



PHILIP MORRIS

U.S.A.

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February 15, 2000

BY OVERNIGHT DELIVERY

Ms. Jan Malcolm
Commissioner
Minnesota Department of Health
Division of Family Health
717 Delaware Street S.E.
P.O. Box 9441
Minneapolis, Minnesota 55440-9441

Ms. Jan Malcolm
Commissioner
Minnesota Department of Health
Division of Family Health
85 East 7th Place, Suite 400
St. Paul, Minnesota 55101

Re: 2000 Annual Report of Philip Morris Incorporated

Dear Commissioner Malcolm:

Philip Morris Incorporated ("Philip Morris") hereby submits its 2000 annual report to the Minnesota Department of Health ("DOH").

Chapter 461.17 of the Minnesota Statutes requires each manufacturer of tobacco products sold in Minnesota to identify, "for each brand of such product, any of the following substances present in detectable levels in the product in its unburned state and, if the product is typically burned when consumed, in its burned state:

- (1) ammonia or any compound of ammonia;
- (2) arsenic;
- (3) cadmium;
- (4) formaldehyde; and
- (5) lead."

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On October 19, 1998, the DOH sent a Tobacco Substance Reporting Form (the "Form") to numerous manufacturers of tobacco products and invited comments on the Form. Philip Morris Incorporated, together with Brown & Williamson, Lorillard Tobacco Company and R.J. Reynolds Tobacco Company, submitted comments to the DOH on January 8, 1999. A copy of the comments is included with this annual report as Attachment A. For the reasons stated in the comments, Philip Morris makes this written submission in lieu of completing the Form.

Based on a comprehensive review of the scientific literature, Philip Morris concludes and reports that ammonia and ammonia compounds, arsenic, cadmium, lead and formaldehyde are present in detectable levels in all of the Philip Morris brand styles of cigarettes sold in Minnesota when the cigarettes are in their unburned and burned state. The brand styles of Philip Morris cigarettes sold in Minnesota are listed in Attachment B.

Please note that Philip Morris recently became aware of a scientific publication suggesting that formaldehyde may be present in green leaf tobacco. Accordingly, our 2000 Annual Report reflects this conclusion.

A list of the scientific literature supporting the conclusions stated above follows for each of the five substances identified in Chapter 461.17 of the Minnesota Statute.

Ammonia and Ammonia Compounds

Akehurst, B.C. Tobacco, Second Edition; Longmans: London, 1980.

Browne, C.L. The Design of Cigarettes, Hoechst Celanese Corporation:
Charlotte, NC, 1990.

Wynder, E.L.; Hoffmann, D. Tobacco and Tobacco Smoke. Studies in
Experimental Carcinogenesis Academic Press: New York, Chapter 3,
1967.

Vogel, A., The Water Content and Ammoniacal Combustion Products of
Tobacco, Neues Repert. Pharm., 6, 1-3, 1857.

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Formaldehyde

Gullner, G. and Tyihak, E. Measurement of formaldehyde, hydrogen peroxide, and non-protein thiols in tobacco leaves during aging. *Biochem. Physiol. Pflanzen* 187, 131-138, 1991.

Thoms, H., Versuche zur Entgiftung des Tabakrauches, *Chem. Z.*, 28, 1-3, 1904.

Metals - Generally

Tso, T. C., *Production, Physiology, and Biochemistry of Tobacco Plant*, Ideals, Inc., Beltsville, Maryland, 1990.

Arsenic

Rhoades, C. B., Jr; White, R. T., Jr. Mainstream smoke collection by electrostatic precipitation for acid dissolution in a microwave digestion system prior to trace metal determination. *J. AOAC Int* 80(6): 1320-1331; 1997.

Schneider, G.; Krivan, V., Multi-element analysis of tobacco and smoke condensate by instrumental neutron activation analysis and atomic absorption spectrometry, *Int J Environ Anal Chem* 53(2): 87-100; 1993.

Wu, D. E; Landsberger, S.; Larson, S. M. Evaluation of elemental cadmium as a marker for environmental tobacco smoke. *Environ Sci Technol* 29(9): 2311-2316; 1995.

Krivan, V.; Schneider, G.; Baumann, H.; Reus, U. Multi-element characterization of tobacco smoke condensate. *Fresenius J Anal Chem* 348(3): 218-225; 1994.

Smith, C. J.; Livingston, S. D.; Doolittle, D. J. An international literature survey of "IARC group I carcinogens" reported in mainstream cigarette smoke, *Food Chem Toxicol* 35(10/11): 1107-1130; 1997.

Allen, R. E.; Vickroy, D. G., The characterization of cigarette smoke from Cytrel smoking products and its comparison to smoke from flue-cured tobacco. III. Particulate phase, *Beitrag Zur Tabakforschung* 8(7): 430-437; 1976.

