Western Interior Basin Late Cretaceous Calcareous Nannofossil Data

-----------------------------------------------------------------------

World Data Center for Paleoclimatology, Boulder

and

NOAA Paleoclimatology Program

-----------------------------------------------------------------------

NOTE: PLEASE CITE ORIGINAL REFERENCE WHEN USING THIS DATA!!!!!

NAME OF DATA SET:

Western Interior Basin Late Cretaceous Calcareous Nannofossil Data

LAST UPDATE: 4/2009 (Original receipt by WDC Paleo)

CONTRIBUTOR: David Watkins, University of Nebraska Lincoln

IGBP PAGES/WDCA CONTRIBUTION SERIES NUMBER: 2009-040

WDC PALEO CONTRIBUTION SERIES CITATION:

Blair, S.A. and D.K. Watkins. 2009.

Western Interior Basin Late Cretaceous Calcareous Nannofossil Data.

IGBP PAGES/World Data Center for Paleoclimatology

Data Contribution Series # 2009-040.

NOAA/NCDC Paleoclimatology Program, Boulder CO, USA.

ORIGINAL REFERENCE:

Blair, S.A. and D.K. Watkins. 2009.

High-resolution calcareous nannofossil biostratigraphy for the

Coniacian/Santonian Stage boundary, Western Interior Basin.

Cretaceous Research, Vol. 30, Issue 2, pp. 367-384, April 2009.

doi:10.1016/j.cretres.2008.07.016

ABSTRACT:

The Ten Mile Creek area (Dallas, Texas) is a proposed Global Stratotype

Section and Point (GSSP) candidate for the Coniacian/Santonian Stage

boundary. The Santonian Working Group has designated the first appearance

of Inoceramus (Cladoceramus) undulatoplicatus as the diagnostic macrofossil

bioevent for the base of the Santonian Stage. Calcareous nannofossils were

examined from sediments of the Bruceville Marl at the proposed GSSP site

and from well-preserved sediments of the coeval Smoky Hill Member-type area

(northwestern Kansas) of the Niobrara Formation. Nannofossil bioevents were

correlated with the lowest stratigraphic occurrence of I. undulatoplicatus

to create a high resolution biostratigraphic framework and stratigraphic

proxy for the Coniacian/Santonian Stage transition.

Six bioevents are useful for recognition of the Coniacian/Santonian

transition within the Bruceville Marl and Smoky Hill Member. The first

appearance datums (FADs) of Prediscosphaera desiderograndis, n. sp.

and Amphizygus megalops, n. sp. as well as the FADs of two rare taxa,

Orastrum campanensis and Tortolithus dodekachelyon, n. sp., are in close

stratigraphic proximity to the lowest occurrence of I. undulatoplicatus.

In addition, two nannofloral acmes occur near the boundary: Watznaueria

quadriradiata and Zeugrhabdotus scutula.

This study describes eight new species from the Smoky Hill Chalk type area;

Amphizygus megalops, Bifidalithus phenax, Pharus evanescens, Gartnerago

margaritatus, Helicolithus tectufissus, Tortolithus dodekachelyon,

Prediscosphaera desiderograndis and Helicolithus varolii. Light microscope

images are provided for rare and well-preserved specimens of Reinhardtites

clavicaviformis Varol, 1991, Orastrum campanensis (Cepek) Wind & Wise, 1977,

Rhombolithus rhombicum (Bukry) Black, 1973, and Gartnerago clarusora Varol,

1991. This study extends the ranges of several species from those documented

in previous literature.

GEOGRAPHIC REGION: Western Interior Basin, central North America

PERIOD OF RECORD: Late Cretaceous, Coniacian/Santonian boundary, ~85.8 MMYrBP

FUNDING SOURCES:

Ed Picou Grant from GCSSEPM (Gulf Coast Section of SEPM);

AAPG (American Association of Petroleum Geologists);

Yatkola-Edwards Scholarship from the Nebraska Geological Society

DESCRIPTION:

High-resolution calcareous nannofossil assemblage count data from two

sections in the Cretaceous Western Interior Basin, across the late

cretaceous Coniacian/Santonian Stage boundary.

The study materials are from upper Coniacian to lower Santonian strata.

They were collected from 65 samples in the proposed Coniacian/Santonian

stage boundary stratotype at Ten Mile Creek (Dallas, TX), and 133 samples

from the type area for the Smoky Hill Member in western Kansas (Locality 13).

Bruceville Marl (Austin Group), Ten Mile Creek, Dallas, Texas: 32°20'N, 96°48'W

Smoky Hill Member (Niobrara Formation), Gove County, Kansas: 38º57'N, 100º29'W

DATA:

1a. Ten Mile Creek calcareous nannofossil census data, part 1 of 5

Column 1: Section Height (m) Column 12: Biscutum notaculum Column 23: Corollithion exiguum

Column 2: Ahmuellerella octoradiata Column 13: Biscutum zulloi Column 24: Corollithion madagascarensis

Column 3: Amphizygus brooksii Column 14: Braarudosphaera bigelowii Column 25: Corollithion signum

Column 4: Amphizygus megalops Column 15: Broinsonia matalosa Column 26: Cretarhadus conicus

Column 5: Arkhangelskiella confusa Column 16: Broinsonia signata Column 27: Cribrosphaera circula

Column 6: Arkhangelskiella cymbiformis Column 17: Bukrylithus ambiguus Column 28: Cribrosphaerella ehrenbergii

Column 7: Axopodorhabdid sp. Column 18: Calculites obscurus Column 29: Cribrosphaerella pelta

Column 8: Biscutum blacki Column 19: Calculites ovalis Column 30: Cyclogelosphaera margharelli

Column 9: Biscutum constans Column 20: Chiastozygus amphipons Column 31: Cyclogelosphaera rotaclypeata

Column 10: Biscutum dissimilis Column 21: Chiastozygus litterarius Column 32: Cylindralithus nudus

Column 11: Biscutum hattneri Column 22: Corrollithion ellipticum Column 33: Discorhabdus ignotus

Column 34: Eiffellithus eximius

SectiAhmuellAmphizyAmphizyArkhangArkhangAxopodoBiscutuBiscutuBiscutuBiscutuBiscutuBiscutuBraarudBroinsoBroinsoBukryliCalculiCalculiChiastoChiastoCorrollCorolliCorolliCorolliCretarhCribrosCribrosCribrosCyclogeCyclogeCylindrDiscorhEiffell

1.25 0.7 0.0 0.0 0.4 0.0 0.0 0.2 10.9 0.0 0.0 0.0 1.7 0.0 0.0 0.2 0.0 1.7 0.4 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 1.7 0.7 0.2 0.0 2.8 4.4

1.35 0.2 0.0 0.2 0.2 0.0 0.2 0.4 6.4 0.0 0.0 0.2 1.8 0.0 0.2 0.7 0.0 0.2 0.2 0.2 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.7 0.2 0.2 0.0 0.2 1.8 1.3

1.45 0.2 0.0 0.2 0.0 0.0 0.2 0.0 9.6 0.0 0.2 0.0 3.7 0.0 0.0 1.1 0.0 0.7 0.2 0.2 0.2 0.0 0.0 0.0 0.9 0.0 0.0 1.1 0.4 0.4 0.0 0.0 3.1 3.1

1.55 0.7 0.2 0.2 0.4 0.0 0.0 0.0 5.9 0.0 0.2 0.0 1.3 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.0 0.2 0.0 1.3 0.0 0.0 0.0 0.2 0.2 0.0 0.0 2.9 4.4

1.65 0.4 0.0 0.0 0.7 0.0 0.0 0.2 11.4 0.0 0.0 0.0 1.5 0.0 0.0 0.4 0.0 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.7 0.0 0.0 3.5 5.7

1.75 1.8 0.2 0.0 0.2 0.0 0.0 0.0 11.6 0.0 0.2 0.0 1.3 0.0 0.0 0.0 0.0 0.4 1.1 0.4 0.0 0.2 0.2 0.0 1.3 0.0 0.0 0.0 0.4 0.2 0.0 0.0 5.7 0.7

1.85 1.1 0.2 0.0 0.0 0.0 0.0 0.2 14.9 0.0 0.0 0.0 1.8 0.0 0.0 0.2 0.0 1.3 0.9 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.2 0.2 0.0 0.0 3.1 3.3

1.95 0.0 0.2 0.2 0.0 0.0 0.0 0.0 9.6 0.0 0.0 0.0 1.3 0.2 0.0 0.7 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.2 0.0 0.7 0.0 0.0 3.5 3.1

2.05 0.4 0.4 0.4 0.0 0.0 0.0 0.0 9.4 0.0 0.0 0.0 1.1 0.2 0.0 0.2 0.0 0.4 0.9 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.4 0.7 0.2 0.2 0.0 3.7 3.5

2.15 0.0 0.2 0.0 0.4 0.0 0.0 0.0 7.7 0.0 0.0 0.0 0.7 0.2 0.0 0.9 0.0 0.0 0.2 0.0 0.0 0.2 0.2 0.2 0.7 0.0 0.0 0.7 0.7 1.5 0.2 0.0 3.7 3.3

2.25 0.4 0.0 0.0 0.9 0.0 0.0 0.4 11.4 0.0 0.4 2.0 0.4 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.2 0.0 1.5 0.0 0.0 0.9 1.1 0.2 0.0 0.0 4.8 2.4

2.35 0.4 0.0 0.0 1.8 0.0 0.4 0.2 6.8 0.0 0.0 0.0 2.0 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 0.2 0.2 0.0 1.1 0.0 0.0 0.2 0.2 0.2 0.0 0.0 6.6 2.0

2.45 0.4 0.0 0.0 0.2 0.2 0.4 0.2 8.3 0.0 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.7 0.0 0.2 0.9 0.0 0.2 0.4 0.9 0.0 0.0 0.0 5.0 2.6

2.55 0.2 0.0 0.0 0.7 0.0 0.2 0.2 9.4 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.0 0.2 0.2 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.2 1.1 0.4 0.0 0.0 4.2 4.2

2.65 0.0 0.0 0.0 0.7 0.0 0.0 0.0 10.3 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.4 1.1 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.9 2.2 0.0 0.0 0.0 3.9 2.9

2.75 0.0 0.0 0.0 0.4 0.0 0.0 0.0 7.5 0.0 0.0 0.4 1.7 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.4 1.1 0.0 0.0 0.2 0.6 0.2 0.2 0.0 4.9 3.2

2.85 0.2 0.0 0.0 0.2 0.0 0.0 0.0 7.2 0.0 0.0 0.0 2.8 0.2 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.0 0.2 1.3 0.0 0.0 0.0 0.7 0.4 0.0 0.0 3.7 2.2

2.95 0.2 0.0 0.0 0.0 0.0 0.0 0.0 12.5 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.2 0.4 0.7 0.4 0.0 0.7 0.0 0.0 1.8 0.0 0.0 0.7 0.0 1.1 0.0 0.0 3.7 0.7

3.05 0.9 0.0 0.0 0.2 0.0 0.0 0.2 5.4 0.0 0.2 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.4 0.2 0.0 1.1 0.0 0.0 0.2 0.0 0.0 0.0 0.0 2.8 4.4

3.15 0.7 0.0 0.0 0.4 0.2 0.0 0.0 7.7 0.0 0.0 0.0 1.8 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 1.8 0.0 0.0 0.9 0.0 0.2 0.0 0.0 1.1 3.1

3.25 0.0 0.0 0.0 0.2 0.2 0.0 0.2 11.6 0.2 0.0 0.0 3.5 0.2 0.0 0.2 0.0 0.0 0.4 0.4 0.0 0.4 0.4 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.2 5.0 3.7

3.35 0.9 0.0 0.0 0.2 0.0 0.2 0.0 7.7 0.0 0.0 0.0 4.6 0.2 0.0 0.0 0.4 0.0 0.9 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.0 1.3 4.8

3.45 0.2 0.0 0.0 0.2 0.0 0.0 0.0 9.1 0.0 0.0 0.0 1.7 0.0 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.7 0.0 0.0 0.4 0.0 0.0 0.4 0.0 0.7 0.0 0.2 3.3 2.0

3.55 0.4 0.0 0.0 0.4 0.0 0.2 0.2 12.2 0.0 0.0 0.0 1.5 0.0 0.0 0.4 0.2 0.7 0.4 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.0 1.7 2.8

3.65 0.0 0.0 0.0 0.2 0.0 0.0 0.4 10.5 0.0 0.0 0.0 1.5 0.0 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.7 0.0 0.2 1.5 2.6

3.75 0.4 0.0 0.0 0.2 0.0 0.0 0.0 11.8 0.0 0.2 0.2 1.1 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.2 0.2 1.7 0.0 0.0 2.2 1.1

3.85 0.2 0.0 0.0 0.4 0.0 0.0 0.2 9.0 0.2 0.0 0.0 1.5 0.0 0.0 0.2 0.0 0.0 0.2 0.4 0.0 0.4 0.0 0.0 0.4 0.0 0.0 0.4 0.2 1.3 0.0 0.2 3.1 2.6

3.95 0.2 0.0 0.0 0.2 0.0 0.2 0.0 11.6 0.2 0.0 0.0 0.9 0.2 0.0 0.2 0.2 0.2 0.9 0.2 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.2 0.9 0.0 0.2 1.1 2.0

4.05 0.2 0.0 0.0 0.2 0.0 0.0 0.7 11.6 0.0 0.0 0.0 3.1 0.0 0.0 0.2 0.0 0.0 0.4 0.2 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.2 0.0 0.4 0.0 0.2 3.9 2.2

4.15 0.0 0.0 0.0 0.7 0.0 0.2 0.2 12.9 0.0 0.2 0.0 2.2 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.7 0.0 0.0 0.0 0.2 0.7 0.0 0.0 3.1 2.2

4.25 0.0 0.0 0.0 0.4 0.0 0.0 0.0 10.3 0.0 0.0 0.0 1.5 0.0 0.0 0.0 0.2 0.4 2.0 0.0 0.0 0.2 0.0 0.0 1.3 0.0 0.0 0.2 0.2 0.4 0.0 0.0 2.2 2.4

4.35 0.0 0.0 0.0 0.4 0.0 0.0 0.0 11.7 0.0 0.0 0.0 3.9 0.0 0.0 0.0 0.0 0.4 0.4 0.4 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.4 0.4 1.1 0.0 0.6 3.9 1.9

4.45 0.7 0.0 0.0 0.2 0.0 0.2 0.0 8.8 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 2.8 0.0 0.0 1.1 0.0 0.2 0.0 0.0 2.0 1.1

4.55 0.7 0.0 0.0 0.7 0.0 0.0 0.0 9.4 0.0 0.2 0.0 1.8 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 2.8 0.0 0.0 0.4 0.0 0.2 0.0 0.2 5.0 1.8

4.65 0.2 0.0 0.0 1.1 0.0 0.0 0.0 6.6 0.0 0.0 0.0 2.0 0.0 0.0 0.2 0.0 0.2 0.4 0.0 0.0 0.2 0.0 0.0 1.5 0.0 0.0 1.1 0.4 0.2 0.0 0.0 3.1 2.9

4.75 0.7 0.0 0.0 0.2 0.0 0.0 0.0 7.9 0.0 0.0 0.0 1.3 0.0 0.0 1.1 0.0 0.2 0.0 0.0 0.2 0.4 0.0 0.0 1.8 0.0 0.0 1.1 1.1 0.4 0.0 0.2 2.6 1.5

4.85 0.7 0.0 0.0 0.2 0.0 0.0 0.0 6.8 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.0 0.4 0.0 0.2 0.0 0.2 0.0 0.0 1.5 0.0 0.0 1.5 1.1 0.2 0.0 0.2 5.9 2.9

