUL2015
		2	55.27	29JUL2015	8.00	31JUL2015
		3	55.16	29JUL2015	8.00	31JUL2015
Kodiak Premium Wintergreen	11JUL2014	1	52.50	31JUL2014	8.34	06AUG2014
		2	52.34	31JUL2014	8.34	06AUG2014
		3	52.60	31JUL2014	8.34	06AUG2014
	17JUN2015	1	52.32	30JUL2015	8.19	10SEP2015
		2	52.06	30JUL2015	8.20	10SEP2015
		3	52.12	30JUL2015	8.21	10SEP2015
Levi Garrett	24JUL2014	1	22.36	31JUL2014	6.33	31JUL2014
		2	23.10	31JUL2014	6.41	31JUL2014
		3	21.97	31JUL2014	6.39	31JUL2014
	12JUN2015	1	24.81	11SEP2015	5.81	10SEP2015
		2	24.33	11SEP2015	5.97	10SEP2015
		3	25.49	11SEP2015	5.88	10SEP2015
Longhorn Mint Long Cut	10JUL2015	1	53.67	29JUL2015	7.93	30JUL2015
		2	53.53	29JUL2015	7.95	30JUL2015
		3	53.52	29JUL2015	7.94	30JUL2015

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Longhorn Natural Fine Cut	06AUG2014	1	52.42	19AUG2014	7.81	18AUG2014
		2	52.68	19AUG2014	7.82	18AUG2014
		3	52.30	19AUG2014	7.81	18AUG2014
	10JUL2015	1	51.40	29JUL2015	7.97	30JUL2015
		2	51.60	29JUL2015	7.97	30JUL2015
		3	51.46	29JUL2015	7.96	30JUL2015
Longhorn Wintergreen Long Cut	06AUG2014	1	54.09	19AUG2014	7.81	11AUG2014
		2	54.15	19AUG2014	7.81	11AUG2014
		3	54.03	19AUG2014	7.81	11AUG2014
	10JUL2015	1	54.28	29JUL2015	7.85	30JUL2015
		2	54.83	29JUL2015	7.88	30JUL2015
		3	54.48	29JUL2015	7.87	30JUL2015
Navy Sweet Dry Snuff	06AUG2014	1	5.28	18AUG2014	6.20	11AUG2014
		2	5.40	18AUG2014	6.21	11AUG2014
		3	5.11	18AUG2014	6.20	11AUG2014
	10JUL2015	1	6.67	11SEP2015	6.40	10SEP2015
		2	6.82	11SEP2015	6.39	10SEP2015
		3	6.91	11SEP2015	6.38	10SEP2015

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Railroad Mills Sweet Scotch	06AUG2014	1	6.56	18AUG2014	5.92	11AUG2014
		2	6.49	18AUG2014	5.91	11AUG2014
		3	6.30	18AUG2014	5.91	11AUG2014
Red Man Original Chewing Tobacco	06AUG2014	1	26.03	19AUG2014	5.99	19AUG2014
		2	26.46	19AUG2014	5.96	19AUG2014
		3	26.30	19AUG2014	5.85	19AUG2014
	10JUL2015	1	25.13	11SEP2015	5.67	10SEP2015
		2	24.91	11SEP2015	5.73	10SEP2015
		3	24.23	11SEP2015	5.75	10SEP2015
Red Seal Fine Cut Natural	10JUL2015	1	53.83	30JUL2015	7.78	31JUL2015
		2	53.76	30JUL2015	7.77	31JUL2015
		3	53.75	30JUL2015	7.77	31JUL2015
Red Seal Fine Cut Wintergreen	10JUL2015	1	54.58	30JUL2015	7.62	10SEP2015
		2	54.46	30JUL2015	7.62	10SEP2015
		3	53.85	30JUL2015	7.62	10SEP2015
Red Seal Long Cut Wintergreen	06AUG2014	1	54.68	19AUG2014	7.43	11AUG2014
		2	55.30	19AUG2014	7.43	11AUG2014
		3	54.85	19AUG2014	7.43	11AUG2014

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Red Seal Long Cut Wintergreen	10JUL2015	1	54.36	30JUL2015	7.35	10SEP2015
		2	54.05	30JUL2015	7.35	10SEP2015
		3	53.96	30JUL2015	7.36	10SEP2015
Skoal Long Cut Mint	06AUG2014	1	56.67	19AUG2014	7.27	11AUG2014
		2	57.21	19AUG2014	7.28	11AUG2014
		3	57.03	19AUG2014	7.27	11AUG2014
	10JUL2015	1	55.72	29JUL2015	7.14	31JUL2015
		2	55.90	29JUL2015	7.14	31JUL2015
		3	55.79	29JUL2015	7.14	31JUL2015
Skoal Long Cut Straight	06AUG2014	1	57.36	19AUG2014	7.55	11AUG2014
		2	57.21	19AUG2014	7.55	11AUG2014
		3	57.32	19AUG2014	7.56	11AUG2014
	10JUL2015	1	56.39	29JUL2015	7.78	31JUL2015
		2	56.59	29JUL2015	7.78	31JUL2015
		3	56.36	29JUL2015	7.78	31JUL2015
Skoal Original Fine Cut Wintergreen	06AUG2014	1	54.94	19AUG2014	7.59	11AUG2014
		2	54.96	19AUG2014	7.59	11AUG2014
		3	54.72	19AUG2014	7.59	11AUG2014



Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Skoal Original Fine Cut Wintergreen	10JUL2015	1	54.87	29JUL2015	7.52	30JUL2015
		2	54.69	29JUL2015	7.50	30JUL2015
		3	54.52	29JUL2015	7.50	30JUL2015
Skoal X-tra Long Cut Mint Blend	06AUG2014	1	56.36	19AUG2014	7.30	11AUG2014
		2	56.02	19AUG2014	7.30	11AUG2014
		3	55.97	19AUG2014	7.29	11AUG2014
	10JUL2015	1	56.73	29JUL2015	7.13	30JUL2015
		2	56.70	29JUL2015	7.14	30JUL2015
		3	56.59	29JUL2015	7.13	30JUL2015
Starr Chewing Tobacco	06AUG2014	1	25.67	19AUG2014	5.58	19AUG2014
		2	26.12	19AUG2014	5.57	19AUG2014
		3	26.33	19AUG2014	5.82	19AUG2014
Stokers Tennessee Chew Original	10JUL2015	1	28.48	11SEP2015	5.48	10SEP2015
		2	26.21	11SEP2015	5.45	10SEP2015
		3	27.32	11SEP2015	5.50	10SEP2015
Stokers Wintergreen Long Cut	06AUG2014	1	52.82	19AUG2014	7.76	11AUG2014
		2	53.48	19AUG2014	7.76	11AUG2014
		3	53.27	19AUG2014	7.76	11AUG2014

Table 1. Smokeless Product Data Listing (as is) (cont'd)

Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture Analysis		pH Analysis	
			Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
Superior Dry Snuff	06AUG2014	1	7.43	19AUG2014	6.08	11AUG2014
		2	7.20	19AUG2014	6.09	11AUG2014
		3	7.20	19AUG2014	6.10	11AUG2014
	10JUL2015	1	7.07	11SEP2015	6.43	10SEP2015
		2	7.44	11SEP2015	6.44	10SEP2015
		3	7.15	11SEP2015	6.43	10SEP2015
Timber Wolf Mint Long Cut	10JUL2015	1	55.06	29JUL2015	7.58	30JUL2015
		2	54.95	29JUL2015	7.56	30JUL2015
		3	55.45	29JUL2015	7.55	30JUL2015
Timber Wolf Wintergreen Long Cut	06AUG2014	1	53.98	19AUG2014	7.96	11AUG2014
		2	54.15	19AUG2014	7.95	11AUG2014
		3	54.01	19AUG2014	7.96	11AUG2014
Tube Rose Scotch	20MAR2015	1	6.02	11SEP2015	5.72	10SEP2015
		2	7.23	11SEP2015	5.73	10SEP2015
		3	6.85	11SEP2015	5.74	10SEP2015
W.E. Garrett & Sons Scotch	18JUL2014	1	2.89	14AUG2014	6.24	06AUG2014
		2	2.72	14AUG2014	6.22	06AUG2014
		3	2.85	14AUG2014	6.21	06AUG2014

Table 1. Smokeless Product Data Listing (as is) (cont'd)

			Moisture Analysis		pH Analysis	
Cigarette Name	Manufacture/ purchase Date	Replicate (n)	Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
W.E. Garrett & Sons Scotch	16JUN2015	1	3.92	11SEP2015	6.31	10SEP2015
		2	4.18	11SEP2015	6.30	10SEP2015
		3	4.34	11SEP2015	6.31	10SEP2015

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Beechnut Chewing Tobacco (2014)				Beechnut Chewing Tobacco (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	8.0	8.0	8.0	3	N/A	N/A	N/A	N/A
% Un-ionized (free) Nicotine	0.4	0.3	0.4	3	N/A	N/A	N/A	N/A
Total Free Nicotine (mg/g)	0.03	0.03	0.03	3	N/A	N/A	N/A	N/A
Moisture (%)	28.9	28.4	29.3	3	N/A	N/A	N/A	N/A
pH	5.6	5.5	5.6	3	N/A	N/A	N/A	N/A
Acetaldehyde (ng/g)	3250	3170	3400	3	N/A	N/A	N/A	N/A
Crotonaldehyde (ng/g)	732*	730*	735*	3	N/A	N/A	N/A	N/A
Formaldehyde (ng/g)	899*	896*	902*	3	N/A	N/A	N/A	N/A
Arsenic (ng/g)	128	95	209	6	N/A	N/A	N/A	N/A
Cadmium (ng/g)	456	359	713	6	N/A	N/A	N/A	N/A
NNN (ng/g)	1267	1240	1290	3	N/A	N/A	N/A	N/A
NNK (ng/g)	337	320	351	3	N/A	N/A	N/A	N/A
NAT (ng/g)	692	678	702	3	N/A	N/A	N/A	N/A
NAB (ng/g)	38	36	39	3	N/A	N/A	N/A	N/A
B(a)P (ng/g)	5.0	4.9	5.2	3	N/A	N/A	N/A	N/A
B(a)A (ng/g)	27*	27*	28*	3	N/A	N/A	N/A	N/A

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Beechnut Chewing Tobacco (2014)				Beechnut Chewing Tobacco (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	36*	36*	38*	3	N/A	N/A	N/A	N/A
B(k)FL (ng/g)	18*	18*	19*	3	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.3*	26.8*	28.2*	3	N/A	N/A	N/A	N/A
Indeno(c,d)P (ng/g)	3.6*	3.6*	3.8*	3	N/A	N/A	N/A	N/A
Acrylamide (ng/g)	69	69	70	3	N/A	N/A	N/A	N/A
Naphthalene (ng/g)	182*	179*	188*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Beechnut Wintergreen Chewing Tobacco (2014)				Beechnut Wintergreen Chewing Tobacco (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	5.1	5.0	5.1	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	0.3	0.3	0.4	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	0.02	0.02	0.02	3
Moisture (%)	N/A	N/A	N/A	N/A	27.0	26.8	27.1	3
pH	N/A	N/A	N/A	N/A	5.6	5.6	5.6	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	4537	4510	4570	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	659*	646*	668*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	839*	822*	850*	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	190	126	263	6
Cadmium (ng/g)	N/A	N/A	N/A	N/A	473	337	549	3
NNN (ng/g)	N/A	N/A	N/A	N/A	1043	1020	1060	3
NNK (ng/g)	N/A	N/A	N/A	N/A	339	335	343	3
NAT (ng/g)	N/A	N/A	N/A	N/A	768	751	784	3
NAB (ng/g)	N/A	N/A	N/A	N/A	44	42	45	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	4.2	3.7	4.7	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	27*	26*	28*	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Beechnut Wintergreen Chewing Tobacco (2014)				Beechnut Wintergreen Chewing Tobacco (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	36*	35*	38*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	18*	17*	19*	3
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	27.4*	26.1*	28.4*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	3.6*	3.5*	3.8*	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	52	52	54	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	182*	174*	189*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Frost (2014)				Camel Snus Frost (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	11.3	11.2	11.5	3	9.6	9.6	9.7	3
% Un-ionized (free) Nicotine	34.6	34.4	34.9	3	32.5	32.4	32.9	3
Total Free Nicotine (mg/g)	3.9	3.9	4.0	3	3.1	3.1	3.2	3
Moisture (%)	31.5	31.5	31.6	3	31.4	31.0	31.8	3
pH	7.7	7.7	7.8	3	7.7	7.7	7.7	3
Acetaldehyde (ng/g)	1197	1150	1250	3	1537	1510	1570	3
Crotonaldehyde (ng/g)	628*	609*	645*	3	620*	600*	636*	3
Formaldehyde (ng/g)	2157	2100	2210	3	826	803	854	3
Arsenic (ng/g)	78	76	82	3	65	63	66	3
Cadmium (ng/g)	396	389	404	3	400	384	410	3
NNN (ng/g)	1543	1460	1610	3	1310	1280	1330	3
NNK (ng/g)	467	435	504	3	249	239	255	3
NAT (ng/g)	497	412	557	3	451	444	458	3
NAB (ng/g)	69	60	75	3	46	45	49	3
B(a)P (ng/g)	1.1	1.0	1.2	3	0.9*	0.8*	1.0	3
B(a)A (ng/g)	25*	24*	26*	3	47*	44*	48*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Frost (2014)				Camel Snus Frost (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	33*	32*	35*	3	62*	58*	64*	3
B(k)FL (ng/g)	16*	16*	17*	3	31*	29*	32*	3
Dibenz(a,h)A (ng/g)	24.7*	23.7*	26.2*	3	46.5*	43.8*	47.9*	3
Indeno(c,d)P (ng/g)	3.3*	3.2*	3.5*	3	6.2*	5.8*	6.4*	3
Acrylamide (ng/g)	138	133	141	3	56	55	57	3
Naphthalene (ng/g)	165*	158*	175*	3	310*	292*	320*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Frost Large (2014)				Camel Snus Frost Large (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	13.0	13.0	13.1	3	10.7	10.6	10.8	3
% Un-ionized (free) Nicotine	37.6	37.6	37.6	3	30.4	30.4	30.4	3
Total Free Nicotine (mg/g)	4.9	4.9	4.9	3	3.3	3.2	3.3	3
Moisture (%)	31.8	31.7	31.9	3	33.0	32.8	33.1	3
pH	7.8	7.8	7.8	3	7.7	7.7	7.7	3
Acetaldehyde (ng/g)	1413	1320	1560	3	1853	1750	2000	3
Crotonaldehyde (ng/g)	696*	682*	718*	3	700*	663*	747*	3
Formaldehyde (ng/g)	901	838	938	3	890*	843*	950*	3
Arsenic (ng/g)	76	74	78	3	58	56	59	3
Cadmium (ng/g)	403	400	405	3	463	456	474	3
NNN (ng/g)	1633	1580	1670	3	1103	1060	1130	3
NNK (ng/g)	475	466	482	3	194	192	197	3
NAT (ng/g)	636	623	646	3	400	389	410	3
NAB (ng/g)	80	78	81	3	42	41	43	3
B(a)P (ng/g)	1.2	1.2	1.3	3	1.0*	1.0*	1.1*	3
B(a)A (ng/g)	28*	27*	29*	3	31*	29*	32*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Frost Large (2014)				Camel Snus Frost Large (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	36*	39*	3	41*	39*	43*	3
B(k)FL (ng/g)	19*	18*	19*	3	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.8*	26.6*	29.0*	3	30.5*	29.1*	32.4*	3
Indeno(c,d)P (ng/g)	3.7*	3.6*	3.9*	3	4.7	4.4	5.1	3
Acrylamide (ng/g)	156	156	157	3	55	54	57	3
Naphthalene (ng/g)	186*	178*	193*	3	203*	194*	216*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Mellow (2014)				Camel Snus Mellow (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	11.5	11.4	11.6	3	9.7	9.7	9.8	3
% Un-ionized (free) Nicotine	37.2	36.5	37.6	3	27.7	27.6	28.0	3
Total Free Nicotine (mg/g)	4.3	4.2	4.4	3	2.7	2.7	2.7	3
Moisture (%)	32.1	31.9	32.4	3	32.6	32.5	32.7	3
pH	7.8	7.8	7.8	3	7.6	7.6	7.6	3
Acetaldehyde (ng/g)	2907	2820	3010	3	2243	2130	2300	3
Crotonaldehyde (ng/g)	603*	591*	617*	3	565*	545*	594*	3
Formaldehyde (ng/g)	1603	1550	1660	3	738	716	762	3
Arsenic (ng/g)	66	63	68	3	52	48	55	3
Cadmium (ng/g)	389	386	392	3	394	390	400	3
NNN (ng/g)	1140	1120	1150	3	1034	993	1110	3
NNK (ng/g)	449	440	454	3	196	180	218	3
NAT (ng/g)	399	377	416	3	371	339	425	3
NAB (ng/g)	66	65	69	3	35	31	42	3
B(a)P (ng/g)	1.2	1.1	1.3	3	0.8	0.8	0.8	3
B(a)A (ng/g)	24*	22*	25*	3	48*	46*	50*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Mellow (2014)				Camel Snus Mellow (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(a)A (ng/g)	23*	22*	24*	3	N/A	N/A	N/A	N/A
B(b/j)FL (ng/g)	32*	30*	34*	3	64*	61*	66*	3
B(b/j)FL (ng/g)	31*	29*	32*	3	N/A	N/A	N/A	N/A
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	23.7*	22.5*	25.2*	3	48.2*	46.0*	49.7*	3
Dibenz(a,h)A (ng/g)	23.0*	21.7*	23.7*	3	N/A	N/A	N/A	N/A
Indeno(c,d)P (ng/g)	4.6	4.2	5.3	3	6.4*	6.1*	6.6*	3
Indeno(c,d)P (ng/g)	4.5	3.9	5.0	3	N/A	N/A	N/A	N/A
Acrylamide (ng/g)	96	95	99	3	55	53	56	3
Naphthalene (ng/g)	158*	150*	168*	3	322*	307*	331*	3
Naphthalene (ng/g)	153*	145*	158*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Mint (2014)				Camel Snus Mint (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	9.7	9.3	10.2	3	9.9	9.9	10.0	3
% Un-ionized (free) Nicotine	40.5	40.3	40.9	3	20.1	19.7	20.5	3
Total Free Nicotine (mg/g)	3.9	3.8	4.2	3	2.0	2.0	2.0	3
Moisture (%)	31.6	31.4	31.8	3	32.4	32.3	32.5	3
pH	7.9	7.9	7.9	3	7.4	7.4	7.4	3
Acetaldehyde (ng/g)	1333	1250	1460	3	1303	1250	1360	3
Crotonaldehyde (ng/g)	632*	618*	654*	3	578*	573*	584*	3
Formaldehyde (ng/g)	1393	1310	1470	3	735*	729*	743*	3
Arsenic (ng/g)	74	70	76	3	58	55	62	3
Cadmium (ng/g)	390	389	392	3	441	427	453	3
NNN (ng/g)	1393	1370	1410	3	1290	1260	1310	3
NNK (ng/g)	591	577	609	3	280	274	285	3
NAT (ng/g)	515	492	531	3	406	389	418	3
NAB (ng/g)	94	93	96	3	49	48	51	3
B(a)P (ng/g)	1.3	1.3	1.4	3	0.9	0.9	0.9	3
B(a)A (ng/g)	26*	25*	27*	3	44*	41*	47*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Mint (2014)				Camel Snus Mint (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	34*	33*	36*	3	59*	55*	63*	3
B(k)FL (ng/g)	17*	17*	18*	3	29*	27*	31*	3
Dibenz(a,h)A (ng/g)	25.8*	25.1*	26.6*	3	43.9*	40.9*	47.2*	3
Indeno(c,d)P (ng/g)	3.4*	3.3*	3.6*	3	5.9*	5.5*	6.3*	3
Acrylamide (ng/g)	84	83	85	3	51	50	53	3
Naphthalene (ng/g)	172*	167*	178*	3	293*	273*	315*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Robust (2014)				Camel Snus Robust (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	9.9	9.7	10.3	3	10.2	10.1	10.2	3
% Un-ionized (free) Nicotine	31.4	30.9	31.9	3	19.8	19.7	20.1	3
Total Free Nicotine (mg/g)	3.1	3.0	3.3	3	2.0	2.0	2.0	3
Moisture (%)	32.4	32.1	32.7	3	33.5	33.5	33.6	3
pH	7.7	7.7	7.7	3	7.4	7.4	7.4	3
Acetaldehyde (ng/g)	1397	1350	1430	3	1513	1490	1530	3
Crotonaldehyde (ng/g)	711*	687*	728*	3	762*	736*	803*	3
Formaldehyde (ng/g)	873*	843*	894*	3	969*	937*	1020*	3
Arsenic (ng/g)	72	69	74	3	72	70	73	3
Cadmium (ng/g)	395	392	399	3	377	371	382	3
NNN (ng/g)	1040	1030	1050	3	872	856	887	3
NNK (ng/g)	328	323	334	3	150	148	151	3
NAT (ng/g)	363	342	374	3	352	330	370	3
NAB (ng/g)	49	45	50	3	35	34	35	3
B(a)P (ng/g)	1.1	1.0	1.1	3	1.0*	1.0*	1.0*	3
B(a)A (ng/g)	28*	27*	29*	3	29*	28*	32*	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Robust (2014)				Camel Snus Robust (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	36*	39*	3	39*	37*	42*	3
Dibenz(a,h)A (ng/g)	28.0*	27.3*	29.3*	3	29.2*	27.8*	31.8*	3
Indeno(c,d)P (ng/g)	5.3	5.2	5.4	3	3.9*	3.7	4.3	3
Acrylamide (ng/g)	61	61	62	3	48	44	50	3
Naphthalene (ng/g)	187*	182*	195*	3	194*	185*	212*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Winterchill (2014)				Camel Snus Winterchill (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	10.4	10.4	10.4	3	9.5	9.4	9.5	3
% Un-ionized (free) Nicotine	40.3	39.8	40.9	3	35.6	35.5	36.0	3
Total Free Nicotine (mg/g)	4.2	4.2	4.3	3	3.4	3.4	3.4	3
Moisture (%)	32.8	32.6	33.0	3	32.9	32.8	33.0	3
pH	7.9	7.8	7.9	3	7.8	7.8	7.8	3
Acetaldehyde (ng/g)	2107	2040	2150	3	1557	1530	1570	3
Crotonaldehyde (ng/g)	640*	614*	672*	3	706*	689*	733*	3
Formaldehyde (ng/g)	786*	754*	825*	3	898*	876*	932*	3
Arsenic (ng/g)	68	64	74	3	66	64	67	3
Cadmium (ng/g)	365	365	366	3	385	383	389	3
NNN (ng/g)	1077	1060	1100	3	980	953	996	3
NNK (ng/g)	399	386	413	3	191	187	198	3
NAT (ng/g)	396	384	403	3	442	436	454	3
NAB (ng/g)	58	56	60	3	40	39	42	3
B(a)P (ng/g)	1.2	1.2	1.3	3	1.5*	1.1*	2.1	3
B(a)A (ng/g)	31*	28*	36*	3	32*	28*	36*	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Camel Snus Winterchill (2014)				Camel Snus Winterchill (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	41*	38*	48*	3	43*	38*	47*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	21*	19*	24*	3
Dibenz(a,h)A (ng/g)	31.1*	28.5*	35.7*	3	31.9*	28.2*	35.5*	3
Indeno(c,d)P (ng/g)	6.1	5.8	6.5	3	4.3*	3.8*	4.7*	3
Acrylamide (ng/g)	96	92	101	3	53	50	55	3
Naphthalene (ng/g)	207*	190*	238*	3	213*	188*	237*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Long Cut (2014)				Copenhagen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	12.0	11.9	12.0	3	12.0	11.9	12.1	3
% Un-ionized (free) Nicotine	26.2	26.2	26.2	3	42.6	42.0	43.1	3
Total Free Nicotine (mg/g)	3.1	3.1	3.1	3	5.1	5.0	5.2	3
Moisture (%)	57.1	57.1	57.2	3	56.0	56.0	56.1	3
pH	7.6	7.6	7.6	3	7.9	7.9	7.9	3
Acetaldehyde (ng/g)	1007*	1000*	1010*	3	997*	991*	1000*	3
Crotonaldehyde (ng/g)	731*	729*	732*	3	693*	689*	696*	3
Formaldehyde (ng/g)	897*	894*	898*	3	882*	877*	885*	3
Arsenic (ng/g)	91	89	94	3	95	89	99	3
Cadmium (ng/g)	396	389	401	3	466	461	470	3
NNN (ng/g)	1267	1260	1280	3	1020	1020	1020	3
NNK (ng/g)	316	313	318	3	239	232	243	3
NAT (ng/g)	1143	1130	1160	3	1001	984	1020	3
NAB (ng/g)	82	80	86	3	59	58	60	3
B(a)P (ng/g)	84.5	82.9	85.5	3	58.8	58.0	59.4	3
B(a)A (ng/g)	77	75	79	3	69	68	70	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Long Cut (2014)				Copenhagen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	36*	36*	37*	3	38*	38*	38*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.3*	26.9*	27.6*	3	28.5*	28.4*	28.6*	3
Indeno(c,d)P (ng/g)	5.8	5.0	6.4	3	4.9	4.4	5.4	3
Acrylamide (ng/g)	426	410	435	3	325	322	331	3
Naphthalene (ng/g)	182*	180*	184*	3	190*	189*	191*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Long Cut Southern Blend (2014)				Copenhagen Long Cut Southern Blend (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	12.6	12.4	12.6	3	10.8	10.7	10.8	3
% Un-ionized (free) Nicotine	28.3	28.0	29.0	3	15.3	15.1	15.7	3
Total Free Nicotine (mg/g)	3.6	3.5	3.6	3	1.6	1.6	1.7	3
Moisture (%)	57.0	56.9	57.2	3	55.8	55.8	55.9	3
pH	7.6	7.6	7.6	3	7.3	7.3	7.3	3
Acetaldehyde (ng/g)	1010*	1010*	1010*	3	996*	988*	1010*	3
Crotonaldehyde (ng/g)	733*	731*	734*	3	692*	688*	700*	3
Formaldehyde (ng/g)	900*	897*	902*	3	1927	1900	1970	3
Arsenic (ng/g)	123	120	125	3	114	112	115	3
Cadmium (ng/g)	465	463	468	3	516	501	525	3
NNN (ng/g)	1197	1180	1220	3	992	957	1010	3
NNK (ng/g)	406	402	408	3	221	220	222	3
NAT (ng/g)	922	907	933	3	852	844	864	3
NAB (ng/g)	59	58	61	3	52	52	53	3
B(a)P (ng/g)	31.3	30.9	31.7	3	31.0	30.0	31.7	3
B(a)A (ng/g)	32	32	32	3	34	34	35	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Long Cut Southern Blend (2014)				Copenhagen Long Cut Southern Blend (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	36*	37*	3	35*	35*	36*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.4*	26.9*	27.9*	3	26.6*	26.3*	27.3*	3
Indeno(c,d)P (ng/g)	3.7*	3.6*	3.7*	3	3.5*	3.5*	3.6*	3
Acrylamide (ng/g)	227	217	237	3	183	181	184	3
Naphthalene (ng/g)	183*	179*	186*	3	177*	175*	182*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Long Cut Wintergreen (2014)				Copenhagen Long Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	11.7	11.4	12.0	3	10.6	10.6	10.6	3
% Un-ionized (free) Nicotine	34.9	34.4	35.5	3	36.0	35.5	36.5	3
Total Free Nicotine (mg/g)	4.1	3.9	4.2	3	3.8	3.8	3.9	3
Moisture (%)	56.7	56.6	56.8	3	56.4	56.1	56.6	3
pH	7.8	7.7	7.8	3	7.8	7.8	7.8	3
Acetaldehyde (ng/g)	2053	1990	2100	3	2337	2280	2390	3
Crotonaldehyde (ng/g)	733*	732*	734*	3	703*	701*	705*	3
Formaldehyde (ng/g)	899*	898*	901*	3	1990	1970	2000	3
Arsenic (ng/g)	94	92	98	3	92	89	95	3
Cadmium (ng/g)	424	422	427	3	381	375	387	3
NNN (ng/g)	974	943	992	3	1067	1050	1080	3
NNK (ng/g)	224	219	230	3	250	246	255	3
NAT (ng/g)	791	769	803	3	1047	1010	1090	3
NAB (ng/g)	51	50	53	3	59	56	61	3
B(a)P (ng/g)	50.0	46.6	52.3	3	51.1	47.9	54.8	3
B(a)A (ng/g)	49	47	50	3	71	70	72	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Long Cut Wintergreen (2014)				Copenhagen Long Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	36*	35*	36*	3	38*	37*	38*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.0*	26.4*	27.3*	3	28.3*	27.9*	28.5*	3
Indeno(c,d)P (ng/g)	4.8	4.3	5.2	3	6.5	5.7	7.0	3
Acrylamide (ng/g)	253	240	259	3	278	277	279	3
Naphthalene (ng/g)	180*	176*	182*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Pouches (2014)				Copenhagen Pouches (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	10.3	9.8	10.7	3	11.0	11.0	11.0	3
% Un-ionized (free) Nicotine	48.1	47.7	48.3	3	38.9	38.1	39.2	3
Total Free Nicotine (mg/g)	5.0	4.8	5.2	3	4.3	4.2	4.3	3
Moisture (%)	53.2	52.5	53.8	3	55.5	55.5	55.7	3
pH	8.0	8.0	8.0	3	7.8	7.8	7.8	3
Acetaldehyde (ng/g)	699*	666*	748*	3	703*	669*	739*	3
Crotonaldehyde (ng/g)	508*	484*	544*	3	490*	466*	514*	3
Formaldehyde (ng/g)	804	799	810	3	623*	592*	654*	3
Arsenic (ng/g)	131	129	134	3	93	71	106	3
Cadmium (ng/g)	600	585	625	3	509	490	534	4
NNN (ng/g)	2373	2340	2420	3	1507	1480	1530	3
NNK (ng/g)	702	666	727	3	327	325	330	3
NAT (ng/g)	2413	2380	2440	3	1297	1230	1370	3
NAB (ng/g)	188	187	189	3	98	95	101	3
B(a)P (ng/g)	64.2	61.3	67.8	3	51.8	48.7	54.1	3
B(a)A (ng/g)	82	73	88	3	79	73	83	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Pouches (2014)				Copenhagen Pouches (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	31	28	34	3	32	30	33	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	17.8*	16.2*	19.9*	3	18.9*	18.4*	19.4*	3
Indeno(c,d)P (ng/g)	7.0	6.7	7.3	3	6.5	6.4	6.6	3
Acrylamide (ng/g)	244	235	249	3	179	175	185	3
Naphthalene (ng/g)	119*	108*	133*	3	126*	123*	130*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Pouches Wintergreen (2014)				Copenhagen Pouches Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	10.1	9.9	10.3	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	7.5	7.4	7.7	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	0.8	0.7	0.8	3
Moisture (%)	N/A	N/A	N/A	N/A	55.6	55.2	56.1	3
pH	N/A	N/A	N/A	N/A	6.9	6.9	6.9	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	675*	661*	688*	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	469*	460*	478*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	1080	1060	1090	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	98	93	104	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	448	447	450	3
NNN (ng/g)	N/A	N/A	N/A	N/A	1443	1400	1520	3
NNK (ng/g)	N/A	N/A	N/A	N/A	336	321	349	3
NAT (ng/g)	N/A	N/A	N/A	N/A	1060	1050	1070	3
NAB (ng/g)	N/A	N/A	N/A	N/A	70	69	72	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	45.7	42.1	50.9	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	69	67	71	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Pouches Wintergreen (2014)				Copenhagen Pouches Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	25*	24*	26*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	18.5*	18.0*	19.4*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	5.3	5.1	5.4	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	181	178	183	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Snuff Fine Cut (2014)				Copenhagen Snuff Fine Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	11.7	11.7	11.8	3	12.2	12.1	12.2	3
% Un-ionized (free) Nicotine	19.7	19.4	20.1	3	27.7	27.6	28.0	3
Total Free Nicotine (mg/g)	2.3	2.3	2.4	3	3.4	3.3	3.4	3
Moisture (%)	55.6	55.5	55.7	3	55.2	55.0	55.5	3
pH	7.4	7.4	7.4	3	7.6	7.6	7.6	3
Acetaldehyde (ng/g)	1007*	1000*	1010*	3	994*	980*	1010*	3
Crotonaldehyde (ng/g)	732*	730*	734*	3	690*	682*	699*	3
Formaldehyde (ng/g)	898*	896*	901*	3	878*	867*	890*	3
Arsenic (ng/g)	120	115	129	3	118	112	127	5
Cadmium (ng/g)	538	534	543	3	537	524	554	5
NNN (ng/g)	2403	2370	2430	3	1523	1520	1530	3
NNK (ng/g)	831	813	856	3	381	377	388	3
NAT (ng/g)	2620	2580	2660	3	1413	1370	1450	3
NAB (ng/g)	181	180	182	3	103	102	103	3
B(a)P (ng/g)	86.7	84.3	88.8	3	71.5	70.9	71.8	3
B(a)A (ng/g)	74	72	76	3	80	79	81	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Copenhagen Snuff Fine Cut (2014)				Copenhagen Snuff Fine Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	36*	37*	3	33*	32	34*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.7*	27.2*	28.1*	3	24.5*	23.2*	25.6*	3
Indeno(c,d)P (ng/g)	6.2	6.1	6.3	3	6.9	6.7	7.2	3
Acrylamide (ng/g)	337	315	356	3	183	182	185	3
Naphthalene (ng/g)	185*	181*	187*	3	164*	155*	171*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Mint Long Cut (2014)				Grizzly Premium Mint Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	14.3	14.2	14.4	3	14.0	13.9	14.0	3
% Un-ionized (free) Nicotine	25.3	25.3	25.3	3	20.2	20.1	20.5	3
Total Free Nicotine (mg/g)	3.6	3.6	3.6	3	2.8	2.8	2.9	3
Moisture (%)	52.6	52.6	52.7	3	52.9	52.8	52.9	3
pH	7.6	7.6	7.6	3	7.4	7.4	7.4	3
Acetaldehyde (ng/g)	7757	7530	8040	3	976*	971*	981*	3
Crotonaldehyde (ng/g)	732*	732*	733*	3	679*	676*	682*	3
Formaldehyde (ng/g)	1110	1090	1140	3	864*	860*	868*	3
Arsenic (ng/g)	106	97	119	3	96	87	112	3
Cadmium (ng/g)	497	490	502	3	655	645	665	3
NNN (ng/g)	1660	1650	1680	3	1650	1620	1680	3
NNK (ng/g)	422	407	431	3	302	296	308	3
NAT (ng/g)	1940	1910	1970	3	1677	1650	1690	3
NAB (ng/g)	113	110	116	3	98	96	100	3
B(a)P (ng/g)	97.1	95.0	99.6	3	99.3	97.4	102.5	3
B(a)A (ng/g)	95	93	96	3	112	108	116	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Mint Long Cut (2014)				Grizzly Premium Mint Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	39	38	41	3	46	46	47	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	16*	15*	16*	3
Dibenz(a,h)A (ng/g)	27.3*	26.2*	28.2*	3	23.8*	23.0*	24.5*	3
Indeno(c,d)P (ng/g)	7.2	6.8	7.8	3	9.7	9.3	10.4	3
Acrylamide (ng/g)	324	319	333	3	191	188	193	3
Naphthalene (ng/g)	182*	175*	188*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Natural Fine Cut (2014)				Grizzly Premium Natural Fine Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	16.0	16.0	16.0	3	13.5	13.4	13.6	3
% Un-ionized (free) Nicotine	24.3	23.6	25.3	3	31.0	30.9	31.4	3
Total Free Nicotine (mg/g)	3.9	3.8	4.1	3	4.2	4.2	4.2	3
Moisture (%)	52.2	52.2	52.3	3	53.2	53.1	53.5	3
pH	7.5	7.5	7.6	3	7.7	7.7	7.7	3
Acetaldehyde (ng/g)	50533	48600	52100	3	1357	1320	1410	3
Crotonaldehyde (ng/g)	732*	731*	733*	3	685*	680*	689*	3
Formaldehyde (ng/g)	2057	2030	2080	3	1010	970	1050	3
Arsenic (ng/g)	111	104	117	3	100	96	107	3
Cadmium (ng/g)	579	571	591	3	594	586	606	3
NNN (ng/g)	5633	5530	5710	3	4810	4590	4970	3
NNK (ng/g)	1107	1090	1120	3	1097	1090	1110	3
NAT (ng/g)	11167	10800	11500	3	6633	6550	6710	3
NAB (ng/g)	498	481	514	3	341	328	351	3
B(a)P (ng/g)	66.1	56.4	71.2	3	85.6	84.0	88.8	3
B(a)A (ng/g)	71	71	72	3	83	80	86	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Natural Fine Cut (2014)				Grizzly Premium Natural Fine Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	36*	35*	38*	3	33*	33*	34	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.2*	26.1*	28.3*	3	23.8*	23.3*	24.5*	3
Indeno(c,d)P (ng/g)	5.4	5.1	5.6	3	7.4	7.1	7.7	3
Acrylamide (ng/g)	253	250	256	3	188	183	192	3
Naphthalene (ng/g)	181*	174*	189*	3	159*	155*	164*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