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Dermelj, M.; Ravnik, V.; Byrne, A. R.; Vasselj, A., Trace heavy metals in various Yugoslav tobaccos, *Mikrochimica Acta* 1: 261-270; 1978.

Wytttenbach, A.; Bajo, S.; Haekkinen, A., Determination of 16 elements in tobacco by neutron activation analysis, *Beitrage zur Tabakforschung* 8(5): 247-249; 1976.

Cogbill, E. C.; Hobbs, M.E., Transfer of metallic constituents of cigarettes to the main-stream smoke, *Tobacco Science* 1(15): 68-73; 1957.

Benner, C. L.; Bayona, J. M.; Caka, F. M.; et al., Chemical composition of environmental tobacco smoke. 2. Particulate-phase compounds, *Environ Sci Technol* 23(6): 688-699; 1989.

Jenkins R A, Occurrence of selected metals in cigarette tobaccos and smoke, *IARC Sci Publ* 71: 129-138; 1986.

McNally, W.D., The tar in cigarette smoke and its possible effects, *Am J Cancer*, 16: 1502-1514, 1932.

Agency for Toxic Substances Disease Registry, (Agency of the U.S. Department of Health and Human Services), Public Health Statement: Arsenic, March 1989, 5 pp., <http://atsdr1.atsdr.cdc.gov/ToxProfiles/phs8802.html>.

Cadmium

Rhoades, C. B., Jr.; White, R. T., Jr., Mainstream smoke collection by electrostatic precipitation for acid dissolution in a microwave digestion system prior to trace metal determination, *J AOAC Int* 80(6), 1320-1331; 1997.

Schneider, G.; Krivan, V., Multi-element analysis of tobacco and smoke condensate by instrumental neutron activation analysis and atomic absorption spectrometry, *Int J Environ Anal Chem* 53(2), 87-100; 1993.

Wu, D. E.; Landsberger, S.; Larson, S. M., Evaluation of elemental cadmium as a marker for environmental tobacco smoke, *Environ Sci Technol* 29(9): 2311-2316; 1995.

Bell, P.; Mulchi, C. L., Heavy metal concentrations in cigarette blends, *Tob Sci* 34: 32-34, 1990.

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Krivan, V.; Schneider, G.; Baumann, H.; Reus, U., Multi-element characterization of tobacco smoke condensate, *Fresenius J Anal Chem* 348(3): 218-25; 1994.

Smith, C. J.; Livingston, S. D.; Doolittle, D. J., An international literature survey of "IARC group I carcinogens" reported in mainstream cigarette smoke, *Food Chem Toxicol* 35(10/11): 1107-1130; 1997.

Friberg, L., Piscator, M., Needberg, G.F. and Kjellstrom, T., *Cadmium in the Environment*, Second Edition, CRC Press: Boca Raton, FL, p. 46 and references therein, 1974.

Agency for Toxic Substances and Disease Registry (Agency of the U.S. Department of Health and Human Services), *Public Health Statement: Cadmium*, 4 pp., March 1989.
<http://atsdr1.atsdr.cdc.gov:8080/ToxProfiles/phs8808.html>.

Agency for Toxic Substances and Disease Registry (Agency of the U.S. Department of Health and Human Services), *ToxFAQs, Cadmium*, 4 pp., 1993. <http://atsdr1.atsdr.cdc.gov:8080/tfacts5.html>.

Norman V, An overview of the vapor phase, semivolatile and nonvolatile components of cigarette smoke, *Recent Adv Tob Sci* 3: 28-58; 1977.

Figueres, G.; de Salles de Hys, L., Cadmium transfer in cigaret smoke, *Ann. Tab./ Sect. 2* (1994), 26, 71-86; 1994.

Lead

Bell P.; Mulchi, C. L., Heavy Metal Concentrations in Cigarette Blends, *Tob Sci* 34: 32-34, 1990.

Krivan, V.; Schneider, G.; Baumann, H.; Reus, U., Multi-element characterization of tobacco smoke condensate, *Fresenius J Anal Chem* 348(3): 218-25; 1994.

Smith, C. J.; Livingston, S. D.; Doolittle, D. J., An international literature survey of "IARC group I carcinogens" reported in mainstream cigarette smoke, *Food Chem Toxicol*, 35(10/11): 1107-1130; 1997.

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Venditti, M., Levels of trace elements (nickel, zinc, cadmium, lead, and mercury) in cigaret smoke, Riv Merceol 28(1), 41-60;1989.

Perinelli, M. A.; Carugno, N., Determination of trace metals in cigarette smoke by flameless atomic absorption spectrometry, Beitrage zur Tabakforschung 9(4): 214-217; 1978.