4.95 0.7 0.0 0.2 0.2 0.0 0.0 0.0 7.9 0.0 0.0 0.0 1.3 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.4 2.0 0.0 0.0 0.4 1.1 0.2 0.0 0.2 6.6 1.1

5.05 0.0 0.0 0.0 0.4 0.0 0.0 0.0 8.6 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.2 0.0 0.0 2.0 0.0 0.0 0.4 0.9 2.6 0.0 0.0 8.3 2.0

5.15 0.0 0.0 0.0 0.4 0.0 0.2 0.2 12.7 0.0 0.0 0.0 2.4 0.0 0.0 0.2 0.2 0.2 0.2 0.0 0.2 0.0 0.0 0.0 1.8 0.0 0.0 0.0 0.0 2.4 0.0 0.0 8.1 0.4

5.25 0.0 0.0 0.2 0.2 0.0 0.0 0.0 9.1 0.0 0.0 0.0 2.4 0.0 0.2 0.2 0.0 0.2 0.2 0.4 0.0 0.4 0.0 0.2 1.3 0.0 0.0 0.7 0.9 0.9 0.0 0.0 6.9 2.7

5.35 0.7 0.0 0.0 0.4 0.0 0.0 0.0 10.5 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.2 0.2 0.2 0.2 0.2 0.7 0.0 0.0 3.3 0.0 0.0 0.7 0.7 0.0 0.0 0.2 4.6 4.4

5.45 0.0 0.0 0.0 0.7 0.0 0.0 0.0 10.7 0.0 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.7 0.0 0.2 0.4 0.2 0.0 0.0 1.5 0.0 0.2 0.4 0.4 0.0 0.0 0.0 4.8 3.5

5.55 0.0 0.0 0.0 0.2 0.0 0.0 0.2 7.7 0.0 0.0 0.0 1.1 0.0 0.4 0.0 0.0 0.0 0.4 0.0 0.0 0.4 0.0 0.2 0.9 0.0 0.0 0.2 0.4 0.4 0.0 0.0 5.5 2.9

5.65 0.2 0.0 0.0 0.0 0.0 0.0 0.0 8.3 0.0 0.0 0.2 2.0 0.2 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.2 1.5 0.0 0.0 0.0 0.4 0.0 0.0 0.0 3.1 3.1

5.75 0.0 0.2 0.0 0.4 0.0 0.0 0.0 6.6 0.0 0.0 0.0 1.3 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.4 1.1 0.0 0.0 0.2 0.2 0.0 0.0 0.0 4.4 4.2

5.85 0.4 0.0 0.0 0.4 0.0 0.2 0.0 9.4 0.0 0.0 0.0 0.7 0.4 0.0 0.9 0.0 0.0 0.2 0.2 0.0 0.7 0.0 0.0 0.9 0.0 0.0 0.4 0.0 0.4 0.0 0.0 3.9 3.5

5.95 0.0 0.0 0.0 0.0 0.0 0.0 0.0 14.6 0.0 0.0 0.0 0.7 0.0 0.2 0.2 0.0 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.7 0.0 0.0 0.0 0.2 0.9 0.0 0.0 5.2 2.8

6.05 0.2 0.0 0.0 0.9 0.0 0.2 0.2 7.5 0.2 0.0 0.0 0.9 0.0 0.0 0.7 0.0 0.9 0.4 0.7 0.4 0.4 0.0 0.0 0.9 0.0 0.0 0.7 0.0 0.2 0.0 0.0 2.0 4.4

6.15 0.2 0.0 0.0 0.7 0.0 0.0 0.0 3.5 0.0 0.0 0.0 0.7 0.2 0.0 0.2 0.0 0.0 0.7 0.2 0.2 0.2 0.0 0.0 1.1 0.0 0.0 0.4 0.0 0.7 0.0 0.0 2.9 4.2

6.25 0.4 0.0 0.0 1.1 0.0 0.0 0.0 8.0 0.0 0.0 0.0 1.6 0.2 0.2 0.4 0.0 0.0 0.2 0.7 0.0 0.0 0.0 0.0 1.6 0.0 0.0 0.0 0.0 1.3 0.0 0.0 2.2 2.7

6.35 0.4 0.0 0.0 0.0 0.0 0.0 0.0 7.5 0.0 0.0 0.0 1.7 0.0 0.2 0.6 0.0 0.2 0.6 0.4 0.0 0.0 0.0 0.2 1.1 0.0 0.0 0.0 0.0 1.5 0.0 0.0 6.2 2.4

6.45 0.2 0.0 0.0 0.9 0.0 0.2 0.2 5.9 0.0 0.0 0.0 2.2 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.7 0.0 0.2 0.2 0.4 0.7 0.2 0.0 3.3 2.6

6.55 0.7 0.0 0.0 0.2 0.0 0.0 0.4 7.9 0.0 0.0 0.0 2.4 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.4 0.0 0.0 0.0 1.8 0.0 0.0 0.4 1.1 0.2 0.0 0.0 3.3 2.9

6.65 0.0 0.2 0.0 0.4 0.0 0.0 0.2 9.9 0.0 0.0 0.0 1.8 0.0 0.0 0.2 0.0 0.2 0.7 0.0 0.0 0.0 0.0 0.4 1.1 0.0 0.0 1.1 0.2 0.7 0.0 0.0 4.2 2.4

6.75 0.9 0.0 0.0 0.2 0.0 0.2 0.0 9.2 0.0 0.0 0.0 2.2 0.0 0.0 0.7 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.4 0.4 0.4 0.0 0.0 6.1 0.9

6.85 0.2 0.0 0.0 0.0 0.0 0.2 0.2 8.6 0.0 0.0 0.0 1.8 0.0 0.0 0.2 0.0 0.4 0.0 0.4 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.9 0.2 1.1 0.0 0.0 5.1 1.8

6.95 0.7 0.0 0.0 0.0 0.0 0.2 0.2 8.3 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.2 0.0 0.0 1.1 0.0 0.0 1.1 0.4 0.0 0.0 0.0 2.6 3.3

7.05 0.0 0.0 0.0 0.2 0.0 0.0 0.0 8.3 0.0 0.0 0.0 2.4 0.0 0.0 0.2 0.4 0.7 0.0 0.0 0.0 0.2 0.0 0.0 2.2 0.0 0.0 0.7 0.7 0.4 0.0 0.0 4.6 0.9

7.15 0.7 0.0 0.0 0.4 0.0 0.0 0.0 11.8 0.0 0.0 0.0 1.8 0.0 0.0 0.7 0.0 0.2 0.7 0.2 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.4 0.2 0.0 0.0 4.8 1.1

7.25 0.4 0.0 0.0 0.0 0.0 0.0 0.2 10.5 0.0 0.0 0.0 1.8 0.0 0.0 0.7 0.0 0.2 0.0 0.2 0.0 0.0 0.2 0.2 1.3 0.0 0.0 0.7 0.0 0.0 0.0 0.0 3.5 3.3

7.35 0.9 0.0 0.0 0.2 0.0 0.0 0.9 10.3 0.0 0.0 0.0 1.3 0.4 0.0 0.9 0.0 0.4 0.7 0.2 0.0 0.2 0.0 0.0 1.5 0.0 0.0 0.0 0.7 0.0 0.2 0.0 3.9 1.8

7.45 1.1 0.0 0.0 0.2 0.0 0.0 0.0 9.0 0.0 0.0 0.0 2.6 0.0 0.2 0.0 0.0 0.2 0.4 0.4 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.7 0.4 0.2 0.0 0.0 4.2 3.3

7.55 0.9 0.0 0.0 0.2 0.0 0.0 0.0 7.7 0.0 0.0 0.0 1.5 0.0 0.0 0.2 0.0 0.4 0.4 0.2 0.0 0.2 0.0 0.0 0.9 0.0 0.0 0.9 0.2 0.4 0.0 0.0 6.6 2.9

1b. Ten Mile Creek calcareous nannofossil census data, part 2 of 5

Column 1: Section Height (m) Column 12: Helicolithus compactus Column 23: Loxolithus armilla

Column 2: Eiffellithus gorkae Column 13: Helicolithus anceps Column 24: Lucianorhabdus cayeuxii

Column 3: Eiffellithus turriseiffelii Column 14: Helicolithus stellafissus Column 25: Lucianorhabdus maleformis

Column 4: Gaarderella granulifera Column 15: Helicolithus trabeculatus Column 26: Manivitella pemmatoidea

Column 5: Gartnerago clarusora Column 16: Helicolithus turonicus Column 27: Marthasterites sp.

Column 6: Gartnerago costatum Column 17: Bifidalithus phenax Column 28: Marthasterites crassus

Column 7: Gartnerago margaritatus Column 18: Kamptnerius magnificus Column 29: Marthasterites furcatus

Column 8: Gartnerago segmentatum Column 19: Kamptnerius punctata Column 30: Microrhabdulus belgicus

Column 9: Glaukolithus bicrescenticus Column 20: Lithastrinus grillii Column 31: Microrhabdulus decoratus

Column 10: Glaukolithus biperforatus Column 21: Lithastrinus septenarius Column 32: Micula concava

Column 11: Grantnarhabdus coronadventis Column 22: Lithraphidites carniolensis Column 33: Micula cubiformis

Column 34: Micula decussata

SectiEiffellEiffellGaarderGartnerGartnerGartnerGartnerGlaukolGlaukolGrantnaHelicolHelicolHelicolHelicolHelicolBifidalKamptneKamptneLithastLithastLithrapLoxolitLucianoLucianoManivitMarthasMarthasMarthasMicrorhMicrorhMicula Micula Micula

1.25 0.4 2.0 0.2 0.0 0.2 0.4 0.7 1.1 0.0 0.0 0.0 1.1 0.4 2.4 0.0 0.2 0.0 0.0 0.0 0.0 0.7 0.0 0.4 0.2 0.0 0.2 0.0 0.2 0.7 0.7 0.0 0.7 0.7

1.35 0.4 2.2 0.0 0.0 0.0 0.0 1.5 0.2 0.0 0.0 0.0 0.4 0.2 3.3 0.0 0.0 0.2 0.0 0.2 0.0 0.7 0.0 0.7 0.0 0.2 0.0 0.0 0.2 0.7 0.0 0.0 0.2 0.9

1.45 0.4 2.2 0.0 0.0 0.0 0.0 0.9 0.9 0.0 0.0 1.3 0.2 0.2 1.3 0.0 0.2 0.0 0.0 0.0 0.0 1.5 0.0 1.3 0.0 0.0 0.0 0.0 0.0 1.5 0.2 0.0 0.0 0.2

1.55 0.7 0.7 0.0 0.0 0.0 0.0 1.8 0.7 0.0 0.2 0.0 1.3 0.2 4.2 0.0 0.0 0.4 0.0 0.0 0.0 1.5 0.0 2.6 0.4 0.0 0.0 0.0 0.0 0.7 0.9 0.0 0.0 0.7

1.65 1.1 1.1 0.0 0.0 0.0 0.2 0.7 1.1 0.2 0.0 0.2 0.2 0.9 1.5 0.0 0.0 0.0 0.0 0.0 0.2 1.7 0.2 0.4 0.4 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.2 0.2

1.75 0.7 2.0 0.0 0.0 0.0 0.0 0.4 1.3 0.0 0.0 0.0 0.7 0.7 1.1 0.0 0.0 0.0 0.0 0.0 0.0 2.2 0.0 0.7 0.0 0.4 0.0 0.0 0.0 0.2 0.0 0.0 0.7 0.0

1.85 0.7 2.0 0.0 0.0 0.0 0.2 0.9 2.9 0.0 0.0 0.2 0.9 1.5 0.9 0.0 0.0 0.2 0.0 0.2 0.0 1.1 0.7 1.3 0.4 0.0 0.0 0.0 0.2 1.5 0.2 0.0 0.0 0.7

1.95 0.4 3.1 0.0 0.2 0.0 0.0 1.3 1.1 0.0 0.0 0.0 0.0 0.4 3.3 0.0 0.4 0.0 0.0 0.2 0.4 0.7 0.0 1.1 0.4 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.2 2.4

2.05 0.2 2.2 0.0 0.0 0.0 0.0 0.9 1.5 0.0 0.0 0.2 0.7 0.9 2.8 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.0 3.5 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.0 1.5

2.15 0.2 2.4 0.2 0.2 0.0 0.2 0.9 0.9 0.0 0.0 0.2 1.1 0.9 3.5 0.0 0.0 0.0 0.0 0.2 0.0 1.3 0.2 1.3 0.2 0.0 0.0 0.0 0.0 2.2 0.2 0.0 0.2 0.2

2.25 1.3 2.9 0.2 0.0 0.0 0.0 0.7 1.1 0.0 0.0 0.4 0.9 1.1 1.5 0.0 0.7 0.0 0.0 0.0 0.0 2.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.2 0.2

2.35 0.2 4.0 0.0 0.2 0.0 0.0 0.4 1.3 0.0 0.0 0.7 0.7 1.1 4.0 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.0 2.2 0.0 0.4 0.0 0.0 0.0 1.3 0.0 0.0 0.4 0.7

2.45 0.2 2.2 0.0 0.0 0.0 0.0 0.9 0.9 0.0 0.0 0.4 0.2 0.2 2.8 0.0 0.2 0.0 0.0 0.2 0.0 0.9 0.4 1.3 0.0 0.2 0.0 0.0 0.2 0.9 0.0 0.0 0.9 1.1

2.55 0.4 3.3 0.0 0.0 0.0 0.2 1.5 0.4 0.2 0.0 0.2 0.2 0.9 4.4 0.0 0.2 0.0 0.0 0.0 0.0 0.9 0.2 1.3 0.2 0.2 0.0 0.0 0.0 1.3 0.2 0.0 0.2 1.1

2.65 0.2 2.0 0.0 0.2 0.0 0.2 0.4 0.2 0.0 0.0 0.4 0.2 1.1 1.8 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.2 2.2 0.2 0.0 0.0 0.0 0.7 1.1 0.0 0.0 0.4 0.4

2.75 0.2 3.0 0.0 0.0 0.0 0.0 0.4 0.2 0.2 0.0 0.2 0.0 0.2 2.6 0.0 0.2 0.4 0.0 0.0 0.2 2.4 0.2 2.1 0.2 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.4 1.1

2.85 0.0 1.5 0.0 0.0 0.0 0.0 1.1 0.2 0.0 0.2 0.0 0.9 2.2 1.5 0.0 0.0 0.0 0.0 0.0 0.0 1.8 0.0 0.4 0.4 0.2 0.0 0.0 0.0 2.2 0.0 0.0 0.2 0.0

2.95 0.4 2.0 0.2 0.2 0.0 0.0 0.4 0.7 0.0 0.0 0.0 0.0 1.3 4.2 0.0 0.0 0.0 0.0 0.2 0.2 1.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.4

3.05 0.4 1.7 0.0 0.0 0.0 0.0 1.1 0.7 0.2 0.0 0.0 0.4 0.2 5.7 0.0 0.2 0.2 0.0 0.4 0.4 0.9 0.4 1.7 0.0 0.7 0.0 0.0 0.0 0.9 0.4 0.0 0.7 0.9

3.15 0.7 1.8 0.0 0.0 0.0 0.2 0.7 0.4 0.0 0.0 0.0 0.7 0.7 5.0 0.0 0.2 0.0 0.0 0.0 0.2 1.1 0.7 1.3 0.2 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.2 1.1

3.25 0.9 1.5 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.0 1.1 2.2 3.3 0.0 0.4 0.0 0.0 0.0 0.0 0.7 0.9 1.3 0.2 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.7

