STS Overview

- **Coordinator and Scientific Commission Liaison:**
  - Karl Wagner (Altria Client Services LLC, Richmond, Virginia)

- **Secretary:**
  - Johan Lindholm (Swedish Match, Stockholm, Sweden)

- **STS established in November 2008**

- **Typically two meetings per year:**
  - ~ 40 attendees
  - ~ 30 companies represented

- **STS Meetings since CORESTA 2014, Québec**
  - 2015: Hangzhou, China (April), Jeju, South Korea (October)
  - 2016: Lausanne, Switzerland (April), Berlin, Germany (October)
1) To propose and evaluate practical and robust recommended methods for the determination of smokeless tobacco analytes

2) To periodically organize collaborative and/or proficiency testing

3) To organize the manufacture and maintain smokeless tobacco reference products
The STS coordinated production of 4 CRPs in 2009

- CRP1: Swedish style snus pouch
- CRP2: American-style loose moist snuff
- CRP3: American-style loose dry snuff powder
- CRP4: American-style loose-leaf chewing tobacco

CRPs are maintained by North Carolina State University
The STS conducted annual collaborative studies to assess the stability of the CRPs (2010 – 2015)

- Nicotine,
- pH,
- Tobacco-specific nitrosamines,
- Moisture (oven volatiles)

The stability results indicate that storage at -20 °C is an appropriate storage condition for the four reference products.

The STS will conduct a 10-year stability study in 2019

The stability reports are published at CORESTA.org
### Supply of 2009 CRPs

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>CRP 1</td>
<td>7000</td>
<td>6135</td>
<td>5443</td>
<td>4895</td>
<td>3975</td>
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<td>CRP 2</td>
<td>7020</td>
<td>6363</td>
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<td>CRP 3</td>
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</table>
The STS coordinated production of new CRPs in 2016

- CRP1.1: Swedish style snus pouch
- CRP2.1: American-style loose moist snuff
- CRP3.1: American-style loose dry snuff powder
- CRP4.1: American-style chopped loose-leaf chewing tobacco

CRPs are maintained by North Carolina State University

Initial characterization completed in 2016

- Nicotine, pH, TSNAs, Moisture, Ammonia, Benzo[a]pyrene
- The report will be published by year end at CORESTA.org
# 2016 CORESTA Reference Products

<table>
<thead>
<tr>
<th>Parameter</th>
<th>2009 CRP1 Mean</th>
<th>2016 CRP1.1 Mean</th>
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</thead>
<tbody>
<tr>
<td>Nicotine (%)</td>
<td>0.98</td>
<td>0.76</td>
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<tr>
<td>pH</td>
<td>7.85</td>
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<tr>
<td>Moisture (%)</td>
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<td>53.95</td>
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<tr>
<td>NNN (µg/g)</td>
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<td>0.19</td>
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<tr>
<td>NNK (µg/g)</td>
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<tr>
<td>NAT (µg/g)</td>
<td>0.51</td>
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<tr>
<td>NAB (µg/g)</td>
<td>0.035</td>
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<td>Ammonia (µg/g)</td>
<td>951</td>
<td>1034</td>
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<tr>
<td>B[a]P (ng/g)</td>
<td>0.70</td>
<td>0.72</td>
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<table>
<thead>
<tr>
<th>Parameter</th>
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<th>2016 CRP2.1 Mean</th>
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<td>pH</td>
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<td>Moisture (%)</td>
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<td>NNN (µg/g)</td>
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<td>NNK (µg/g)</td>
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<td>NAT (µg/g)</td>
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<td>NAB (µg/g)</td>
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<td>Ammonia (µg/g)</td>
<td>2581</td>
<td>2356</td>
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<tr>
<td>B[a]P (ng/g)</td>
<td>56.2</td>
<td>143.9</td>
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</table>


3) CRM Nº 60: Determination of 1,2-Propylene Glycol and Glycerol in Tobacco and Tobacco Products by GC (3rd ed., 2015)