Allen R. E.; Vickroy, D. G., The characterization of cigarette smoke from Cytrel smoking products and its comparison to smoke from flue-cured tobacco. III. Particulate phase, Beitrage Zur Tabakforschung 8(7): 430-437; 1976.

Bailey, P.C., The Quantitative Determination of some Constituents of Tobacco Smoke, Master Thesis, Duke University, 1-40 (1952).

Cogbill, E. C.; Hobbs, M. E., Transfer of metallic constituents of cigarettes to the main-stream smoke, Tobacco Science 1(15): 68-73; 1957.

Agency for Toxic Substances and Disease Registry, (Agency of the U.S. Department of Health and Human Services), ToxFAQs, Lead, April 1993, 4 pp., <http://atsdr1.atsdr.cdc.gov:8080/tfacts13.html>.

Agency for Toxic Substances and Diseases Registry, (Agency of the U.S. Department of Health and Human Services), Public Health Statement: Lead, (1990), 4 pp., <http://atsdr1.atsdr.cdc.gov:8080/ToxProfiles/phs8817.html>.

The scientific literature relied upon is that which Philip Morris considers to be the most current, reliable or relevant to the request for information. However, additional scientific support was reviewed and found to be consistent with the conclusions stated.

If you have questions related to Philip Morris' 2000 Annual Report, please contact:

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Vice President, Scientific Technical Services
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Dr. Cox is familiar with the information set forth herein.

Please acknowledge your receipt of the 2000 Annual Report of Philip Morris Incorporated by signing and returning one copy of this letter in the pre-addressed, postage paid mailer provided for your convenience.

Sincerely,

Philip Morris Incorporated

By: *Richard O'Hara*

Title: Vice President, Scientific Technical Services

ACKNOWLEDGMENT OF RECEIPT

Minnesota Department of Health

By: _____

Title: _____

cc: Ms. Janet Olstead
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ATTACHMENT B

BRAND STYLES OF PHILIP MORRIS CIGARETTES SOLD IN MINNESOTA

Alpine 100 F SP Menthol

Alpine 100 F SP Lt Menthol
Alpine King F SP Lt Menthol
Alpine King F SP Menthol

Basic 100 F SP Ultra-Lt

Basic 100 F HP Ultra-Lt Menthol
Basic 100 F SP FF Menthol
Basic 100 F SP Lt Menthol
Basic 100 F SP Lt
Basic 100 F SP
Basic 100 F HP
Basic 100 F HP Lt
Basic King F SP
Basic King F SP Lt
Basic King F SP FF Menthol
Basic King F SP Ultra-Lt
Basic King F SP Lt Menthol
Basic King NF SP
Basic King F HP
Basic King F HP Menthol
Basic King F HP Lt

Benson & Hedges 100 F HP Ultra-Lt Menthol Dlx

Benson & Hedges 100 F HP Ultra-Lt Dlx
Benson & Hedges 100 F SP Menthol
Benson & Hedges 100 F HP Menthol
Benson & Hedges 100 F HP Lt
Benson & Hedges 100 F HP Lt Menthol
Benson & Hedges 100 F HP
Benson & Hedges 100 F SP Lt
Benson & Hedges 100 F SP Lt Menthol
Benson & Hedges 100 F SP
Benson & Hedges King F HP
Benson & Hedges King F SP M-filter

Best Buy 100 F HP FF Generic

Best Buy 100 F SP FF Generic
Best Buy 100 F SP Ultra-Lt Generic
Best Buy 100 F SP Lt Menthol Generic
Best Buy 100 F SP Lt Generic
Best Buy Reg F HP FF Generic
Best Buy King F SP FF Generic
Best Buy King F SP Lt Menthol Generic

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Best Buy King F SP Lt Generic
Best Buy King F SP Ultra-Lt Generic
Best Buy King NF SP Generic

Bristol 100 F SP

Bristol 100 F SP Lt
Bristol 100 F SP Lt Menthol
Bristol 100 F SP Ultra-Lt
Bristol King F SP
Bristol King F SP Lt
Bristol King F SP Lt Menthol
Bristol King NF SP

Bucks King F SP Lt

Bucks King F SP

Canadian Players Reg F HP Extra-Lt

Canadian Players King F HP Extra-Lt
Canadian Players Reg F HP
Canadian Players Reg F HP Lt
Canadian Players King F HP Lt