3.35 0.2 2.4 0.0 0.0 0.0 0.0 1.5 0.2 0.0 0.0 0.2 0.7 0.9 4.4 0.0 0.0 0.0 0.0 0.0 0.0 1.5 0.4 2.0 0.4 0.0 0.0 0.0 0.0 1.8 0.0 0.0 1.3 0.9

3.45 0.4 2.0 0.0 0.2 0.0 0.0 0.7 0.4 0.0 0.0 0.2 0.9 0.0 6.5 0.0 0.2 0.0 0.0 0.0 0.0 0.9 0.4 1.5 0.0 0.4 0.0 0.0 0.2 1.1 0.4 0.0 0.2 0.7

3.55 0.7 0.9 0.0 0.0 0.0 0.0 0.2 0.7 0.0 0.0 0.4 0.2 1.3 6.8 0.0 0.2 0.0 0.0 0.2 0.0 1.7 0.7 0.9 0.2 0.0 0.0 0.0 0.0 1.7 0.2 0.0 0.4 0.0

3.65 1.1 2.6 0.2 0.0 0.0 0.0 0.4 0.9 0.2 0.0 0.0 0.0 1.3 6.5 0.0 0.0 0.2 0.0 0.0 0.2 0.7 0.0 1.7 0.4 0.2 0.0 0.0 0.0 1.3 0.0 0.0 0.2 0.7

3.75 1.5 2.0 0.0 0.0 0.0 0.0 1.3 1.1 0.0 0.0 0.4 0.7 0.2 3.9 0.0 0.2 0.0 0.0 0.0 0.0 2.6 0.0 1.1 0.4 0.2 0.0 0.0 0.0 1.5 0.0 0.0 1.1 0.4

3.85 0.9 3.5 0.0 0.2 0.0 0.0 0.7 1.1 0.2 0.0 0.0 0.2 0.9 3.9 0.0 0.0 0.0 0.0 0.0 0.2 1.1 0.0 2.0 0.0 0.0 0.0 0.0 0.0 1.3 0.2 0.0 0.2 0.9

3.95 1.1 3.9 0.2 0.2 0.0 0.0 0.9 1.1 0.0 0.0 0.2 0.2 0.4 3.1 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.2 1.1 0.0 0.4 0.0 0.0 0.0 0.7 0.0 0.0 0.4 0.4

4.05 0.2 2.9 0.2 0.0 0.0 0.4 0.4 1.1 0.0 0.0 0.0 0.2 0.4 4.6 0.0 0.0 0.0 0.0 0.2 0.0 1.1 0.0 1.1 0.2 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.9 0.9

4.15 1.3 2.6 0.2 0.7 0.0 0.4 0.7 0.4 0.0 0.0 0.0 0.7 0.9 2.4 0.0 0.2 0.0 0.0 0.0 0.0 1.3 0.0 1.3 0.9 0.0 0.0 0.0 0.0 1.3 0.2 0.0 0.4 0.0

4.25 1.3 2.4 0.0 0.2 0.0 0.4 1.5 0.0 0.2 0.0 0.0 0.4 2.0 4.8 0.0 0.4 0.0 0.0 0.2 0.0 1.3 0.0 3.7 0.2 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.2

4.35 1.5 2.2 0.6 0.0 0.0 0.2 0.4 0.2 0.0 0.0 0.2 0.0 1.1 3.5 0.0 0.2 0.0 0.0 0.0 0.2 1.3 0.0 0.4 0.0 0.0 0.0 0.0 0.2 2.2 0.2 0.0 0.2 0.2

4.45 0.9 3.9 0.0 0.0 0.0 0.4 1.1 0.2 0.0 0.0 0.0 0.2 0.7 3.1 0.0 0.7 0.0 0.0 0.0 0.0 0.9 0.0 0.7 0.9 0.2 0.0 0.0 0.0 0.9 0.0 0.0 0.2 0.0

4.55 0.4 2.2 0.4 0.0 0.0 0.2 0.2 0.9 0.2 0.0 0.0 0.4 1.5 4.4 0.0 0.2 0.0 0.0 0.2 0.0 1.3 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.0 0.0

4.65 0.9 3.7 0.0 0.0 0.0 0.0 0.9 0.7 0.0 0.0 0.0 0.0 1.8 5.7 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.2 1.5 0.0 0.2 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.2

4.75 0.2 3.7 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.0 0.2 1.8 5.3 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.4 0.7 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0

4.85 0.4 2.9 0.2 0.0 0.0 0.0 0.7 0.9 0.0 0.2 0.0 0.7 0.9 5.7 0.0 0.0 0.2 0.0 0.0 0.0 1.8 0.0 0.9 0.0 0.2 0.0 0.0 0.0 1.5 0.0 0.0 0.0 0.2

4.95 0.7 4.2 0.0 0.0 0.0 0.0 0.9 0.4 0.2 0.0 0.0 0.9 0.4 2.8 0.0 0.4 0.0 0.0 0.4 0.7 1.1 0.2 0.4 0.0 0.2 0.0 0.0 0.0 1.1 0.2 0.0 0.2 0.4

5.05 0.9 2.4 0.4 0.0 0.0 0.0 0.7 0.2 0.0 0.0 0.0 0.4 0.4 3.1 0.0 0.2 0.0 0.0 0.0 0.0 0.9 0.2 0.2 0.2 0.0 0.0 0.0 0.0 2.9 0.2 0.0 0.0 0.4

5.15 0.4 2.0 0.0 0.0 0.0 0.2 0.7 0.4 0.0 0.0 0.0 0.2 2.0 2.0 0.0 0.7 0.0 0.0 0.0 0.2 0.4 0.2 0.4 0.0 0.0 0.0 0.0 0.2 2.6 0.2 0.0 0.2 0.0

5.25 1.3 2.2 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.0 0.0 0.4 0.7 2.0 0.0 0.2 0.0 0.0 0.2 0.0 1.8 0.0 0.7 0.0 0.4 0.0 0.0 0.0 2.2 0.0 0.0 0.4 0.0

5.35 0.4 3.7 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.0 0.0 0.0 0.4 2.8 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 1.3 0.0 0.2 0.0 0.0 0.0 0.7 0.0 0.2 0.0 0.0

5.45 1.1 4.8 0.0 0.0 0.0 0.0 1.3 0.2 0.0 0.2 0.4 0.4 0.4 3.3 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.7 0.2 0.0 0.0 0.0

5.55 0.7 2.9 0.2 0.0 0.0 0.0 0.9 0.9 0.2 0.0 0.0 0.4 0.2 4.4 0.0 0.2 0.0 0.0 0.2 0.0 0.9 0.4 0.7 0.0 0.2 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.0

5.65 0.7 2.2 0.0 0.0 0.0 0.0 1.1 0.4 0.0 0.0 0.0 0.9 0.9 2.4 0.0 0.2 0.0 0.0 0.0 0.0 1.1 0.2 0.7 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.4

5.75 1.1 5.0 0.0 0.0 0.0 0.0 0.9 0.4 0.0 0.0 0.0 0.2 0.4 3.5 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.0 1.8 0.2 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.9 0.0

5.85 1.1 2.0 0.0 0.2 0.0 0.0 1.5 0.2 0.0 0.0 0.0 0.7 0.9 3.1 0.0 0.0 0.0 0.0 0.4 0.2 0.9 0.2 1.5 0.0 0.2 0.0 0.0 0.0 1.3 0.0 0.0 0.9 1.3

5.95 0.2 3.3 0.0 0.0 0.0 0.0 1.3 0.2 0.0 0.0 0.2 0.7 1.3 4.4 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.2 0.4

6.05 1.5 1.5 0.0 0.0 0.0 0.0 0.4 1.1 0.0 0.0 0.0 0.2 0.4 3.5 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.2 3.3 0.2 0.0 0.0 0.0 0.0 1.1 0.2 0.4 0.0 0.7

6.15 0.2 5.5 0.2 0.2 0.0 0.0 2.0 1.3 0.0 0.0 0.0 0.0 1.1 3.3 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.4 2.0

6.25 0.9 2.4 0.4 0.0 0.0 0.0 0.4 0.9 0.0 0.2 0.0 0.0 0.2 4.2 0.0 0.0 0.0 0.0 0.0 0.0 1.8 0.2 2.2 0.0 0.0 0.0 0.0 0.0 1.6 0.0 0.2 0.0 0.4

6.35 0.2 2.6 0.0 0.0 0.0 0.0 1.9 1.7 0.0 0.0 0.0 0.6 1.1 2.1 0.0 0.2 0.0 0.0 0.0 0.0 2.6 0.0 2.6 0.0 0.0 0.0 0.0 0.0 0.6 0.0 0.2 0.9 0.0

6.45 0.2 2.0 0.0 0.0 0.0 0.0 1.3 0.4 0.0 0.0 0.0 0.4 0.7 2.2 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.2 0.0 0.7

6.55 0.4 2.0 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.9 0.7 2.0 0.0 0.7 0.0 0.0 0.0 0.0 0.7 0.0 1.8 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.2 0.9

6.65 0.2 2.4 0.2 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.4 0.4 1.3 0.9 0.0 0.2 0.0 0.0 0.4 0.4 1.1 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.9 0.4 0.0 0.2 0.4

6.75 1.1 2.4 0.0 0.0 0.0 0.2 0.4 0.4 0.0 0.0 0.0 0.0 1.5 3.3 0.0 0.2 0.0 0.0 0.0 0.2 0.9 0.4 1.5 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.4 0.2

6.85 0.4 2.6 0.2 0.0 0.0 0.0 1.1 0.2 0.0 0.0 0.2 0.9 1.1 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.7 0.0 0.2 0.0 0.0 0.0 2.9 0.0 0.0 0.2 0.0

6.95 0.4 2.6 0.2 0.2 0.0 0.0 1.3 0.4 0.0 0.0 0.0 0.9 1.3 3.5 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.0 1.1 0.0 0.4 0.0 0.0 0.0 0.4 0.0 0.0 0.2 1.1

7.05 0.2 2.8 0.0 0.2 0.0 0.0 0.9 0.4 0.0 0.0 0.2 0.4 2.2 4.6 0.0 0.4 0.0 0.0 0.0 0.0 1.5 0.0 1.5 0.4 0.0 0.0 0.0 0.0 2.2 0.2 0.0 0.0 0.4

7.15 0.0 2.2 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.2 1.3 3.1 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.9 0.4 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.0 0.0

7.25 0.2 2.8 0.0 0.0 0.0 0.0 2.2 0.2 0.0 0.0 0.0 0.4 0.9 3.1 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.4 0.2 0.0 0.0 0.0 0.0 0.7 0.2 0.0 0.2 0.2

7.35 0.0 2.9 0.0 0.0 0.0 0.4 1.3 1.1 0.0 0.0 0.0 0.4 2.2 3.7 0.0 0.4 0.0 0.0 0.0 0.0 1.1 0.9 1.5 0.0 0.0 0.0 0.0 0.0 0.7 0.2 0.0 0.2 0.0

7.45 0.4 2.2 0.0 0.0 0.0 0.2 0.7 0.2 0.4 0.0 0.2 1.3 0.7 3.7 0.0 0.0 0.0 0.0 0.0 0.2 1.1 0.0 0.9 0.2 0.4 0.0 0.0 0.0 2.0 0.2 0.4 0.0 0.0

7.55 0.4 2.4 0.0 0.0 0.0 0.0 0.2 0.4 0.2 0.0 0.0 1.1 2.0 2.6 0.0 0.0 0.0 0.0 0.0 0.2 0.7 0.0 1.3 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.2 0.0

1c. Ten Mile Creek calcareous nannofossil census data, part 3 of 5

Column 1: Section Height (m) Column 12: Prediscosphaera cretacea Column 23: Retecapsa angustiforata

Column 2: Micula sp. Column 13: Prediscosphaera grandis Column 24: Retecapsa crenulata

Column 3: Micula swastica Column 14: Prediscosphaera intercisa Column 25: Retecapsa ficula

Column 4: Munarinus sp. Column 15: Prediscosphaera ponticula Column 26: Retecapsa schizobrachiata

Column 5: Nannoconid sp. Column 16: Prediscosphaera spinosa Column 27: Retecapsa surirella

Column 6: Octocyclus reinhardtii Column 17: Quadrum gartneri Column 28: Retemediaformis teneraretis

Column 7: Octolithus sp. Column 18: Radiolithus planus Column 29: Rhagodiscus angustus

Column 8: Orastrum campanensis Column 19: Radiolithus sp. Column 30: Rhagodiscus plebius

Column 9: Pharus evanescens Column 20: Reinhardtites anthophorus Column 31: Rhagodiscus reniformis

Column 10: Placozygus sigmoides Column 21: Reinhardtites clavicaviformis Column 32: Rhagodiscus splendens

Column 11: Prediscosphaera arkhangelskyi Column 22: Repagulum parvidentatum Column 33: Rotellapillus crenulatus

Column 34: Scapholithus fossilis

SectiMicula Micula MunarinNannocoOctocycOctolitOrastruPharus PlacozyPrediscPrediscPrediscPrediscPrediscPrediscQuadrumRadioliRadioliReinharReinharRepagulRetecapRetecapRetecapRetecapRetecapRetemedRhagodiRhagodiRhagodiRhagodiRotellaScaphol

1.25 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.9 0.2 3.9 0.9 1.1 0.0 4.8 0.2 0.0 0.0 0.2 0.0 0.9 0.0 1.3 0.0 0.0 0.4 0.2 0.2 0.9 0.2 0.0 0.2 0.4

1.35 0.0 0.0 2.6 0.0 0.0 0.0 0.0 0.0 0.4 0.9 7.7 0.7 1.5 0.9 4.6 0.2 0.0 0.0 1.3 0.0 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.2 0.2 0.4 0.0 0.2 0.0

1.45 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.7 5.3 0.0 1.5 0.0 4.8 0.2 0.2 0.0 0.2 0.0 0.2 0.2 0.2 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.2 0.4 0.2

1.55 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.7 1.1 7.0 0.4 0.2 0.0 3.9 0.7 0.0 0.0 1.3 0.0 0.9 0.0 1.1 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.7 0.4 0.4

1.65 0.2 0.2 0.7 0.0 0.0 0.0 0.0 0.0 0.2 0.7 7.0 0.2 2.2 1.1 6.1 0.2 0.0 0.2 0.4 0.0 0.7 0.2 0.7 0.0 0.0 0.2 1.1 0.4 0.7 0.0 0.0 0.4 0.7

1.75 0.2 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.4 1.3 5.3 0.4 3.1 0.2 5.3 0.0 0.0 0.0 0.2 0.0 2.0 0.0 1.5 0.0 0.0 0.4 0.0 1.8 0.7 0.0 0.2 0.0 0.0

1.85 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.4 0.4 3.3 0.4 1.3 0.2 4.4 0.2 0.0 0.0 0.2 0.0 1.5 0.4 0.7 0.0 0.0 0.4 0.4 0.9 0.2 0.0 0.0 0.9 0.0

1.95 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.2 0.9 6.6 0.2 1.3 0.2 3.9 0.9 0.0 0.0 0.7 0.0 2.6 0.2 0.7 0.0 0.0 0.2 0.2 0.7 0.2 0.2 0.7 0.2 0.0

2.05 0.2 0.0 1.1 0.2 0.0 0.0 0.0 0.0 0.0 0.9 4.8 0.0 0.7 0.0 3.5 0.4 0.0 0.0 0.4 0.0 0.7 0.2 1.3 0.0 0.0 0.4 0.2 0.0 0.7 0.2 0.4 1.3 0.0

2.15 0.0 0.0 1.8 0.0 0.0 0.0 0.0 0.0 0.0 0.2 4.2 0.2 1.3 0.2 2.2 0.2 0.0 0.0 0.4 0.0 2.0 0.2 0.7 0.0 0.0 0.4 0.2 0.2 0.0 0.0 0.4 0.4 0.4