	Grizzly Premium Natural Snuff (2014)				Grizzly Premium Natural Snuff (2015)			
Analyte	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	13.1	13.1	13.1	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	20.5	20.1	20.8	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	2.7	2.6	2.7	3
Moisture (%)	N/A	N/A	N/A	N/A	52.0	51.9	52.1	3
pH	N/A	N/A	N/A	N/A	7.4	7.4	7.4	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	1010	1000	1020	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	684*	674*	700*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	870*	857*	890*	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	119	110	133	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	527	522	535	3
NNN (ng/g)	N/A	N/A	N/A	N/A	2017	2000	2040	3
NNK (ng/g)	N/A	N/A	N/A	N/A	725	712	748	3
NAT (ng/g)	N/A	N/A	N/A	N/A	2080	2040	2150	3
NAB (ng/g)	N/A	N/A	N/A	N/A	131	126	138	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	72.8	71.8	74.2	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	76	75	78	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Natural Snuff (2014)				Grizzly Premium Natural Snuff (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	32*	31	34*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	24.2*	22.6*	25.5*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	6.4	6.0	6.7	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	142	139	145	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	161*	151*	170*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Straight Long Cut (2014)				Grizzly Premium Straight Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	12.6	12.6	12.7	3	12.0	12.0	12.1	3
% Un-ionized (free) Nicotine	30.1	29.9	30.4	3	42.0	42.0	42.0	3
Total Free Nicotine (mg/g)	3.8	3.8	3.8	3	5.1	5.0	5.1	3
Moisture (%)	52.9	52.8	53.0	3	53.5	53.4	53.5	3
pH	7.7	7.7	7.7	3	7.9	7.9	7.9	3
Acetaldehyde (ng/g)	3533	3450	3630	3	978*	967*	989*	3
Crotonaldehyde (ng/g)	733*	731*	735*	3	681*	673*	688*	3
Formaldehyde (ng/g)	2150	2100	2190	3	866*	856*	875*	3
Arsenic (ng/g)	191	179	211	3	183	172	190	3
Cadmium (ng/g)	679	669	684	3	621	617	625	3
NNN (ng/g)	1810	1790	1820	3	1103	1070	1130	3
NNK (ng/g)	635	620	651	3	249	242	259	3
NAT (ng/g)	2573	2500	2620	3	1383	1350	1440	3
NAB (ng/g)	158	157	159	3	85	84	87	3
B(a)P (ng/g)	86.3	83.5	88.1	3	1.0*	1.0*	1.0*	3
B(a)A (ng/g)	85	83	88	3	92	91	93	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Straight Long Cut (2014)				Grizzly Premium Straight Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	36*	38*	3	34*	33*	36*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.5*	26.6*	28.4*	3	25.9*	25.0*	26.6*	3
Indeno(c,d)P (ng/g)	7.2	7.0	7.4	3	6.7	6.4	6.9	3
Acrylamide (ng/g)	221	218	224	3	160	156	162	3
Naphthalene (ng/g)	183*	178*	190*	3	172*	167*	178*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Wintergreen Long Cut (2014)				Grizzly Premium Wintergreen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	12.5	12.5	12.5	3	11.3	11.2	11.5	3
% Un-ionized (free) Nicotine	57.1	56.9	57.4	3	66.8	66.1	67.1	3
Total Free Nicotine (mg/g)	7.1	7.1	7.2	3	7.6	7.4	7.7	3
Moisture (%)	52.1	52.0	52.1	3	51.8	51.6	51.9	3
pH	8.1	8.1	8.2	3	8.3	8.3	8.3	3
Acetaldehyde (ng/g)	6083	6040	6160	3	2130	2050	2230	3
Crotonaldehyde (ng/g)	732*	729*	734*	3	723*	706*	741*	3
Formaldehyde (ng/g)	2407	2380	2420	3	1853	1800	1890	3
Arsenic (ng/g)	148	138	164	3	122	110	145	3
Cadmium (ng/g)	532	524	536	3	591	589	593	3
NNN (ng/g)	1403	1380	1430	3	1640	1600	1680	3
NNK (ng/g)	286	281	293	3	462	456	469	3
NAT (ng/g)	1347	1310	1380	3	1923	1890	1970	3
NAB (ng/g)	94	92	97	3	123	120	125	3
B(a)P (ng/g)	130.0	128.6	131.4	3	101.5	96.7	109.5	3
B(a)A (ng/g)	110	109	111	3	165	164	167	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Wintergreen Long Cut (2014)				Grizzly Premium Wintergreen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	45	45	45	3	61	59	62	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	64	63	64	3
Dibenz(a,h)A (ng/g)	28.0*	27.6*	28.6*	3	27.5*	26.0*	28.6*	3
Indeno(c,d)P (ng/g)	9.1	8.9	9.6	3	13.2	12.5	13.7	3
Acrylamide (ng/g)	294	291	298	3	158	156	161	3
Naphthalene (ng/g)	187*	184*	190*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Wintergreen Pouches (2014)				Grizzly Premium Wintergreen Pouches (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	11.3	11.2	11.3	3	9.9	9.9	10.0	3
% Un-ionized (free) Nicotine	64.4	63.5	65.6	3	37.4	37.1	37.6	3
Total Free Nicotine (mg/g)	7.3	7.2	7.4	3	3.7	3.7	3.8	3
Moisture (%)	49.0	48.7	49.4	3	49.4	48.7	50.1	3
pH	8.3	8.3	8.3	3	7.8	7.8	7.8	3
Acetaldehyde (ng/g)	5620	5400	5790	3	3667	3550	3750	3
Crotonaldehyde (ng/g)	543*	526*	563*	3	536*	521*	546*	3
Formaldehyde (ng/g)	3580	3570	3590	3	2713	2670	2750	3
Arsenic (ng/g)	112	109	119	3	117	107	127	3
Cadmium (ng/g)	496	491	499	3	540	522	554	3
NNN (ng/g)	2037	1990	2070	3	1740	1710	1760	3
NNK (ng/g)	481	464	512	3	546	537	560	3
NAT (ng/g)	2133	2100	2150	3	1990	1920	2030	3
NAB (ng/g)	151	148	154	3	115	112	118	3
B(a)P (ng/g)	120.3	117.1	124.4	3	85.0	81.6	90.8	3
B(a)A (ng/g)	130	129	131	3	151	146	157	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Wintergreen Pouches (2014)				Grizzly Premium Wintergreen Pouches (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	53	52	53	3	59	57	62	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	28.0*	26.8*	28.7*	3	22.6*	22.1*	22.9*	3
Indeno(c,d)P (ng/g)	10.8	10.6	11.2	3	12.9	11.8	13.7	3
Acrylamide (ng/g)	464	457	478	3	200	199	201	3
Naphthalene (ng/g)	186*	179*	191*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Wintergreen Wide Cut (2014)				Grizzly Premium Wintergreen Wide Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	14.3	14.1	14.4	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	16.2	16.0	16.3	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	2.3	2.3	2.4	3
Moisture (%)	N/A	N/A	N/A	N/A	52.3	52.3	52.4	3
pH	N/A	N/A	N/A	N/A	7.3	7.3	7.3	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	3010	2930	3150	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	682*	676*	688*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	944	933	954	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	108	105	113	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	509	500	518	3
NNN (ng/g)	N/A	N/A	N/A	N/A	1317	1280	1340	3
NNK (ng/g)	N/A	N/A	N/A	N/A	191	189	193	3
NAT (ng/g)	N/A	N/A	N/A	N/A	1573	1550	1600	3
NAB (ng/g)	N/A	N/A	N/A	N/A	98	93	101	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	76.9	73.9	82.5	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	111	105	115	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Grizzly Premium Wintergreen Wide Cut (2014)				Grizzly Premium Wintergreen Wide Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	34	33	36	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	48	47	48	3
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	23.4*	22.7*	23.9*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	8.9	8.6	9.1	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	132	131	133	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Kayak Long Cut Straight (2014)				Kayak Long Cut Straight (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	9.6	9.5	9.6	3	12.4	12.2	12.5	3
% Un-ionized (free) Nicotine	7.0	6.9	7.1	3	3.4	3.4	3.4	3
Total Free Nicotine (mg/g)	0.7	0.7	0.7	3	0.4	0.4	0.4	3
Moisture (%)	54.2	53.9	54.4	3	55.3	55.1	55.7	3
pH	6.9	6.9	6.9	3	6.6	6.6	6.6	3
Acetaldehyde (ng/g)	1340	1280	1390	3	1005*	944*	1050	3
Crotonaldehyde (ng/g)	733*	732*	735*	3	670*	652*	700*	3
Formaldehyde (ng/g)	900*	898*	902*	3	851*	829*	890*	3
Arsenic (ng/g)	127	120	133	3	100	94	106	3
Cadmium (ng/g)	590	582	599	3	458	456	462	3
NNN (ng/g)	5500	5480	5540	3	1563	1520	1630	3
NNK (ng/g)	2107	2070	2170	3	548	534	567	3
NAT (ng/g)	6760	6700	6810	3	1860	1830	1900	3
NAB (ng/g)	721	707	729	3	142	138	147	3
B(a)P (ng/g)	106.5	102.4	109.1	3	64.0	60.6	66.8	3
B(a)A (ng/g)	103	102	104	3	114	113	116	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Kayak Long Cut Straight (2014)				Kayak Long Cut Straight (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	39	39	40	3	43	42	43	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	44	43	44	3
Dibenz(a,h)A (ng/g)	27.2*	26.9*	27.5*	3	20.7*	20.3*	21.3*	3
Indeno(c,d)P (ng/g)	9.0	8.8	9.3	3	9.2	8.9	9.4	3
Acrylamide (ng/g)	91	87	98	3	174	172	177	3
Naphthalene (ng/g)	181*	180*	183*	3	138*	135*	142*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Kayak Long Cut Wintergreen (2014)				Kayak Long Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	9.7	9.6	9.7	3	12.8	12.5	13.2	3
% Un-ionized (free) Nicotine	24.5	24.5	24.5	3	13.7	13.7	13.7	3
Total Free Nicotine (mg/g)	2.4	2.4	2.4	3	1.8	1.7	1.8	3
Moisture (%)	52.8	52.8	52.8	3	52.9	52.8	53.0	3
pH	7.5	7.5	7.5	3	7.2	7.2	7.2	3
Acetaldehyde (ng/g)	1007*	1000*	1010*	3	1483	1390	1550	3
Crotonaldehyde (ng/g)	732*	728*	735*	3	714*	697*	736*	3
Formaldehyde (ng/g)	944*	899*	1030*	3	929*	899	950	3
Arsenic (ng/g)	139	131	151	3	124	117	129	3
Cadmium (ng/g)	719	713	728	3	526	515	537	3
NNN (ng/g)	6180	6110	6300	3	1333	1290	1370	3
NNK (ng/g)	3027	2980	3060	3	476	471	480	3
NAT (ng/g)	6250	6180	6360	3	1603	1560	1630	3
NAB (ng/g)	702	695	716	3	119	114	123	3
B(a)P (ng/g)	120.9	117.1	128.5	3	90.3	89.4	91.0	3
B(a)A (ng/g)	106	101	111	3	168	166	170	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Kayak Long Cut Wintergreen (2014)				Kayak Long Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	43	40	45	3	60	59	61	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	62	61	62	3
Dibenz(a,h)A (ng/g)	27.7*	27.5*	28.0*	3	25.3*	24.1*	27.2*	3
Indeno(c,d)P (ng/g)	9.7	8.8	10.3	3	11.8	11.6	12.0	3
Acrylamide (ng/g)	122	121	123	3	274	270	276	3
Naphthalene (ng/g)	185*	183*	187*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Klondike Long Cut Straight (2014)				Klondike Long Cut Straight (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	7.7	7.6	7.7	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	67.1	67.1	67.1	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	5.2	5.1	5.2	3
Moisture (%)	N/A	N/A	N/A	N/A	55.9	55.2	56.5	3
pH	N/A	N/A	N/A	N/A	8.3	8.3	8.3	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	6630	6530	6680	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	701*	692*	706*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	891*	881*	898*	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	46	42	49	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	366	361	372	3
NNN (ng/g)	N/A	N/A	N/A	N/A	552	542	571	3
NNK (ng/g)	N/A	N/A	N/A	N/A	97	89	101	3
NAT (ng/g)	N/A	N/A	N/A	N/A	266	256	274	3
NAB (ng/g)	N/A	N/A	N/A	N/A	27	26	29	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	3.9*	3.8*	3.9*	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	20*	20*	21*	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Klondike Long Cut Straight (2014)				Klondike Long Cut Straight (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	27*	26*	28*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	20.3*	19.8*	20.8*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	2.8*	2.7*	2.8	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	129	126	131	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	135*	132*	138*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Klondike Long Cut Wintergreen (2014)				Klondike Long Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	7.4	7.3	7.4	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	48.9	48.9	48.9	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	3.6	3.6	3.6	3
Moisture (%)	N/A	N/A	N/A	N/A	55.6	55.2	56.5	3
pH	N/A	N/A	N/A	N/A	8.0	8.0	8.0	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	5997	5850	6130	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	695*	682*	704*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	1603	1580	1630	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	48	43	54	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	350	347	353	3
NNN (ng/g)	N/A	N/A	N/A	N/A	558	554	562	3
NNK (ng/g)	N/A	N/A	N/A	N/A	110	108	111	3
NAT (ng/g)	N/A	N/A	N/A	N/A	284	277	294	3
NAB (ng/g)	N/A	N/A	N/A	N/A	26	26	27	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	3.9*	3.8*	3.9*	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	23*	22*	25*	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Klondike Long Cut Wintergreen (2014)				Klondike Long Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	31*	29*	33*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	23.2*	22.1*	25.0*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	3.1*	2.9*	3.3*	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	127	124	129	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Kodiak Premium Wintergreen (2014)				Kodiak Premium Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	11.4	11.2	11.6	3	10.5	10.4	10.6	3
% Un-ionized (free) Nicotine	67.6	67.6	67.6	3	60.2	59.7	60.8	3
Total Free Nicotine (mg/g)	7.7	7.6	7.9	3	6.3	6.3	6.3	3
Moisture (%)	52.5	52.3	52.6	3	52.2	52.1	52.3	3
pH	8.3	8.3	8.3	3	8.2	8.2	8.2	3
Acetaldehyde (ng/g)	3773	3720	3850	3	3250	3200	3310	3
Crotonaldehyde (ng/g)	733*	730*	734*	3	685*	676*	690*	3
Formaldehyde (ng/g)	3193	3140	3250	3	4263	4250	4280	3
Arsenic (ng/g)	145	135	152	3	123	120	125	3
Cadmium (ng/g)	568	546	584	3	658	654	662	3
NNN (ng/g)	1690	1660	1720	3	2187	2170	2200	3
NNK (ng/g)	395	394	397	3	632	618	642	3
NAT (ng/g)	1813	1800	1820	3	3250	3200	3310	3
NAB (ng/g)	130	129	131	3	187	181	190	3
B(a)P (ng/g)	190.4	187.7	193.2	3	181.9	179.9	185.5	3
B(a)A (ng/g)	161	159	163	3	185	180	191	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Kodiak Premium Wintergreen (2014)				Kodiak Premium Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	61	61	62	3	74	72	75	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	16*	16*	17*	3
Dibenz(a,h)A (ng/g)	28.1*	27.4*	28.5*	3	24.3*	23.6*	24.9*	3
Indeno(c,d)P (ng/g)	13.3	12.9	13.8	3	16.2	15.8	17.0	3
Acrylamide (ng/g)	403	395	414	3	266	263	269	3
Naphthalene (ng/g)	187*	183*	190*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Levi Garrett (2014)				Levi Garrett (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	5.3	5.3	5.3	3	5.7	5.6	5.7	3
% Un-ionized (free) Nicotine	2.2	2.0	2.4	3	0.7	0.6	0.9	3
Total Free Nicotine (mg/g)	0.1	0.1	0.1	3	0.0	0.0	0.1	3
Moisture (%)	22.5	22.0	23.1	3	24.9	24.3	25.5	3
pH	6.4	6.3	6.4	3	5.9	5.8	6.0	3
Acetaldehyde (ng/g)	1913	1850	1960	3	1697	1690	1710	3
Crotonaldehyde (ng/g)	731*	729*	733*	3	674*	668*	678*	3
Formaldehyde (ng/g)	897*	895*	900*	3	857*	850*	863*	3
Arsenic (ng/g)	137	95	191	6	130	115	153	3
Cadmium (ng/g)	658	270	1068	6	754	173	1989	6
NNN (ng/g)	3700	3590	3820	3	2943	2890	3000	3
NNK (ng/g)	781	765	790	3	954	928	988	3
NAT (ng/g)	1260	1230	1290	3	1817	1790	1850	3
NAB (ng/g)	262	243	277	3	182	180	187	3
B(a)P (ng/g)	5.0	4.8	5.2	3	3.4	3.3	3.6	3
B(a)A (ng/g)	27*	27*	28*	3	27*	26*	28*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Levi Garrett (2014)				Levi Garrett (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	35*	37*	3	36*	35*	37*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	18*	18*	19*	3
Dibenz(a,h)A (ng/g)	27.5*	26.5*	28.1*	3	27.0*	26.3*	27.8*	3
Indeno(c,d)P (ng/g)	3.7*	3.5*	3.7*	3	3.6*	3.5*	3.7*	3
Acrylamide (ng/g)	494	493	497	3	212	194	225	3
Naphthalene (ng/g)	183*	177*	187*	3	180*	175*	186*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Longhorn Mint Long Cut (2014)				Longhorn Mint Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	12.6	12.6	12.7	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	45.4	44.8	46.0	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	5.7	5.7	5.8	3
Moisture (%)	N/A	N/A	N/A	N/A	53.6	53.5	53.7	3
pH	N/A	N/A	N/A	N/A	7.9	7.9	8.0	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	1797	1740	1880	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	705*	705*	705*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	897*	897*	897*	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	109	103	112	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	539	530	550	3
NNN (ng/g)	N/A	N/A	N/A	N/A	1173	1130	1240	3
NNK (ng/g)	N/A	N/A	N/A	N/A	293	286	300	3
NAT (ng/g)	N/A	N/A	N/A	N/A	1273	1210	1310	3
NAB (ng/g)	N/A	N/A	N/A	N/A	74	73	74	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	52.9	48.3	61.9	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	62	60	65	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Longhorn Mint Long Cut (2014)				Longhorn Mint Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	37*	36*	37*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	27.4*	26.9*	27.8*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	5.6	5.3	5.7	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	281	276	285	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Longhorn Natural Fine Cut (2014)				Longhorn Natural Fine Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	11.7	11.6	11.9	3	12.2	12.1	12.2	3
% Un-ionized (free) Nicotine	38.3	38.1	38.7	3	46.9	46.6	47.1	3
Total Free Nicotine (mg/g)	4.5	4.4	4.6	3	5.7	5.7	5.7	3
Moisture (%)	52.5	52.3	52.7	3	51.5	51.4	51.6	3
pH	7.8	7.8	7.8	3	8.0	8.0	8.0	3
Acetaldehyde (ng/g)	2750	2510	3190	3	1010*	1010*	1010*	3
Crotonaldehyde (ng/g)	732*	731*	733*	3	703*	701*	706*	3
Formaldehyde (ng/g)	898*	897*	900*	3	894*	892*	898*	3
Arsenic (ng/g)	86	82	90	3	86	82	90	3
Cadmium (ng/g)	525	519	529	3	481	478	483	3
NNN (ng/g)	1070	1060	1090	3	1047	1030	1070	3
NNK (ng/g)	284	282	286	3	280	267	291	3
NAT (ng/g)	987	980	992	3	1023	1010	1040	3
NAB (ng/g)	66	62	68	3	59	58	61	3
B(a)P (ng/g)	48.9	48.1	49.9	3	52.1	51.9	52.3	3
B(a)A (ng/g)	47	46	47	3	65	64	67	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Longhorn Natural Fine Cut (2014)				Longhorn Natural Fine Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	37*	38*	3	36*	35*	36*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.8*	27.4*	28.1*	3	26.6*	26.3*	26.8*	3
Indeno(c,d)P (ng/g)	4.2*	3.7*	4.8	3	5.6	5.2	5.8	3
Acrylamide (ng/g)	221	219	223	3	208	205	212	3
Naphthalene (ng/g)	185*	183*	188*	3	178*	175*	179*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Longhorn Wintergreen Long Cut (2014)				Longhorn Wintergreen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	13.7	13.6	13.7	3	11.3	11.2	11.3	3
% Un-ionized (free) Nicotine	38.1	38.1	38.1	3	41.3	40.3	42.0	3
Total Free Nicotine (mg/g)	5.2	5.2	5.2	3	4.6	4.6	4.7	3
Moisture (%)	54.1	54.0	54.2	3	54.5	54.3	54.8	3
pH	7.8	7.8	7.8	3	7.9	7.9	7.9	3
Acetaldehyde (ng/g)	4837	4790	4880	3	2850	2710	3050	3
Crotonaldehyde (ng/g)	732*	731*	733*	3	705*	703*	707*	3
Formaldehyde (ng/g)	928	920	938	3	1903	1890	1930	3
Arsenic (ng/g)	81	78	82	3	103	99	106	3
Cadmium (ng/g)	542	534	551	3	494	488	498	3
NNN (ng/g)	945	932	969	3	1157	1120	1210	3
NNK (ng/g)	184	179	190	3	296	291	304	3
NAT (ng/g)	997	991	1000	3	1193	1120	1230	3
NAB (ng/g)	60	60	61	3	75	74	76	3
B(a)P (ng/g)	57.4	56.5	59.0	3	43.2	42.0	45.6	3
B(a)A (ng/g)	58	58	58	3	61	60	61	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Longhorn Wintergreen Long Cut (2014)				Longhorn Wintergreen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	36*	37*	3	30*	29*	30*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.4*	26.8*	28.1*	3	22.4*	22.1*	22.6*	3
Indeno(c,d)P (ng/g)	6.1	5.8	6.4	3	5.3	5.1	5.6	3
Acrylamide (ng/g)	214	214	215	3	196	193	198	3
Naphthalene (ng/g)	183*	179*	187*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Navy Sweet Dry Snuff (2014)				Navy Sweet Dry Snuff (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	19.0	18.7	19.6	3	17.6	17.6	17.8	3
% Un-ionized (free) Nicotine	1.5	1.5	1.5	3	2.3	2.2	2.3	3
Total Free Nicotine (mg/g)	0.3	0.3	0.3	3	0.4	0.4	0.4	3
Moisture (%)	5.3	5.1	5.4	3	6.8	6.7	6.9	3
pH	6.2	6.2	6.2	3	6.4	6.4	6.4	3
Acetaldehyde (ng/g)	2760	2700	2860	3	3190	3130	3250	3
Crotonaldehyde (ng/g)	732*	730*	734*	3	679*	674*	687*	3
Formaldehyde (ng/g)	1560	1540	1580	3	2440	2430	2450	3
Arsenic (ng/g)	132	128	135	3	143	134	162	3
Cadmium (ng/g)	1106	1098	1122	3	1025	986	1051	3
NNN (ng/g)	6843	6810	6870	3	12400	12300	12500	3
NNK (ng/g)	1437	1410	1480	3	4543	4400	4710	3
NAT (ng/g)	5803	5690	6000	3	8863	8660	9070	3
NAB (ng/g)	296	292	299	3	517	497	535	3
B(a)P (ng/g)	27.0	26.8	27.1	3	27.8	27.7	27.9	3
B(a)A (ng/g)	68	67	68	3	79	73	85	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Navy Sweet Dry Snuff (2014)				Navy Sweet Dry Snuff (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	36*	37*	3	36*	36*	36*	3
B(k)FL (ng/g)	18*	18*	18*	3	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.4*	27.3*	27.6*	3	27.3*	27.3*	27.4*	3
Indeno(c,d)P (ng/g)	5.7	5.2	6.2	3	11.5	10.4	13.3	3
Acrylamide (ng/g)	122	117	126	3	90	88	91	3
Naphthalene (ng/g)	183*	182*	184*	3	182*	182*	183*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Railroad Mills Sweet Scotch (2014)				Railroad Mills Sweet Scotch (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	30.2	30.2	30.3	3	N/A	N/A	N/A	N/A
% Un-ionized (free) Nicotine	0.8	0.8	0.8	3	N/A	N/A	N/A	N/A
Total Free Nicotine (mg/g)	0.2	0.2	0.2	3	N/A	N/A	N/A	N/A
Moisture (%)	6.5	6.3	6.6	3	N/A	N/A	N/A	N/A
pH	5.9	5.9	5.9	3	N/A	N/A	N/A	N/A
Acetaldehyde (ng/g)	1863	1600	2100	3	N/A	N/A	N/A	N/A
Crotonaldehyde (ng/g)	730*	729*	731*	3	N/A	N/A	N/A	N/A
Formaldehyde (ng/g)	985	976	990	3	N/A	N/A	N/A	N/A
Arsenic (ng/g)	125	122	129	3	N/A	N/A	N/A	N/A
Cadmium (ng/g)	1517	1505	1526	3	N/A	N/A	N/A	N/A
NNN (ng/g)	7557	7530	7580	3	N/A	N/A	N/A	N/A
NNK (ng/g)	2590	2550	2620	3	N/A	N/A	N/A	N/A
NAT (ng/g)	6087	5820	6300	3	N/A	N/A	N/A	N/A
NAB (ng/g)	415	408	419	3	N/A	N/A	N/A	N/A
B(a)P (ng/g)	52.6	52.4	52.9	3	N/A	N/A	N/A	N/A
B(a)A (ng/g)	154	151	157	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Railroad Mills Sweet Scotch (2014)				Railroad Mills Sweet Scotch (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	65	62	68	3	N/A	N/A	N/A	N/A
B(k)FL (ng/g)	18*	18*	19*	3	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.0*	26.3*	27.8*	3	N/A	N/A	N/A	N/A
Indeno(c,d)P (ng/g)	8.7	8.4	8.9	3	N/A	N/A	N/A	N/A
Acrylamide (ng/g)	123	122	124	3	N/A	N/A	N/A	N/A
Naphthalene (ng/g)	180*	175*	185*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Red Man Original Chewing Tobacco (2014)				Red Man Original Chewing Tobacco (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	8.6	8.4	8.7	3	7.8	7.4	8.0	3
% Un-ionized (free) Nicotine	0.8	0.7	0.9	3	0.5	0.4	0.5	3
Total Free Nicotine (mg/g)	0.07	0.06	0.08	3	0.04	0.03	0.04	3
Moisture (%)	26.3	26.0	26.5	3	24.8	24.2	25.1	3
pH	5.9	5.9	6.0	3	5.7	5.7	5.8	3
Acetaldehyde (ng/g)	2690	2660	2750	3	2210	2200	2230	3
Crotonaldehyde (ng/g)	733*	731*	735*	3	696*	684*	707*	3
Formaldehyde (ng/g)	900*	897*	902*	3	885*	870*	900*	3
Arsenic (ng/g)	91	82	102	3	99	68	120	6
Cadmium (ng/g)	434	318	493	3	518	402	683	3
NNN (ng/g)	1723	1660	1780	3	945	893	1030	3
NNK (ng/g)	548	535	564	3	168	156	186	3
NAT (ng/g)	931	921	946	3	397	393	401	3
NAB (ng/g)	56	55	57	3	23	22	25	3
B(a)P (ng/g)	4.1	3.8	4.2	3	2.5	2.5	2.6	3
B(a)A (ng/g)	26*	26*	27*	3	28*	28*	28*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Red Man Original Chewing Tobacco (2014)				Red Man Original Chewing Tobacco (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	35*	35*	36*	3	37*	37*	37*	3
B(k)FL (ng/g)	18*	17*	18*	3	19*	18*	19*	3
Dibenz(a,h)A (ng/g)	26.4*	26.1*	26.9*	3	27.8*	27.5*	28.1*	3
Indeno(c,d)P (ng/g)	3.5*	3.5*	3.6*	3	3.7*	3.7*	3.7*	3
Acrylamide (ng/g)	68	66	69	3	92	87	97	3
Naphthalene (ng/g)	176*	174*	180*	3	186*	183*	187*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Red Seal Fine Cut Natural (2014)				Red Seal Fine Cut Natural (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	12.4	12.4	12.5	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	36.2	36.0	36.5	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	4.5	4.4	4.5	3
Moisture (%)	N/A	N/A	N/A	N/A	53.8	53.8	53.8	3
pH	N/A	N/A	N/A	N/A	7.8	7.8	7.8	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	996*	978*	1010*	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	692*	681*	700*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	881*	866*	891*	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	100	96	104	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	550	546	552	3
NNN (ng/g)	N/A	N/A	N/A	N/A	1457	1440	1470	3
NNK (ng/g)	N/A	N/A	N/A	N/A	345	344	347	3
NAT (ng/g)	N/A	N/A	N/A	N/A	1293	1250	1320	3
NAB (ng/g)	N/A	N/A	N/A	N/A	91	90	92	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	66.6	66.6	66.8	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	70	69	71	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Red Seal Fine Cut Natural (2014)				Red Seal Fine Cut Natural (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	30*	29*	31*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	22.2*	21.6*	23.2*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	5.2	4.9	5.5	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	198	195	203	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	148*	144*	155*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