Cambridge 100 F HP Ultra-Lt

Cambridge 100 F SP Ultra-Lt
Cambridge 100 F HP Lt
Cambridge 100 F SP Lt
Cambridge 100 F HP FF
Cambridge 100 F SP FF
Cambridge 100 F SP Lowest
Cambridge 100 F SP Lt Menthol
Cambridge King F SP Lt Menthol
Cambridge King F SP Lowest
Cambridge King F HP Lt
Cambridge King F SP Lt
Cambridge King F HP FF
Cambridge King F SP FF

Chesterfield King NF SP FF

Chesterfield Reg NF SP FF

Commander King NF SP

Commander Reg NF SP

English Ovals King NF HP

Genco 100 F HP Generic

Genco 100 F SP Lt Generic
Genco 100 F SP Generic
Genco 100 F SP Lt Menthol Generic
Genco 100 F SP Ultra-Lt Generic

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Genco 100 F SP FF Menthol Generic
Genco King F HP Generic
Genco King F HP Lt Generic
Genco King F SP Lt Menthol Generic
Genco King F SP Lt Generic
Genco King F SP Generic
Genco King F SP FF Menthol Generic
Genco King F SP Ultra-Lt Generic
Genco King NF SP Generic

L&M 100 F SP FF
L&M King F SP FF

Lark 100 F SP FF
Lark King F SP FF
Lark 100 F SP Lt
Lark King F SP Lt

Marlboro 100 F HP Ultra-Lt
Marlboro 100 F HP Ultra-Lt Menthol
Marlboro 100 F HP Lt Menthol
Marlboro 100 F HP Menthol
Marlboro 100 F HP Red
Marlboro 100 F HP Lt
Marlboro 100 F HP Medium
Marlboro 100 F SP Lt
Marlboro 100 F SP Lt Menthol
Marlboro 100 F SP Red
Marlboro 100 F SP Medium
Marlboro King F HP Lt
Marlboro King F HP Lt Menthol
Marlboro King F HP Ultra-Lt
Marlboro King F HP Ultra-Lt Menthol
Marlboro King F HP
Marlboro King F HP Menthol
Marlboro King F HP Medium
Marlboro King F SP
Marlboro King F SP Medium
Marlboro King F SP 25's
Marlboro King F SP Menthol
Marlboro King F SP Lt
Marlboro King F SP Lt 25's
Marlboro King F SP Lt Menthol

Medley King F SP Lt Menthol

Merit 100 F SP Ultra-Lt
Merit 100 F SP Ultima
Merit 100 F SP
Merit 100 F HP Ultima

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Merit 100 F HP Ultra-Lt
Merit 100 F SP Menthol
Merit 100 F SP Ultra-Lt Menthol
Merit King F HP Ultra-Lt
Merit King F HP
Merit King F HP Ultima
Merit King F SP
Merit King F SP Ultra-Lt Menthol
Merit King F SP Ultra-Lt
Merit King F SP Ultima
Merit King F SP Menthol

Parliament 100 F SP Lt

Parliament King F SP Lt
Parliament King F HP Lt
Parliament King F HP Lt Menthol
Parliament King F HP
Parliament King F HP Menthol
Parliament King F HP Octagonal Corner
Parliament King F HP Menthol Octagonal Corner
Parliament King F HP Lt Octagonal Corner
Parliament King F HP Lt Menthol Octagonal Corner

Players 100 F HP Menthol

Players 100 F HP
Players 100 F SP Lt
Players 100 F SP Lt Menthol
Players King F HP Menthol
Players King F HP
Players King F SP Lt
Players King F SP Lt Menthol
Players Reg NF HP

Rothmans King F HP

Rothmans King F HP Spec-Mild

Saratoga 120 F HP

Saratoga 120 F HP Menthol

Shield 100 F SP Generic

Shield 100 F SP FF Menthol Generic
Shield King NF SP Generic
Shield King F SP Generic
Shield King F SP FF Menthol Generic
Shield 100 F SP Lt Generic
Shield 100 F SP Lt Menthol Generic
Shield King F SP Lt Generic
Shield King F SP Lt Menthol Generic
Shield 100 F SP Ultra-Lt Generic
Shield King F SP Ultra-Lt Generic

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Skyline King F SP FF

Virginia Slims 100 F HP Lt Slim

Virginia Slims 100 F HP Ultra-Lt Menthol Slim

Virginia Slims 100 F SP Slim

Virginia Slims 100 F HP Slim

Virginia Slims 100 F HP Sup-Slim

Virginia Slims 100 F HP Lt Menthol Slim

Virginia Slims 100 F HP Menthol Sup-Slim

Virginia Slims 100 F HP Ultra-Lt Slim

Virginia Slims 100 F SP Menthol Slim

Virginia Slims 100 F HP Menthol Slim

Virginia Slims 120 F HP Lt Menthol Slim

Virginia Slims 120 F HP Lt Slim

Vista King F SP Lt

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