2.25 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.9 0.9 4.2 0.4 2.4 0.7 2.0 0.2 0.0 0.0 0.4 0.0 3.1 0.2 1.3 0.0 0.0 0.7 0.2 0.9 0.7 0.0 0.0 0.0 0.7

2.35 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.7 8.1 0.2 1.3 0.2 3.7 0.2 0.0 0.0 0.7 0.0 0.2 0.2 1.3 0.0 0.0 0.0 0.0 0.2 0.4 0.2 0.2 0.2 0.4

2.45 0.2 0.0 1.1 0.0 0.0 0.0 0.0 0.0 0.7 0.4 6.6 0.4 0.9 0.2 2.8 0.0 0.0 0.0 1.3 0.0 0.0 0.2 2.2 0.0 0.0 0.2 0.9 0.9 0.2 0.0 0.4 0.0 0.0

2.55 0.0 0.0 0.9 0.0 0.0 0.2 0.0 0.0 0.9 0.0 6.8 0.4 0.9 0.4 2.0 0.2 0.0 0.2 1.1 0.0 0.2 0.0 1.5 0.0 0.0 0.2 0.0 0.2 0.2 0.0 0.2 0.0 0.2

2.65 0.0 0.0 1.8 0.0 0.0 0.0 0.0 0.0 0.0 1.1 8.1 0.7 2.0 0.0 2.4 0.2 0.0 0.2 1.3 0.0 0.0 0.0 1.1 0.0 0.0 0.4 0.0 0.7 0.4 0.0 0.2 0.4 0.2

2.75 0.2 0.0 1.9 0.0 0.0 0.0 0.0 0.0 1.1 0.6 8.2 1.1 0.6 0.2 3.4 0.2 0.0 0.0 1.3 0.2 0.2 0.2 1.5 0.0 0.0 0.2 0.0 0.6 0.4 0.0 0.0 0.0 0.0

2.85 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.0 1.3 0.7 7.9 0.7 1.1 0.2 4.6 0.0 0.2 0.2 0.7 0.2 0.0 0.4 0.2 0.0 0.0 0.4 0.0 0.2 0.9 0.0 0.4 0.4 0.2

2.95 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.2 0.7 3.9 0.2 2.8 0.2 4.2 0.4 0.0 0.2 0.4 0.0 0.2 0.2 0.9 0.0 0.4 0.7 0.0 0.4 0.2 0.0 0.2 0.7 0.0

3.05 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.2 0.0 0.2 6.1 0.2 3.9 0.7 2.8 0.2 0.0 0.0 0.4 0.2 0.7 0.7 0.7 0.0 0.0 0.2 0.0 0.4 0.4 0.0 0.2 1.1 0.4

3.15 0.0 0.0 0.4 0.0 0.0 0.0 0.2 0.0 0.7 0.4 6.1 0.2 2.2 0.2 3.9 0.2 0.0 0.0 0.7 0.2 0.4 0.4 0.7 0.0 0.0 0.4 0.2 1.3 0.2 0.0 0.2 0.4 0.0

3.25 0.0 0.0 0.9 0.0 0.0 0.0 0.2 0.0 0.9 0.4 2.4 0.0 2.2 0.2 2.0 0.0 0.0 0.2 0.0 0.0 2.2 0.0 1.1 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.4 0.7 0.0

3.35 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.9 0.4 5.9 0.2 2.2 0.0 5.3 0.4 0.0 0.0 0.2 0.0 1.1 0.4 1.5 0.0 0.0 0.2 0.0 0.2 0.0 0.2 0.2 0.2 0.0

3.45 0.2 0.0 2.0 0.0 0.0 0.0 0.2 0.0 0.9 0.2 6.1 0.4 1.1 0.0 3.5 0.7 0.0 0.0 0.4 0.0 0.7 0.0 0.4 0.0 0.0 0.0 0.4 0.9 0.2 0.0 0.2 0.0 0.0

3.55 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.7 0.2 5.4 0.2 1.3 0.2 6.5 0.0 0.0 0.4 0.0 0.0 0.9 0.0 1.3 0.0 0.0 0.2 0.2 0.9 0.4 0.0 0.2 0.2 0.0

3.65 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.9 0.2 6.5 0.4 0.4 0.2 7.0 0.2 0.2 0.0 0.4 0.0 0.4 0.4 0.9 0.0 0.2 0.2 0.0 0.4 0.4 0.0 0.0 0.4 0.0

3.75 0.2 0.0 1.1 0.7 0.0 0.0 0.0 0.0 0.7 0.2 6.3 0.2 2.4 0.4 4.1 0.4 0.4 0.0 0.2 0.0 0.9 0.2 0.7 0.0 0.0 0.0 0.2 0.4 0.2 0.0 0.0 0.4 0.2

3.85 0.0 0.0 2.8 0.0 0.0 0.0 0.0 0.0 0.0 0.9 7.2 0.7 1.8 0.0 3.1 0.2 0.2 0.0 0.2 0.0 0.9 0.4 1.1 0.0 0.0 0.7 0.7 0.9 0.0 0.0 0.7 0.4 0.4

3.95 0.0 0.0 2.6 0.2 0.0 0.0 0.0 0.0 1.1 0.4 5.9 0.2 1.3 0.4 5.0 0.0 0.0 0.0 0.4 0.0 0.7 0.2 0.2 0.0 0.0 0.0 0.0 0.7 0.9 0.2 0.2 0.4 0.2

4.05 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.7 0.2 5.9 0.4 2.0 0.2 3.3 0.0 0.0 0.0 0.2 0.0 0.0 0.2 2.4 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.7 0.4 0.2

4.15 0.0 0.0 1.5 0.0 0.0 0.0 0.0 0.0 0.0 0.4 5.5 0.4 0.7 0.0 5.5 0.4 0.0 0.0 0.0 0.0 0.2 0.4 0.4 0.0 0.0 0.7 0.7 0.0 0.2 0.0 0.0 0.0 0.2

4.25 0.0 0.0 1.8 0.0 0.0 0.0 0.0 0.0 0.4 0.2 7.0 0.0 1.3 0.2 5.5 0.0 0.2 0.4 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.0 0.0 0.2 0.7 0.0 0.0 0.0

4.35 0.0 0.0 3.5 0.0 0.0 0.0 0.0 0.0 0.4 0.2 5.2 0.6 2.6 0.0 4.5 0.0 0.4 0.2 0.2 0.2 0.0 0.0 0.9 0.0 0.0 0.4 0.2 0.6 0.6 0.2 0.4 0.0 0.6

4.45 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.7 0.2 4.8 0.0 2.6 0.0 7.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.4 0.0 0.7 0.4 0.2 0.7 0.2 0.0

4.55 0.0 0.0 3.1 0.0 0.0 0.0 0.0 0.0 0.4 0.0 3.9 0.2 2.0 0.0 5.7 0.2 0.0 0.4 0.2 0.0 0.2 0.0 0.4 0.0 0.2 0.4 0.0 0.2 0.2 0.2 0.0 0.2 0.2

4.65 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.0 1.3 0.2 6.6 0.2 3.1 0.4 5.9 0.0 0.0 0.0 1.1 0.2 0.2 0.0 1.3 0.0 0.0 0.4 0.0 0.9 0.7 0.4 0.2 0.2 0.0

4.75 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.2 0.4 7.9 0.9 2.9 0.0 7.9 0.2 0.0 0.2 1.1 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.7 1.1 0.7 0.2 0.4 0.0 0.2

4.85 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.4 7.0 0.7 2.6 0.2 4.2 0.0 0.0 0.2 0.7 0.0 0.4 0.2 0.4 0.0 0.0 0.0 0.2 0.4 0.7 0.0 0.0 0.7 0.0

4.95 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.9 0.7 6.3 0.0 3.1 0.4 3.3 0.0 0.0 0.9 0.0 0.0 0.0 1.1 1.5 0.0 0.0 0.0 0.0 2.0 0.4 0.2 0.0 0.0 0.0

5.05 0.0 0.0 3.5 0.0 0.0 0.0 0.0 0.0 0.9 0.2 4.6 0.0 1.1 0.4 5.3 0.2 0.0 0.0 0.2 0.2 0.0 0.0 0.9 0.0 0.0 0.2 0.7 0.7 0.4 0.0 0.0 0.7 0.4

5.15 0.2 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.7 1.1 2.2 0.0 0.9 0.0 5.3 0.0 0.0 0.0 0.7 0.2 0.7 0.0 1.5 0.0 0.0 0.2 0.4 1.1 0.4 0.2 0.0 0.4 0.2

5.25 0.0 0.0 2.2 0.2 0.0 0.0 0.2 0.0 0.4 0.2 5.3 0.0 2.2 0.0 4.9 0.0 0.2 0.2 0.4 0.0 0.4 0.7 0.7 0.0 0.0 0.0 0.4 0.2 0.7 0.7 0.0 0.2 0.0

5.35 0.0 0.0 1.7 0.0 0.0 0.0 0.0 0.0 1.1 1.5 5.0 0.9 2.6 0.2 5.5 0.0 0.0 0.4 0.0 0.0 0.2 0.4 0.7 0.0 0.0 0.2 0.0 0.4 0.2 0.0 0.4 0.2 0.4

5.45 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.2 1.1 5.9 0.4 4.2 0.4 6.1 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.2 0.0 0.0 0.7 0.2 0.2 0.4 0.2 0.4 0.9 0.2

5.55 0.0 0.0 2.0 0.2 0.0 0.0 0.0 0.0 0.0 0.4 5.3 0.7 2.4 0.4 8.1 0.2 0.0 0.0 0.2 0.0 0.7 0.0 0.2 0.0 0.0 0.4 0.2 0.4 0.2 0.4 0.2 0.9 0.0

5.65 0.0 0.0 2.4 0.2 0.0 0.0 0.0 0.0 0.2 0.4 6.4 0.9 2.4 0.0 7.2 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.9 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0

5.75 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.0 0.7 0.4 5.7 0.4 1.5 0.7 6.8 0.4 0.0 0.0 0.2 0.0 0.4 0.2 0.7 0.0 0.0 0.0 0.2 0.7 0.4 0.2 0.0 0.2 0.0

5.85 0.0 0.0 1.1 0.4 0.0 0.0 0.0 0.0 0.7 0.4 3.9 0.2 3.5 0.2 9.4 0.2 0.0 0.0 0.0 0.0 0.2 0.2 1.1 0.0 0.0 0.2 0.4 0.2 0.4 0.0 0.2 0.2 0.2

5.95 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 6.3 0.2 3.7 0.0 5.7 0.4 0.0 0.0 0.0 0.0 0.7 0.2 0.7 0.0 0.0 0.7 0.4 0.4 0.0 0.0 0.4 0.2 0.0

6.05 0.0 0.0 2.2 0.2 0.0 0.0 0.0 0.0 0.4 0.2 4.8 0.4 1.5 0.4 5.5 0.2 0.0 0.2 0.0 0.2 1.1 0.2 0.2 0.0 0.0 0.0 0.2 0.9 0.0 0.2 0.4 0.4 0.2

6.15 0.0 0.0 1.1 0.2 0.0 0.0 0.0 0.0 0.4 0.0 4.2 1.1 2.9 0.0 6.4 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.7 0.0 0.0 0.2 0.7 0.2 0.0 0.0 0.4 0.2 0.0

6.25 0.0 0.0 0.9 0.2 0.0 0.0 0.0 0.0 0.4 0.7 5.1 0.7 2.0 0.0 7.6 0.2 0.4 0.0 0.2 0.0 0.9 0.2 0.9 0.0 0.0 0.0 0.2 1.1 0.4 0.0 0.4 0.7 0.0

6.35 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.0 0.6 0.2 6.0 0.4 3.8 0.0 2.8 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.4 0.0 0.0 0.0 0.4 0.9 0.9 0.0 0.0 0.2 0.2

6.45 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.9 1.1 8.3 1.1 2.0 0.0 4.8 0.0 0.2 0.4 0.7 0.0 0.2 0.2 1.8 0.0 0.0 0.0 0.4 0.4 0.9 0.0 0.0 0.4 0.0

6.55 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.2 5.1 0.7 5.3 0.9 5.7 0.2 0.0 0.0 0.2 0.0 0.4 0.2 1.3 0.0 0.0 0.7 0.0 1.3 0.0 0.0 0.2 0.0 0.0

6.65 0.0 0.0 1.1 0.2 0.0 0.0 0.0 0.0 0.7 0.2 7.5 0.2 2.4 0.2 5.1 0.4 0.0 0.0 0.0 0.0 0.2 0.2 1.1 0.0 0.0 0.7 0.0 0.4 0.7 0.0 0.2 0.0 0.2

6.75 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 1.1 0.4 3.7 0.7 3.3 0.2 5.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 2.4 0.0 0.0 0.2 0.2 0.2 0.4 0.7 0.4 0.4 0.0

6.85 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 6.6 1.1 2.0 0.0 3.5 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.9 0.0 0.0 0.0 0.2 0.4 0.2 0.2 0.0 0.0 0.0

6.95 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.7 3.9 0.7 2.4 0.2 3.9 0.2 0.0 0.0 0.0 0.0 0.2 0.7 1.1 0.0 0.0 0.2 0.0 0.9 0.7 0.0 0.0 0.7 0.2

7.05 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.7 9.2 0.4 1.1 0.0 2.8 0.0 0.0 0.0 0.4 0.0 0.0 0.0 1.3 0.0 0.0 0.2 0.2 0.2 0.0 0.2 0.0 0.0 0.0

7.15 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.9 0.2 8.8 0.0 3.3 0.0 5.3 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.2 0.0 1.3 0.4 0.2 0.2 0.0 0.0

7.25 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.4 8.8 0.7 1.5 0.2 4.2 0.0 0.0 0.0 0.7 0.0 0.0 0.2 1.8 0.0 0.0 0.4 0.2 0.7 0.7 0.2 0.2 0.0 0.0

7.35 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.2 0.4 6.4 0.2 3.3 0.0 1.3 0.0 0.0 0.0 0.2 0.0 0.9 0.0 1.5 0.0 0.0 0.2 0.4 0.4 0.2 0.2 0.0 0.2 0.4

7.45 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.4 0.9 5.0 0.7 3.5 0.2 4.2 0.0 0.0 0.0 0.0 0.0 0.2 0.4 1.1 0.0 0.0 0.4 0.0 0.7 1.1 0.0 0.2 0.2 0.0

7.55 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 0.0 0.4 5.5 0.2 2.9 0.0 3.3 0.0 0.0 0.0 0.7 0.0 0.7 0.0 1.1 0.0 0.0 0.0 0.2 0.7 0.2 0.4 0.2 0.4 0.0

1d. Ten Mile Creek calcareous nannofossil census data, part 4 of 5

Column 1: Section Height (m) Column 12: Staurolithites sp. 1 Column 23: Tortolithus dodekachelyon

Column 2: Seribiscutum primitivum Column 13: Staurolithites sp. 2 Column 24: Tranolithus exiguus

Column 3: Sm. P. sigm, Z. erec, etc… Column 14: Staurolithites zoensis Column 25: Tranolithus gabalus

Column 4: Sollasites barringtonensis Column 15: Stoverius asymmetricus Column 26: Tranolithus macleodiae

Column 5: Sollasites sp. Column 16: Stoverius sp. Column 27: Tranolithus manifestus

Column 6: Staurolithites crux Column 17: Stoverius biarcus Column 28: Tranolithus minimus

Column 7: Stuarolithites dorfii Column 18: Stoverius coronatus Column 29: Tranolithus phacelosus

Column 8: Staurolithites ellipticus Column 19: Stradnerlithus rhombicus Column 30: U. gothicus?