	Red Seal Fine Cut Wintergreen (2014)				Red Seal Fine Cut Wintergreen (2015)			
Analyte	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	12.1	12.1	12.2	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	28.5	28.5	28.5	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	3.5	3.4	3.5	3
Moisture (%)	N/A	N/A	N/A	N/A	54.3	53.9	54.6	3
pH	N/A	N/A	N/A	N/A	7.6	7.6	7.6	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	2737	2670	2790	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	697*	656*	728*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	917	899	936	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	103	101	107	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	515	514	516	3
NNN (ng/g)	N/A	N/A	N/A	N/A	1417	1410	1420	3
NNK (ng/g)	N/A	N/A	N/A	N/A	335	333	337	3
NAT (ng/g)	N/A	N/A	N/A	N/A	1280	1260	1320	3
NAB (ng/g)	N/A	N/A	N/A	N/A	86	83	89	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	55.3	53.5	58.5	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	96	94	97	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Red Seal Fine Cut Wintergreen (2014)				Red Seal Fine Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	35	34	36	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	37	37	38	3
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	24.5*	24.1*	25.0*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	7.3	7.0	7.6	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	184	183	185	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Red Seal Long Cut Wintergreen (2014)				Red Seal Long Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	13.9	13.9	13.9	3	12.5	12.3	12.7	3
% Un-ionized (free) Nicotine	20.5	20.5	20.5	3	17.7	17.6	18.0	3
Total Free Nicotine (mg/g)	2.8	2.8	2.8	3	2.2	2.2	2.2	3
Moisture (%)	54.9	54.7	55.3	3	54.1	54.0	54.4	3
pH	7.4	7.4	7.4	3	7.4	7.4	7.4	3
Acetaldehyde (ng/g)	4227	4150	4310	3	1797	1770	1850	3
Crotonaldehyde (ng/g)	730*	729*	732*	3	726*	716*	744*	3
Formaldehyde (ng/g)	897*	895*	899*	3	924*	911*	947*	3
Arsenic (ng/g)	97	93	99	3	94	91	97	3
Cadmium (ng/g)	447	442	450	3	490	482	495	3
NNN (ng/g)	1253	1240	1280	3	1313	1290	1330	3
NNK (ng/g)	299	291	305	3	364	354	381	3
NAT (ng/g)	1177	1160	1210	3	1267	1200	1310	3
NAB (ng/g)	75	74	76	3	76	74	78	3
B(a)P (ng/g)	77.9	73.7	83.8	3	62.5	59.7	66.8	3
B(a)A (ng/g)	83	81	85	3	121	121	122	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Red Seal Long Cut Wintergreen (2014)				Red Seal Long Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	35*	38*	3	43	43	44	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	45	44	45	3
Dibenz(a,h)A (ng/g)	27.6*	26.5*	28.4*	3	21.4*	20.9*	21.9*	3
Indeno(c,d)P (ng/g)	6.0	5.5	7.1	3	8.9	8.7	9.2	3
Acrylamide (ng/g)	335	330	345	3	234	232	236	3
Naphthalene (ng/g)	184*	177*	189*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Skoal Long Cut Mint (2014)				Skoal Long Cut Mint (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	12.3	12.2	12.4	3	11.3	11.3	11.4	3
% Un-ionized (free) Nicotine	15.2	15.1	15.4	3	11.7	11.7	11.7	3
Total Free Nicotine (mg/g)	1.9	1.9	1.9	3	1.3	1.3	1.3	3
Moisture (%)	57.0	56.7	57.2	3	55.8	55.7	55.9	3
pH	7.3	7.3	7.3	3	7.1	7.1	7.1	3
Acetaldehyde (ng/g)	1010*	1010*	1010*	3	979*	970*	988*	3
Crotonaldehyde (ng/g)	733*	732*	733*	3	681*	675*	688*	3
Formaldehyde (ng/g)	899*	898*	900*	3	867*	859*	875*	3
Arsenic (ng/g)	98	94	104	3	100	96	105	3
Cadmium (ng/g)	423	409	431	3	399	393	404	3
NNN (ng/g)	1163	1150	1170	3	928	905	959	3
NNK (ng/g)	324	319	327	3	237	232	243	3
NAT (ng/g)	969	946	987	3	870	852	882	3
NAB (ng/g)	65	63	66	3	47	45	48	3
B(a)P (ng/g)	62.0	61.7	62.3	3	46.7	45.8	47.7	3
B(a)A (ng/g)	64	62	65	3	50	49	52	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Skoal Long Cut Mint (2014)				Skoal Long Cut Mint (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	37*	37*	3	32*	30*	35*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.6*	27.4*	27.7*	3	24.2*	22.5*	26.1*	3
Indeno(c,d)P (ng/g)	5.3	4.9	5.6	3	4.0	3.8	4.1	3
Acrylamide (ng/g)	260	255	265	3	164	160	169	3
Naphthalene (ng/g)	184*	183*	185*	3	161*	150*	174*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Skoal Long Cut Straight (2014)				Skoal Long Cut Straight (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	12.3	12.3	12.4	3	11.6	11.6	11.6	3
% Un-ionized (free) Nicotine	25.5	25.3	25.8	3	36.5	36.5	36.5	3
Total Free Nicotine (mg/g)	3.1	3.1	3.2	3	4.2	4.2	4.3	3
Moisture (%)	57.3	57.2	57.4	3	56.4	56.4	56.6	3
pH	7.6	7.6	7.6	3	7.8	7.8	7.8	3
Acetaldehyde (ng/g)	1007*	1000*	1010*	3	966*	960*	978*	3
Crotonaldehyde (ng/g)	733*	730*	734*	3	672*	668*	680*	3
Formaldehyde (ng/g)	900*	896*	902*	3	855*	849*	865*	3
Arsenic (ng/g)	94	90	100	3	90	83	99	3
Cadmium (ng/g)	395	376	414	3	386	382	393	3
NNN (ng/g)	1167	1140	1180	3	1283	1280	1290	3
NNK (ng/g)	308	306	312	3	309	295	317	3
NAT (ng/g)	1030	1020	1040	3	1193	1170	1230	3
NAB (ng/g)	68	67	68	3	66	60	68	3
B(a)P (ng/g)	72.4	70.6	73.6	3	1.0*	1.0*	1.0*	3
B(a)A (ng/g)	76	74	78	3	61	59	63	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Skoal Long Cut Straight (2014)				Skoal Long Cut Straight (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	36*	35*	36*	3	37*	37*	37*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	26.8*	26.2*	27.3*	3	27.7*	27.4*	28.1*	3
Indeno(c,d)P (ng/g)	5.2	4.9	5.6	3	4.6	4.3	4.8	3
Acrylamide (ng/g)	344	337	356	3	236	228	247	3
Naphthalene (ng/g)	179*	175*	182*	3	185*	183*	187*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Skoal Original Fine Cut Wintergreen (2014)				Skoal Original Fine Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	11.9	11.8	12.0	3	12.2	12.2	12.3	3
% Un-ionized (free) Nicotine	27.1	27.1	27.1	3	23.5	23.2	24.0	3
Total Free Nicotine (mg/g)	3.2	3.2	3.3	3	2.9	2.8	2.9	3
Moisture (%)	54.9	54.7	55.0	3	54.7	54.5	54.9	3
pH	7.6	7.6	7.6	3	7.5	7.5	7.5	3
Acetaldehyde (ng/g)	2173	2140	2190	3	2353	2280	2440	3
Crotonaldehyde (ng/g)	732*	730*	734*	3	703*	701*	705*	3
Formaldehyde (ng/g)	898*	896*	900*	3	1363	1330	1420	3
Arsenic (ng/g)	131	123	137	3	121	110	129	3
Cadmium (ng/g)	566	562	569	3	490	487	495	3
NNN (ng/g)	2303	2270	2330	3	1390	1350	1440	3
NNK (ng/g)	657	650	663	3	309	307	310	3
NAT (ng/g)	2053	2030	2080	3	1057	1010	1090	3
NAB (ng/g)	163	161	164	3	74	72	75	3
B(a)P (ng/g)	74.0	70.8	75.7	3	49.9	47.6	52.7	3
B(a)A (ng/g)	79	78	80	3	65	64	66	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Skoal Original Fine Cut Wintergreen (2014)				Skoal Original Fine Cut Wintergreen (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	35*	34*	35*	3	36*	36*	37*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	26.2*	25.8*	26.5*	3	27.4*	27.0*	27.7*	3
Indeno(c,d)P (ng/g)	7.4	7.1	7.9	3	5.7	5.0	6.4	3
Acrylamide (ng/g)	160	156	165	3	156	151	161	3
Naphthalene (ng/g)	174*	172*	177*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

	Skoal X-tra Long Cut Mint Blend (2014)				Skoal X-tra Long Cut Mint Blend (2015)			
Analyte	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	12.9	12.9	12.9	3	11.2	11.1	11.2	3
% Un-ionized (free) Nicotine	15.9	15.7	16.0	3	11.5	11.4	11.7	3
Total Free Nicotine (mg/g)	2.1	2.0	2.1	3	1.3	1.3	1.3	3
Moisture (%)	56.1	56.0	56.4	3	56.7	56.6	56.7	3
pH	7.3	7.3	7.3	3	7.1	7.1	7.1	3
Acetaldehyde (ng/g)	1003*	1000*	1010*	3	992*	965*	1010*	3
Crotonaldehyde (ng/g)	731*	729*	734*	3	689*	671*	699*	3
Formaldehyde (ng/g)	898*	895*	901*	3	878*	854*	890*	3
Arsenic (ng/g)	109	104	115	3	105	99	110	3
Cadmium (ng/g)	389	367	409	3	392	373	404	3
NNN (ng/g)	1203	1200	1210	3	969	961	974	3
NNK (ng/g)	424	420	432	3	283	276	292	3
NAT (ng/g)	948	918	985	3	980	963	1010	3
NAB (ng/g)	66	65	66	3	53	52	54	3
B(a)P (ng/g)	53.6	50.8	56.6	3	56.1	55.6	56.5	3
B(a)A (ng/g)	54	54	54	3	55	54	56	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Skoal X-tra Long Cut Mint Blend (2014)				Skoal X-tra Long Cut Mint Blend (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	37*	36*	37*	3	34*	32*	36*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.5*	27.0*	27.8*	3	25.3*	24.3*	26.7*	3
Indeno(c,d)P (ng/g)	4.0*	3.7*	4.2	3	4.2	4.2	4.2	3
Acrylamide (ng/g)	234	233	236	3	198	190	203	3
Naphthalene (ng/g)	183*	180*	185*	3	169*	162*	178*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Starr Chewing Tobacco (2014)				Starr Chewing Tobacco (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	7.9	7.8	8.0	3	N/A	N/A	N/A	N/A
% Un-ionized (free) Nicotine	0.4	0.4	0.6	3	N/A	N/A	N/A	N/A
Total Free Nicotine (mg/g)	0.04	0.03	0.05	3	N/A	N/A	N/A	N/A
Moisture (%)	26.0	25.7	26.3	3	N/A	N/A	N/A	N/A
pH	5.7	5.6	5.8	3	N/A	N/A	N/A	N/A
Acetaldehyde (ng/g)	3450	3400	3490	3	N/A	N/A	N/A	N/A
Crotonaldehyde (ng/g)	733*	731*	734*	3	N/A	N/A	N/A	N/A
Formaldehyde (ng/g)	899*	897*	901*	3	N/A	N/A	N/A	N/A
Arsenic (ng/g)	76	70	80	3	N/A	N/A	N/A	N/A
Cadmium (ng/g)	548	449	632	3	N/A	N/A	N/A	N/A
NNN (ng/g)	851	840	866	3	N/A	N/A	N/A	N/A
NNK (ng/g)	184	181	188	3	N/A	N/A	N/A	N/A
NAT (ng/g)	485	458	502	3	N/A	N/A	N/A	N/A
NAB (ng/g)	26	25	27	3	N/A	N/A	N/A	N/A
B(a)P (ng/g)	4.3	4.2	4.4	3	N/A	N/A	N/A	N/A
B(a)A (ng/g)	27*	27*	28*	3	N/A	N/A	N/A	N/A

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Starr Chewing Tobacco (2014)				Starr Chewing Tobacco (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	36*	36*	37*	3	N/A	N/A	N/A	N/A
B(k)FL (ng/g)	18*	18*	19*	3	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.3*	26.6*	27.8*	3	N/A	N/A	N/A	N/A
Indeno(c,d)P (ng/g)	3.6*	3.6*	3.7*	3	N/A	N/A	N/A	N/A
Acrylamide (ng/g)	115	112	117	3	N/A	N/A	N/A	N/A
Naphthalene (ng/g)	182*	178*	185*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Stokers Tennessee Chew Original (2014)				Stokers Tennessee Chew Original (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	3.5	3.4	3.6	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	0.3	0.3	0.3	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	0.0	0.0	0.0	3
Moisture (%)	N/A	N/A	N/A	N/A	27.3	26.2	28.5	3
pH	N/A	N/A	N/A	N/A	5.5	5.5	5.5	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	6543	6340	6690	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	657*	652*	667*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	837*	830*	849*	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	71	60	81	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	449	282	731	6
NNN (ng/g)	N/A	N/A	N/A	N/A	1113	1100	1130	3
NNK (ng/g)	N/A	N/A	N/A	N/A	357	351	363	3
NAT (ng/g)	N/A	N/A	N/A	N/A	535	514	552	3
NAB (ng/g)	N/A	N/A	N/A	N/A	48	47	51	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	4.2	4.0	4.3	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	26*	22*	28*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Stokers Tennessee Chew Original (2014)				Stokers Tennessee Chew Original (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	34*	29*	37*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	17*	15*	19*	3
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	25.5*	21.8*	28.0*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	3.4*	2.9*	3.7*	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	51	50	51	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	170*	146*	187*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Stokers Wintergreen Long Cut (2014)				Stokers Wintergreen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	11.4	11.3	11.5	3	N/A	N/A	N/A	N/A
% Un-ionized (free) Nicotine	35.5	35.5	35.5	3	N/A	N/A	N/A	N/A
Total Free Nicotine (mg/g)	4.0	4.0	4.1	3	N/A	N/A	N/A	N/A
Moisture (%)	53.2	52.8	53.5	3	N/A	N/A	N/A	N/A
pH	7.8	7.8	7.8	3	N/A	N/A	N/A	N/A
Acetaldehyde (ng/g)	4490	4330	4640	3	N/A	N/A	N/A	N/A
Crotonaldehyde (ng/g)	733*	731*	735*	3	N/A	N/A	N/A	N/A
Formaldehyde (ng/g)	1240	1180	1280	3	N/A	N/A	N/A	N/A
Arsenic (ng/g)	87	79	95	3	N/A	N/A	N/A	N/A
Cadmium (ng/g)	534	528	541	3	N/A	N/A	N/A	N/A
NNN (ng/g)	1437	1430	1450	3	N/A	N/A	N/A	N/A
NNK (ng/g)	363	357	376	3	N/A	N/A	N/A	N/A
NAT (ng/g)	1670	1660	1690	3	N/A	N/A	N/A	N/A
NAB (ng/g)	110	108	113	3	N/A	N/A	N/A	N/A
B(a)P (ng/g)	75.9	74.4	78.4	3	N/A	N/A	N/A	N/A
B(a)A (ng/g)	78	70	83	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Stokers Wintergreen Long Cut (2014)				Stokers Wintergreen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	36*	35*	37*	3	N/A	N/A	N/A	N/A
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	27.2*	26.6*	27.6*	3	N/A	N/A	N/A	N/A
Indeno(c,d)P (ng/g)	6.8	6.4	7.6	3	N/A	N/A	N/A	N/A
Acrylamide (ng/g)	336	327	343	3	N/A	N/A	N/A	N/A
Naphthalene (ng/g)	181*	177*	184*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Superior Dry Snuff (2014)				Superior Dry Snuff (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	32.6	32.4	32.8	3	24.0	23.9	24.1	3
% Un-ionized (free) Nicotine	1.2	1.1	1.2	3	2.5	2.5	2.6	3
Total Free Nicotine (mg/g)	0.4	0.4	0.4	3	0.6	0.6	0.6	3
Moisture (%)	7.3	7.2	7.4	3	7.2	7.1	7.4	3
pH	6.1	6.1	6.1	3	6.4	6.4	6.4	3
Acetaldehyde (ng/g)	1150	1140	1160	3	962*	955*	971*	3
Crotonaldehyde (ng/g)	731*	729*	733*	3	670*	665*	676*	3
Formaldehyde (ng/g)	1657	1640	1670	3	2133	2120	2150	3
Arsenic (ng/g)	211	206	215	3	233	231	236	3
Cadmium (ng/g)	1591	1574	1605	3	1436	1421	1445	3
NNN (ng/g)	7777	7740	7840	3	15900	15500	16500	3
NNK (ng/g)	1363	1350	1380	3	5233	5150	5350	3
NAT (ng/g)	7643	7630	7660	3	13467	13300	13600	3
NAB (ng/g)	404	393	418	3	912	894	942	3
B(a)P (ng/g)	128.9	128.5	129.4	3	130.7	129.1	133.2	3
B(a)A (ng/g)	292	290	294	3	335	333	336	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Superior Dry Snuff (2014)				Superior Dry Snuff (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	121	120	124	3	112	111	112	3
B(k)FL (ng/g)	21	19	22	3	42	41	43	3
Dibenz(a,h)A (ng/g)	27.7*	27.2*	27.9*	3	28.6*	28.6*	28.7*	2
Indeno(c,d)P (ng/g)	16.4	15.9	17.3	3	38.7	37.8	40.1	3
Acrylamide (ng/g)	126	125	129	3	117	116	118	3
Naphthalene (ng/g)	184*	182*	186*	3	191*	191*	192*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Timber Wolf Mint Long Cut (2014)				Timber Wolf Mint Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	12.2	12.2	12.3	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	25.9	25.3	26.6	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	3.2	3.1	3.3	3
Moisture (%)	N/A	N/A	N/A	N/A	55.2	55.0	55.5	3
pH	N/A	N/A	N/A	N/A	7.6	7.6	7.6	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	1460	1420	1510	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	704*	703*	705*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	897*	895*	898*	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	96	88	101	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	519	512	528	3
NNN (ng/g)	N/A	N/A	N/A	N/A	1170	1140	1220	3
NNK (ng/g)	N/A	N/A	N/A	N/A	299	293	308	3
NAT (ng/g)	N/A	N/A	N/A	N/A	1200	1180	1220	3
NAB (ng/g)	N/A	N/A	N/A	N/A	70	69	73	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	48.4	45.9	50.0	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	57	56	58	3

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Timber Wolf Mint Long Cut (2014)				Timber Wolf Mint Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	36*	35*	36*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	26.8*	26.2*	27.3*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	4.2	4.1	4.3	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	185	182	189	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	179*	175*	182*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Timber Wolf Wintergreen Long Cut (2014)				Timber Wolf Wintergreen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	13.4	13.4	13.5	3	N/A	N/A	N/A	N/A
% Un-ionized (free) Nicotine	46.4	46.0	46.6	3	N/A	N/A	N/A	N/A
Total Free Nicotine (mg/g)	6.2	6.2	6.3	3	N/A	N/A	N/A	N/A
Moisture (%)	54.0	54.0	54.2	3	N/A	N/A	N/A	N/A
pH	8.0	8.0	8.0	3	N/A	N/A	N/A	N/A
Acetaldehyde (ng/g)	3393	3320	3470	3	N/A	N/A	N/A	N/A
Crotonaldehyde (ng/g)	731*	729*	733*	3	N/A	N/A	N/A	N/A
Formaldehyde (ng/g)	897*	894*	900*	3	N/A	N/A	N/A	N/A
Arsenic (ng/g)	99	92	104	3	N/A	N/A	N/A	N/A
Cadmium (ng/g)	603	601	608	3	N/A	N/A	N/A	N/A
NNN (ng/g)	1223	1200	1240	3	N/A	N/A	N/A	N/A
NNK (ng/g)	277	271	286	3	N/A	N/A	N/A	N/A
NAT (ng/g)	1210	1190	1240	3	N/A	N/A	N/A	N/A
NAB (ng/g)	77	74	80	3	N/A	N/A	N/A	N/A
B(a)P (ng/g)	62.7	61.7	64.4	3	N/A	N/A	N/A	N/A
B(a)A (ng/g)	57	56	57	3	N/A	N/A	N/A	N/A

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Timber Wolf Wintergreen Long Cut (2014)				Timber Wolf Wintergreen Long Cut (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	36*	35*	37*	3	N/A	N/A	N/A	N/A
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	26.9*	26.5*	27.5*	3	N/A	N/A	N/A	N/A
Indeno(c,d)P (ng/g)	4.9	4.1	5.4	3	N/A	N/A	N/A	N/A
Acrylamide (ng/g)	199	194	205	3	N/A	N/A	N/A	N/A
Naphthalene (ng/g)	179*	177*	183*	3	N/A	N/A	N/A	N/A

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Tube Rose Scotch (2014)				Tube Rose Scotch (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	N/A	N/A	N/A	N/A	17.3	17.3	17.4	3
% Un-ionized (free) Nicotine	N/A	N/A	N/A	N/A	0.5	0.5	0.5	3
Total Free Nicotine (mg/g)	N/A	N/A	N/A	N/A	0.1	0.1	0.1	3
Moisture (%)	N/A	N/A	N/A	N/A	6.7	6.0	7.2	3
pH	N/A	N/A	N/A	N/A	5.7	5.7	5.7	3
Acetaldehyde (ng/g)	N/A	N/A	N/A	N/A	2843	2610	3180	3
Crotonaldehyde (ng/g)	N/A	N/A	N/A	N/A	676*	649*	703*	3
Formaldehyde (ng/g)	N/A	N/A	N/A	N/A	5523	5140	6000	3
Arsenic (ng/g)	N/A	N/A	N/A	N/A	201	189	212	3
Cadmium (ng/g)	N/A	N/A	N/A	N/A	1200	1188	1214	3
NNN (ng/g)	N/A	N/A	N/A	N/A	47733	46800	48400	3
NNK (ng/g)	N/A	N/A	N/A	N/A	99367	98400	100000	3
NAT (ng/g)	N/A	N/A	N/A	N/A	66600	66300	66900	3
NAB (ng/g)	N/A	N/A	N/A	N/A	5873	5850	5890	3
B(a)P (ng/g)	N/A	N/A	N/A	N/A	43.9	43.5	44.3	3
B(a)A (ng/g)	N/A	N/A	N/A	N/A	123	120	128	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.



Table 2. Smokeless Product Descriptive Data (as is)

Analyte	Tube Rose Scotch (2014)				Tube Rose Scotch (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	N/A	N/A	N/A	N/A	38*	38*	38*	3
Dibenz(a,h)A (ng/g)	N/A	N/A	N/A	N/A	28.3*	28.3*	28.4*	3
Indeno(c,d)P (ng/g)	N/A	N/A	N/A	N/A	18.6	17.0	20.0	3
Acrylamide (ng/g)	N/A	N/A	N/A	N/A	205	202	207	3
Naphthalene (ng/g)	N/A	N/A	N/A	N/A	189*	188*	189*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	W.E. Garrett & Sons Scotch (2014)				W.E. Garrett & Sons Scotch (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	23.3	23.2	23.6	3	20.3	20.2	20.4	3
% Un-ionized (free) Nicotine	1.6	1.5	1.6	3	1.9	1.9	1.9	3
Total Free Nicotine (mg/g)	0.4	0.4	0.4	3	0.4	0.4	0.4	3
Moisture (%)	2.8	2.7	2.9	3	4.1	3.9	4.3	3
pH	6.2	6.2	6.2	3	6.3	6.3	6.3	3
Acetaldehyde (ng/g)	2090	2010	2180	3	2400	2350	2440	3
Crotonaldehyde (ng/g)	731*	730*	733*	3	691*	670*	702*	3
Formaldehyde (ng/g)	6933	6850	7020	3	6240	6150	6300	3
Arsenic (ng/g)	172	164	178	3	208	194	219	3
Cadmium (ng/g)	1153	1129	1180	3	1247	1225	1281	3
NNN (ng/g)	5597	5560	5660	3	6273	6200	6400	3
NNK (ng/g)	2673	2650	2690	3	4267	4200	4310	3
NAT (ng/g)	6063	5870	6170	3	6437	5960	6700	3
NAB (ng/g)	439	435	443	3	441	439	444	3
B(a)P (ng/g)	253.6	252.5	254.4	3	160.0	151.5	165.0	3
B(a)A (ng/g)	492	488	496	3	433	383	464	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 2. Smokeless Product Descriptive Data (as is)

Analyte	W.E. Garrett & Sons Scotch (2014)				W.E. Garrett & Sons Scotch (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(b/j)FL (ng/g)	192	190	193	3	175	164	188	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	28.2*	27.6*	28.5*	3	27.8*	27.8*	27.9*	3
Indeno(c,d)P (ng/g)	31.1	30.0	31.9	3	40.0	38.4	41.4	3
Acrylamide (ng/g)	1433	1430	1440	3	1297	1280	1330	3
Naphthalene (ng/g)	188*	184*	190*	3	186*	185*	186*	3

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used as value in the calculation of the mean in this table. Minimum and maximum values are also affected by the use of the LOQ value as replicate data.

Table 3. Range of Product Means Observed for Three (0.6 gram) Camel Snus Styles and for Other U.S. Smokeless Tobacco Product Categories  
(Expressed on a 0.6 gram Basis, as is)

Analyte	Camel Snus Means		Moist Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Nicotine (mg)	5.9	6.4	4.4	8.8
% Un-ionized (free) Nicotine	30.3	33.6	5.2	67.1
Total Free Nicotine (mg)	1.8	2.1	0.3	4.4
Moisture (%)	31.5	32.3	49.2	56.9
pH	7.6	7.7	6.7	8.3
Acetaldehyde (ng)	791	1545	405*	15567
Crotonaldehyde (ng)	351*	374*	282*	440*
Formaldehyde (ng)	639*	895	428*	2237
Arsenic (ng)	35	43	27	112
Cadmium (ng)	235	249	210	390
NNN (ng)	652	856	331	3133
NNK (ng)	194	261	58	1051
NAT (ng)	231	284	160	5340
NAB (ng)	30	43	16	259
B(a)P (ng)	0.6*	0.7	2.3*	111.7
B(a)A (ng)	21*	22*	12*	104
B(b/j)FL (ng)	28*	29*	15*	41
B(k)FL (ng)	14*	14*	10*	38

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 \*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 3. Range of Product Means Observed for Three (0.6 gram) Camel Snus Styles and for Other U.S. Smokeless Tobacco Product Categories  
(Expressed on a 0.6 gram Basis, as is)

Analyte	Camel Snus Means		Moist Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Dibenz(a,h)A (ng)	20.9*	21.5*	11.0*	16.8*
Indeno(c,d)P (ng)	2.8*	3.3*	1.7*	8.9
Acrylamide (ng)	40	58	76	225
Naphthalene (ng)	139*	143*	73*	112*

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 \*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 3. Range of Product Means Observed for Three (0.6 gram) Camel Snus Styles and for Other U.S. Smokeless Tobacco Product Categories (Expressed on a 0.6 gram Basis, as is) (cont'd)  
(Expressed on a 0.6 gram Basis, as is) (cont'd)

Analyte	Loose Leaf Means		Dry Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Nicotine (mg)	2.1	4.9	10.4	18.1
% Un-ionized (free) Nicotine	0.3	1.5	0.5	1.9
Total Free Nicotine (mg)	0.0	0.0	0.1	0.3
Moisture (%)	23.7	28.9	3.5	7.2
pH	5.5	6.1	5.7	6.3
Acetaldehyde (ng)	1083	3926	634*	1785
Crotonaldehyde (ng)	394*	440*	406*	438*
Formaldehyde (ng)	502*	540*	591	3952
Arsenic (ng)	43	114	75	133
Cadmium (ng)	269	424	639	910
NNN (ng)	510	1993	3561	28640
NNK (ng)	110	520	1554	59620
NAT (ng)	291	923	3652	39960
NAB (ng)	16	133	244	3524
B(a)P (ng)	2.0	3.0	16.4	124.1
B(a)A (ng)	15*	16*	44	278
B(b/j)FL (ng)	20*	22*	22*	110
B(k)FL (ng)	10*	11*	11*	19

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine

NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene

B(k)FL= Benzo(k)fluoranthene

Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 3. Range of Product Means Observed for Three (0.6 gram) Camel Snus Styles and for Other U.S. Smokeless Tobacco Product Categories (Expressed on a 0.6 gram Basis, as is) (cont'd)  
(Expressed on a 0.6 gram Basis, as is) (cont'd)

Analyte	Loose Leaf Means		Dry Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Dibenz(a,h)A (ng)	15.3*	16.4*	16.2*	17.0*
Indeno(c,d)P (ng)	2.0*	2.2*	5.2	21.3
Acrylamide (ng)	30	212	63	819
Naphthalene (ng)	102*	109*	108*	113*

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
B(k)FL= Benzo(k)fluoranthene  
Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 4. Range of Product Means Observed for Three (1.0 gram) Camel Snus Styles and for Other U.S. Smokeless Tobacco Product Categories  
(Expressed on a 1.0 gram Basis, as is)

Analyte	Camel Snus Means		Moist Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Nicotine (mg)	10.0	11.9	7.4	14.7
% Un-ionized (free) Nicotine	25.6	38.0	5.2	67.1
Total Free Nicotine (mg)	2.6	4.1	0.5	7.3
Moisture (%)	32.4	32.9	49.2	56.9
pH	7.5	7.8	6.7	8.3
Acetaldehyde (ng)	1455	1832	675*	25945
Crotonaldehyde (ng)	673*	736*	469*	733*
Formaldehyde (ng)	842*	921*	714*	3728
Arsenic (ng)	67	72	46	187
Cadmium (ng)	375	433	350	650
NNN (ng)	956	1368	552	5222
NNK (ng)	239	335	97	1751
NAT (ng)	358	518	266	8900
NAB (ng)	42	61	26	431
B(a)P (ng)	1.0*	1.3*	3.9*	186.2
B(a)A (ng)	29*	32*	20*	173
B(b/j)FL (ng)	38*	42*	25*	68
B(k)FL (ng)	19*	21*	16*	64

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 \*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.