4) CRM Nº 61: Determination of 1,2-Propylene Glycol, Glycerol and Sorbitol in Tobacco and Tobacco Products by HPLC (3rd ed., 2015)

5) CRM Nº 69: Determination of pH in Smokeless Tobacco Products (2010)
6) CRM Nº 71: Smokeless Tobacco Products – Sampling (2011)

7) CRM Nº 72: Determination of TSNAs in Smokeless Tobacco Products by LC-MS/MS (3rd ed., 2016)

8) CRM Nº 76: Determination of Moisture Content (Oven Volatiles) of Smokeless Tobacco Products (2014)

9) CRM Nº 79: Determination of Ammonia in Tobacco and Tobacco Products by Ion Chromatographic Analysis (2015)

10) CRM Nº 82: Determination of Benzo[a]pyrene in Tobacco Products by GC-MS (2016)
CORESTA Guide No. 11 - Technical Guideline for Sample Handling of Smokeless Tobacco and Smokeless Tobacco Products (2011)

2015 Collaborative Study on Benzo[a]pyrene in Tobacco Products (March 2016)

CRM No. 82 - Determination of Benzo[a]pyrene in Tobacco Products by GC-MS (March 2016)

CORESTA Reference Products (Smokeless Tobacco) - 2015 Analysis (December 2015)
1) Characterization and maintenance of the 2016 CRPs
   - Finalize technical report

2) Carbonyls – formaldehyde, acetaldehyde, crotonaldehyde
   - Receive final data sets, draft technical report and CRM

3) Nicotine by GC-MS - Joint RAC / STS project
   - Finalize study report and draft CRM

4) Nitrate/ nitrite
   - Draft technical report
New Work Items

1) Metals Proficiency Study – spring 2017
   - Arsenic, Beryllium, Cadmium, Chromium, Cobalt, Nickel, Lead, and Selenium

2) TSNAs, OV, pH collaborative study for tobacco and tobacco products
   - Update CRMs to include other forms of tobacco products

3) Develop CRM for expanded list of PAHs
   - Preliminary collaborative study
ISO/CD 21045: "Tobacco and tobacco products - Determination of ammonia - Method using ion chromatographic analysis"
- Approved as a Draft International Standard

ISO/NP 21766: “Tobacco and tobacco products - Determination of tobacco-specific nitrosamines in tobacco products - Method using LC-MS/MS”
- Approved as a Committee Draft

B[a]P, Oven Volatiles, and pH have also been approved by the Scientific Commission and Board for submittal to ISO
## Progress Against Objectives
### Constituents of Regulatory Concern

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Status</th>
<th>HPHC Abbreviated List</th>
<th>WHO STP Priority Toxicants</th>
<th>Swedish National Food Agency</th>
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<tbody>
<tr>
<td>Nicotine (total and free)</td>
<td>CRM N°62</td>
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<tr>
<td>pH (calculation of nicotine)</td>
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<td>NNK, NNN</td>
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<td>Benzo[a]pyrene</td>
<td>CRM N°82</td>
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<td>Arsenic, Cadmium</td>
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<td>Lead</td>
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<td>Aflatoxin B1</td>
<td>Estab. list</td>
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**Constituent**
- Nicotine (total and free)
- pH (calculation of nicotine)
- NNK, NNN
- Benzo[a]pyrene
- Acetaldehyde, Croton., Form.
- Arsenic, Cadmium
- Lead
- Aflatoxin B1

**Status**
- CRM N°62
- CRM N°69
- CRM N°72
- CRM N°82
- work item
- PT
- Estab. list
Benefits to the Scientific Community

- Production and maintenance of CRPs
- Development of robust methods with defined repeatability and reproducibility
- Collaborative and proficiency studies which:
  - Provide laboratory performance feedback
  - Support ISO 17025 accreditation
- Study results and methodology are a source of engagement with authorities and regulators
Participating laboratories and their management’s support

John Bunch
- WG4 Coordinator (reference products)

Michael Morton
- Statistical Support