Column 9: Staurolithites imbricatus Column 20: Tegumentum stradneri Column 31: Watznaueria barnasae

Column 10: Staurolithites mielnicensis Column 21: Tetrapodorhabdus copt/dec Column 32: Watznaueria biporta

Column 11: Stuarolithites mitcheneri Column 22: Thiersteinia ecclesiastica Column 33: Watznaueria fossicincta

Column 34: Watznaueria ovata

SectiSeribisSm. P. SollasiSollasiStaurolStuarolStaurolStaurolStaurolStuarolStaurolStaurolStaurolStoveriStoveriStoveriStoveriStradneTegumenTetrapoThierstTortoliTranoliTranoliTranoliTranoliTranoliTranoliU. gothWatznauWatznauWatznauWatznau

1.25 0.0 2.4 0.0 0.0 1.5 0.0 0.7 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 2.0 0.4 0.0 0.2 1.7 0.4 0.0 26.0 0.0 0.7 0.2

1.35 0.0 2.2 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.2 1.1 0.0 2.2 0.0 0.0 0.2 1.1 1.1 0.0 30.7 0.2 0.7 0.7

1.45 0.0 1.8 0.0 0.2 1.3 0.2 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.4 0.7 0.0 1.8 0.0 0.0 0.0 3.5 1.5 0.0 24.8 0.2 0.9 0.2

1.55 0.0 2.9 0.0 0.2 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.2 0.2 0.2 1.5 0.2 0.0 0.0 3.5 1.5 0.0 22.8 0.0 1.5 0.4

1.65 0.0 2.2 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.7 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.1 0.2 0.0 0.0 2.0 1.7 0.0 20.3 0.2 0.9 0.4

1.75 0.0 3.7 0.0 0.0 0.2 0.0 0.9 0.0 0.0 0.2 0.0 0.9 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 2.9 0.0 0.2 0.0 2.2 3.3 0.0 18.2 0.0 1.3 0.2

1.85 0.0 2.9 0.0 0.0 0.2 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.9 0.2 0.2 0.0 2.6 3.3 0.0 18.9 0.0 1.1 0.2

1.95 0.0 2.0 0.0 0.0 0.7 0.2 0.2 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.0 1.1 0.0 1.5 0.2 0.0 0.0 0.9 2.4 0.0 25.2 0.2 0.7 0.0

2.05 0.0 2.6 0.0 0.0 0.4 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 1.7 0.0 2.2 0.2 0.0 0.0 0.7 1.7 0.0 26.2 0.9 0.9 0.0

2.15 0.0 4.2 0.0 0.0 0.4 0.0 1.8 0.0 0.0 0.2 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 1.5 0.0 2.6 0.0 0.0 0.0 0.7 4.0 0.0 23.3 0.0 0.4 0.0

2.25 0.0 4.2 0.0 0.0 0.2 0.0 1.1 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.4 0.0 0.4 0.2 0.0 0.0 2.6 2.9 0.0 16.4 0.0 0.9 0.0

2.35 0.0 2.4 0.0 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 1.3 0.0 0.0 0.0 0.4 0.9 0.0 26.2 0.2 0.9 0.0

2.45 0.0 2.6 0.0 0.0 0.4 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 1.5 0.0 0.0 0.0 1.5 1.8 0.0 28.9 0.2 0.9 0.0

2.55 0.0 4.8 0.0 0.0 0.7 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.4 0.0 2.0 0.0 0.0 0.2 2.0 1.3 0.0 23.9 0.0 0.4 0.0

2.65 0.0 3.7 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.7 0.0 1.8 0.4 0.0 0.0 2.9 1.8 0.0 22.4 0.0 0.7 0.0

2.75 0.0 4.9 0.0 0.0 0.2 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.0 0.2 0.0 1.1 0.0 0.0 0.0 2.8 0.9 0.0 20.6 0.2 1.3 0.9

2.85 0.0 4.8 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 2.0 0.0 0.0 0.0 2.4 1.1 0.0 22.8 0.0 1.8 1.5

2.95 0.0 3.5 0.0 0.0 0.4 0.0 0.7 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 2.4 0.0 0.0 0.4 1.1 2.6 0.0 19.7 0.2 0.9 0.2

3.05 0.0 2.2 0.0 0.0 0.2 0.7 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 2.8 0.2 0.2 0.0 2.2 2.6 0.0 21.6 0.0 0.2 0.2

3.15 0.0 3.1 0.0 0.0 0.0 0.2 0.7 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.4 0.0 3.1 0.2 0.0 0.0 1.8 1.1 0.0 25.4 0.0 0.4 0.9

3.25 0.0 3.9 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 2.9 0.0 0.2 0.0 2.6 1.8 0.0 17.8 0.0 1.8 0.0

3.35 0.0 0.9 0.0 0.0 0.2 0.2 0.9 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 1.1 0.2 0.0 0.0 2.6 1.3 0.0 20.8 0.0 0.4 0.4

3.45 0.0 4.3 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.4 0.0 3.3 0.2 0.0 0.4 2.4 1.1 0.0 19.3 0.0 1.7 0.0

3.55 0.0 4.6 0.0 0.0 0.2 0.0 1.1 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.4 0.0 2.0 0.0 0.0 0.2 2.4 0.9 0.0 14.8 0.0 0.7 0.0

3.65 0.0 2.6 0.0 0.0 0.2 0.0 1.1 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 1.1 0.0 0.0 0.0 2.8 2.6 0.0 19.2 0.0 2.0 0.0

3.75 0.0 1.5 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.2 0.2 0.0 0.2 1.5 1.7 0.0 21.4 0.0 0.0 0.0

3.85 0.0 2.8 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.2 1.3 1.5 0.0 21.4 0.0 0.7 0.0

3.95 0.0 3.7 0.0 0.0 0.9 0.0 0.4 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.2 0.0 2.0 0.2 0.0 0.0 1.1 1.3 0.0 20.7 0.0 2.2 0.2

4.05 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.9 0.0 1.5 0.0 0.0 0.2 2.2 0.9 0.0 23.9 0.0 0.9 0.0

4.15 0.0 3.7 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 1.1 0.0 0.0 0.0 2.2 0.4 0.0 20.4 0.0 0.9 0.4

4.25 0.0 2.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.4 0.0 1.1 0.0 0.0 0.2 1.5 1.5 0.0 19.9 0.0 0.9 0.2

4.35 0.0 5.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.6 0.0 0.0 0.0 0.6 1.3 0.0 14.5 0.0 0.9 0.0

4.45 0.0 4.4 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 2.0 0.0 0.0 0.2 2.2 1.3 0.0 14.4 0.0 1.3 0.2

4.55 0.0 2.8 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.2 0.0 2.6 0.0 0.0 0.4 2.4 0.9 0.0 12.5 0.0 0.9 0.0

4.65 0.0 4.2 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.2 0.0 2.2 0.0 0.0 0.0 1.3 1.5 0.0 14.9 0.0 0.4 0.0

4.75 0.0 1.5 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 1.1 0.0 1.1 0.0 0.0 0.0 1.5 0.9 0.0 17.1 0.0 0.4 0.0

4.85 0.0 0.2 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.9 0.0 2.0 0.0 0.0 0.2 2.2 1.3 0.0 18.9 0.0 1.1 0.0

4.95 0.0 2.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.7 0.0 3.1 0.0 0.0 0.4 1.1 0.2 0.0 14.4 0.0 1.5 0.0

5.05 0.0 3.3 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.2 0.0 0.0 0.0 2.9 2.6 0.0 19.1 0.0 0.4 0.0

5.15 0.0 4.4 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 2.6 1.1 0.0 14.0 0.0 0.7 0.0

5.25 0.0 2.9 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.0 3.3 2.0 0.0 19.5 0.0 0.2 0.0

5.35 0.0 0.9 0.0 0.0 0.4 0.0 0.9 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.9 0.2 0.0 0.0 1.7 1.5 0.0 18.6 0.0 0.4 0.2

5.45 0.0 2.4 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 1.1 0.0 0.0 0.0 3.3 0.7 0.0 17.5 0.0 0.2 0.0

5.55 0.0 4.8 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 1.3 0.2 0.0 0.0 1.3 2.0 0.0 20.8 0.0 0.0 0.0

5.65 0.0 4.2 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 2.2 0.0 0.0 0.0 1.8 1.3 0.0 27.0 0.0 1.1 0.0

5.75 0.0 1.3 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4 0.4 0.0 0.0 2.6 0.7 0.0 23.0 0.0 0.2 0.7

5.85 0.0 2.2 0.0 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.0 1.1 2.6 0.0 21.3 0.4 0.2 0.2

5.95 0.0 2.8 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.2 0.0 0.0 4.1 2.4 0.0 14.6 0.0 0.2 0.0

6.05 0.0 3.1 0.0 0.0 0.4 0.0 1.8 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.0 3.5 2.4 0.0 19.3 0.0 0.4 0.2

6.15 0.0 2.6 0.0 0.0 0.4 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.9 0.0 0.0 0.2 1.8 4.4 0.0 25.9 0.2 0.9 0.0

6.25 0.0 2.9 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.0 3.1 2.7 0.0 19.2 0.0 1.8 0.0

6.35 0.0 3.8 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.0 2.4 1.5 0.0 21.8 0.0 1.5 0.0

6.45 0.0 1.3 0.0 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.0 2.2 0.2 0.0 0.0 0.4 0.9 0.0 25.2 0.4 3.1 0.7

6.55 0.0 2.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.0 0.9 0.2 0.0 0.2 3.1 1.8 0.0 24.2 0.0 1.3 0.0

6.65 0.0 1.3 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.4 0.0 1.1 0.0 0.0 0.0 4.4 2.9 0.0 23.3 0.0 0.0 0.2

6.75 0.0 3.1 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 1.8 0.0 0.0 0.0 2.4 2.2 0.0 21.9 0.0 0.7 0.0

6.85 0.0 4.2 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 1.3 0.0 0.0 0.4 2.2 2.6 0.0 23.5 0.0 1.3 0.0

6.95 0.0 3.1 0.0 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 1.3 0.0 2.4 0.2 0.0 0.0 2.0 2.2 0.0 24.0 0.2 0.7 0.0

7.05 0.0 3.5 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.8 0.0 0.0 0.2 2.6 0.4 0.0 20.4 0.2 0.7 0.0

7.15 0.0 2.8 0.0 0.0 0.9 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.9 0.0 3.7 0.0 0.0 0.7 1.3 0.9 0.0 18.4 0.0 1.5 0.0

7.25 0.0 0.7 0.0 0.0 0.9 0.0 0.2 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.2 0.0 2.6 0.0 0.0 0.2 1.5 0.7 0.2 23.6 0.2 1.3 0.2

7.35 0.0 1.1 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 3.5 0.2 0.0 0.0 2.0 0.4 0.0 20.4 0.0 1.1 0.0

7.45 0.0 1.1 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.8 0.0 0.0 0.0 0.4 0.2 0.0 21.2 0.0 0.9 0.2

7.55 0.0 0.9 0.0 0.0 0.7 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.9 0.2 0.0 0.2 2.6 1.8 0.0 22.6 0.0 0.4 0.0

1e. Ten Mile Creek calcareous nannofossil census data, part 5 of 5

Column 1: Section Height (m)

Column 2: Watznaueria quadriradiata

Column 3: Zeugrhabdotus diplogrammus

Column 4: Zeugrhabdotus erectus

Column 5: Zeug. pseudanthophorus

Column 6: Zeugrhabdotus scutula

Column 7: Zeugrhabdotus spiralis

Column 8: Zeugrhabdotus trivectus

Column 9: Zeugrhabdotus wynnhayi

Column 10: Helicolithus varolii

SectiWatznauZeugrhaZeugrhaZeug. pZeugrhaZeugrhaZeugrhaZeugrhaHelicolithus varolii