Table 4. Range of Product Means Observed for Three (1.0 gram) Camel Snus Styles and for Other U.S. Smokeless Tobacco Product Categories  
(Expressed on a 1.0 gram Basis, as is)

Analyte	Camel Snus Means		Moist Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Dibenz(a,h)A (ng)	28.6*	31.5*	18.4*	27.9*
Indeno(c,d)P (ng)	4.2*	5.2*	2.8*	14.8
Acrylamide (ng)	55	106	127	376
Naphthalene (ng)	191*	210*	122*	187*

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 \*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 4. Range of Product Means Observed for Three (1.0 gram) Camel Snus Styles and for Other U.S. Smokeless Tobacco Product Categories  
(Expressed on a 1.0 gram Basis, as is)

Analyte	Loose Leaf Means		Dry Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Nicotine (mg)	3.5	8.2	17.3	30.2
% Un-ionized (free) Nicotine	0.3	1.5	0.5	1.9
Total Free Nicotine (mg)	0.0	0.1	0.1	0.5
Moisture (%)	23.7	28.9	3.5	7.2
pH	5.5	6.1	5.7	6.3
Acetaldehyde (ng)	1805	6543	1056*	2975
Crotonaldehyde (ng)	657*	733*	676*	730*
Formaldehyde (ng)	837*	899*	985	6587
Arsenic (ng)	71	190	125	222
Cadmium (ng)	449	706	1065	1517
NNN (ng)	851	3322	5935	47733
NNK (ng)	184	867	2590	99367
NAT (ng)	485	1538	6087	66600
NAB (ng)	26	222	407	5873
B(a)P (ng)	3.3	5.0	27.4	206.8
B(a)A (ng)	26*	27*	73	463
B(b/j)FL (ng)	34*	36*	37*	184
B(k)FL (ng)	17*	18*	18*	32

NNN = N'nitrosoanornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 \*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 4. Range of Product Means Observed for Three (1.0 gram) Camel Snus Styles and for Other U.S. Smokeless Tobacco Product Categories  
(Expressed on a 1.0 gram Basis, as is)

Analyte	Loose Leaf Means		Dry Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Dibenz(a,h)A (ng)	25.5*	27.4*	27.0*	28.3*
Indeno(c,d)P (ng)	3.4*	3.6*	8.6	35.5
Acrylamide (ng)	51	353	106	1365
Naphthalene (ng)	170*	182*	180*	189*

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 \*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 5. Range of Product Means Observed for All Six Camel Snus Styles and Other U.S. Smokeless Product Categories  
(Expressed on a per Gram Basis) (as is)

Analyte	Camel Snus Means		Moist Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Nicotine (mg)	9.8	11.9	7.4	14.7
% Un-ionized (free) Nicotine	25.6	38.0	5.2	67.1
Total Free Nicotine (mg)	2.6	4.1	0.5	7.3
Moisture (%)	31.5	32.9	49.2	56.9
pH	7.5	7.8	6.7	8.3
Acetaldehyde (ng)	1318	2575	675*	25945
Crotonaldehyde (ng)	584*	736*	469*	733*
Formaldehyde (ng)	842*	1491	714*	3728
Arsenic (ng)	59	72	46	187
Cadmium (ng)	375	433	350	650
NNN (ng)	956	1427	552	5222
NNK (ng)	239	435	97	1751
NAT (ng)	358	518	266	8900
NAB (ng)	42	72	26	431
B(a)P (ng)	1.0*	1.3*	3.9*	186.2
B(a)A (ng)	29*	36*	20*	173
B(b/j)FL (ng)	38*	48*	25*	68
B(k)FL (ng)	19*	24*	16*	64

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 \*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 5. Range of Product Means Observed for All Six Camel Snus Styles and Other U.S. Smokeless Product Categories  
(Expressed on a per Gram Basis) (as is)

Analyte	Camel Snus Means		Moist Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Dibenz(a,h)A (ng)	28.6*	35.8*	18.4*	27.9*
Indeno(c,d)P (ng)	4.2*	5.5*	2.8*	14.8
Acrylamide (ng)	55	106	127	376
Naphthalene (ng)	191*	239*	122*	187*

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 \*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 5. Range Of Product Means Observed for All Six Camel Snus Styles and Other U.S. Smokeless Product Categories

(Expressed on a per Gram Basis) (as is) (Cont'd)

Analyte	Loose Leaf Means		Dry Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Nicotine (mg)	3.5	8.2	17.3	30.2
% Un-ionized (free) Nicotine	0.3	1.5	0.5	1.9
Total Free Nicotine (mg)	0.0	0.1	0.1	0.5
Moisture (%)	23.7	28.9	3.5	7.2
pH	5.5	6.1	5.7	6.3
Acetaldehyde (ng)	1805	6543	1056*	2975
Crotonaldehyde (ng)	657*	733*	676*	730*
Formaldehyde (ng)	837*	899*	985	6587
Arsenic (ng)	71	190	125	222
Cadmium (ng)	449	706	1065	1517
NNN (ng)	851	3322	5935	47733
NNK (ng)	184	867	2590	99367
NAT (ng)	485	1538	6087	66600
NAB (ng)	26	222	407	5873
B(a)P (ng)	3.3	5.0	27.4	206.8
B(a)A (ng)	26*	27*	73	463
B(b/j)FL (ng)	34*	36*	37*	184
B(k)FL (ng)	17*	18*	18*	32

NNN = N'-nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'-nitrosoanatabine

NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene

B(k)FL= Benzo(k)fluoranthene

Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 5. Range Of Product Means Observed for All Six Camel Snus Styles and Other U.S. Smokeless Product Categories  
(Expressed on a per Gram Basis) (as is) (Cont'd)

Analyte	Loose Leaf Means		Dry Snuff Means	
	Minimum	Maximum	Minimum	Maximum
Dibenz(a,h)A (ng)	25.5*	27.4*	27.0*	28.3*
Indeno(c,d)P (ng)	3.4*	3.6*	8.6	35.5
Acrylamide (ng)	51	353	106	1365
Naphthalene (ng)	170*	182*	180*	189*

NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine  
 NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene  
 B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenzo(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene  
 \*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 6. Smokeless Reference Product Data Listing (as is)

Smokeless Reference Product	Replicate	Nicotine Analysis		Moisture Analysis		pH Analysis	
		Nicotine (mg/g)	Completed Analysis Date	Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
CRP2(2014)							
	1	12.51	18AUG2014	53.30	31JUL2014	7.70	06AUG2014
	2	12.44	18AUG2014	53.26	31JUL2014	7.62	06AUG2014
	3	12.41	18AUG2014	53.27	31JUL2014	7.63	06AUG2014
CRP2(2015)							
	1	12.22	03SEP2015	53.11	30JUL2015	7.43	10SEP2015
	2	12.32	03SEP2015	53.32	30JUL2015	7.43	10SEP2015
	3	12.36	03SEP2015	53.06	30JUL2015	7.44	10SEP2015
CRP1(2014)							
	1	9.76	18AUG2014	51.99	31JUL2014	7.87	06AUG2014
	2	9.74	18AUG2014	51.79	31JUL2014	7.88	06AUG2014
	3	9.88	18AUG2014	52.58	31JUL2014	7.87	06AUG2014
CRP1(2015)							
	1	9.98	03SEP2015	49.24	11SEP2015	7.65	10SEP2015
	2	10.04	03SEP2015	48.70	11SEP2015	7.64	10SEP2015
	3	9.87	03SEP2015	48.90	11SEP2015	7.65	10SEP2015

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4=  
CORESTA Loose Leaf Chewing Tobacco



Table 6. Smokeless Reference Product Data Listing (as is)

Smokeless Reference Product	Replicate	Nicotine Analysis		Moisture Analysis		pH Analysis	
		Nicotine (mg/g)	Completed Analysis Date	Moisture (%)	Completed Analysis Date	pH	Completed Analysis Date
CRP3(2014)							
	1	21.58	18AUG2014	6.27	31JUL2014	6.83	31JUL2014
	2	21.09	18AUG2014	6.36	31JUL2014	6.83	31JUL2014
	3	21.52	18AUG2014	6.47	31JUL2014	6.83	31JUL2014
CRP4(2014)							
	1	10.89	13AUG2014	23.01	31JUL2014	5.81	31JUL2014
	2	11.28	13AUG2014	23.11	31JUL2014	5.91	31JUL2014
	3	11.17	13AUG2014	23.35	31JUL2014	5.96	31JUL2014

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4=  
CORESTA Loose Leaf Chewing Tobacco

Table 6. Smokeless Reference Product Data Listing (as is) (cont'd)

Smokeless Reference Product	Replicate	Metals Analysis			Acrylamide Analysis	
		Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date	Acrylamide (ng/g)	Completed Analysis Date
CRP1(2014)						
	1	88.1	267.9	05AUG2014	83.7	04AUG2014
	2	84.9	262.2	05AUG2014	81.6	19AUG2014
	3	96.8	270.9	05AUG2014	76.7	19AUG2014
CRP1(2015)						
	1	83.4	273.0	12AUG2015	69.8	31JUL2015
	2	75.9	281.5	12AUG2015	63.9	31JUL2015
	3	77.1	283.1	12AUG2015	65.1	31JUL2015
CRP2(2014)						
	1	102.4	534.3	07AUG2014	100.0	04AUG2014
	2	98.2	532.0	07AUG2014	106.0	04AUG2014
	3	89.0	529.1	07AUG2014	109.0	04AUG2014
CRP2(2015)						
	1	124.5	585.1	12AUG2015	80.4	30JUL2015
	2	141.5	564.7	12AUG2015	78.5	30JUL2015
	3	119.8	570.1	12AUG2015	80.7	30JUL2015

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4=  
CORESTA Loose Leaf Chewing Tobacco N/A= not available

Table 6. Smokeless Reference Product Data Listing (as is) (cont'd)

Smokeless Reference Product	Replicate	Metals Analysis			Acrylamide Analysis	
		Arsenic (ng/g)	Cadmium (ng/g)	Completed Analysis Date	Acrylamide (ng/g)	Completed Analysis Date
CRP3(2014)						
	1	332.4	1413.0	05AUG2014	251.0	07AUG2014
	2	314.3	1384.0	05AUG2014	256.0	19AUG2014
	3	330.8	1412.0	05AUG2014	262.0	19AUG2014
CRP4(2014)						
	1	98.1	442.6	05AUG2014	100.0	07AUG2014
	2	69.6	424.9	05AUG2014	99.5	19AUG2014
	3	109.9	657.9	05AUG2014	109.0	19AUG2014
	4	N/A	746.6	06AUG2014	N/A	N/A
	5	N/A	379.6	06AUG2014	N/A	N/A
	6	N/A	573.6	06AUG2014	N/A	N/A

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4=  
CORESTA Loose Leaf Chewing Tobacco N/A= not available

Table 6. Smokeless Reference Product Data Listing (as is) (cont'd)

Smokeless Reference Product	Replicate	Carbonyl Analysis			Completed Analysis Date
		Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	
CRP1(2014)					
	1	8170.0	689.0*	1100.0	04AUG2014
	2	7750.0	698.0*	1060.0	04AUG2014
	3	7790.0	699.0*	1010.0	04AUG2014
CRP1(2015)					
	1	7340.0	646.0*	1110.0	03AUG2015
	2	7360.0	699.0*	1150.0	03AUG2015
	3	7090.0	701.0*	1150.0	03AUG2015
CRP2(2014)					
	1	2500.0	730.0*	927.0	04AUG2014
	2	2380.0	734.0*	940.0	04AUG2014
	3	2330.0	729.0*	921.0	04AUG2014
CRP2(2015)					
	1	2340.0	672.0*	855.0*	29JUL2015
	2	2310.0	741.0*	942.0*	29JUL2015
	3	2220.0	710.0*	904.0*	29JUL2015

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4= CORESTA Loose Leaf Chewing Tobacco

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 6. Smokeless Reference Product Data Listing (as is) (cont'd)

Smokeless Reference Product	Replicate	Carbonyl Analysis			Completed Analysis Date
		Acetaldehyde (ng/g)	Crotonaldehyde (ng/g)	Formaldehyde (ng/g)	
CRP3(2014)					
	1	2250.0	732.0*	11100.0	04AUG2014
	2	2150.0	732.0*	10700.0	04AUG2014
	3	2090.0	734.0*	10400.0	04AUG2014
CRP4(2014)					
	1	1000.0*	728.0*	894.0*	04AUG2014
	2	1010.0*	734.0*	901.0*	05AUG2014
	3	1000.0*	729.0*	895.0*	05AUG2014

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4=CORESTA Loose Leaf Chewing Tobacco

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 6. Smokeless Reference Product Data Listing (as is) (cont'd)

Smokeless Reference Product	Replicate	Tobacco Specific Nitrosamine Analysis				Completed Analysis Date
		NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	
CRP1(2014)						
	1	28.8	482.0	196.0	594.0	06AUG2014
	2	29.2	482.0	196.0	609.0	19AUG2014
	3	29.9	458.0	196.0	602.0	19AUG2014
CRP1(2015)						
	1	31.1	552.0	223.0	715.0	29JUL2015
	2	30.6	560.0	219.0	733.0	29JUL2015
	3	31.5	580.0	220.0	699.0	29JUL2015
CRP2(2014)						
	1	150.0	1680.0	435.0	1800.0	06AUG2014
	2	148.0	1550.0	428.0	1710.0	06AUG2014
	3	139.0	1570.0	447.0	1710.0	06AUG2014
CRP2(2015)						
	1	155.0	1860.0	445.0	1860.0	24JUL2015
	2	160.0	1820.0	441.0	1970.0	24JUL2015
	3	158.0	1810.0	458.0	1950.0	24JUL2015

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4=  
CORESTA Loose Leaf Chewing Tobacco NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT=  
N'nitrosoanatabine NAB= N' nitrosoanabasine N/A= not available

Table 6. Smokeless Reference Product Data Listing (as is) (cont'd)

Smokeless Reference Product	Replicate	Tobacco Specific Nitrosamine Analysis				Completed Analysis Date
		NAB (ng/g)	NAT (ng/g)	NNK (ng/g)	NNN (ng/g)	
CRP3(2014)						
	1	399.0	5990.0	4630.0	7890.0	06AUG2014
	2	397.0	5720.0	4460.0	7740.0	19AUG2014
	3	399.0	5630.0	4570.0	8030.0	19AUG2014
CRP4(2014)						
	1	57.2	1170.0	455.0	1840.0	06AUG2014
	2	N/A	1780.0	675.0	N/A	19AUG2014
	2	86.7	N/A	N/A	2770.0	22AUG2014
	3	55.5	1220.0	433.0	1850.0	22AUG2014
	1	59.1	1290.0	461.0	1940.0	19AUG2014
	2	57.7	N/A	N/A	1970.0	19AUG2014
	2	N/A	1320.0	454.0	N/A	22AUG2014
	3	58.7	1290.0	481.0	2040.0	22AUG2014

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4=  
CORESTA Loose Leaf Chewing Tobacco NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT=  
N'nitrosoanatabine NAB= N' nitrosoanabasine N/A= not available

Table 6. Smokeless Reference Product Data Listing(as is) (cont'd)

Smokeless Reference Product	Replicate	Polycyclic Aromatic Hydrocarbon Analysis					Completed Analysis Date
		B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	
CRP1(2014)							
	1	0.96*	N/A	N/A	N/A	N/A	22AUG2014
	2	1.06	N/A	N/A	N/A	N/A	22AUG2014
	3	0.99*	N/A	N/A	N/A	N/A	22AUG2014
CRP1(2014)							
	1	N/A	30.0*	40.0*	N/A	29.97*	27JAN2015
	2	N/A	29.7*	39.6*	N/A	29.73*	27JAN2015
	3	N/A	28.1*	37.4*	N/A	28.05*	27JAN2015
CRP1(2015)							
	1	0.95*	N/A	N/A	N/A	N/A	03AUG2015
	2	0.93*	N/A	N/A	N/A	N/A	03AUG2015
	3	1.00*	N/A	N/A	N/A	N/A	03AUG2015
CRP1(2015)							
	1	N/A	29.8*	39.6*	N/A	29.68*	08JAN2016
	2	N/A	28.1*	37.4*	N/A	28.02*	08JAN2016
	3	N/A	29.1*	38.7*	N/A	29.04*	08JAN2016

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4= CORESTA Loose Leaf Chewing Tobacco B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene B(k)FL=benzo(k)fluoranthene Dibenz(a,h)A= Dibenz(a,h)anthracene N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.



Table 6. Smokeless Reference Product Data Listing(as is) (cont'd)

Smokeless Reference Product	Replicate	Polycyclic Aromatic Hydrocarbon Analysis					Completed Analysis Date
		B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	
CRP2(2014)							
	1	76.62	N/A	N/A	N/A	N/A	11AUG2014
	2	76.48	N/A	N/A	N/A	N/A	11AUG2014
	3	76.51	N/A	N/A	N/A	N/A	11AUG2014
CRP2(2014)							
	1	N/A	82.1	36.7*	N/A	27.53*	27JAN2015
	2	N/A	80.2	37.7*	N/A	28.28*	27JAN2015
	3	N/A	83.4	36.4*	N/A	27.31*	27JAN2015
CRP2(2015)							
	1	58.33	N/A	N/A	N/A	N/A	03AUG2015
	2	56.73	N/A	N/A	N/A	N/A	03AUG2015
	3	55.87	N/A	N/A	N/A	N/A	03AUG2015
CRP2(2015)							
	1	N/A	105.2	39.8	40.4	24.09*	08JAN2016
	2	N/A	105.1	41.0	40.3	23.91*	08JAN2016
	3	N/A	105.7	39.4	41.6	24.15*	08JAN2016

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4= CORESTA Loose Leaf Chewing Tobacco B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene B(k)FL=benzo(k)fluoranthene Dibenz(a,h)A= Dibenz(a,h)anthracene N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 6. Smokeless Reference Product Data Listing(as is) (cont'd)

Smokeless Reference Product	Replicate	Polycyclic Aromatic Hydrocarbon Analysis					Completed Analysis Date
		B(a)P (ng/g)	B(a)A (ng/g)	B(b/j)FL (ng/g)	B(k)FL (ng/g)	Dibenz(a,h)A (ng/g)	
CRP3(2014)							
	1	54.58	N/A	N/A	N/A	N/A	15AUG2014
	2	54.62	N/A	N/A	N/A	N/A	15AUG2014
	3	55.04	N/A	N/A	N/A	N/A	15AUG2014
CRP3(2014)							
	1	N/A	134.7	60.7	N/A	28.57*	27JAN2015
	2	N/A	135.2	61.5	N/A	25.98*	27JAN2015
	3	N/A	136.5	61.9	N/A	25.50*	27JAN2015
CRP4(2014)							
	1	1.80	N/A	N/A	N/A	N/A	19AUG2014
	2	1.88	N/A	N/A	N/A	N/A	19AUG2014
	3	1.12	N/A	N/A	N/A	N/A	19AUG2014
CRP4(2014)							
	1	N/A	25.9*	34.5*	N/A	25.90*	27JAN2015
	2	N/A	28.3*	37.7*	N/A	28.28*	27JAN2015
	3	N/A	27.7*	36.9*	N/A	27.68*	27JAN2015

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4=CORESTA Loose Leaf Chewing Tobacco B(a)P= Benzo(a)pyrene B(a)A= Benz(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene B(k)FL=benzo(k)fluoranthene Dibenz(a,h)A= Dibenz(a,h)anthracene N/A= not available

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 6. Smokeless Reference Product Data Listing(as is) (cont'd)

Smokeless Reference Product	Replicate	Polycyclic Aromatic Hydrocarbon Analysis		
		Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	Completed Analysis Date
CRP1(2014)				
	1	4.00*	199.8*	27JAN2015
	2	3.96*	198.2*	27JAN2015
	3	3.74*	187.0*	27JAN2015
CRP1(2015)				
	1	3.96*	198.0*	08JAN2016
	2	3.74*	186.8*	08JAN2016
	3	3.87*	193.7*	08JAN2016
CRP2(2014)				
	1	6.48	183.5*	27JAN2015
	2	5.89	188.5*	27JAN2015
	3	5.80	182.1*	27JAN2015
CRP2(2015)				
	1	7.38	160.6*	08JAN2016
	2	8.07	159.5*	08JAN2016
	3	8.40	161.1*	08JAN2016

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4= CORESTA Loose Leaf Chewing Tobacco Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 6. Smokeless Reference Product Data Listing(as is) (cont'd)

Smokeless Reference Product	Replicate	Polycyclic Aromatic Hydrocarbon Analysis		
		Indeno(c,d)P (ng/g)	Naphthalene (ng/g)	Completed Analysis Date
CRP3(2014)				
	1	8.93	190.4*	27JAN2015
	2	8.39	173.2*	27JAN2015
	3	8.07	170.0*	27JAN2015
CRP4(2014)				
	1	3.45*	172.7*	27JAN2015
	2	3.77*	188.5*	27JAN2015
	3	3.69*	184.5*	27JAN2015

CRP2=CORESTA Reference Moist Snuff CRP1= CORESTA Reference Snus CRP3=CORESTA Reference Dry Snuff CRP4=  
CORESTA Loose Leaf Chewing Tobacco Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene

\*indicates value below Limit of Quantification (LOQ). LOQ was used as value in these tables.

Table 7. Smokeless Reference Product Descriptive Data (as is)

Analyte	CRP2 (2014)				CRP2 (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	12.5	12.4	12.5	3	12.3	12.2	12.4	3
% Un-ionized (free) Nicotine	29.9	28.5	32.4	3	20.6	20.4	20.8	3
Total Free Nicotine (mg/g)	3.7	3.5	4.0	3	2.5	2.5	2.6	3
Moisture (%)	53.3	53.3	53.3	3	53.2	53.1	53.3	3
pH	7.7	7.6	7.7	3	7.4	7.4	7.4	3
Acetaldehyde (ng/g)	2403	2330	2500	3	2290	2220	2340	3
Crotonaldehyde (ng/g)	731*	729*	734*	3	708*	672*	741*	3
Formaldehyde (ng/g)	929	921	940	3	900*	855*	942*	3
Arsenic (ng/g)	97	89	102	3	129	120	142	3
Cadmium (ng/g)	532	529	534	3	573	565	585	3
NNN (ng/g)	1740	1710	1800	3	1927	1860	1970	3
NNK (ng/g)	437	428	447	3	448	441	458	3
NAT (ng/g)	1600	1550	1680	3	1830	1810	1860	3
NAB (ng/g)	146	139	150	3	158	155	160	3
B(a)P (ng/g)	76.5	76.5	76.6	3	57.0	55.9	58.3	3
B(a)A (ng/g)	82	80	83	3	105	105	106	3
B(b/j)FL (ng/g)	37*	36*	38*	3	40	39	41	3

CRP2=CORESTA Reference Moist Snuff NNN = N'nitrosoornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benzo(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenz(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 7. Smokeless Reference Product Descriptive Data (as is)

Analyte	CRP2 (2014)				CRP2 (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	41	40	42	3
Dibenz(a,h)A (ng/g)	27.7*	27.3*	28.3*	3	24.1*	23.9*	24.2*	3
Indeno(c,d)P (ng/g)	6.1	5.8	6.5	3	7.9	7.4	8.4	3
Acrylamide (ng/g)	105	100	109	3	80	79	81	3
Naphthalene (ng/g)	185*	182*	189*	3	160*	160*	161*	3

CRP2=CORESTA Reference Moist Snuff NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benzo(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene B(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenz(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 7. Smokeless Reference Product Descriptive Data (as is) (cont'd)

Analyte	CRP1 (2014)				CRP1 (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
Nicotine (mg/g)	9.8	9.7	9.9	3	10.0	9.9	10.0	3
% Un-ionized (free) Nicotine	41.6	41.5	42.0	3	29.7	29.4	29.9	3
Total Free Nicotine (mg/g)	4.1	4.0	4.1	3	3.0	3.0	3.0	3
Moisture (%)	52.1	51.8	52.6	3	48.9	48.7	49.2	3
pH	7.9	7.9	7.9	3	7.6	7.6	7.7	3
Acetaldehyde (ng/g)	7903	7750	8170	3	7263	7090	7360	3
Crotonaldehyde (ng/g)	695*	689*	699*	3	682*	646*	701*	3
Formaldehyde (ng/g)	1057	1010	1100	3	1137	1110	1150	3
Arsenic (ng/g)	90	85	97	3	79	76	83	3
Cadmium (ng/g)	267	262	271	3	279	273	283	3
NNN (ng/g)	602	594	609	3	716	699	733	3
NNK (ng/g)	196	196	196	3	221	219	223	3
NAT (ng/g)	474	458	482	3	564	552	580	3
NAB (ng/g)	29	29	30	3	31	31	32	3
B(a)P (ng/g)	1.0*	1.0*	1.1	3	1.0*	0.9*	1.0*	3
B(a)A (ng/g)	29*	28*	30*	3	29*	28*	30*	3
B(b/j)FL (ng/g)	39*	37*	40*	3	39*	37*	40*	3

CRP1=CORESTA Reference Snus NNN = N'-nitrosoornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NAT= N'-nitrosoanatabine NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benzo(a)anthraceneB(b/j)FL= Benzo(b/j)fluorantheneB(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenz(a,h)anthraceneIndeno(c,d)P= Indeno(1,2,3-c,d)pyrene N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 7. Smokeless Reference Product Descriptive Data (as is) (cont'd)

Analyte	CRP1 (2014)				CRP1 (2015)			
	Mean	Minimum	Maximum	Replicates (n)	Mean	Minimum	Maximum	Replicates (n)
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	29.3*	28.1*	30.0*	3	28.9*	28.0*	29.7*	3
Indeno(c,d)P (ng/g)	3.9*	3.7*	4.0*	3	3.9*	3.7*	4.0*	3
Acrylamide (ng/g)	81	77	84	3	66	64	70	3
Naphthalene (ng/g)	195*	187*	200*	3	193*	187*	198*	3

CRP1=CORESTA Reference Snus NNN = N'nitrosonornicotine NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone  
 NAT= N'nitrosoanatabine NAB= N' nitrosoanabasine B(a)P= Benzo(a)pyrene B(a)A= Benzo(a)anthraceneB(b/j)FL= Benzo(b/j)fluorantheneB(k)FL= Benzo(k)fluoranthene Dibenz(a,h)A= Dibenz(a,h)anthraceneIndeno(c,d)P= Indeno(1,2,3-c,d)pyrene N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.



Table 7. Smokeless Reference Product Descriptive Data (as is) (cont'd)

Analyte	CRP3 (2014)				CRP4 (2015)			
	Mean	Minimum	Maximum	Replicate (n)	Mean	Minimum	Maximum	Replicate (n)
Nicotine (mg/g)	21.4	21.1	21.6	3	11.1	10.9	11.3	3
% Un-ionized (free) Nicotine	6.1	6.1	6.1	3	0.7	0.6	0.9	3
Total Free Nicotine (mg/g)	1.3	1.3	1.3	3	0.1	0.1	0.1	3
Moisture (%)	6.4	6.3	6.5	3	23.2	23.0	23.4	3
pH	6.8	6.8	6.8	3	5.9	5.8	6.0	3
Acetaldehyde (ng/g)	2163	2090	2250	3	1003*	1000*	1010*	3
Crotonaldehyde (ng/g)	733*	732*	734*	3	730*	728*	734*	3
Formaldehyde (ng/g)	10733	10400	11100	3	897*	894*	901*	3
Arsenic (ng/g)	326	314	332	3	93	70	110	3
Cadmium (ng/g)	1403	1384	1413	3	538	380	747	6
NNN (ng/g)	7887	7740	8030	3	2153	1840	2770	3
	N/A	N/A	N/A	N/A	1983	1940	2040	3
NNK (ng/g)	4553	4460	4630	3	521	433	675	3
	N/A	N/A	N/A	N/A	465	454	481	3
NAT (ng/g)	5780	5630	5990	3	1390	1170	1780	3
	N/A	N/A	N/A	N/A	1300	1290	1320	3

CRP3=CORESTA Reference Dry Snuff CRP4=CORESTA Reference Looseleaf Chewing Tobacco NNN = N'nitrosoanornicotine  
 NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine NAB= N' nitrosoanabasine  
 B(a)P= Benzo(a)pyrene B(a)A= Benzo(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenz(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

Table 7. Smokeless Reference Product Descriptive Data (as is) (cont'd)

Analyte	CRP3 (2014)				CRP4 (2015)			
	Mean	Minimum	Maximum	Replicate (n)	Mean	Minimum	Maximum	Replicate (n)
NAB (ng/g)	398	397	399	3	66	56	87	3
	N/A	N/A	N/A	N/A	59	58	59	3
B(a)P (ng/g)	54.7	54.6	55.0	3	1.6	1.1	1.9	3
B(a)A (ng/g)	135	135	137	3	27*	26*	28*	3
B(b/j)FL (ng/g)	61	61	62	3	36*	35*	38*	3
B(k)FL (ng/g)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dibenz(a,h)A (ng/g)	26.7*	25.5*	28.6*	3	27.3*	25.9*	28.3*	3
Indeno(c,d)P (ng/g)	8.5	8.1	8.9	3	3.6*	3.5*	3.8*	3
Acrylamide (ng/g)	256	251	262	3	103	100	109	3
Naphthalene (ng/g)	178*	170*	190*	3	182*	173*	189*	3

CRP3=CORESTA Reference Dry Snuff CRP4=CORESTA Reference Looseleaf Chewing Tobacco NNN = N'nitrosonornicotine  
 NNK=4-(methylnitrosamino)-1-(3-pyridyl)-1-butanone NAT= N'nitrosoanatabine NAB= N' nitrosoanabasine  
 B(a)P= Benzo(a)pyrene B(a)A= Benzo(a)anthracene B(b/j)FL= Benzo(b/j)fluoranthene B(k)FL= Benzo(k)fluoranthene  
 Dibenz(a,h)A= Dibenz(a,h)anthracene Indeno(c,d)P= Indeno(1,2,3-c,d)pyrene N/A=not available

\*indicates at least one value below Limit of Quantification (LOQ). LOQ was used to calculate the mean and thus the minimum and maximum in this table.

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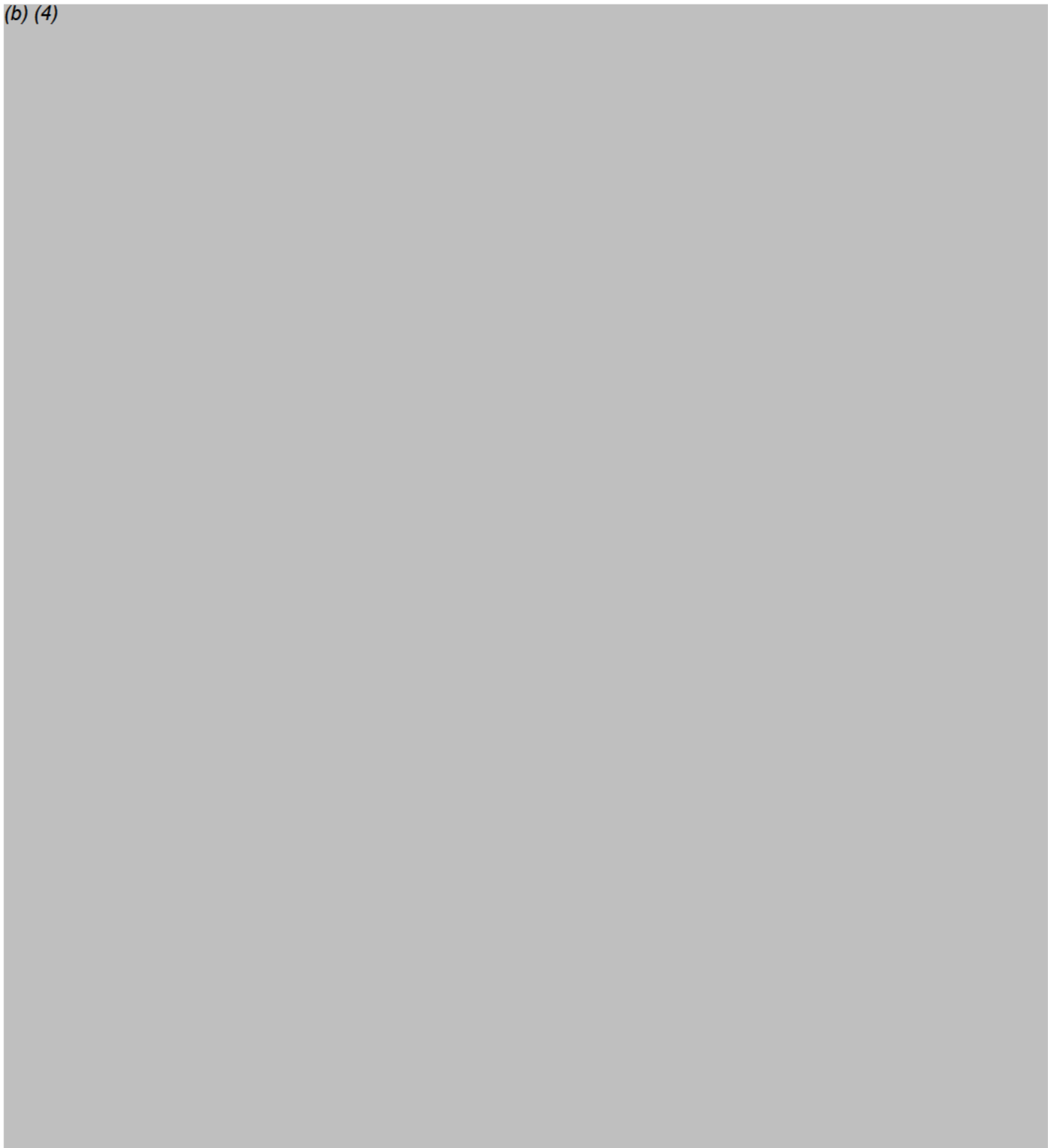
## Appendix B Analytical Methods

**COMPANY CONFIDENTIAL**  
**Level 3 Document**

**Determination of Specific Alkaloids in Tobacco**

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**COMPANY CONFIDENTIAL**  
**Level 3 Document**

(b) (4)





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Date: 05/02/2014

Approved by: Lisa Winkler  
Quality Assurance - LLI Document Control

Date: 05/02/14

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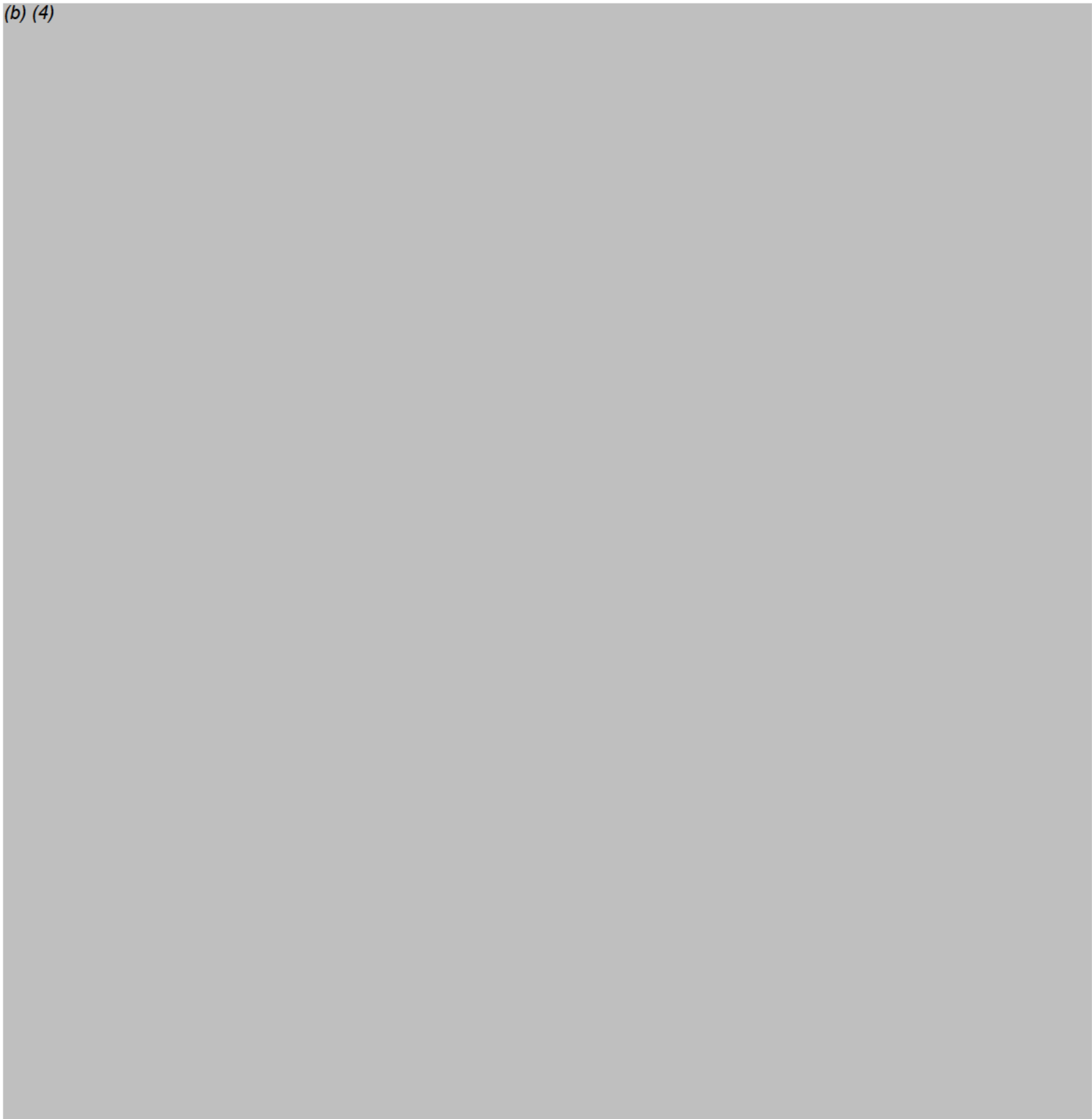
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**Title:** Determination of Specific Alkaloids in Tobacco

**Effective Date:** 1/9/2015

**Document No.:** RJRT-WI-004105

**Revision Level:** 020

**Author:** Candice K Cunningham

**Status:** CURRENT

### **Release Review and Approval**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Sr Technician	MCCLUNE	12/10/2014 15:52
RJRT-AUTHOR	Candice K Cunningham	Sr Scientist	CUNNINC	12/10/2014 21:26
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	12/11/2014 13:46
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Sr Technician	MCCLUNE	12/11/2014 15:00

### **Periodic Review**

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Author

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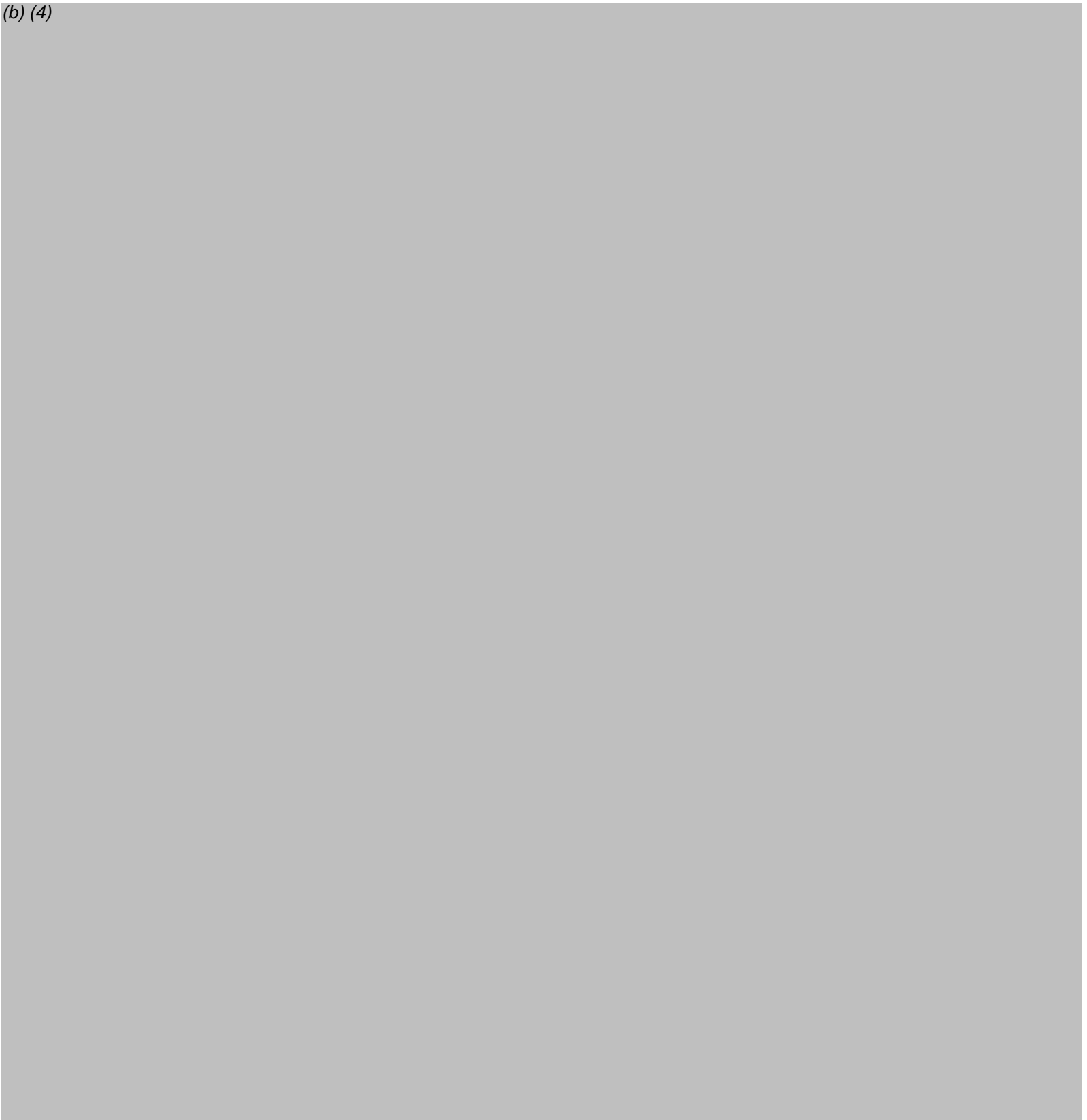
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Inductively Coupled Plasma Mass  
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**Effective Date:** 1/9/2015

**Document No.:** RJRT-WI-004210

**Revision Level:** 015

**Author:** Keith J Green

**Status:** EXPIRED

### **Release Review and Approval**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	12/16/2014 16:33
RJRT-AUTHOR	Keith J Green	Scientist IV	GREENK1	12/17/2014 14:57
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	12/17/2014 20:29
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	12/17/2014 21:21

### **Periodic Review**

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### **Reason for Revision**

New template

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Prepared by:

Author

Date:

Approved by:

Management - LLI

Date:

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ASM Management - RJRT

Date:

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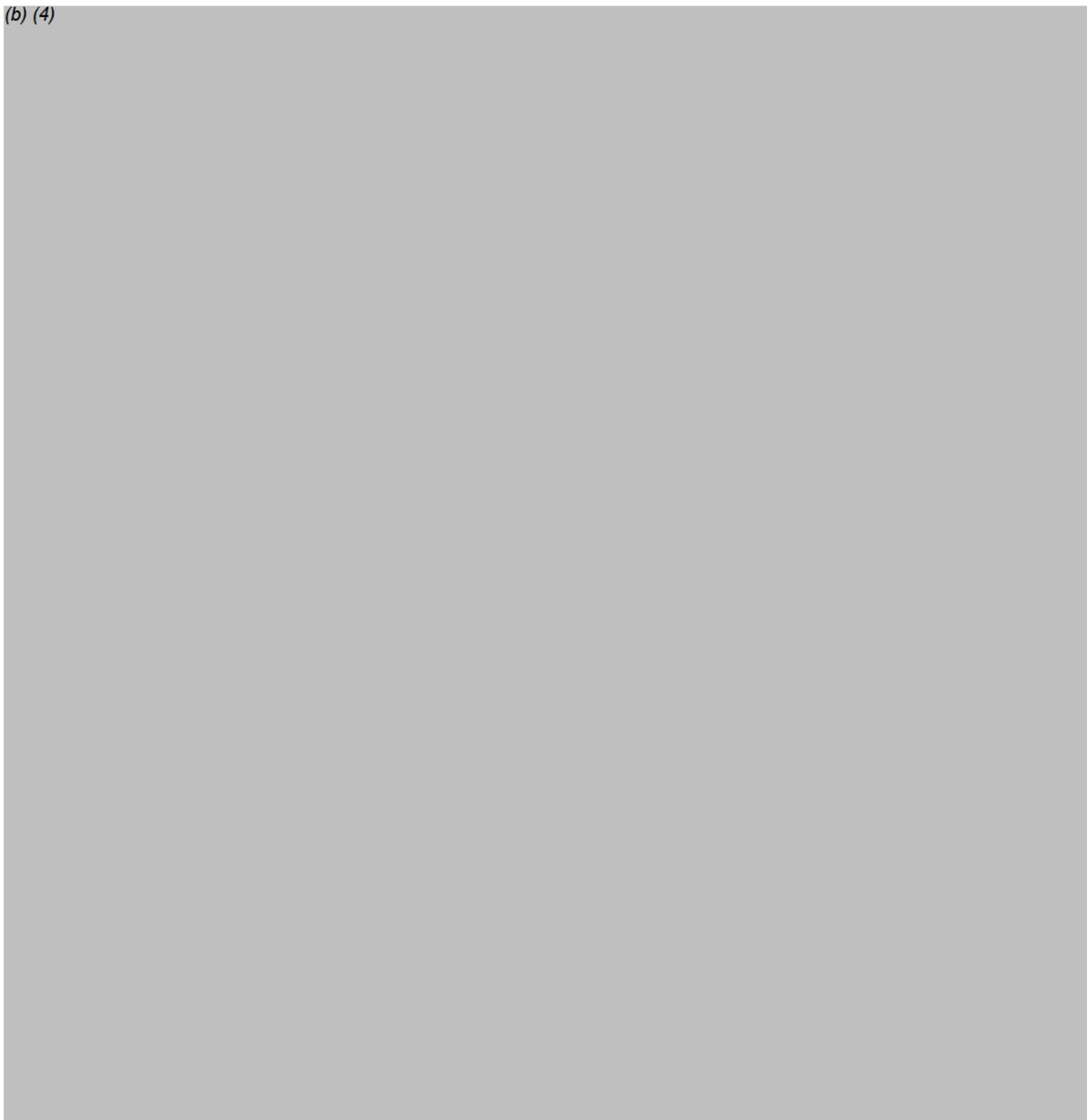
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**Quantitative Determination of Acrylamide by Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)**

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**Quantitative Determination of Acrylamide by Liquid  
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Date Issued: 08/28/2014



**Title:** Quantitative Determination of Acrylamide by  
Ultra Performance Liquid Chromatography  
Tandem Mass Spectrometry (LC/MS/MS)

**Effective Date:** 3/17/2015

**Document No.:** RJRT-WI-004218

**Revision Level:** 006

**Author:** Keith J Green

**Status:** EXPIRED

### **Release Review and Approval**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/02/2015 17:39
RJRT-AUTHOR	Keith J Green	Scientist IV	GREENK1	03/03/2015 20:05
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	03/04/2015 12:24
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/04/2015 13:31

### **Periodic Review**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
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### **Reason for Revision**

New template

Title: Quantitative Determination of Acrylamide by Ultra Performance Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	Effective Date: 3/17/2015
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Title: Quantitative Determination of Acrylamide by Ultra Performance Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	Effective Date: 3/17/2015
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Title: Quantitative Determination of Acrylamide by Ultra Performance Liquid Chromatography Tandem Mass Spectrometry (LC/MS/MS)	Effective Date: 3/17/2015
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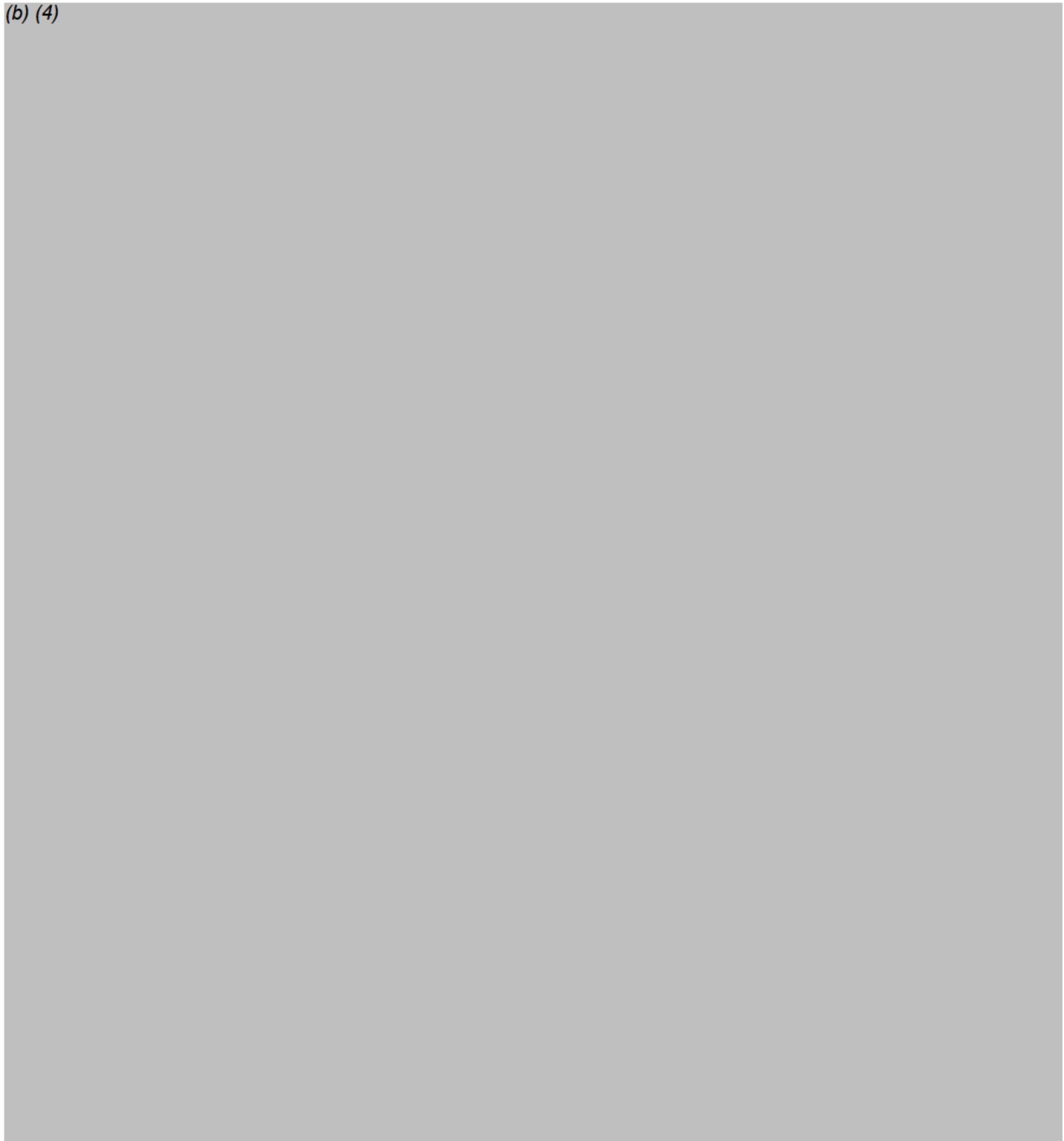


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**Determination of Benzo[a]pyrene (B[a]P) in Tobacco and Cigarette Smoke Condensate**

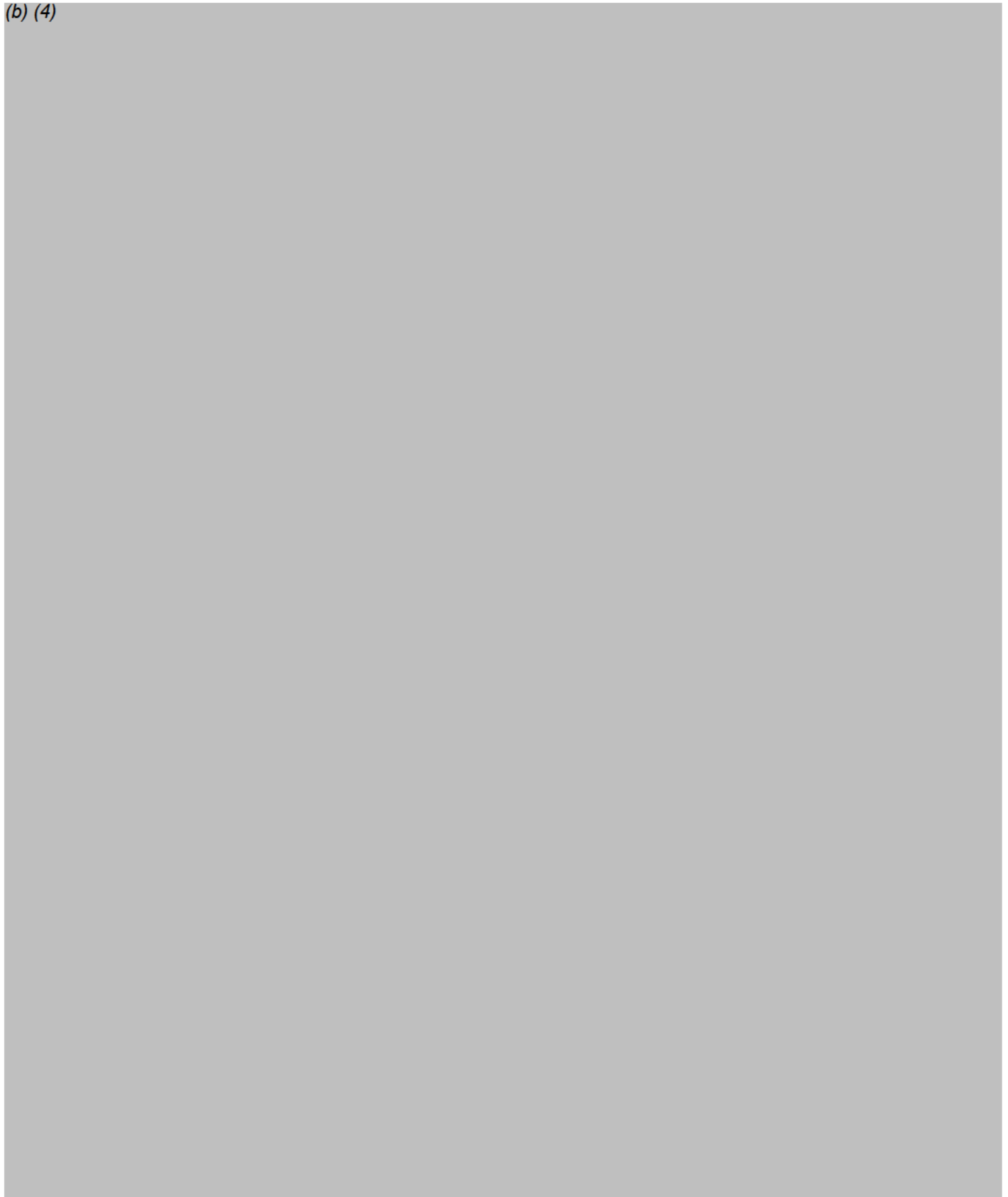
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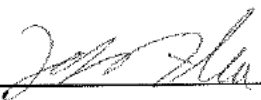
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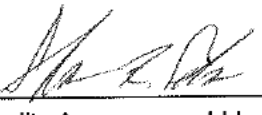
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Prepared by:   
Author

Date: 7/23/14

Approved by:   
Management - LLI

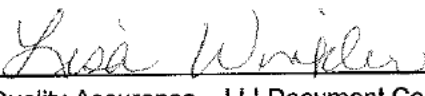
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Quality Assurance - LLI


Date: 07/23/14

Approved by:   
ASM Management - RJRT

Date: 07/23/14

Approved by:   
Quality Assurance - LLI Document Control


Date: 07/23/2014

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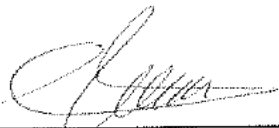
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Approvals:

Prepared by:   
Author

Date: 8/27/14

Approved by:   
Management - LLI


Date: 8/28/14

Approved by:   
Quality Assurance - LLI

Date: 08/28/14

Approved by:   
ASM Management - RJRT

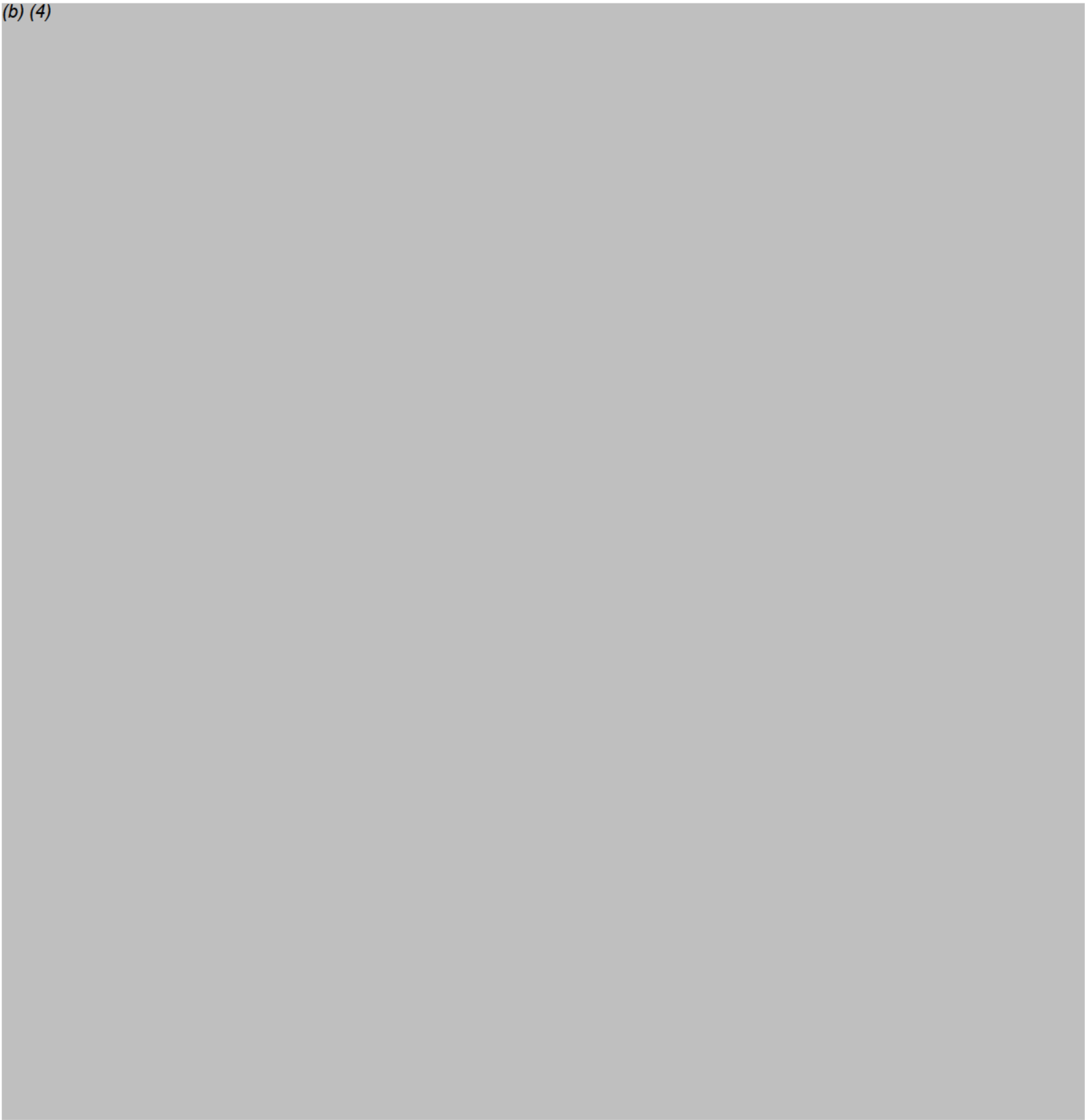
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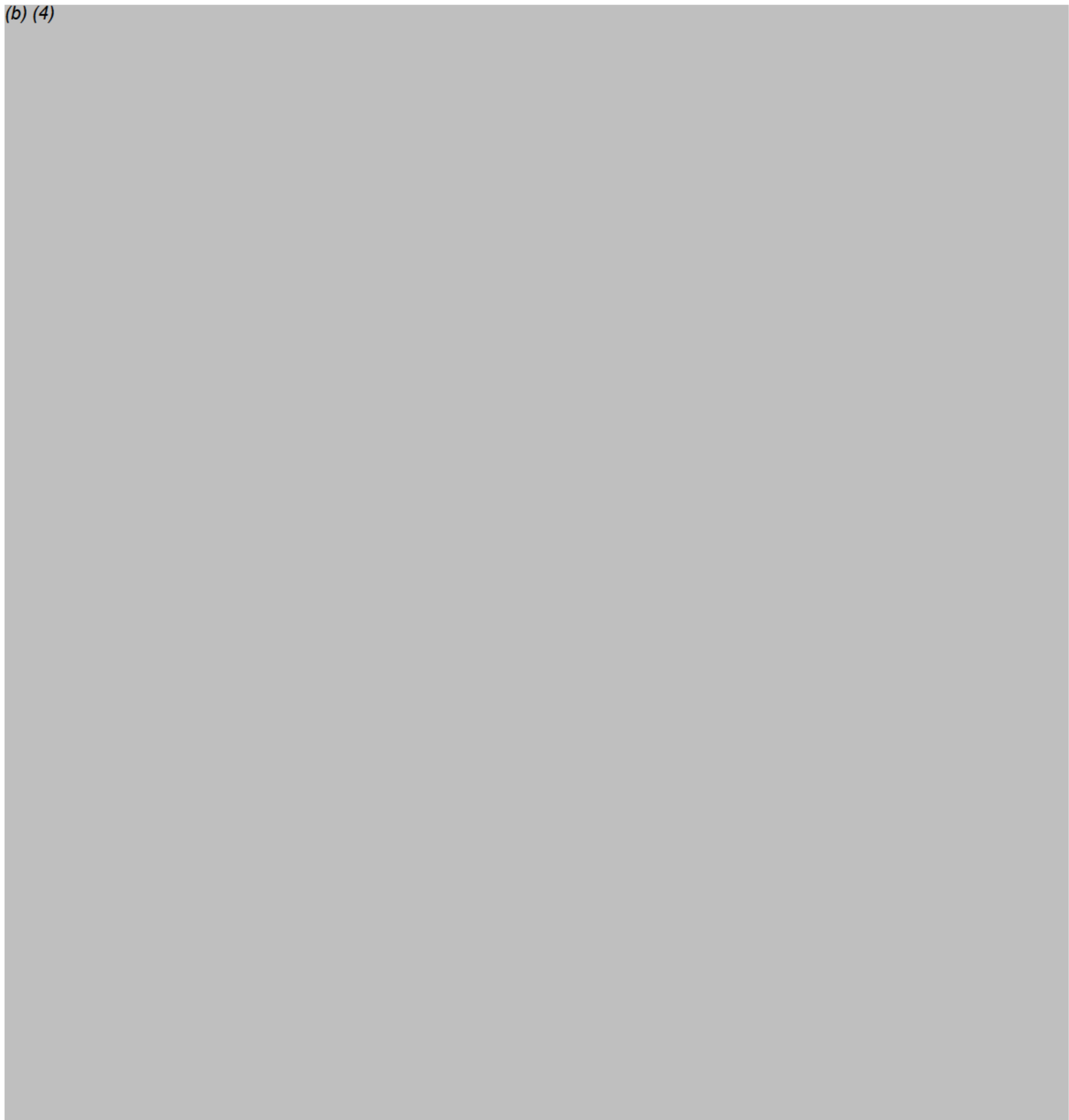
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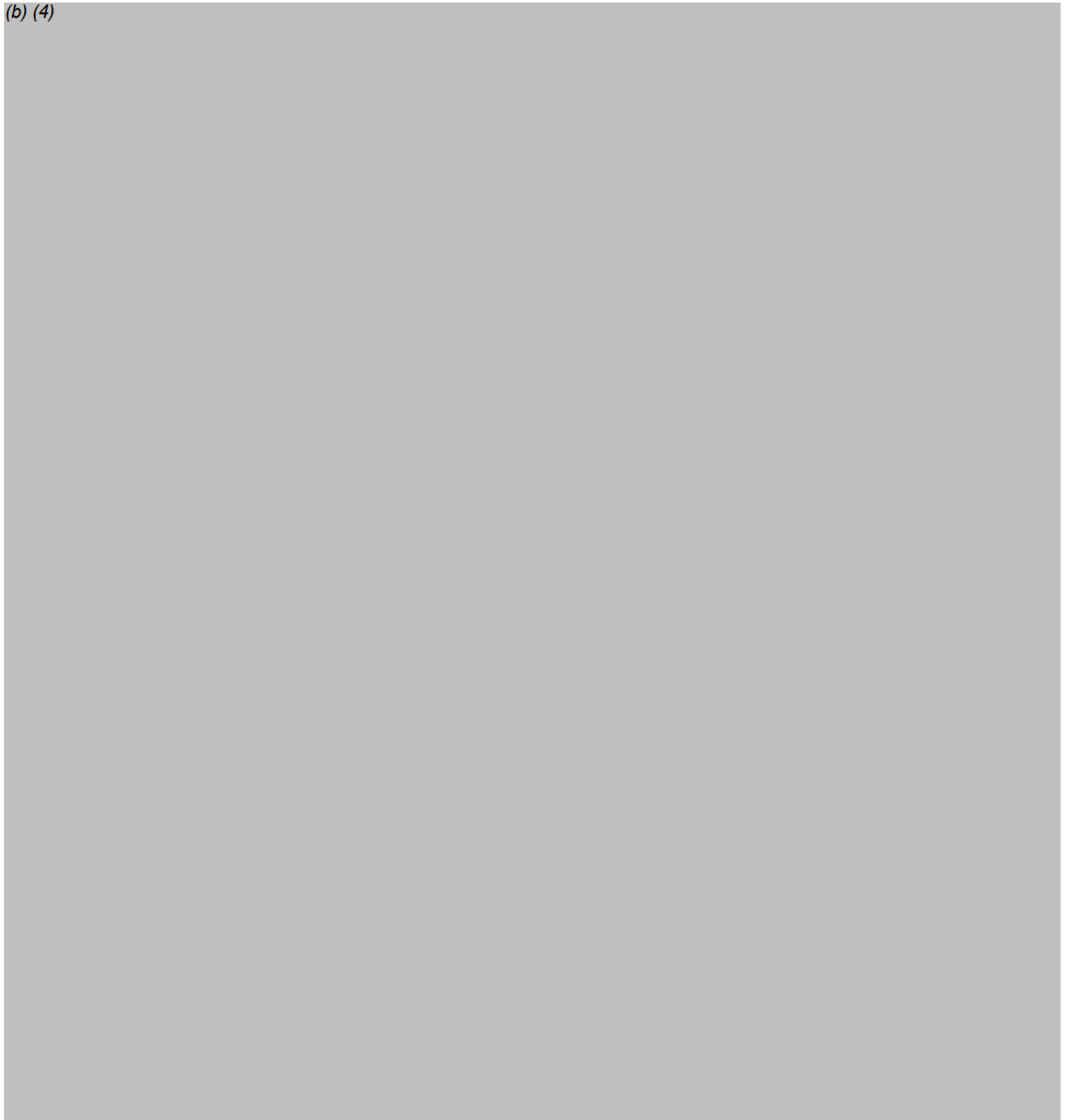
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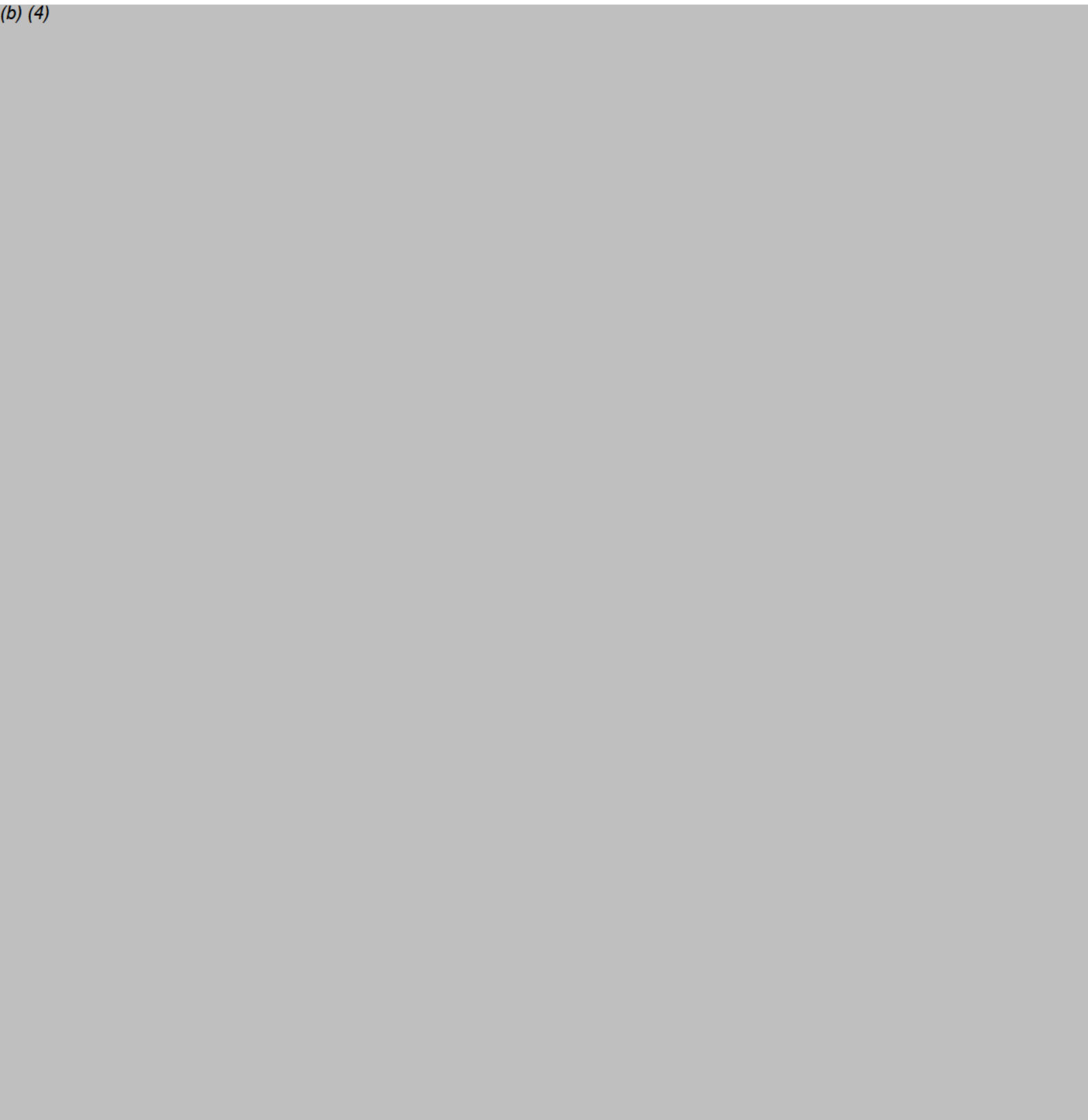


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**Title:** Determination of Benzo[a]pyrene (B[a]P) in  
Fired-Cured and Other Tobaccos

**Effective Date:** 3/17/2015

**Document No.:** RJRT-WI-004204

**Revision Level:** 013

**Author:** Keith J Green

**Status:** EXPIRED

### **Release Review and Approval**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/02/2015 15:11
RJRT-AUTHOR	Keith J Green	Scientist IV	GREENK1	03/02/2015 15:14
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	03/03/2015 1:57
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/03/2015 14:28

### **Periodic Review**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
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### **Reason for Revision**

New template

Title: Determination of Benzo[a]pyrene (B[a]P) in Fired-Cured and Other Tobaccos	Effective Date: 3/17/2015
Document #: RJRT-WI-004204	Revision: 013

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Title: Determination of Benzo[a]pyrene (B[a]P) in Fired-Cured and Other Tobaccos	Effective Date: 3/17/2015
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Title: Determination of Benzo[a]pyrene (B[a]P) in Fired-Cured and Other Tobaccos	Effective Date: 3/17/2015
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Title: Determination of Benzo[a]pyrene (B[a]P) in Fired-Cured and Other Tobaccos	Effective Date: 3/17/2015
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Title: Determination of Benzo[a]pyrene (B[a]P) in Fired-Cured and Other Tobaccos	Effective Date: 3/17/2015
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Title: Determination of Benzo[a]pyrene (B[a]P) in Fired-Cured and Other Tobaccos	Effective Date: 3/17/2015
Document #: RJRT-WI-004204	Revision: 013

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Title: Determination of Benzo[a]pyrene (B[a]P) in Fired-Cured and Other Tobaccos	Effective Date: 3/17/2015
Document #: RJRT-WI-004204	Revision: 013

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Title: Determination of Benzo[a]pyrene (B[a]P) in Fired-Cured and Other Tobaccos	Effective Date: 3/17/2015
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6. The limit of quantification (LOQ) is the concentration of the lowest standard of the calibration.
7. The relative standard deviation for test samples is monitored. If the test samples have a relative standard deviation >25%, group leader will be consulted for further action.