1.25 0.0 0.0 3.9 0.0 0.7 0.2 0.2 0.0 0.0

1.35 0.2 0.0 4.6 0.0 0.7 0.0 0.4 0.0 0.0

1.45 0.4 0.4 4.6 0.0 1.1 0.4 0.0 0.0 0.0

1.55 0.2 0.0 5.0 0.2 0.2 0.0 0.2 0.0 0.0

1.65 0.2 0.7 6.1 0.0 0.4 0.0 0.0 0.0 0.0

1.75 0.4 0.4 2.6 0.0 0.0 0.4 0.0 0.0 0.0

1.85 0.0 0.0 3.7 0.0 0.7 0.0 0.4 0.0 0.0

1.95 0.2 0.4 2.2 0.0 0.9 0.0 0.0 0.0 0.0

2.05 0.7 0.4 3.9 0.0 0.4 0.0 0.0 0.0 0.0

2.15 0.0 0.0 3.1 0.0 1.5 0.0 0.4 0.0 0.0

2.25 0.4 0.0 2.4 0.0 2.0 0.0 0.0 0.0 0.0

2.35 0.0 0.2 2.2 0.0 1.8 0.4 0.2 0.0 0.0

2.45 0.2 0.0 2.2 0.0 1.5 0.0 0.2 0.0 0.0

2.55 0.2 0.0 3.1 0.0 2.4 0.0 0.2 0.0 0.0

2.65 0.2 0.4 3.3 0.0 1.3 0.0 0.0 0.0 0.0

2.75 0.0 0.0 4.3 0.0 2.1 0.2 0.4 0.0 0.0

2.85 0.2 0.0 3.7 0.0 3.3 0.0 0.2 0.2 0.0

2.95 1.5 0.2 4.2 0.0 4.8 0.0 0.0 0.0 0.2

3.05 0.4 0.4 4.6 0.0 2.4 0.0 0.2 0.0 0.0

3.15 0.4 0.0 4.6 0.0 2.8 0.0 0.0 0.2 0.0

3.25 0.2 0.0 8.3 0.0 2.2 0.0 0.0 0.0 0.0

3.35 0.4 0.4 4.8 0.0 2.6 0.0 0.2 0.0 0.0

3.45 0.4 0.4 7.2 0.0 0.9 0.0 0.0 0.0 0.0

3.55 0.7 0.4 8.9 0.0 1.5 0.2 0.4 0.0 0.0

3.65 0.2 0.0 4.6 0.0 1.3 0.2 0.4 0.0 0.0

3.75 0.4 0.0 6.3 0.0 1.7 0.4 0.2 0.2 0.0

3.85 0.0 0.2 5.5 0.0 2.2 0.2 0.0 0.0 0.0

3.95 0.2 0.0 6.8 0.0 1.5 0.0 0.0 0.0 0.0

4.05 0.0 0.2 5.7 0.0 1.8 0.0 0.0 0.0 0.2

4.15 0.2 0.0 9.6 0.0 2.2 0.4 0.2 0.0 0.0

4.25 0.0 0.0 6.1 0.0 2.6 0.0 0.0 0.0 0.0

4.35 0.0 0.0 9.1 0.0 2.2 0.0 0.4 0.0 0.2

4.45 0.2 0.2 13.1 0.0 5.7 0.7 0.0 0.0 0.0

4.55 0.9 0.0 12.5 0.0 4.6 0.0 0.0 0.0 0.0

4.65 0.4 0.0 5.5 0.0 4.2 0.2 0.4 0.0 0.0

4.75 0.2 0.2 10.7 0.0 1.1 0.4 0.0 0.0 0.0

4.85 0.4 0.0 8.8 0.2 2.0 0.0 0.0 0.0 0.2

4.95 0.0 0.0 11.8 0.0 2.2 0.2 0.0 0.2 0.2

5.05 0.0 0.0 6.8 0.0 0.9 0.0 0.2 0.0 0.0

5.15 0.0 0.7 11.2 0.0 2.2 0.0 0.0 0.0 0.0

5.25 0.2 0.0 7.1 0.0 1.8 0.0 0.0 0.0 0.0

5.35 0.2 0.0 8.1 0.0 2.2 0.0 0.0 0.0 0.0

5.45 0.4 0.2 6.8 0.0 2.6 0.2 0.2 0.0 0.0

5.55 0.0 0.0 6.4 0.0 1.8 0.4 0.0 0.0 0.0

5.65 0.0 0.4 5.9 0.0 0.9 0.0 0.0 0.0 0.2

5.75 0.7 0.0 7.5 0.0 1.3 0.7 0.2 0.0 0.0

5.85 0.2 0.4 4.6 0.0 1.1 0.0 0.2 0.0 0.0

5.95 0.0 0.4 7.0 0.0 0.2 0.0 0.4 0.2 0.0

6.05 0.0 0.2 7.9 0.0 1.3 0.2 0.2 0.0 0.0

6.15 0.0 0.0 5.7 0.0 1.1 0.0 0.0 0.0 0.0

6.25 0.0 0.0 6.2 0.0 1.1 0.4 0.2 0.0 0.0

6.35 0.0 0.0 5.8 0.0 1.7 0.0 0.2 0.0 0.2

6.45 0.2 0.2 6.1 0.0 2.4 0.2 0.2 0.0 0.0

6.55 0.0 0.0 6.2 0.0 0.9 0.0 0.2 0.0 0.0

6.65 0.0 0.2 6.2 0.0 1.8 0.0 0.2 0.0 0.0

6.75 0.0 0.0 5.5 0.0 1.1 0.2 0.2 0.0 0.0

6.85 0.0 0.0 5.3 0.0 2.0 0.0 0.4 0.0 0.0

6.95 0.2 0.0 5.9 0.0 2.8 0.0 0.4 0.0 0.2

7.05 0.0 0.0 7.7 0.0 2.4 0.2 0.2 0.0 0.0

7.15 0.0 0.0 7.9 0.0 2.0 0.0 0.0 0.0 0.0

7.25 0.0 0.0 6.1 0.0 1.8 0.9 0.4 0.0 0.0

7.35 0.0 0.7 8.6 0.0 1.3 0.0 0.0 0.4 0.2

7.45 0.2 0.2 10.5 0.0 2.8 0.0 0.2 0.2 0.0

7.55 0.2 0.0 9.6 0.0 2.4 0.2 0.0 0.2 0.0

2a. Smoky Hill calcareous nannofossil census data, upper section, part 1 of 5

Column 1: Section Height (m) Column 12: Biscutum notaculum Column 23: Corollithion exiguum

Column 2: Ahmuellerella octoradiata Column 13: Biscutum zulloi Column 24: Corollithion madagascarensis

Column 3: Amphizygus brooksii Column 14: Braarudosphaera bigelowii Column 25: Corollithion signum

Column 4: Amphizygus megalops Column 15: Broinsonia matalosa Column 26: Cretarhadus conicus

Column 5: Arkhangelskiella confusa Column 16: Broinsonia signata Column 27: Cribrosphaera circula

Column 6: Arkhangelskiella cymbiformis Column 17: Bukrylithus ambiguus Column 28: Cribrosphaerella ehrenbergii

Column 7: Axopodorhabdid sp. Column 18: Calculites obscurus Column 29: Cribrosphaerella pelta

Column 8: Biscutum blacki Column 19: Calculites ovalis Column 30: Cyclogelosphaera margharelli

Column 9: Biscutum constans Column 20: Chiastozygus amphipons Column 31: Cyclogelosphaera rotaclypeata

Column 10: Biscutum dissimilis Column 21: Chiastozygus litterarius Column 32: Cylindralithus nudus

Column 11: Biscutum hattneri Column 22: Corrollithion ellipticum Column 33: Discorhabdus ignotus

Column 34: Eiffellithus eximius

SectiAhmuellAmphizyAmphizyArkhangArkhangAxopodoBiscutuBiscutuBiscutuBiscutuBiscutuBiscutuBraarudBroinsoBroinsoBukryliCalculiCalculiChiastoChiastoCorrollCorolliCorolliCorolliCretarhCribrosCribrosCribrosCyclogeCyclogeCylindrDiscorhEiffell

0 0.2 0.2 0.0 0.2 0.0 0.0 0.0 11.8 0.0 0.2 0.0 3.5 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 2.6 0.0 0.0 1.3 1.3 1.1 0.0 0.0 1.8 1.8

1 0.2 0.0 0.0 0.4 0.0 0.0 0.0 4.6 0.0 0.2 0.0 4.2 0.0 0.0 0.0 0.0 1.3 0.4 0.0 0.2 0.0 0.0 0.7 0.2 0.0 0.0 1.5 0.4 0.7 0.0 0.0 2.2 1.5

2 0.2 0.0 0.0 0.7 0.0 0.2 0.0 5.0 0.0 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.7 0.7 0.2 0.7 0.2 0.0 1.5 3.1 0.0 0.0 0.2 0.9 0.4 0.0 0.0 1.8 1.5

3 0.0 0.0 0.0 0.7 0.0 0.0 0.2 5.9 0.0 0.0 0.0 5.3 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.7 0.2 0.0 0.2 0.2 0.0 0.0 0.2 1.3 1.3 0.0 0.0 3.5 1.8

4 0.0 0.0 0.0 0.4 0.0 0.0 0.0 9.8 0.0 0.4 0.0 3.1 0.0 0.0 0.2 0.0 0.9 0.0 0.4 0.4 0.0 1.6 1.3 2.7 0.0 0.0 2.0 0.2 5.1 0.0 0.0 3.1 1.3

5 0.4 0.0 0.0 0.4 0.0 0.0 0.0 9.2 0.0 0.0 0.0 6.1 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.9 0.7 2.9 0.0 0.0 1.8 0.9 5.4 0.0 0.0 2.2 1.6

6 1.8 0.4 0.0 0.4 0.0 0.0 0.0 3.1 0.0 0.0 0.0 5.9 0.2 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.7 0.2 2.0 0.0 0.0 0.9 2.4 2.6 0.0 0.0 2.0 0.4

7 0.4 0.0 0.0 0.4 0.0 0.0 0.0 7.7 0.0 0.0 0.0 4.4 0.0 0.4 0.9 0.7 0.0 0.2 0.2 0.0 0.0 0.9 0.2 1.1 0.0 0.0 1.3 3.1 3.3 0.0 0.0 1.5 0.9

8 0.4 0.0 0.0 0.7 0.0 0.0 0.0 7.4 0.2 0.0 0.0 2.4 0.0 0.0 0.9 0.0 0.9 0.4 0.2 0.0 0.0 0.2 0.4 2.8 0.0 0.0 1.7 2.2 1.7 0.0 0.0 1.1 1.1

8.8 0.0 0.4 0.0 2.2 0.0 0.0 0.0 6.6 0.2 0.7 0.0 2.0 0.0 0.0 0.2 0.4 0.4 0.9 0.2 0.0 0.0 0.7 0.0 3.7 0.0 0.0 0.7 0.9 4.4 0.0 0.0 2.9 0.9

8.9 0.9 0.0 0.0 4.4 0.0 0.0 0.0 9.0 0.0 0.0 0.0 1.8 0.0 0.0 0.2 0.2 0.2 0.2 0.0 0.0 0.0 0.4 0.0 4.2 0.0 0.0 1.5 1.3 1.3 0.0 0.0 0.4 0.4

9 0.9 0.0 0.0 0.7 0.0 0.0 0.0 6.1 0.0 0.2 0.0 1.5 0.0 0.0 0.0 0.4 0.4 0.4 0.0 0.2 0.0 0.4 0.4 2.6 0.2 0.0 1.8 2.6 3.3 0.0 0.0 1.3 2.0

9.1 1.1 0.0 0.0 0.2 0.0 0.0 0.0 4.0 0.0 0.0 0.0 1.1 0.0 0.0 0.0 0.2 0.2 0.4 0.2 0.0 0.0 0.2 0.2 3.6 0.0 0.0 1.1 0.7 1.6 0.0 0.0 1.8 1.8

9.2 1.1 0.4 0.0 0.9 0.0 0.0 0.0 5.0 0.0 0.0 0.0 2.4 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 1.1 0.0 1.1 0.0 0.0 0.0 0.0 1.1 0.0 0.0 1.1 1.1

9.3 0.7 0.4 0.0 0.4 0.0 0.0 0.0 11.0 0.0 0.2 0.0 1.3 0.0 0.0 0.7 0.0 0.7 0.4 0.0 0.4 0.0 1.1 0.2 1.3 0.0 0.0 0.7 0.0 1.8 0.0 0.0 1.5 0.4

9.4 0.4 0.2 0.0 1.1 0.0 0.0 0.0 9.4 0.0 0.2 0.0 1.1 0.0 0.0 0.4 0.2 0.7 1.5 0.0 0.2 0.0 0.4 0.4 0.7 0.0 0.0 0.4 0.0 0.9 0.0 0.0 1.5 2.2

9.5 0.4 0.0 0.0 0.2 0.0 0.0 0.0 9.6 0.0 0.0 0.0 0.9 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.0 0.0 1.1 0.0 0.0 1.3 1.1

9.6 1.1 0.0 0.0 0.7 0.0 0.0 0.0 9.0 0.0 0.0 0.0 0.7 0.0 0.0 1.1 0.4 0.4 0.0 0.0 0.2 0.0 0.4 0.0 1.3 0.0 0.0 0.7 0.4 0.9 0.0 0.0 2.2 2.0

9.7 0.9 0.0 0.0 0.0 0.0 0.0 0.0 9.0 0.0 0.0 0.0 2.6 0.0 0.0 0.2 0.0 0.4 0.2 0.0 0.2 0.0 0.2 0.0 0.4 0.0 0.0 1.3 0.9 1.3 0.2 0.0 1.3 0.6

9.8 0.2 0.0 0.0 0.0 0.0 0.0 0.0 14.0 0.0 0.2 0.0 0.7 0.0 0.0 0.2 0.2 0.7 1.5 0.0 0.0 0.0 0.2 0.0 1.5 0.0 0.0 2.8 1.3 0.9 0.0 0.2 3.1 0.7

9.9 0.7 0.0 0.0 0.4 0.0 0.0 0.0 9.5 0.0 0.0 0.0 1.5 0.0 0.0 1.1 0.0 0.4 1.8 0.0 0.2 0.0 0.2 0.0 1.1 0.0 0.0 0.9 0.7 0.4 0.0 0.0 1.8 0.9

10 0.0 0.0 0.2 1.1 0.0 0.0 0.0 16.4 0.0 0.0 0.0 0.7 0.0 0.0 0.4 0.0 1.1 1.1 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.4 0.0 0.0 2.2 0.9

10.1 0.4 0.0 0.0 0.4 0.0 0.0 0.0 14.5 0.0 0.0 0.0 0.9 0.0 0.0 0.4 0.0 0.7 1.3 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.7 0.0 2.5 0.0 0.0 3.1 0.2

10.2 0.2 0.0 0.0 0.4 0.0 0.0 0.0 21.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.4 0.4 1.3 0.0 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.4 0.0 0.9 0.0 0.0 2.2 0.4

10.3 1.1 0.6 0.0 0.2 0.0 0.0 0.0 13.3 0.0 0.2 0.0 0.9 0.0 0.0 0.6 0.4 0.2 0.2 0.0 0.0 0.0 0.4 0.0 3.0 0.0 0.0 1.5 1.3 2.4 0.0 0.0 1.1 0.9

10.4 0.2 0.0 0.0 0.0 0.0 0.0 0.0 9.5 0.0 0.2 0.0 1.8 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.0 0.4 0.0 2.0 0.0 0.0 1.8 0.2 1.8 0.0 0.0 1.1 0.7

10.5 1.1 0.7 0.0 0.0 0.0 0.0 0.2 7.9 0.0 0.0 0.0 1.3 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.3 0.2 2.6 0.0 0.0 3.7 1.1 3.1 0.0 0.0 1.5 0.7

10.6 0.7 0.2 0.9 0.0 0.0 0.0 0.0 12.3 0.0 0.7 0.0 0.2 0.0 0.0 0.2 0.0 1.3 1.3 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 2.0 0.7 1.8 0.0 0.0 1.1 1.1

10.7 0.4 0.2 0.0 0.4 0.0 0.0 0.0 9.0 0.0 0.7 0.0 1.1 0.2 0.0 0.0 0.2 0.7 0.4 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 2.2 1.5 1.7 0.0 0.2 2.8 0.2

10.8 0.4 0.0 0.0 0.2 0.0 0.0 0.0 6.1 0.0 0.2 0.0 2.2 0.2 0.4 0.2 0.2 0.7 0.9 0.2 0.0 0.0 2.0 0.0 0.2 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.9 1.1

10.9 0.2 0.0 0.0 0.4 0.0 0.0 0.0 9.2 0.0 0.2 0.0 2.4 0.0 0.2 0.0 0.0 0.7 1.1 0.9 0.2 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.2 1.5 0.0 0.0 1.3 1.5

11 0.9 0.2 0.0 0.2 0.2 0.0 0.0 5.5 0.0 0.2 0.2 1.5 0.0 0.2 0.0 0.0 0.9 1.3 0.4 0.0 0.0 1.8 0.0 0.0 0.0 0.0 0.4 0.0 1.5 0.0 0.2 1.8 0.4

11.1 0.2 0.0 0.2 0.0 0.0 0.0 0.0 9.8 0.0 0.0 0.0 1.7 0.0 0.2 0.2 0.7 0.4 0.9 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.2 3.3 1.3

11.2 0.9 0.0 0.2 0.0 0.0 0.0 0.0 11.4 0.0 0.2 0.0 2.6 0.2 0.2 0.7 0.0 0.0 0.4 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.4 0.7 0.9 0.0 0.0 3.1 1.3

11.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 9.9 0.0 0.2 0.0 2.4 0.0 0.4 0.0 0.0 0.4 0.2 0.0 0.2 0.0 0.2 0.2 0.4 0.0 0.0 2.0 1.1 1.8 0.0 0.0 2.9 0.9

11.4 0.7 0.2 0.0 2.0 0.0 0.0 0.0 14.8 0.0 0.2 0.0 0.9 0.0 0.0 0.9 0.0 0.2 0.0 0.2 0.2 0.0 0.4 0.0 1.1 0.0 0.0 0.9 1.3 2.0 0.0 0.0 2.2 1.1

11.5 0.4 0.0 0.0 1.3 0.0 0.0 0.0 14.5 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.2 0.7 0.4 0.7 0.0 0.0 0.4 0.0 1.3 0.0 0.0 0.4 1.8 0.7 0.2 0.0 3.3 0.7

11.6 1.3 0.0 0.2 0.0 0.0 0.0 0.0 15.4 0.0 0.9 0.0 0.9 0.0 0.0 0.0 0.9 0.4 0.0 1.1 0.2 0.0 0.7 0.0 1.3 0.0 0.0 0.7 0.9 1.1 0.0 0.0 4.2 1.3

11.7 0.7 0.2 0.0 0.2 0.0 0.0 0.0 10.1 0.0 2.6 0.0 0.7 0.0 0.2 0.2 0.2 0.2 0.0 0.7 0.2 0.0 1.5 0.0 2.0 0.0 0.0 0.2 0.7 1.1 0.0 0.0 2.6 0.7

11.8 0.4 0.0 0.0 0.2 0.0 0.0 0.7 9.9 0.0 2.4 0.0 1.1 0.0 0.0 0.2 0.0 0.4 0.4 0.2 0.0 0.7 0.4 0.2 1.3 0.0 0.0 0.4 0.4 2.0 0.0 0.0 3.5 0.4