**NOTE:** *If one or more tobacco samples have B[a]P levels outside the calibration range, dilution may be necessary.*

**NOTE:** *Overlay a labeled standard chromatogram with each sample chromatogram to ensure that peaks are identified correctly in the sample chromatogram. Also, review chromatograms closely for possible interferences or retention time differences between standards and samples and for possible differences from a typical sample chromatogram.*

## 15. Statistical Information/Method Performance:

N/A

## 16. Quality Assurance/Quality Control:

### Quality Control Data Acceptance Criteria

Analysis of the tobacco control sample must be within established limits (ACD0014QAR Form 1).

When a high %RSD (>25%) for the samples is observed the Group Leader will be notified. An exception, per ACD0002NCT, will be generated if it is determined to be necessary by the Group Leader. If an exception is not necessary then documented justification in the laboratory notebook and/or data packet is required and all data (original and new aliquot) is to be reported.

Title: Determination of Benzo[a]pyrene (B[a]P) in Fired-Cured and Other Tobaccos	Effective Date: 3/17/2015
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**Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Cigarettes  
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Doc: ACD1109-3STM  
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Approvals:

Prepared by:

Author

Date:

Approved by:

Management – LLI

Date:

Approved by:

Quality Assurance – LLI

Date:

Approved by:

ASM Management – RJRT

Date:

Approved by:

Quality Assurance – LLI Document Control

Date:

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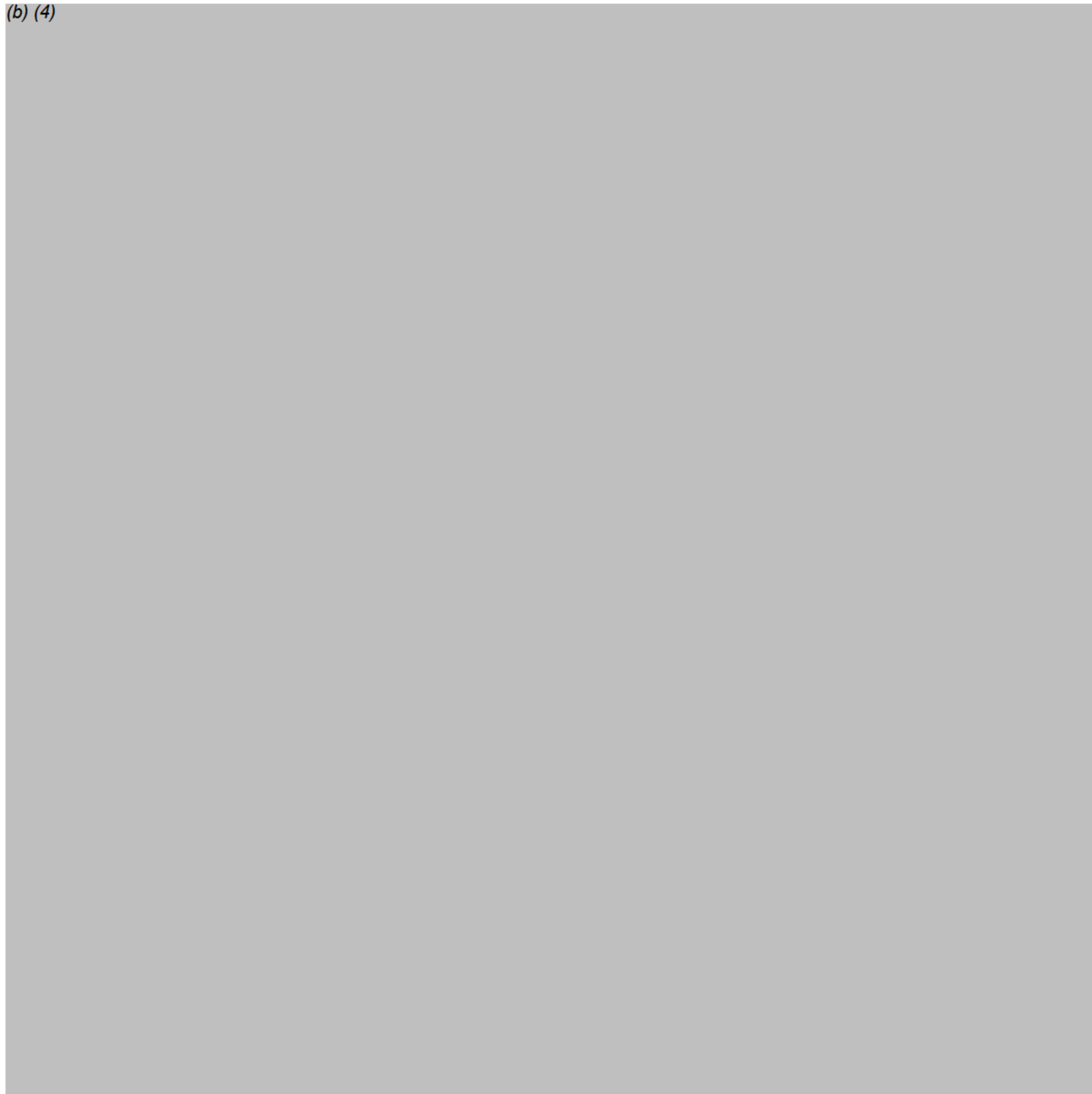


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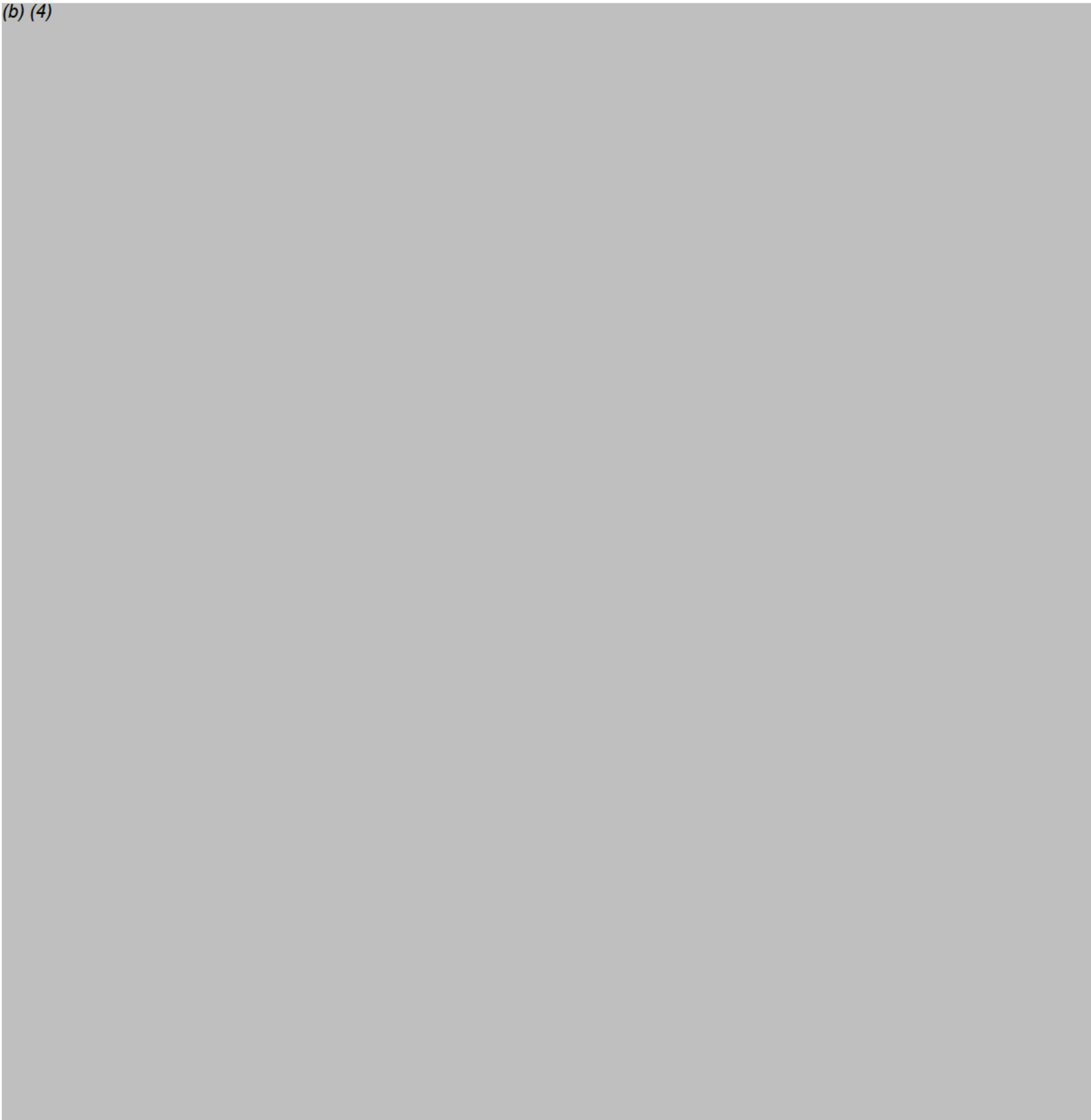
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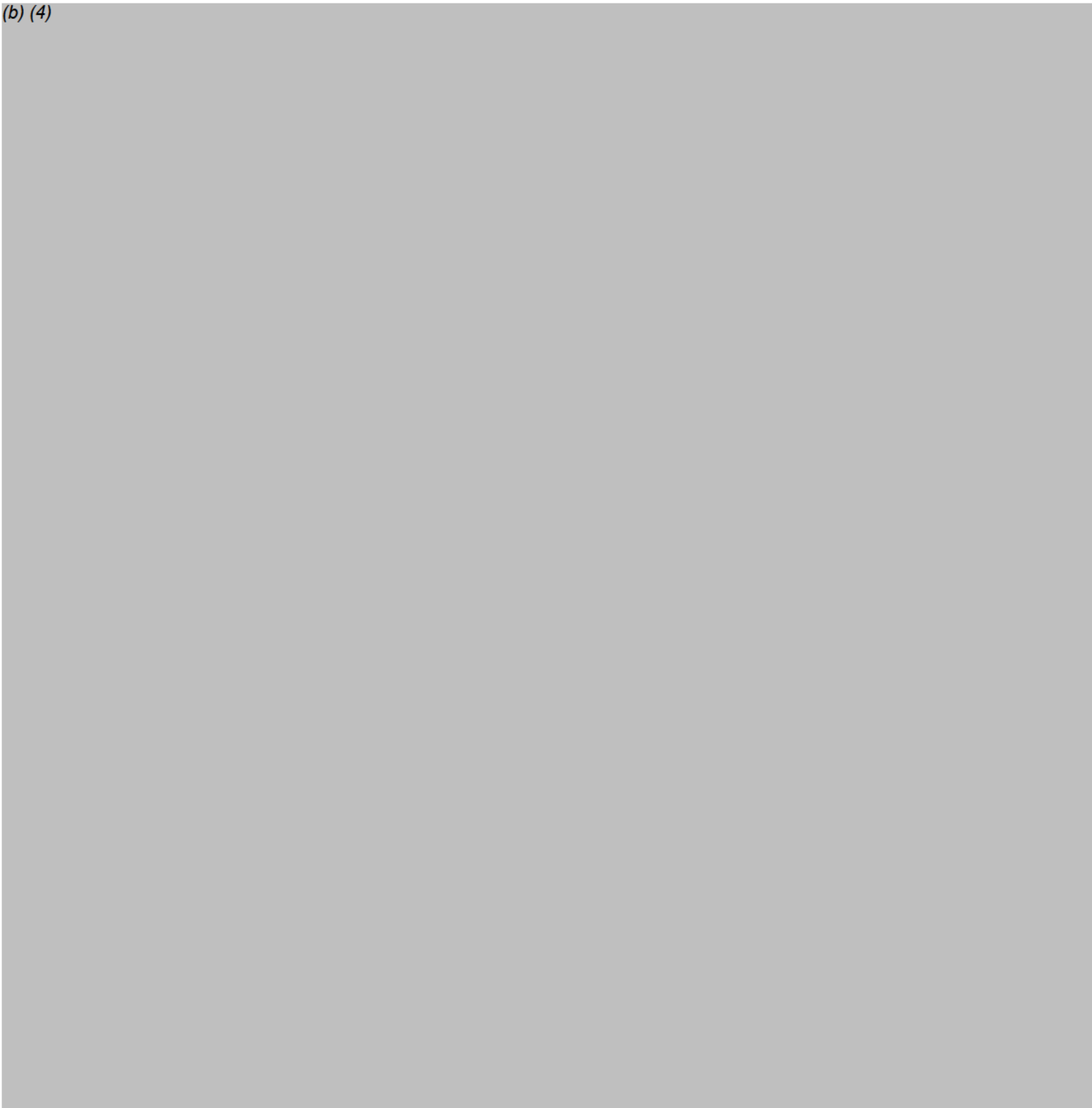
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**Title:** Quantitative Determination of Polycyclic Aromatic Hydrocarbons (PAHs) in Cigarettes and Tobacco Products by GC-MS

**Effective Date:** 3/25/2015

**Document No.:** RJRT-WI-004227

**Revision Level:** 011

**Author:** Tracy M. Hefner

**Status:** EXPIRED

### **Release Review and Approval**

<u><b>Role</b></u>	<u><b>Actor</b></u>	<u><b>Title</b></u>	<u><b>Sign-off By</b></u>	<u><b>Sign-Off Date &amp; Time(GMT)</b></u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/19/2015 17:18
RJRT-AUTHOR	Tracy M. Hefner	Sr Technician	HEFNERT	03/19/2015 17:55
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	03/20/2015 11:13
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/20/2015 13:00

### **Periodic Review**

<u><b>Role</b></u>	<u><b>Actor</b></u>	<u><b>Title</b></u>	<u><b>Sign-off By</b></u>	<u><b>Sign-Off Date &amp; Time(GMT)</b></u>
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### **Reason for Revision**

Title Changed to shorten it. : Made corrections, deleted any references to analytes in mixes that are not being reported; added clarification about what analytes to report for which matrix; added section about data to be entered into LIMS; re-organized the flow of the WI to make it easier to follow.

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**Title:** Quantitative Determination of Polycyclic  
Aromatic Hydrocarbons (PAHs) in Cigarettes  
and Tobacco Products by GC-MS

**Effective Date:** 10/8/2015

**Document No.:** RJRT-WI-004227

**Revision Level:** 012

**Author:** Tracy M. Hefner

**Status:** EXPIRED

### **Release Review and Approval**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	09/28/2015 13:00
RJRT-AUTHOR	Tracy M. Hefner	Sr Technician	HEFNERT	09/28/2015 14:17
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	09/29/2015 21:02
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	10/01/2015 13:58

### **Periodic Review**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
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### **Reason for Revision**

Title Change; Clarity; remove obsolete sections, update to documentation requirements. Changed company name.

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Rev: 11  
Date Issued: 02/12/2014

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Approvals:

Prepared by:

Author

Date:

Approved by:

Management - LLI

Date:

Approved by:

Quality Assurance -- LLI

Date:

Approved by:


ASM Management - RJRT

Date:

Approved by:

Quality Assurance - LLI Document Control

Date:

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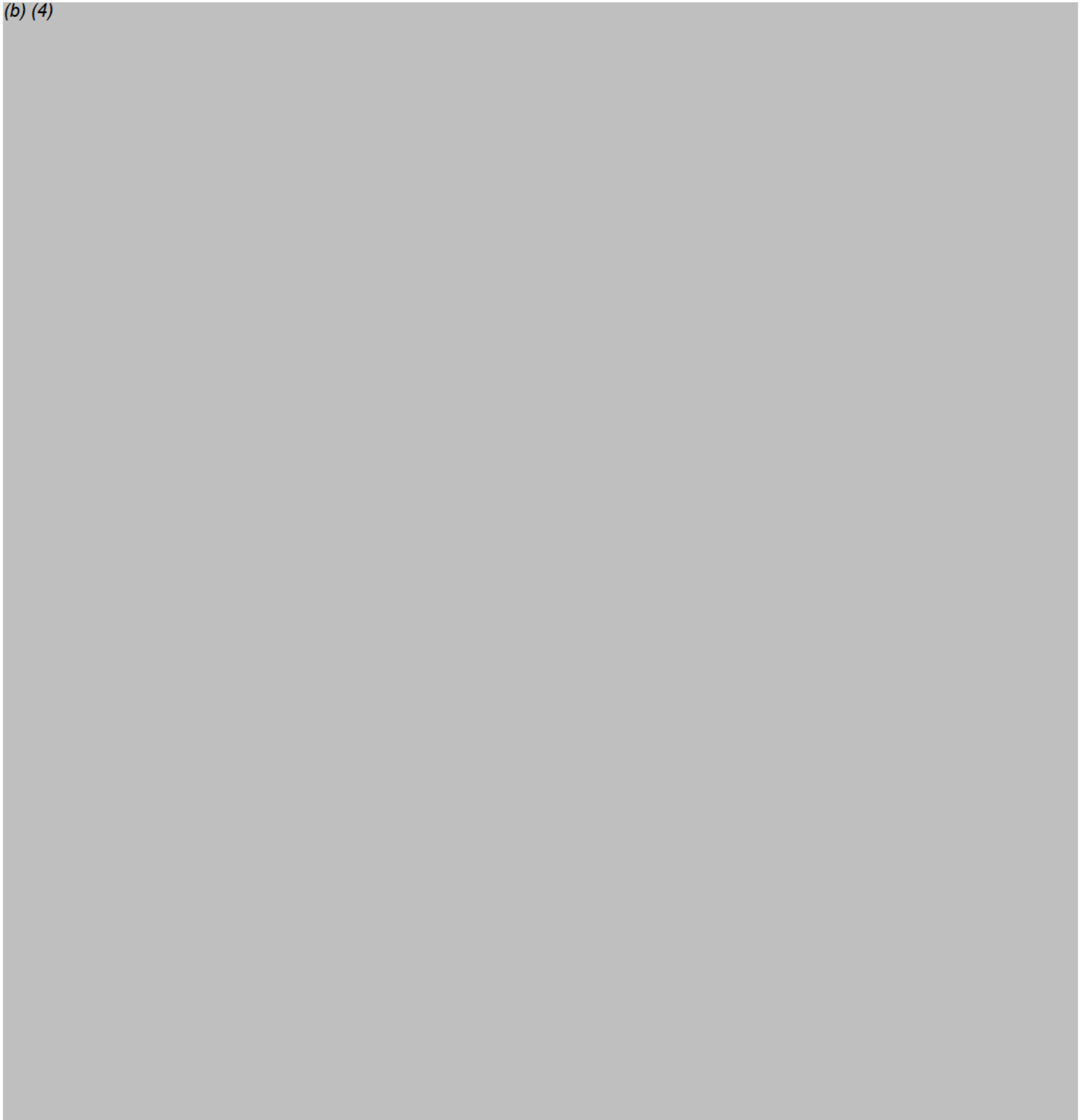
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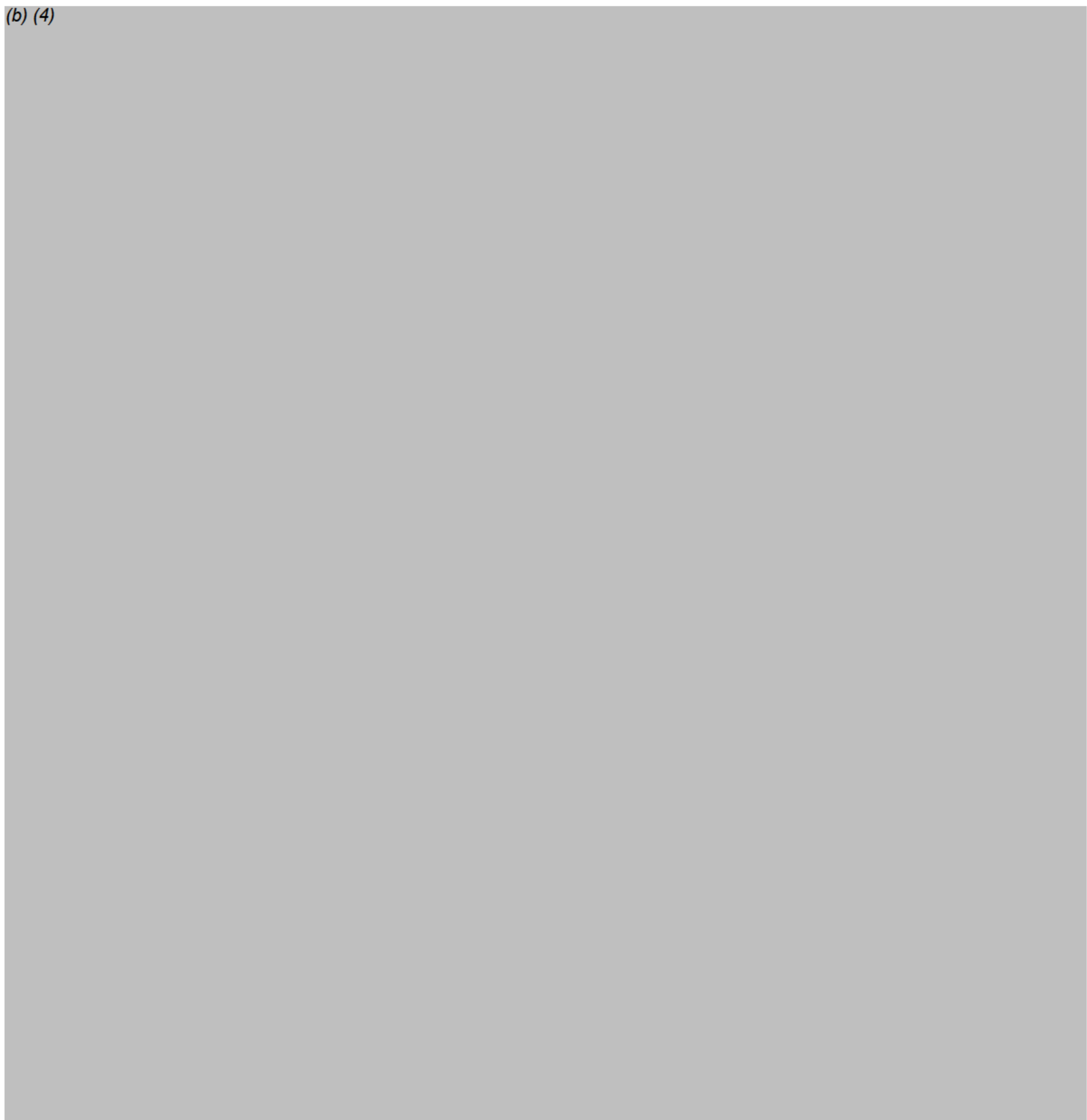
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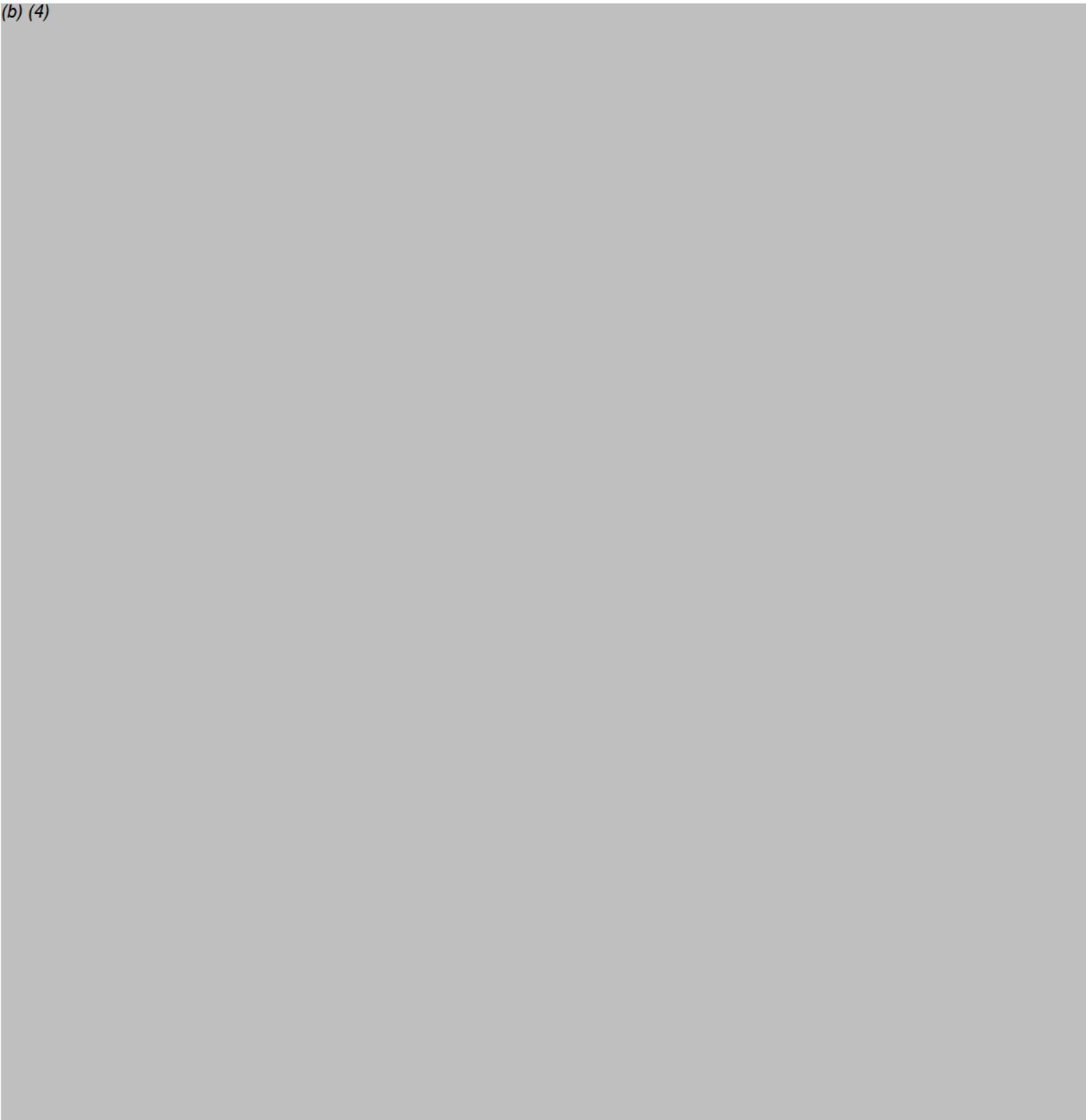
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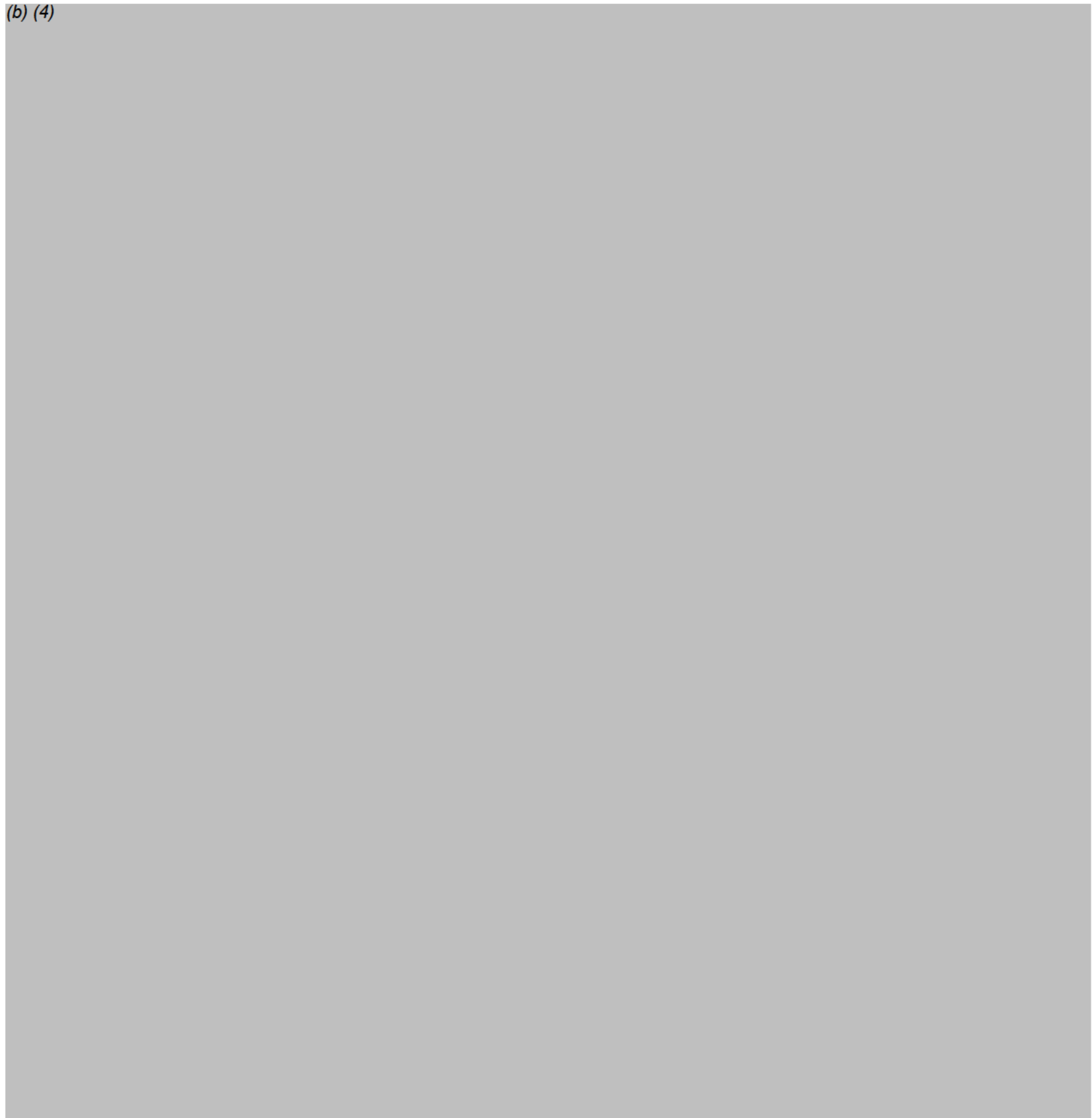



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Approvals:

Prepared by:

Author

Date:

Approved by:

Management - LLI

Date:

Approved by:

Quality Assurance - LLI

Date:

Approved by:


ASM Management - RJRT

Date:

Approved by:

Quality Assurance - LLI Document Control

Date:

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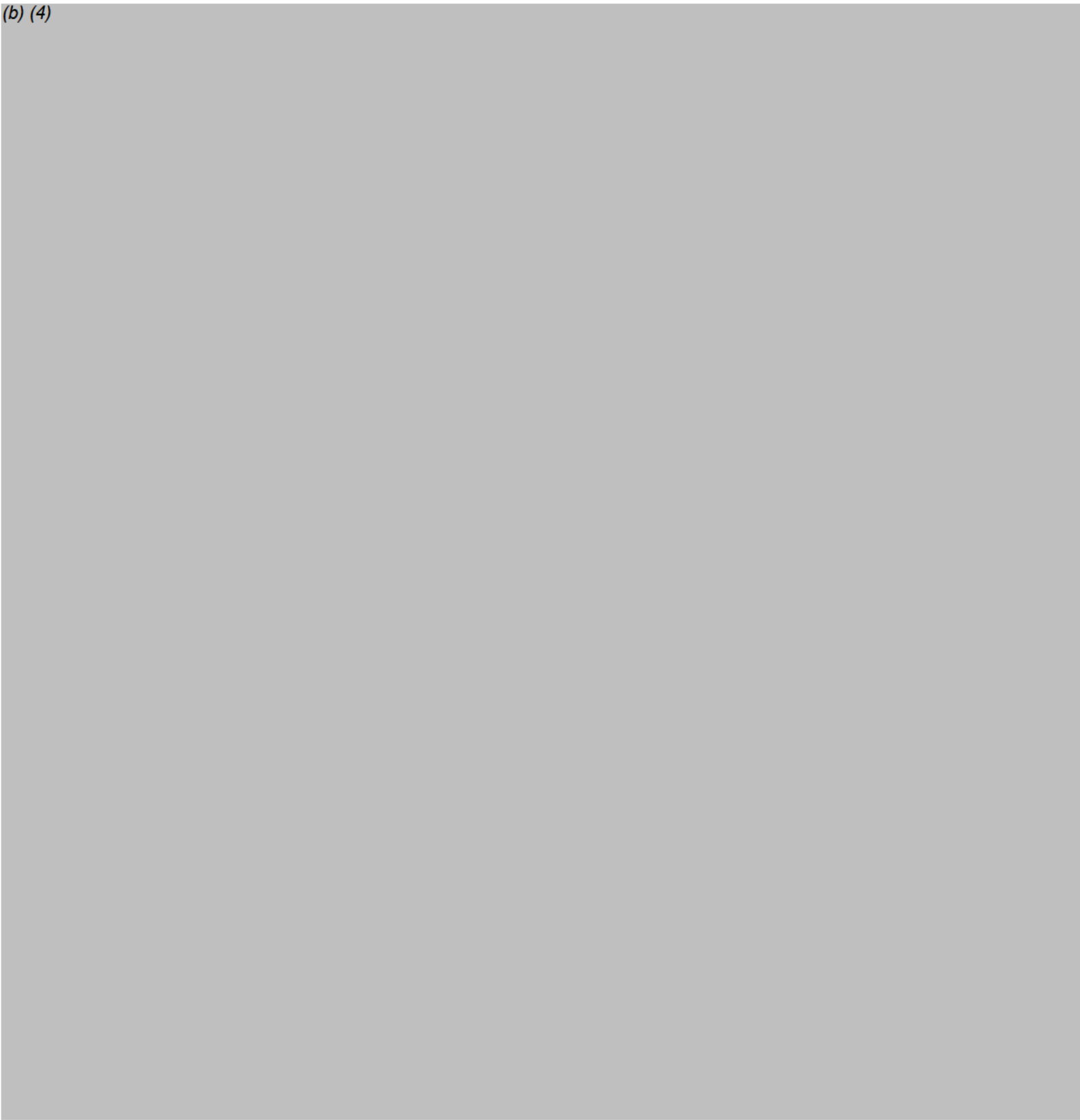
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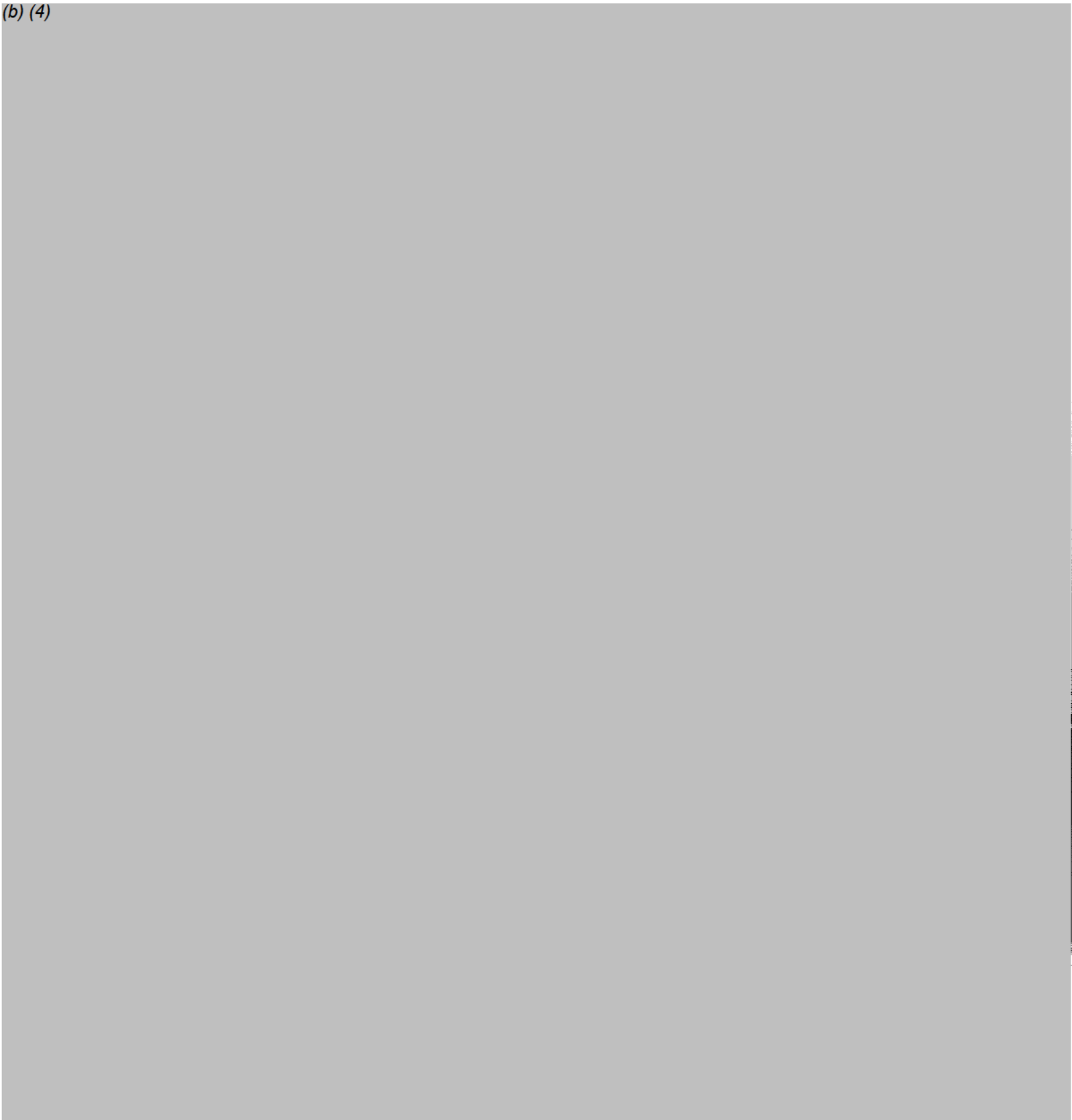
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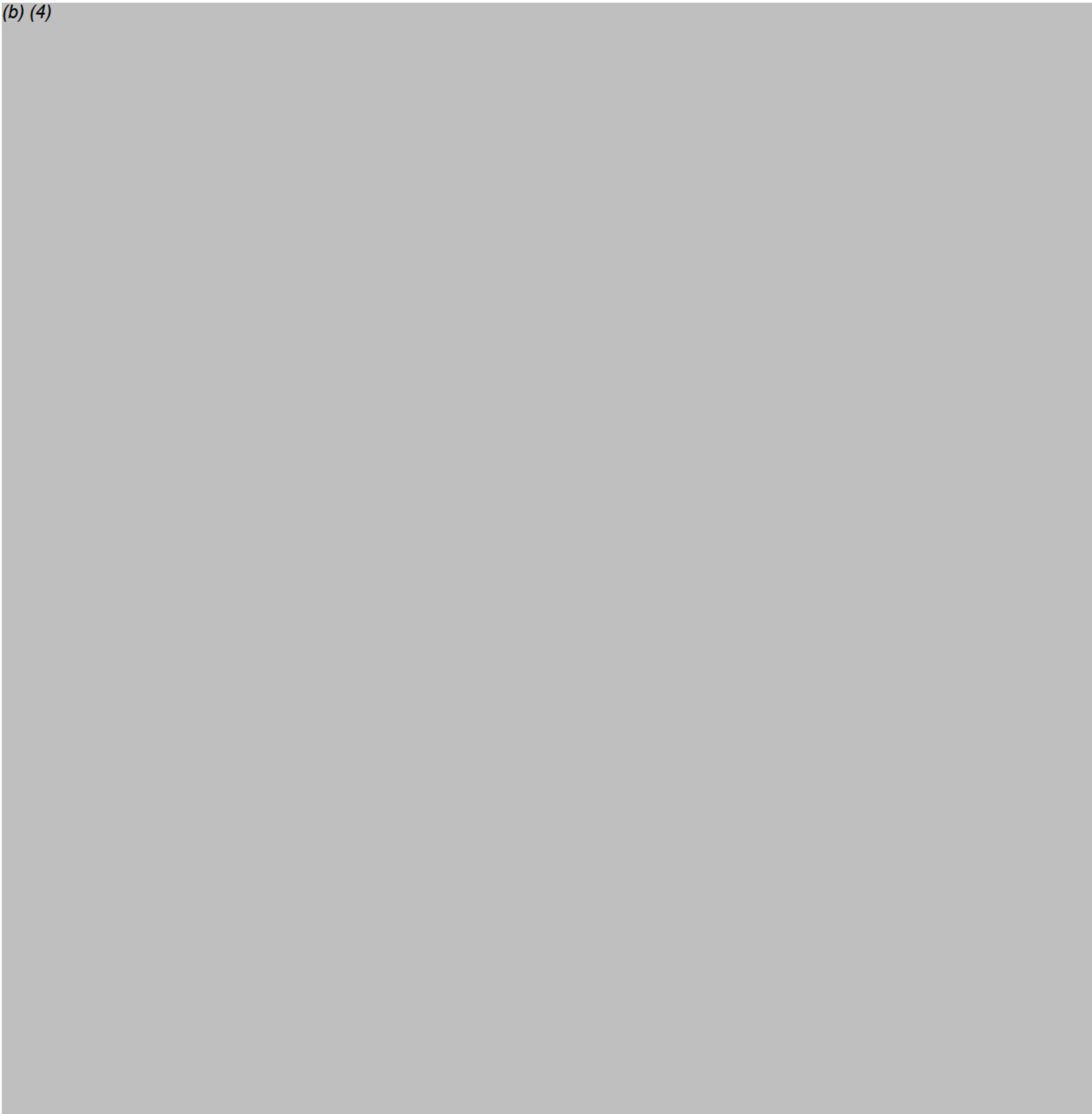
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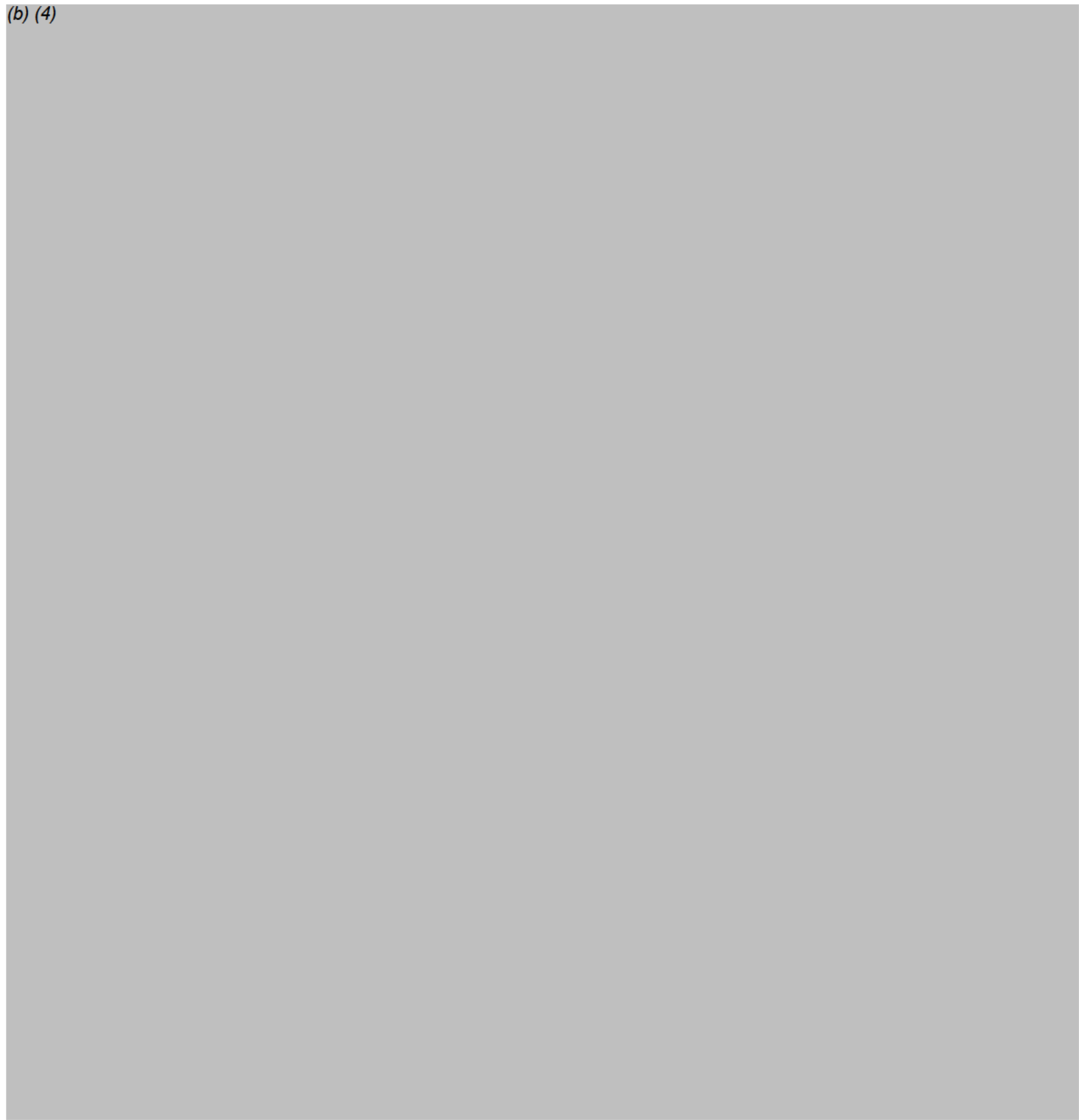
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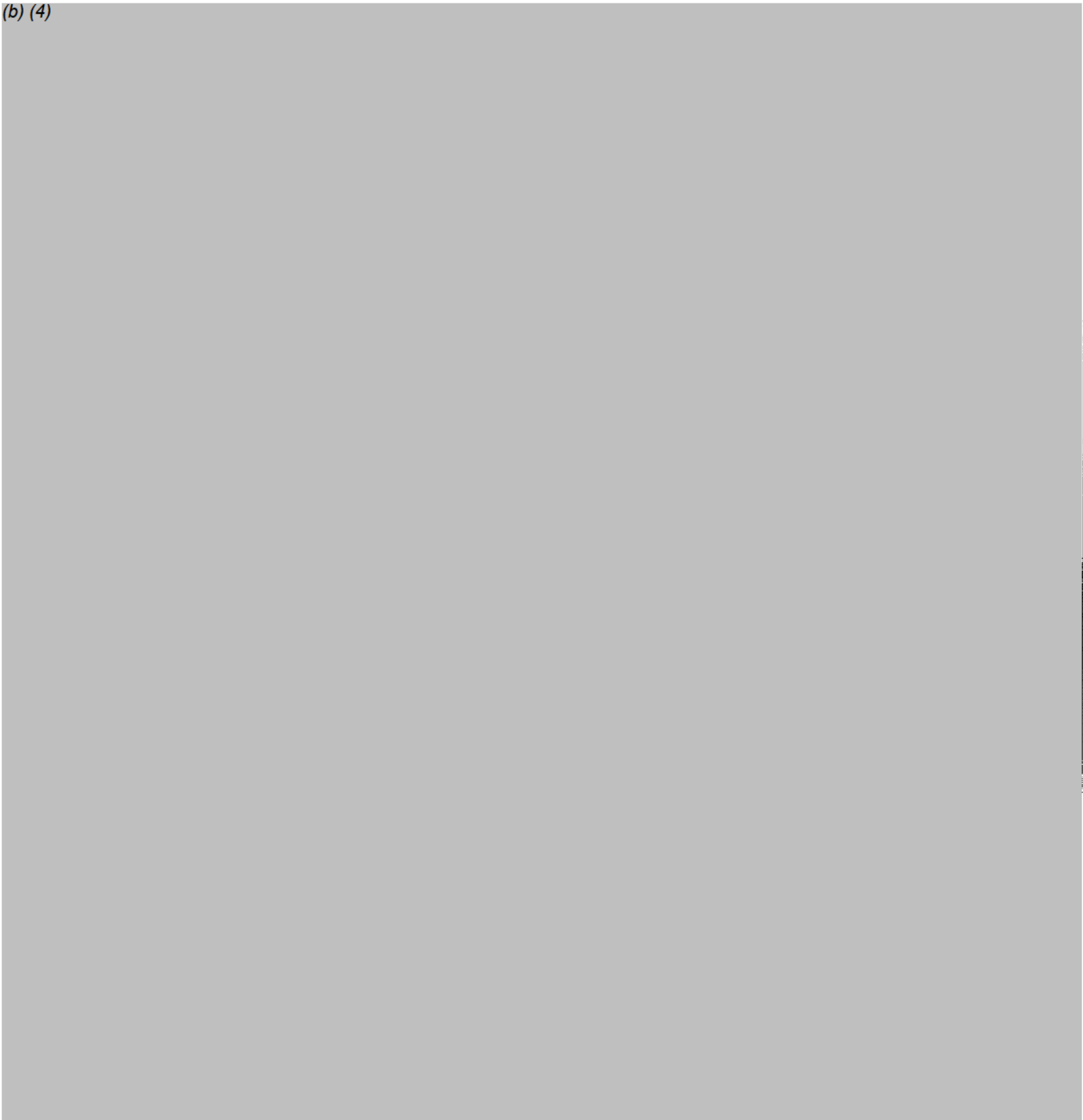
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**Title:** Determination of Tobacco Specific  
Nitrosamines by HPLC-MS-MS

**Effective Date:** 3/17/2015

**Document No.:** RJRT-WI-004216

**Revision Level:** 013

**Author:** Keith J Green

**Status:** EXPIRED

### **Release Review and Approval**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/02/2015 17:39
RJRT-AUTHOR	Keith J Green	Scientist IV	GREENK1	03/03/2015 20:10
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	03/04/2015 12:24
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/04/2015 13:32

### **Periodic Review**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
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### **Reason for Revision**

New template

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Rev: 6

Date Issued: 03/12/2014

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Approvals:


Prepared by: *Caleb J. Harrison* Date: 3/12/14  
Author

Approved by: *[Signature]* Date: 3/12/14  
Management - LLI

Approved by: *[Signature]* Date: 03/12/14  
Quality Assurance - LLI

Approved by: *Jannell M. Rowe* Date: 03/12/2014  
ASM Management - RJRT

Approved by: *Lisa Winkler* Date: 03/12/2014  
Quality Assurance - LLI Document Control

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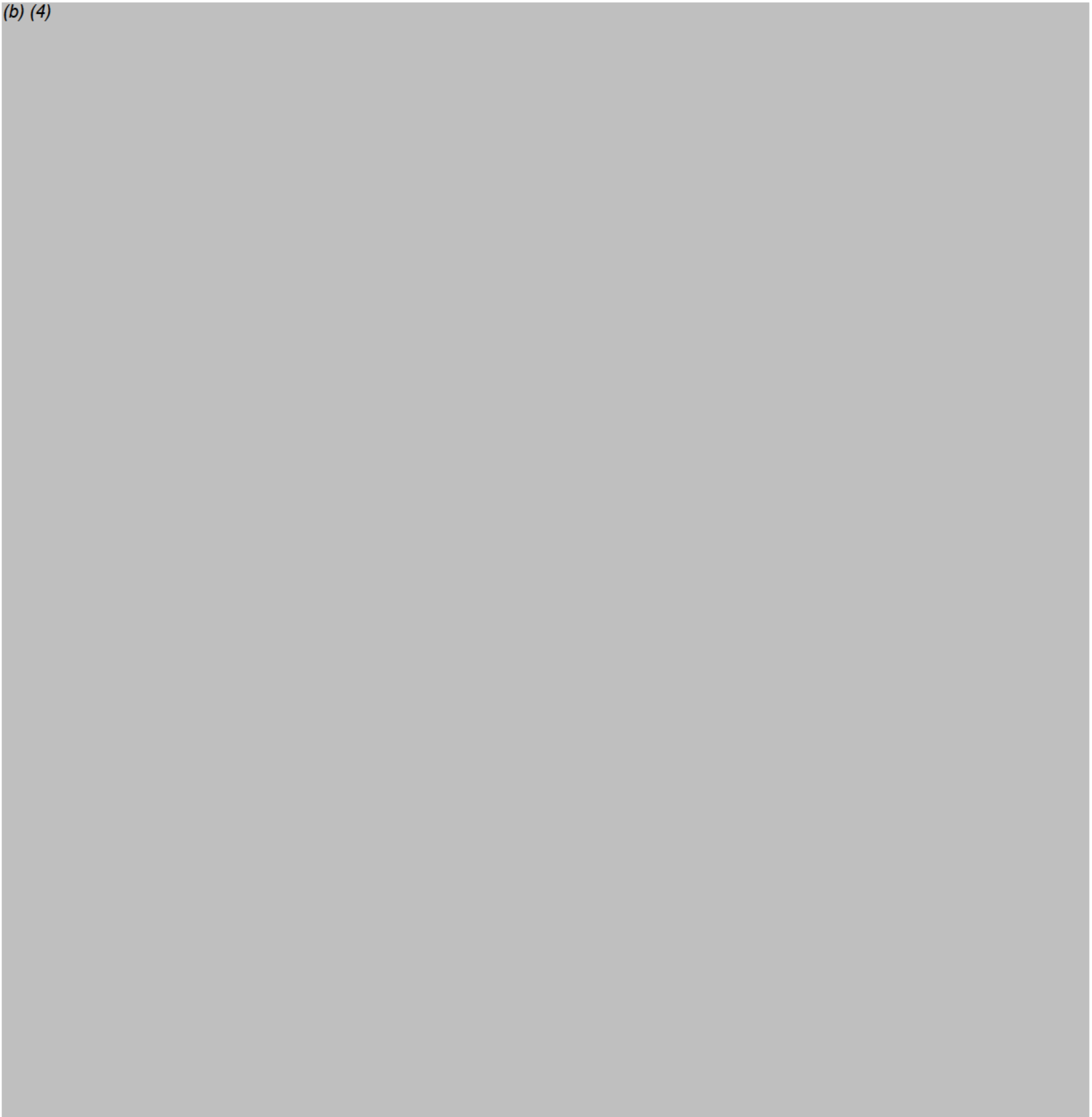
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**Level 3 Document**

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Doc: ACD1103STM

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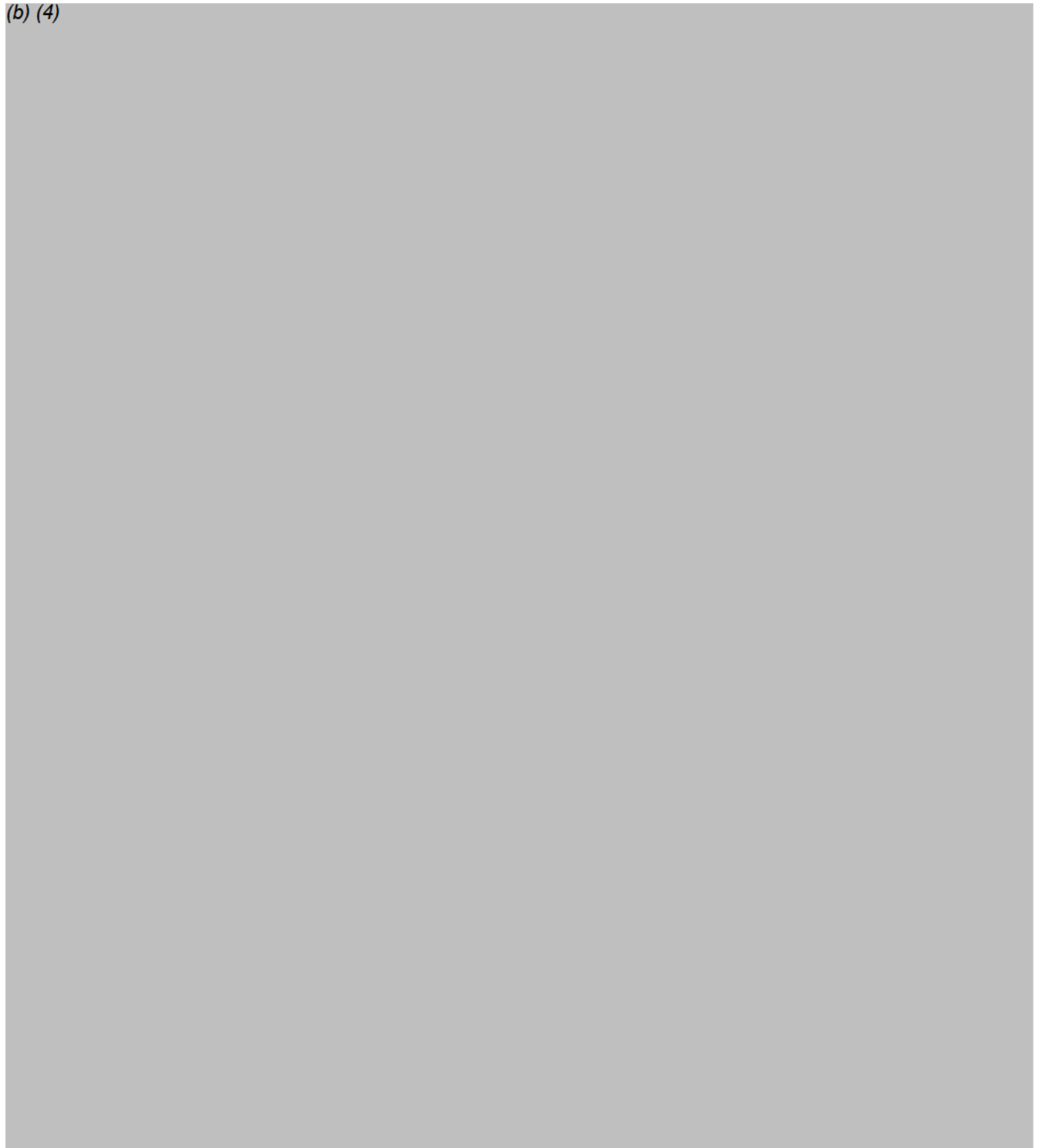
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Rev: 6  
Date Issued: 03/12/2014


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**Determination of Carbonyl Compounds in Tobacco and Tobacco Products**

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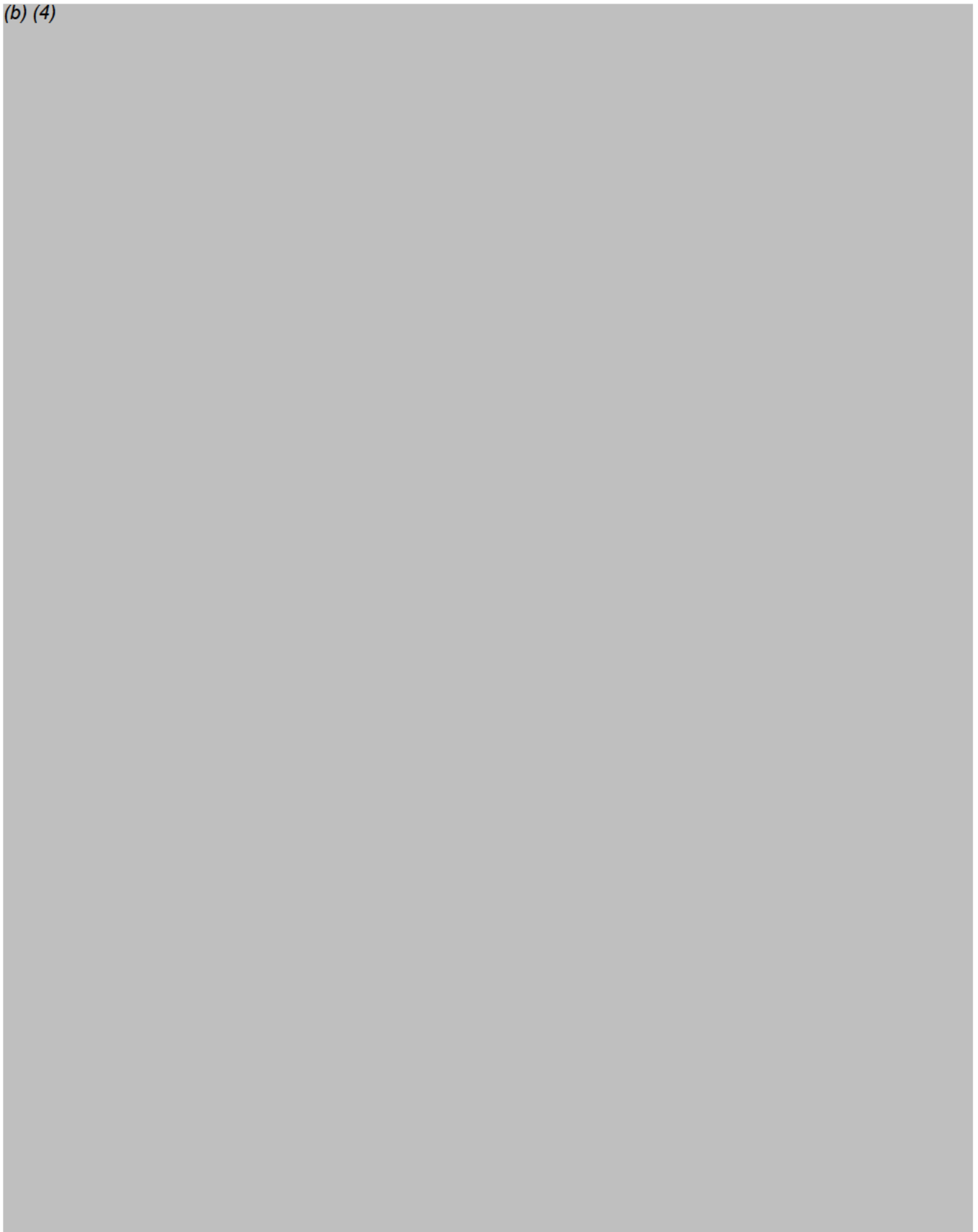
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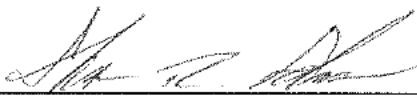
Approvals:

Prepared by:   
Author

Date: 8/26/14

Approved by:   
Management - LLI

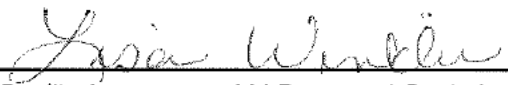
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Approved by:   
Quality Assurance - LLI

Date: 8/26/14

Approved by:   
ASM Management - RJRT

Date: 08/26/2014

Approved by:   
Quality Assurance - LLI Document Control

Date: 08/26/2014



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**Standard Operating Procedure for the Determination of  
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Doc: ACD1103STM

Rev: 7

Date Issued: 08/26/2014

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Doc: ACD1103STM  
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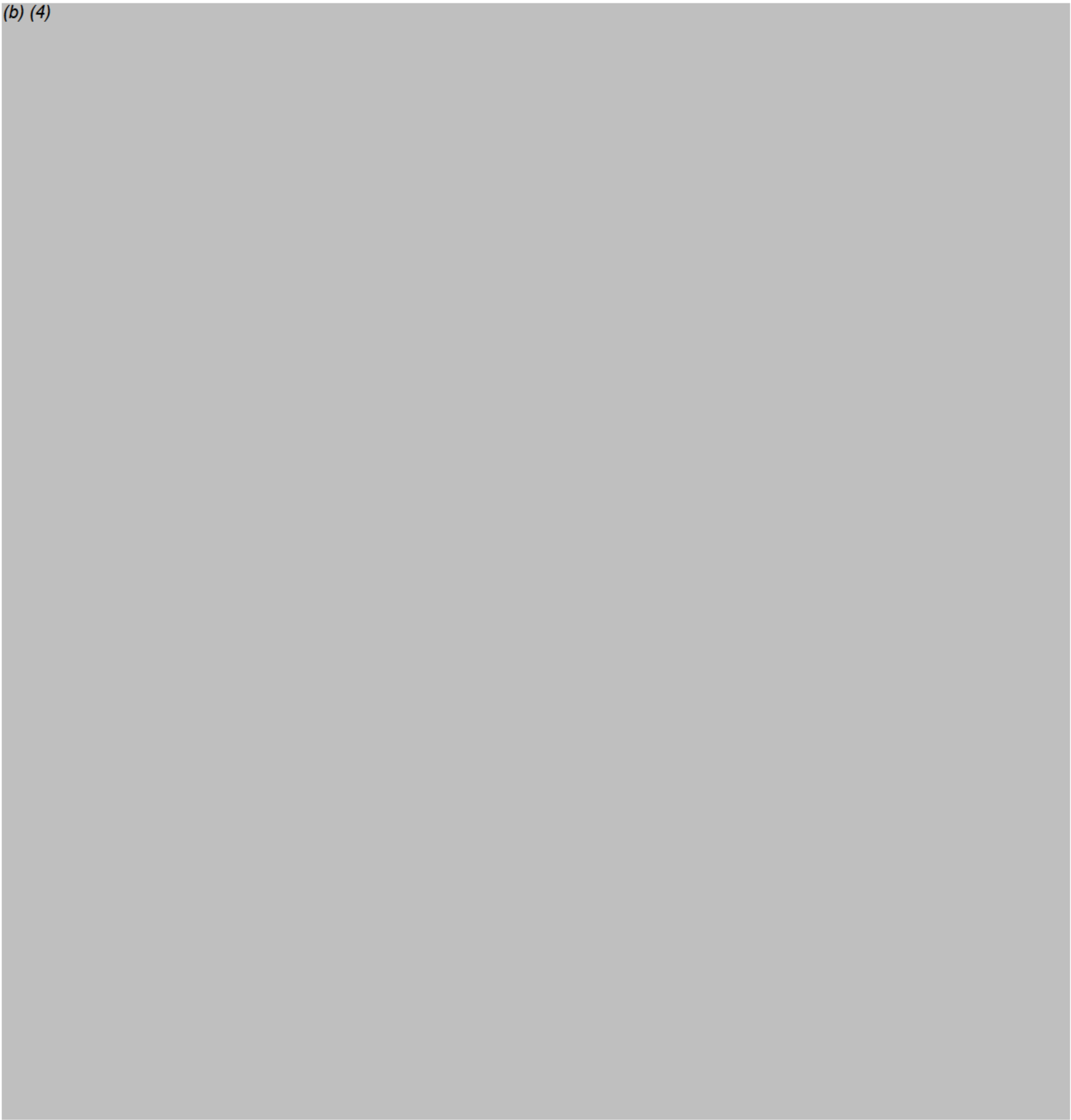
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**Standard Operating Procedure for the Determination of  
Carbonyl Compounds in Tobacco and Tobacco Products**



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**Title:** Determination of Carbonyl Compounds in Tobacco and Tobacco Products

**Effective Date:** 3/17/2015

**Document No.:** RJRT-WI-004219

**Revision Level:** 008

**Author:** Keith J Green

**Status:** EXPIRED

### **Release Review and Approval**

<u><b>Role</b></u>	<u><b>Actor</b></u>	<u><b>Title</b></u>	<u><b>Sign-off By</b></u>	<u><b>Sign-Off Date &amp; Time(GMT)</b></u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/02/2015 17:38
RJRT-AUTHOR	Keith J Green	Scientist IV	GREENK1	03/03/2015 20:00
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	03/04/2015 12:24
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/04/2015 13:32

### **Periodic Review**

<u><b>Role</b></u>	<u><b>Actor</b></u>	<u><b>Title</b></u>	<u><b>Sign-off By</b></u>	<u><b>Sign-Off Date &amp; Time(GMT)</b></u>
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### **Reason for Revision**

New template



Title: Determination of Carbonyl Compounds in Tobacco and Tobacco Products	Effective Date: 3/17/2015
Document #: RJRT-WI-004219	Revision: 008

(b) (4)



Title: Determination of Carbonyl Compounds in Tobacco and Tobacco Products	Effective Date: 3/17/2015
Document #: RJRT-WI-004219	Revision: 008

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Title: Determination of Carbonyl Compounds in Tobacco and Tobacco Products	Effective Date: 3/17/2015
Document #: RJRT-WI-004219	Revision: 008

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Title: Determination of Carbonyl Compounds in Tobacco and Tobacco Products	Effective Date: 3/17/2015
Document #: RJRT-WI-004219	Revision: 008

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Title: Determination of Carbonyl Compounds in Tobacco and Tobacco Products	Effective Date: 3/17/2015
Document #: RJRT-WI-004219	Revision: 008

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Title: Determination of Carbonyl Compounds in Tobacco and Tobacco Products	Effective Date: 3/17/2015
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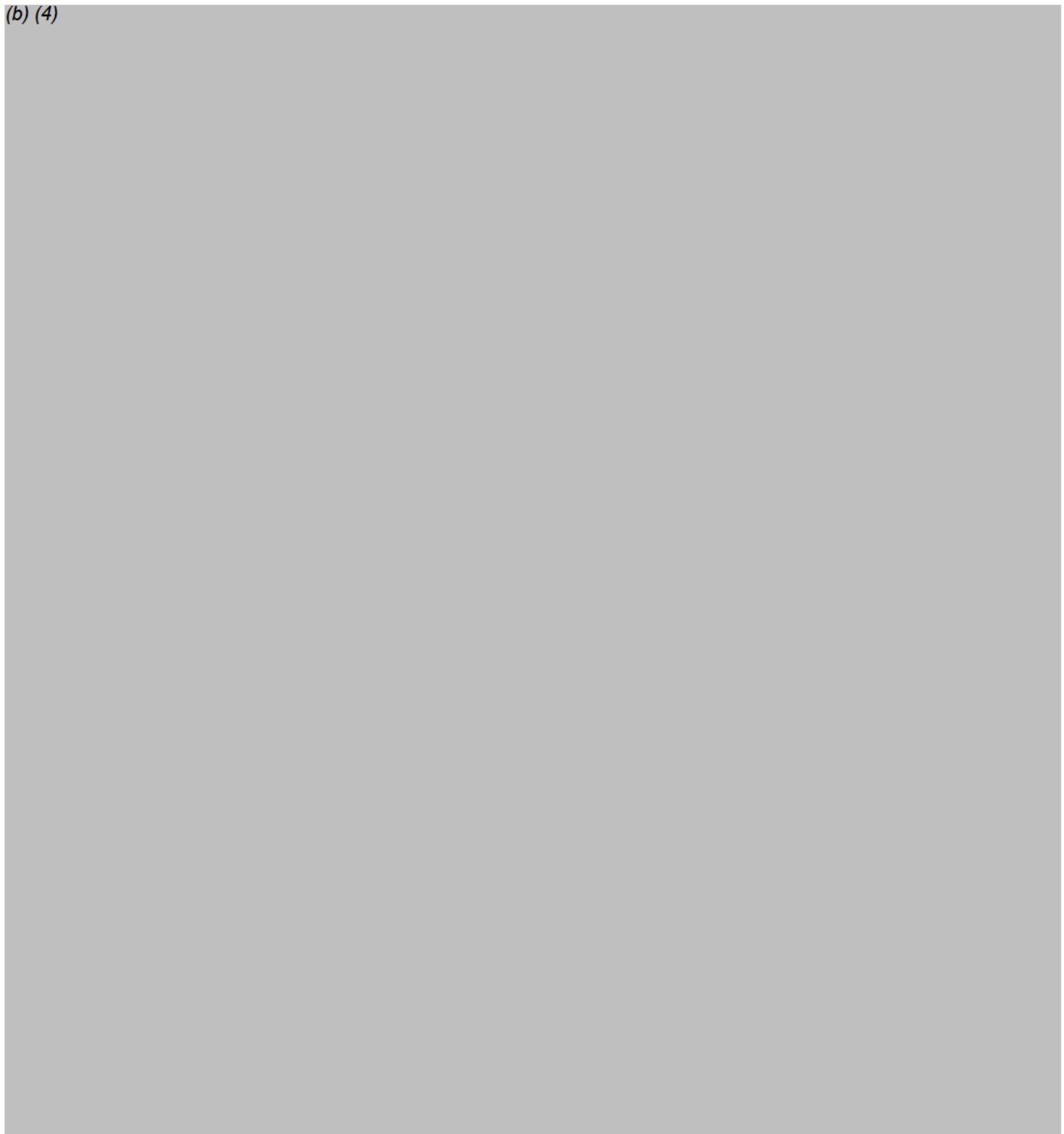
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**Determination of pH in Tobacco**

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**Standard Operating Procedure for the  
Determination of pH in Tobacco**



Doc: ACD0026STM

Rev: 14

Date Issued: 07/23/2014



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Level 3 Document

Approvals:

Prepared by: Long Lertay / Justin Anderson Date: 7/23/14 7/23/14  
Title of Author

Approved by: Dud C. [Signature] Date: 7-23-14  
Management - LLI

Approved by: [Signature] Date: 07/23/14  
Quality Assurance - LLI


Approved by: Candice [Signature] Date: 7-23-2014  
ASM Management - RJRT

Approved by: Lisa Winkler Date: 07/23/2014  
Quality Assurance - LLI Document Control

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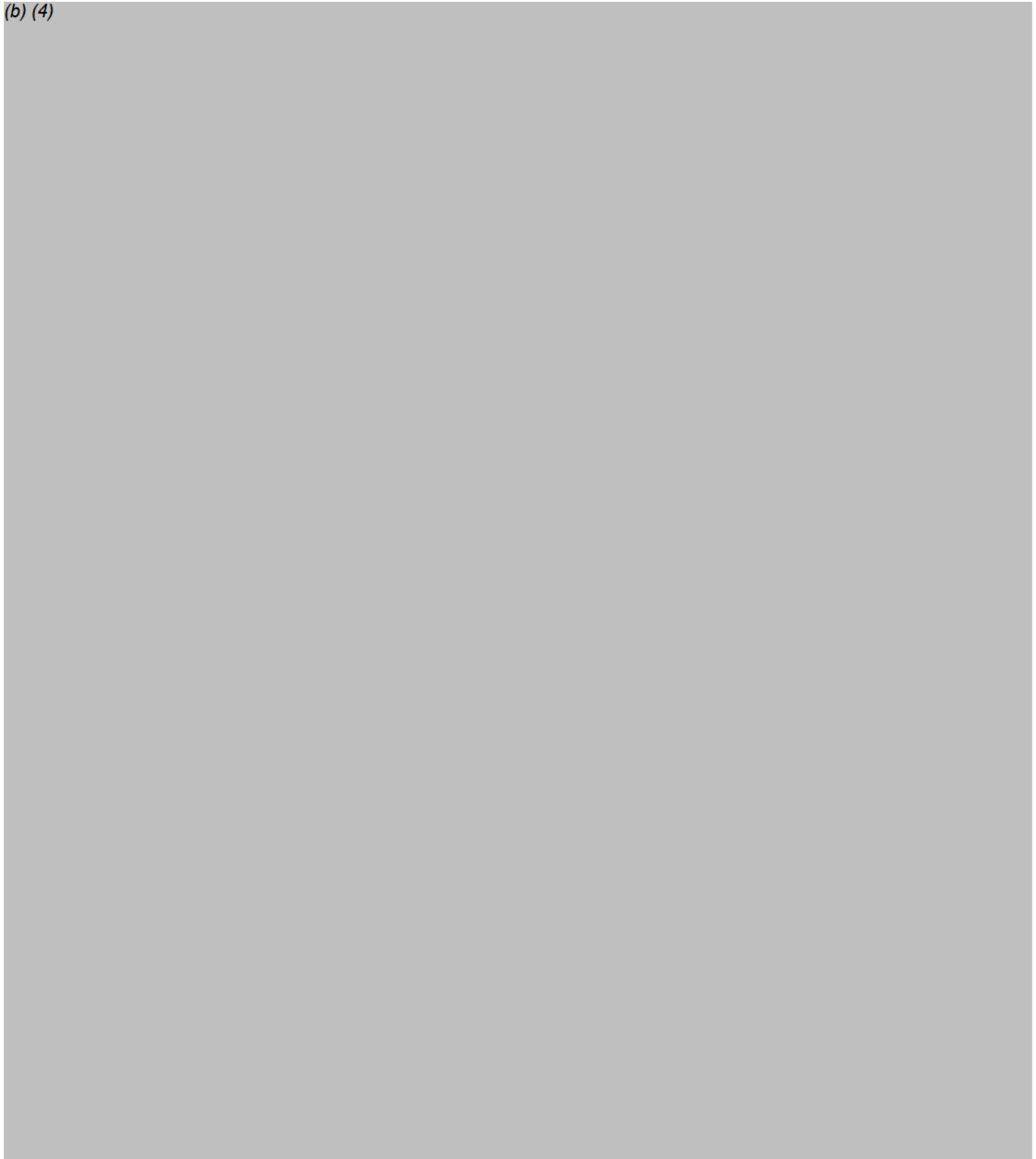
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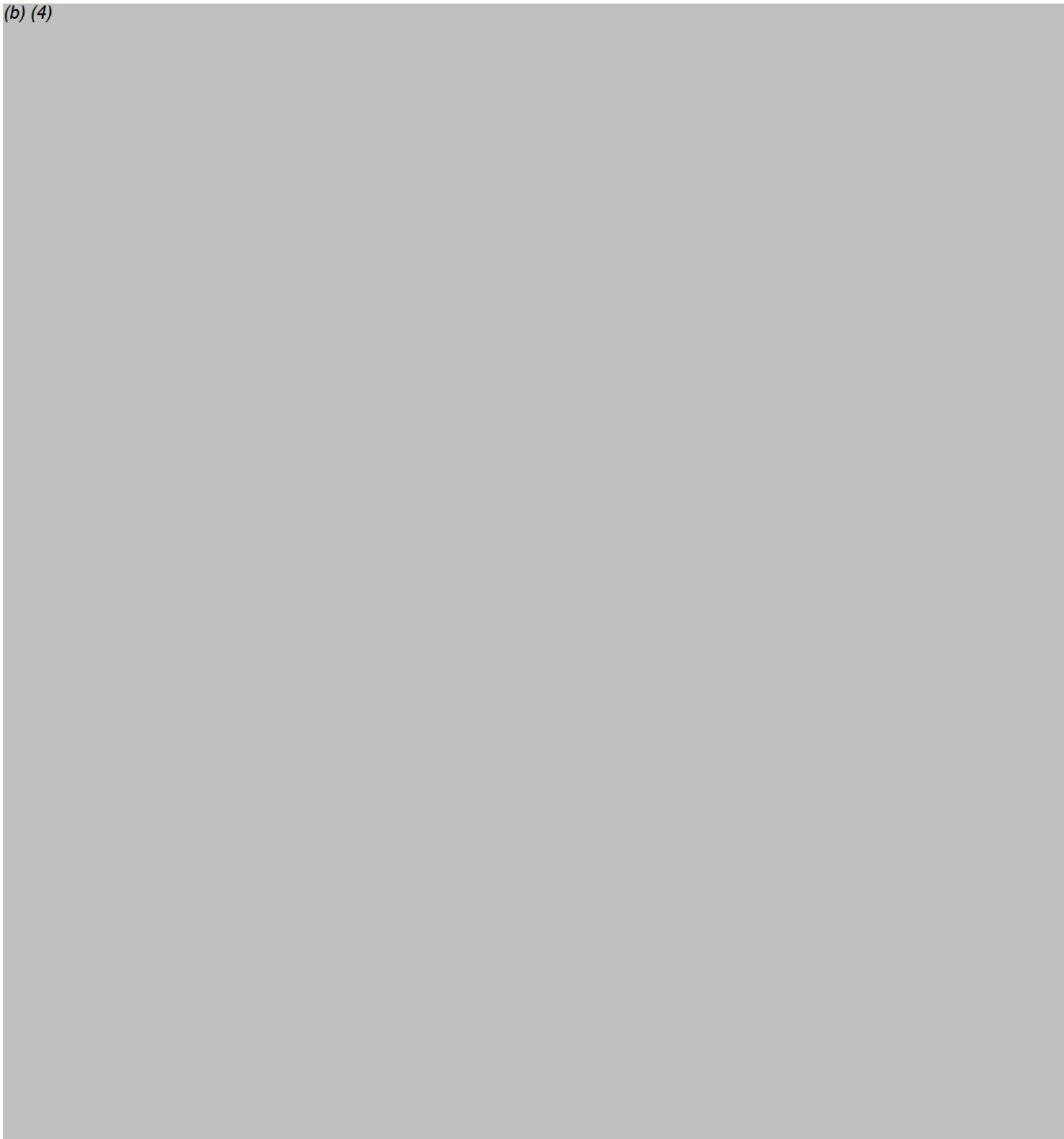
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Doc: ACD0026STM

Rev: 14

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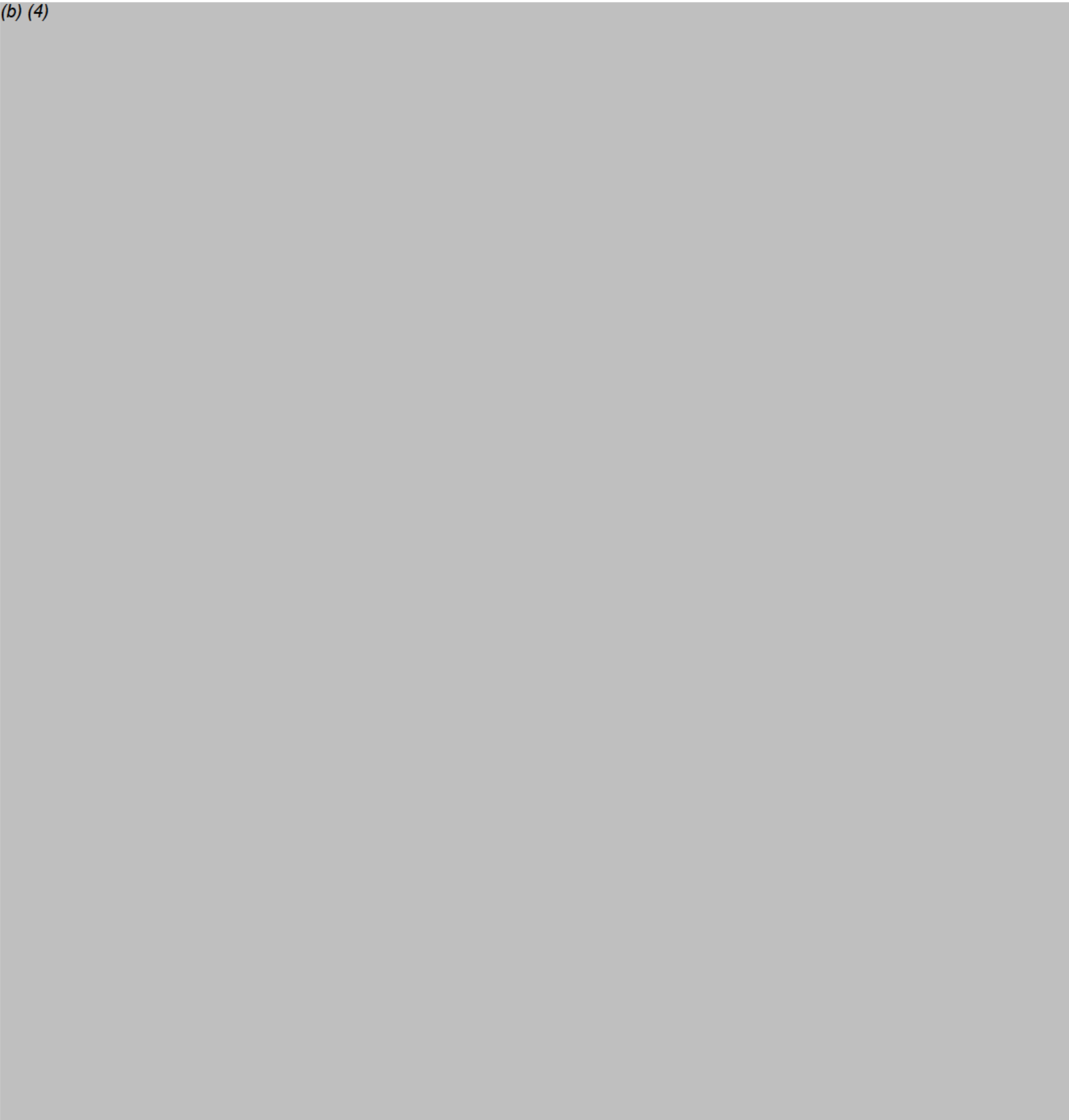
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**Title:** Determination of pH in Tobacco

**Effective Date:** 3/24/2015

**Document No.:** RJRT-WI-004089

**Revision Level:** 015

**Author:** Candice K Cunningham

**Status:** EXPIRED

### **Release Review and Approval**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/11/2015 21:17
RJRT-AUTHOR	Candice K Cunningham	Sr Scientist	CUNNINC	03/17/2015 15:59
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	03/18/2015 11:14
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/18/2015 13:12

### **Periodic Review**

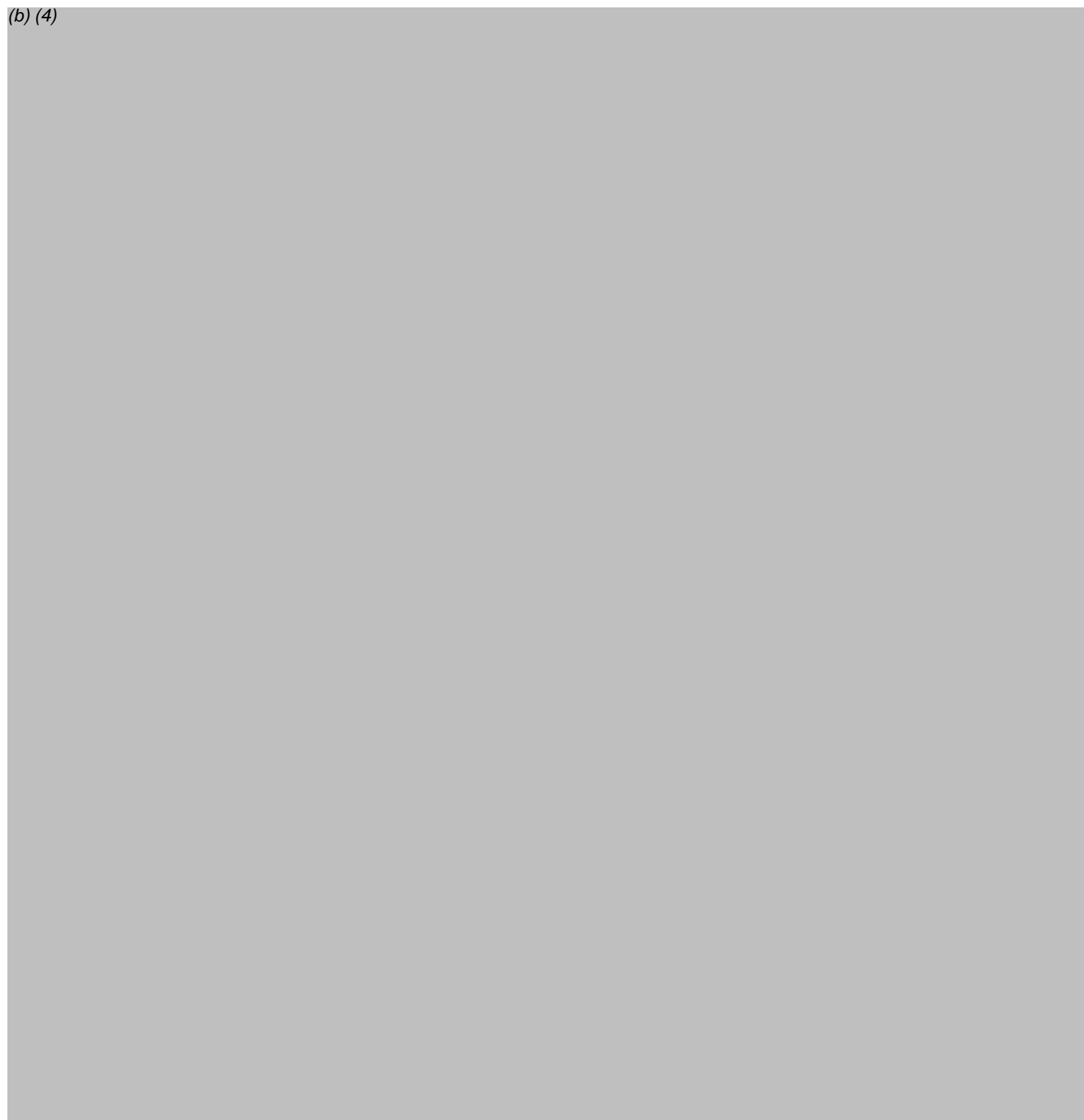
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### **Reason for Revision**

New template

Title: Determination of pH in Tobacco	Effective Date: 3/24/2015
Document #: RJRT-WI-004089	Revision: 015

**Level 3 Document**



Title: Determination of pH in Tobacco	Effective Date: 3/24/2015
Document #: RJRT-WI-004089	Revision: 015

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Title: Determination of pH in Tobacco	Effective Date: 3/24/2015
Document #: RJRT-WI-004089	Revision: 015

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Title: Determination of pH in Tobacco	Effective Date: 3/24/2015
Document #: RJRT-WI-004089	Revision: 015

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Title: Determination of pH in Tobacco	Effective Date: 3/24/2015
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**COMPANY CONFIDENTIAL**  
**Level 3 Document**

**Approvals:**

Prepared by: \_\_\_\_\_ Date: \_\_\_\_\_  
Author

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
Management - LLI


Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
Quality Officer - LLI

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_  
Quality Assurance - LLI

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Doc: ACD0027STM

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Date Issued: 03/08/2013

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Date Revised: 03/08/2013

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Doc: ACD0027STM

Rev: 8

Date Issued: 03/08/2013

Date Revised: 03/08/2013



**Title:** Gravimetric Determination of Moisture in Tobacco

**Effective Date:** 3/20/2015

**Document No.:** RJRT-WI-004090

**Revision Level:** 009

**Author:** Candice K Cunningham

**Status:** EXPIRED

### **Release Review and Approval**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/03/2015 18:59
RJRT-AUTHOR	Candice K Cunningham	Sr Scientist	CUNNINC	03/10/2015 16:12
RJRT-RELEASE APPROVER	Jannell M. Rowe	Dir Product Services	ROWEJ	03/11/2015 11:20
RJRT-DOCUMENT COORDINATOR	Erica R McClung	Scientist III	MCCLUNE	03/11/2015 12:20

### **Periodic Review**

<u>Role</u>	<u>Actor</u>	<u>Title</u>	<u>Sign-off By</u>	<u>Sign-Off Date &amp; Time(GMT)</u>
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### **Reason for Revision**

Periodic review.  
New template.

Title: Gravimetric Determination of Moisture in Tobacco	Effective Date: 3/20/2015
Document #: RJRT-WI-004090	Revision: 009

**Level 3 Document**

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Title: Gravimetric Determination of Moisture in Tobacco	Effective Date: 3/20/2015
Document #: RJRT-WI-004090	Revision: 009

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Title: Gravimetric Determination of Moisture in Tobacco	Effective Date: 3/20/2015
Document #: RJRT-WI-004090	Revision: 009

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Title: Gravimetric Determination of Moisture in Tobacco	Effective Date: 3/20/2015
Document #: RJRT-WI-004090	Revision: 009

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Title: Gravimetric Determination of Moisture in Tobacco	Effective Date: 3/20/2015
Document #: RJRT-WI-004090	Revision: 009

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Title: Gravimetric Determination of Moisture in Tobacco	Effective Date: 3/20/2015
Document #: RJRT-WI-004090	Revision: 009

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## Appendix C Chemical Accreditation

Appendix C (Chemical Accreditation June 2018)

American Association for Laboratory Accreditation



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

R. J. REYNOLDS TOBACCO COMPANY<sup>1</sup>  
Product Services Analytical Testing Laboratories  
950 Reynolds Blvd.  
Winston Salem, NC 27105  
Jannell Rowe Phone: 336 741 4121

CHEMICAL

Valid To: June 30, 2018

Certificate Number: 1137.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following types of tests on cigarettes, cigarette smoke and related processes and materials:

Test Description	Test Procedures	Test Method
<b>I. Cigarette Smoke Parameters</b>		
TNCO in Mainstream Smoke by Cambridge Filter pad Method TNCO in Mainstream Smoke by ISO Methods 4387 and 8454	32 FR 11178 45 FR 46483 ISO 4387 TIOJ Method	RJRT-WI-004120 RJRT-WI-004181
Nicotine	32 FR 11178 45 FR 46483 ISO 10315	RJRT-WI-004181
Carbon Monoxide	45 FR 46483 ISO 8454	RJRT-WI-004181
Water	32 CFR 11178 45 CFR 46483 ISO 10362-1	RJRT-WI-004181
<b>II. Ignition Properties</b>		
Ignition Strength of Cigarettes	ASTM E2187-09 Appendix A to Part 429 of Title 19 NYCRR Regulation	RJRT-WI-004194
Eclipse (Non-Burn Down) Testing Procedure for NYS Free Air Extinction	-----	RJRT-WI-004195
<b>III. Spectroscopy</b>		
Inductively Coupled Plasma Optical Emission Spectroscopy		
ICPOES Analysis of Tobacco and Paper after Digestion	-----	RJRT-WI-004118
ICP/Mass Spectroscopy		
Elemental Content	-----	RJRT-WI-004210
Digestion and Analysis of Metals in Mainstream Smoke Condensate	-----	RJRT-WI-004231

(A2LA Cert. No. 1137.01) 06/03/2016

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## Appendix D Mechanical Accreditation

Appendix D (Mechanical Accreditation June 2018)

American Association for Laboratory Accreditation



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

R.J. REYNOLDS TOBACCO COMPANY  
Product Services Physical and Materials Testing Labs  
950 Reynolds Blvd. Bldg 611-9  
Winston-Salem, NC 27102  
Jannell Rowe Phone: 336 741 4121

MECHANICAL

Valid To: June 30, 2018

Certificate Number: 1137.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following types of tests on cigarettes and related materials:

Test Technology	Test Method
Filling Capacity D51	RJT-WI-004261
Cigarette Loose Ends	RJT-WI-004262
Cigarette Hardness	RJT-WI-004263
Component Weight	RJT-WI-004264
Expanded Tobacco	RJT-WI-004265
Cigarette QTM	RJT-WI-004266
Oven Volatiles	RJT-WI-004267
Sieve Analysis	RJT-WI-004268
Filter QTM	RJT-WI-004270
Circumference DTL	RJT-WI-004271
Cigarette QTM5U	RJT-WI-004274
Filter Segment QTM	RJT-WI-004277
Filter Hardness	RJT-WI-004278
Physical Lab Capsule Analyses	RJT-WI-004279
Flashpoint Miniflash FLP	RJT-WI-004282
Filling Capacity D61	RJT-WI-004552
Brightness	RJT-WI-004285

(A2LA Cert. No. 1137.02) 06/03/2016

*J. Rowe* Page 1 of 2