11.9 0.7 0.0 0.0 0.2 0.0 0.0 0.2 7.0 0.0 0.2 0.0 1.1 0.0 0.0 0.9 0.0 0.2 0.9 0.0 0.0 0.4 0.9 0.2 2.8 0.0 0.0 0.0 0.2 2.0 0.0 0.0 2.6 0.9

12 0.4 0.0 0.0 0.4 0.0 0.0 0.0 9.2 0.0 2.4 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.2 0.9 0.2 0.4 0.7 0.2 0.7 0.0 0.0 1.5 0.0 1.5 0.0 0.0 2.2 0.2

12.1 0.9 0.0 0.0 0.0 0.0 0.0 0.7 12.3 0.0 3.1 0.0 0.7 0.0 0.0 0.0 0.0 0.2 0.0 0.9 0.0 0.4 1.8 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.2 1.8 0.7

12.2 0.2 0.4 0.0 0.9 0.0 0.0 0.4 5.5 0.0 0.2 0.0 0.2 0.0 0.0 0.2 0.4 0.0 0.2 0.7 0.0 0.0 0.7 0.0 0.4 0.0 0.0 0.0 0.2 1.1 0.0 0.2 1.1 3.3

12.3 1.5 0.2 0.0 0.0 0.0 0.2 0.2 8.3 0.0 2.0 0.0 0.4 0.0 0.2 0.0 0.2 0.0 0.0 0.2 0.2 0.2 1.1 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.0 1.3 0.9

12.4 0.4 0.2 0.0 0.2 0.0 0.2 0.2 7.5 0.0 1.1 0.0 1.8 0.0 0.2 0.7 0.4 0.0 0.2 0.4 0.2 0.9 0.2 0.0 1.1 0.0 0.0 0.0 0.0 2.2 0.0 0.0 2.2 0.7

12.5 0.4 0.4 0.0 0.2 0.0 0.0 0.0 6.6 0.0 3.7 0.0 0.2 0.0 1.1 0.0 0.0 0.0 0.2 0.2 0.4 1.1 0.2 0.2 1.3 0.0 0.0 2.4 0.4 2.4 0.0 0.0 2.4 0.4

12.6 0.4 0.2 0.0 0.0 0.0 0.0 0.2 3.7 0.0 0.7 0.0 3.5 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.2 0.4 0.4 0.2 0.4 0.0 0.0 3.7 0.9 2.4 0.0 0.0 2.2 0.2

12.7 0.4 0.7 0.0 0.4 0.0 0.0 0.0 4.4 0.0 1.1 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.4 0.2 0.7 1.1 0.0 0.7 1.5 0.0 0.0 2.0 0.0 1.8 0.0 0.0 3.1 0.9

12.8 0.7 0.2 0.0 0.0 0.0 0.0 0.0 3.5 0.0 0.7 0.0 1.1 0.0 0.0 0.0 0.0 0.2 0.7 0.2 0.0 0.0 0.2 0.7 0.9 0.0 0.0 2.2 0.0 2.4 0.2 0.0 3.1 0.4

12.9 0.2 0.2 0.0 0.4 0.0 0.0 0.0 3.9 0.0 0.7 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.4 0.4 0.0 0.0 0.9 0.0 0.0 0.7 0.2 2.0 0.0 0.0 2.2 0.0

13 0.4 0.2 0.0 0.4 0.2 0.0 0.2 6.8 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.2 0.0 0.0 0.4 0.0 1.1 0.4 0.0 1.3 0.0 0.0 0.2 0.0 1.7 0.0 0.4 1.5 0.2

13.1 0.4 0.0 0.0 1.3 0.0 0.0 0.0 14.9 0.0 0.4 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.2 0.7 0.7 0.2 0.0 0.0 1.3 0.0 0.0 0.9 0.0 2.4 0.0 0.0 0.7 0.2

13.2 0.2 0.2 0.0 0.0 0.0 0.0 0.0 7.5 0.0 0.0 0.0 0.4 0.0 0.0 0.4 0.0 0.2 0.4 0.2 0.0 0.4 0.4 1.1 0.7 0.0 0.0 0.7 0.9 3.5 0.0 0.0 2.4 1.3

13.3 0.2 0.0 0.0 0.2 0.0 0.0 0.0 7.7 0.0 0.4 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.2 1.3 0.4 0.2 0.0 0.0 0.0 2.4 2.4 2.9 0.0 0.0 2.0 0.7

13.4 0.2 0.2 0.0 0.4 0.0 0.2 0.0 6.1 0.0 0.4 0.0 2.4 0.0 0.0 0.7 0.4 0.0 0.2 0.7 0.0 0.2 0.4 0.2 0.4 0.0 0.0 1.3 1.3 2.9 0.0 0.0 4.4 1.1

13.5 0.2 0.0 0.0 0.0 0.0 0.0 0.0 10.7 0.0 0.2 0.0 0.4 0.2 0.0 0.2 0.0 0.0 0.4 0.2 0.0 0.4 0.4 0.2 0.4 0.0 0.0 0.0 0.0 2.1 0.0 0.0 3.4 1.9

13.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 9.4 0.0 0.9 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.2 1.5 0.4 0.0 0.0 0.0 0.0 2.4 1.3 2.0 0.0 0.2 2.0 1.5

13.7 0.2 0.0 0.0 0.2 0.0 0.0 0.0 13.4 0.0 1.5 0.0 2.4 0.0 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.4 0.0 0.2 0.2 0.0 0.0 1.8 1.8 2.2 0.0 0.0 0.9 1.5

13.8 0.0 0.2 0.0 0.0 0.0 0.0 0.4 7.9 0.2 1.3 0.0 3.7 0.0 0.2 0.2 0.0 0.2 0.0 0.9 0.0 1.8 0.4 0.0 0.7 0.0 0.0 0.4 0.7 0.9 0.0 0.0 1.8 1.5

13.9 0.2 0.0 0.2 0.0 0.0 0.0 0.0 6.6 0.0 0.4 0.2 0.7 0.0 0.2 0.0 0.9 0.0 0.7 0.7 0.0 1.1 0.4 0.0 1.5 0.0 0.0 2.2 2.0 0.9 0.0 0.0 3.3 2.2

14 0.4 0.2 0.0 0.2 0.0 0.0 0.4 8.4 0.0 0.0 0.0 3.5 0.0 0.2 0.4 0.2 0.0 0.0 0.2 0.0 1.1 0.7 0.0 1.1 0.0 0.2 0.7 1.3 0.9 0.0 0.0 4.8 2.4

14.1 0.2 0.0 0.2 0.0 0.0 0.4 0.2 7.9 0.0 0.9 0.0 1.1 0.0 0.0 0.4 0.2 0.0 0.0 0.2 0.2 0.2 0.7 0.7 0.9 0.0 0.0 1.8 0.9 0.9 0.0 0.0 3.9 1.5

14.2 0.7 0.4 0.0 0.2 0.0 0.2 0.4 7.9 0.0 0.9 0.0 0.9 0.0 0.0 0.9 0.2 0.0 0.2 0.4 0.2 1.1 0.2 0.0 1.1 0.0 0.0 2.4 3.1 1.1 0.0 0.0 5.0 0.7

14.3 0.4 0.2 0.2 0.2 0.0 0.0 0.4 8.1 0.0 1.8 0.0 1.1 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.2 0.4 0.7 0.0 2.0 0.0 0.2 3.3 2.2 1.8 0.0 0.0 3.9 0.9

14.4 0.2 0.2 0.0 0.0 0.0 0.2 0.0 6.8 0.0 2.2 0.0 2.2 0.0 0.0 0.9 0.0 0.0 0.2 0.2 0.0 0.2 0.2 0.0 0.4 0.0 0.0 2.0 2.0 1.8 0.0 0.0 5.1 0.2

14.5 0.9 0.4 0.0 0.0 0.0 0.0 0.0 7.5 0.0 1.5 0.2 0.7 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.4 0.0 0.2 0.0 3.9 0.0 0.0 2.9 1.5 2.0 0.0 0.0 4.6 0.9

14.6 0.2 0.2 0.0 0.0 0.0 0.2 0.0 12.7 0.0 0.4 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.7 0.2 0.0 2.2 0.0 0.0 0.4 0.9 2.9 0.0 0.0 4.4 0.2

14.7 0.4 0.2 0.2 0.4 0.0 0.2 1.3 7.0 0.0 2.0 0.0 2.4 0.0 0.0 0.2 0.0 0.2 0.0 0.2 0.0 0.4 0.0 0.4 2.6 0.0 0.0 0.9 0.4 2.2 0.0 0.2 3.1 1.1

14.8 0.4 0.0 0.0 0.0 0.0 0.4 0.2 6.6 0.0 0.9 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.0 1.1 0.0 0.0 1.5 0.2 2.2 0.0 0.4 0.9 3.5

14.9 0.7 0.0 0.0 0.4 0.0 0.0 0.2 6.3 0.0 0.4 0.0 0.7 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.9 0.0 0.0 1.3 0.4 1.8 0.0 0.0 2.0 1.5

15 0.2 0.0 0.2 0.4 0.0 0.4 1.1 5.7 0.0 1.3 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.9 0.0 0.0 1.8 0.0 0.0 2.9 1.3 3.1 0.0 0.2 2.2 4.8

15.1 0.7 0.2 0.0 0.0 0.0 0.2 0.2 6.6 0.0 2.2 0.0 0.9 0.0 0.0 0.4 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.0 1.5 0.0 0.0 0.7 0.7 0.2 0.0 0.0 2.2 5.9

15.2 0.7 0.0 0.0 0.0 0.0 0.2 0.7 4.8 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.4 0.2 0.0 0.7 0.0 0.0 2.2 0.9 2.0 0.0 0.0 1.3 3.5

15.3 0.4 0.0 0.4 0.2 0.0 0.0 0.0 8.8 0.0 0.2 0.2 0.9 0.0 0.0 0.0 0.4 0.0 0.2 0.7 0.2 0.7 0.4 0.0 1.8 0.0 0.0 2.9 0.4 2.6 0.0 0.0 4.2 2.2

15.4 0.7 0.0 0.0 0.0 0.0 0.2 0.4 6.1 0.0 1.3 0.0 2.9 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.7 0.2 0.2 0.0 1.1 0.0 0.0 4.4 1.3 1.3 0.0 0.2 3.7 2.6

15.5 0.4 0.7 0.0 0.0 0.0 0.4 0.7 10.3 0.0 1.1 0.0 0.9 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.0 2.4 0.0 0.0 2.2 0.0 0.9 0.0 0.0 3.3 1.8

15.6 0.4 0.7 0.0 0.0 0.0 0.2 0.7 8.8 0.0 2.0 0.4 1.1 0.0 0.0 0.2 0.0 0.4 0.4 0.2 0.0 0.2 0.0 0.0 0.9 0.0 0.0 1.1 0.4 2.6 0.0 0.0 1.8 2.6

15.7 0.7 0.2 0.0 0.4 0.0 0.0 0.2 4.8 0.0 0.9 0.0 1.8 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.0 1.5 0.2 1.3 0.0 0.0 2.9 2.0

15.8 0.2 0.4 0.0 0.0 0.0 0.0 0.9 7.3 0.0 1.8 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.2 0.2 0.0 0.0 0.0 0.0 0.9 0.0 2.0 0.0 0.0 2.6 1.8

15.9 0.9 0.0 0.0 0.0 0.0 0.4 0.7 5.9 0.0 2.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.2 0.2 0.0 0.2 0.0 0.0 0.0 1.5 0.7 1.8 0.0 0.0 1.5 3.5

16 0.2 0.0 0.0 0.0 0.0 0.0 0.0 3.1 0.0 1.1 0.0 0.4 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.2 0.0 0.4 0.2 1.3 0.0 0.0 3.5 0.4 0.9 0.0 0.0 3.5 1.8

16.1 0.0 0.2 0.2 0.0 0.0 0.2 0.0 3.5 0.0 1.3 0.2 0.4 0.0 0.2 0.2 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.2 2.6 0.0 0.0 0.9 0.0 0.7 0.0 0.0 1.5 2.2

16.2 0.9 0.2 0.2 0.0 0.0 0.0 0.2 4.4 0.0 2.2 0.0 1.7 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.4 0.0 1.1 0.0 0.0 0.9 0.0 0.7 0.0 0.2 4.6 1.5

16.3 1.3 0.4 0.0 0.0 0.0 0.0 0.7 11.6 0.0 1.5 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.2 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.2 0.0 0.0 4.4 2.0

2b. Smoky Hill calcareous nannofossil census data, upper section, part 2 of 5

Column 1: Section Height (m) Column 12: Helicolithus compactus Column 23: Loxolithus armilla

Column 2: Eiffellithus gorkae Column 13: Helicolithus anceps Column 24: Lucianorhabdus cayeuxii

Column 3: Eiffellithus turriseiffelii Column 14: Helicolithus stellafissus Column 25: Lucianorhabdus maleformis

Column 4: Gaarderella granulifera Column 15: Helicolithus trabeculatus Column 26: Manivitella pemmatoidea

Column 5: Gartnerago clarusora Column 16: Helicolithus turonicus Column 27: Marthasterites sp.

Column 6: Gartnerago costatum Column 17: Bifidalithus phenax Column 28: Marthasterites crassus

Column 7: Gartnerago margaritatus Column 18: Kamptnerius magnificus Column 29: Marthasterites furcatus

Column 8: Gartnerago segmentatum Column 19: Kamptnerius punctata Column 30: Microrhabdulus belgicus

Column 9: Glaukolithus bicrescenticus Column 20: Lithastrinus grillii Column 31: Microrhabdulus decoratus

Column 10: Glaukolithus biperforatus Column 21: Lithastrinus septenarius Column 32: Micula concava

Column 11: Grantnarhabdus coronadventis Column 22: Lithraphidites carniolensis Column 33: Micula cubiformis

Column 34: Micula decussata

SectiEiffellEiffellGaarderGartnerGartnerGartnerGartnerGlaukolGlaukolGrantnaHelicolHelicolHelicolHelicolHelicolBifidalKamptneKamptneLithastLithastLithrapLoxolitLucianoLucianoManivitMarthasMarthasMarthasMicrorhMicrorhMicula Micula Micula

0 0.4 1.8 0.0 0.2 0.2 0.0 0.0 0.4 0.0 0.2 0.2 0.4 1.5 5.5 0.0 0.0 0.2 0.0 0.2 0.0 1.5 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.9 0.7 0.0 0.4 0.7

1 0.4 3.3 0.2 0.0 0.0 0.0 0.2 0.2 1.3 0.0 0.4 0.4 1.3 3.9 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.0 1.1 0.4 0.0 0.0 0.0 0.0 1.3 0.7 0.0 0.0 0.2

2 0.2 1.8 0.4 0.0 0.0 0.0 0.2 0.7 0.0 0.4 0.0 1.3 1.3 3.3 0.0 0.0 0.2 0.0 0.2 0.0 0.9 0.0 0.2 0.2 0.2 0.0 0.0 0.0 1.5 0.0 0.0 0.2 0.2

3 0.9 1.8 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.4 1.3 3.3 5.9 0.0 0.0 0.4 0.0 0.2 0.0 0.4 0.2 0.4 0.0 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.2 0.4

4 0.0 2.2 0.0 0.2 0.0 0.0 0.4 0.2 0.9 0.0 0.0 1.6 0.4 6.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2

5 0.2 1.8 0.0 0.2 0.0 0.0 0.7 0.0 0.9 0.0 0.0 0.7 1.1 0.4 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.2 0.0 0.2 0.0 0.2 0.9

6 0.7 3.5 0.0 0.0 0.0 0.0 0.2 0.4 0.4 0.0 0.0 2.6 0.4 8.6 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.7 0.0 0.0 1.1

7 0.2 2.6 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.2 0.2 1.1 2.0 3.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 1.3

8 2.2 4.1 0.0 0.0 0.0 0.0 0.9 0.9 0.7 0.0 0.0 0.7 0.9 6.8 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.0 2.6 0.2 0.7 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2

8.8 0.4 1.8 0.0 0.0 0.0 0.2 0.2 0.9 0.7 0.0 0.0 0.2 1.1 2.9 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2

8.9 0.4 3.7 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 1.1 1.1 4.6 0.0 0.0 0.2 0.0 0.7 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.4

9 0.9 2.0 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.4 0.2 2.2 3.5 0.0 0.0 0.2 0.0 0.7 0.2 0.2 0.4 0.9 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2

9.1 2.9 2.7 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.7 0.2 1.3 1.6 5.6 0.0 0.0 0.2 0.0 1.6 0.2 0.7 0.0 1.3 0.2 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2

9.2 0.0 2.2 0.0 0.0 0.0 0.0 0.2 0.7 0.7 0.2 0.0 0.9 0.7 7.9 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.4 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.4

9.3 0.0 1.1 0.0 0.0 0.0 0.0 0.2 0.4 0.2 0.4 0.0 1.3 1.3 8.6 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.4 1.8 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.9

9.4 0.9 2.4 0.0 0.0 0.0 0.0 0.7 0.2 0.7 0.0 0.0 0.2 2.6 5.3 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 2.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4

9.5 1.3 0.9 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.0 0.0 0.4 2.6 7.2 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.3

9.6 1.1 2.2 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.0 0.0 0.7 4.0 7.5 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.7 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.4

9.7 0.2 1.5 0.0 0.0 0.0 0.0 0.4 0.4 0.2 0.0 0.0 1.1 4.1 6.2 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.4 1.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.6

9.8 0.2 1.8 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.4 0.4 4.4 3.3 0.0 0.0 0.0 0.0 0.0 1.1 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.2

9.9 0.4 2.6 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.0 0.2 2.9 4.4 0.0 0.0 0.0 0.0 0.2 2.0 0.0 0.0 1.3 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9

10 0.2 0.9 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.4 0.7 2.4 6.1 0.0 0.0 0.0 0.0 0.7 0.7 0.0 0.2 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.4 0.2

10.1 0.7 1.1 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.2 1.3 2.7 0.0 0.0 0.0 0.0 0.7 0.7 0.0 0.0 1.1 0.0 0.2 0.0 0.2 0.0 0.0 0.7 0.0 0.0 0.7

10.2 0.7 1.5 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.7 0.4 1.5 2.6 0.0 0.0 0.0 0.0 0.7 0.9 0.0 0.2 1.1 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.9

10.3 0.6 0.2 0.0 0.0 0.0 0.0 0.2 0.6 0.2 0.2 1.1 0.4 1.3 5.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.4

10.4 0.4 1.3 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.0 0.0 0.7 0.4 5.9 0.0 0.0 0.0 0.0 0.2 0.2 0.0 1.1 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.4 0.7

10.5 1.3 0.7 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.9 0.9 3.9 0.0 0.0 0.0 0.0 0.2 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.4

10.6 0.9 2.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.7 0.4 1.3 2.6 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 1.8 0.0 0.2 0.0 0.0 0.2 0.2 0.2 0.0 0.2 1.1

10.7 0.4 1.7 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.4 0.4 0.9 4.6 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.2 0.7 0.2 0.0 0.2 0.2 0.2 0.0 0.0 0.0 0.2 0.4

10.8 0.7 2.6 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 2.4 1.1 5.5 0.0 0.4 0.0 0.0 0.2 1.5 0.0 0.7 1.5 0.0 0.2 0.0 0.2 0.2 0.0 0.2 0.0 0.0 0.7

10.9 1.1 0.7 0.0 0.0 0.0 0.0 0.4 1.1 0.0 0.0 0.0 2.8 1.7 5.7 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 1.1 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2

11 0.7 2.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.9 0.2 6.2 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.2 3.1 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.4

11.1 0.4 1.3 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 1.1 0.4 5.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.7

11.2 0.7 1.1 0.0 0.0 0.0 0.0 0.2 0.2 1.1 0.0 0.4 0.2 1.5 2.4 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.2 1.1 0.0 0.2 0.0 0.0 0.0 0.9 0.2 0.0 0.2 0.9

11.3 0.9 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.2 1.1 2.0 7.7 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.7

11.4 1.7 1.5 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 1.1 0.4 2.6 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.9 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.4

11.5 1.3 1.8 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.4 2.0 1.1 3.3 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 2.2 0.0 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.0 0.0

11.6 2.0 2.4 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.9 0.4 0.2 2.2 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.2 1.8 0.0 0.0 0.0 0.0 0.2 2.4 0.4 0.0 0.2 0.2

11.7 1.8 1.3 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.9 1.3 0.9 6.6 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.2

11.8 1.5 1.1 0.4 0.2 0.0 0.0 0.2 1.1 0.0 0.0 0.0 0.9 1.1 2.4 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.7 0.0 0.0 0.0 0.2 0.0 1.1 0.2 0.0 0.2 0.0

11.9 0.9 2.2 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.0 0.7 1.3 3.1 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.2 0.4 0.0 0.2 0.0 0.0 0.2 2.4 0.2 0.0 0.4 0.4

12 1.3 0.7 0.7 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.4 0.4 2.2 0.0 0.0 0.0 0.0 0.2 0.7 0.2 0.4 0.2 0.0 0.0 0.0 0.0 0.2 2.2 0.0 0.0 0.0 0.2

12.1 0.4 0.9 0.2 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 1.1 2.0 5.1 0.0 0.0 0.0 0.0 0.2 0.9 0.0 0.7 0.4 0.0 0.0 0.0 0.2 0.4 0.9 0.4 0.0 0.0 0.0

12.2 0.2 0.9 0.0 0.0 0.0 0.0 0.4 0.7 0.0 0.4 0.0 0.4 0.7 5.7 0.0 0.0 0.0 0.0 0.2 2.6 0.0 0.0 3.8 0.0 0.7 0.0 0.2 0.7 0.7 0.2 0.0 0.0 0.7

12.3 0.7 1.8 0.4 0.2 0.0 0.0 0.2 0.7 0.0 0.0 0.0 0.4 1.3 2.9 0.0 0.0 0.0 0.0 0.4 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.4 0.0 0.0 0.2 0.0

12.4 1.1 1.8 0.2 0.2 0.0 0.0 0.0 1.3 0.0 0.0 0.0 0.4 1.3 5.3 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.2 1.1 0.0 0.0 0.0 0.7

12.5 0.9 1.5 0.0 0.0 0.0 0.0 0.2 1.3 0.0 0.4 0.2 0.9 1.1 5.3 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.2 1.8 0.0 0.0 0.2 0.4

12.6 1.8 1.3 0.7 0.0 0.0 0.0 0.2 1.1 0.0 0.0 0.9 0.7 1.3 4.2 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.9 1.1 0.0 0.0 0.0 0.2

12.7 0.2 0.4 0.2 0.0 0.0 0.0 0.2 0.4 0.0 0.2 0.2 0.9 1.3 4.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.2 0.0 0.0 0.2 0.7 0.2 0.0 0.0 0.0

12.8 0.2 0.9 0.7 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.4 0.9 1.5 5.3 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.2

12.9 1.1 1.1 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.2 0.9 1.1 5.9 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.9 0.0 0.0 0.0 0.0 0.0 1.1 0.7 0.0 0.0 0.2

13 1.3 1.7 0.2 0.0 0.0 0.0 0.0 1.7 0.2 0.0 0.0 1.7 0.2 3.1 0.0 0.0 0.0 0.0 0.0 0.0 0.2 1.3 0.4 0.0 0.0 0.0 0.0 0.0 2.2 0.4 0.0 0.4 0.7

13.1 1.8 2.4 0.2 0.0 0.0 0.0 0.2 0.7 0.0 0.0 0.9 1.5 0.4 2.4 0.0 0.0 0.0 0.0 0.0 0.2 0.7 0.4 0.2 0.0 0.0 0.0 0.0 0.2 1.3 0.2 0.0 0.9 0.4

13.2 1.1 2.6 0.4 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.9 1.8 2.9 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 1.1 0.0 0.2 0.0 0.0 0.2 2.0 0.2 0.0 0.4 0.2

13.3 0.9 0.7 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.9 3.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.2 2.0 0.0 0.0 0.0 0.0

13.4 0.0 1.5 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.2 0.7 0.9 1.8 0.0 0.0 0.0 0.0 0.2 0.2 0.4 0.0 1.1 0.0 0.0 0.0 0.0 0.0 3.3 0.0 0.0 0.7 0.2

13.5 0.4 0.0 0.2 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.6 2.5 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.0 0.4 0.2 0.4 0.0 0.0 0.0 4.0 0.4 0.0 0.0 0.8

13.6 0.0 0.4 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.9 0.9 1.3 0.0 0.0 0.0 0.0 0.0 0.0 0.2 1.1 0.2 0.0 0.0 0.0 0.0 0.2 1.8 0.0 0.0 0.2 0.0

13.7 0.2 0.2 0.4 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.7 0.2 5.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.0 2.2 0.9 0.0 0.0 0.0

13.8 0.0 0.7 0.9 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.4 0.2 2.2 3.9 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 1.5 0.0 0.0 0.2 0.7

13.9 0.7 1.5 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.2 0.4 0.7 1.1 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.0 0.0 0.0 0.2 0.2 1.5 0.0 0.0 0.4 2.0

14 0.4 1.5 0.4 0.9 0.0 0.0 0.4 0.7 0.0 0.2 0.0 0.4 0.2 2.6 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.2 0.7 0.0 0.0 1.1

14.1 0.4 1.3 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.7 1.3 2.2 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.0 0.0 0.2 0.0 0.0 1.5 0.2 0.0 0.2 0.9

14.2 0.4 2.4 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.2 1.1 0.9 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.4 0.4 0.0 0.0 0.0 0.0 0.2 2.0 0.9 0.0 1.1 0.2

14.3 1.1 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 2.2 1.1 0.0 0.0 0.0 0.0 0.4 0.9 0.0 0.7 0.9 0.0 0.0 0.0 0.0 0.0 1.5 0.4 0.0 0.0 0.2

14.4 0.7 2.0 0.7 0.7 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.2 1.5 1.1 0.2 0.0 0.0 0.0 0.2 0.0 0.4 0.2 0.2 0.0 0.2 0.0 0.0 0.0 1.8 0.9 0.0 0.2 0.4

14.5 0.7 1.5 0.2 0.2 0.0 0.0 0.0 0.4 0.0 0.7 0.7 0.2 1.3 1.8 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.2 2.0 0.0 0.2 0.0 0.0 0.0 1.5 0.0 0.0 0.0 0.2

14.6 0.9 1.3 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.9 0.2 0.7 0.9 0.0 0.4 0.2 0.0 0.2 0.0 0.2 0.2 0.2 0.0 0.2 0.0 0.0 0.0 1.3 0.2 0.0 0.9 0.4

14.7 0.7 1.5 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.2 0.9 2.0 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.2 0.4 0.0 1.3 0.7

14.8 0.4 1.1 0.4 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.2 0.2 3.3 1.1 0.0 0.0 0.0 0.0 0.4 0.7 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 1.8 0.0 0.0 0.2 0.7

14.9 0.7 0.7 0.4 0.2 0.0 0.0 0.2 0.7 0.0 0.4 0.7 0.2 0.9 3.7 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.2 0.4 0.0 0.0 0.2 0.2 0.2 0.9 0.2 0.0 0.4 0.9

15 0.4 2.4 0.2 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.9 1.1 0.9 2.6 0.0 0.0 0.9 0.0 0.2 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.4 1.1 0.0 0.0 0.4 3.1

15.1 0.7 0.9 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.4 0.4 0.9 1.1 3.1 0.0 0.4 0.4 0.0 0.7 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.4 0.9 1.1 0.2 0.0 0.7 3.1

15.2 0.2 2.0 0.2 0.2 0.2 0.0 0.0 0.4 0.0 0.0 0.4 1.5 0.9 1.8 0.0 0.0 0.0 0.0 0.2 0.7 0.4 1.3 0.2 0.0 0.0 0.0 0.0 0.0 0.9 0.4 0.0 0.0 1.5

15.3 1.1 0.9 0.2 0.2 0.0 0.0 0.0 1.3 0.0 0.2 0.7 0.7 0.9 2.2 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.9 0.4 0.0 0.0 0.0 0.0 0.0 2.2 0.4 0.0 0.9 1.5

15.4 0.9 2.6 0.0 0.0 0.2 0.4 0.2 0.0 0.0 0.4 0.7 1.3 0.2 2.2 0.0 0.2 0.0 0.0 0.0 0.2 0.4 0.7 0.2 0.0 0.0 0.2 0.0 0.2 0.9 0.2 0.0 0.4 0.4

15.5 0.7 1.3 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.9 0.7 0.9 0.4 0.0 0.2 0.2 0.0 0.0 0.7 0.2 0.4 0.2 0.0 0.0 0.0 0.0 0.4 1.3 0.4 0.0 0.7 0.9

15.6 0.4 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.7 0.7 0.7 1.5 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.4 1.1 0.0 0.4 0.0 0.0 0.2 0.9 0.4 0.0 0.9 0.9

15.7 0.9 1.5 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.9 0.9 0.7 0.2 1.5 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.2 0.7 0.0 0.2 0.2 1.1 0.2 2.0 0.2 0.0 0.7 0.4

15.8 0.0 1.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.7 0.2 0.2 1.1 0.0 0.0 0.0 0.0 0.9 0.7 0.2 0.4 0.0 0.0 0.0 0.2 0.0 0.0 1.8 0.4 0.0 0.4 0.9

15.9 0.2 2.2 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.2 0.2 0.7 0.2 0.4 0.0 0.0 0.2 0.0 1.1 0.9 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.9 0.2 0.0 0.0 0.2 1.3

16 0.4 2.0 0.2 0.0 0.0 0.0 0.2 0.4 0.2 0.4 0.4 0.4 2.8 2.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.4 0.7 0.0 0.4 2.2

16.1 0.0 1.5 0.0 0.0 0.0 0.0 0.0 0.9 0.7 0.0 0.4 1.1 0.4 2.4 0.0 0.0 0.0 0.0 0.4 0.4 0.2 0.2 0.0 0.0 0.4 0.0 0.0 0.2 1.8 0.7 0.0 0.0 1.5

16.2 1.1 2.8 0.2 0.4 0.0 0.0 0.4 0.2 0.0 0.7 0.7 0.7 2.4 2.6 0.0 0.0 0.2 0.0 0.7 0.4 0.7 0.2 0.9 0.0 0.0 0.0 0.0 0.0 3.3 0.4 0.0 0.0 0.9

16.3 0.4 2.2 0.0 0.2 0.0 0.0 0.2 0.7 0.0 0.9 0.9 0.4 3.9 2.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.4 0.4 0.0 0.0 0.0 0.4 0.7 0.9 0.2 0.0 0.0 0.2

2c. Smoky Hill calcareous nannofossil census data, upper section, part 3 of 5

Column 1: Section Height (m) Column 12: Prediscosphaera grandis Column 23: Retecapsa crenulata

Column 2: Micula swastica Column 13: Prediscosphaera intercisa Column 24: Retecapsa ficula

Column 3: Micula sp. Column 14: Prediscosphaera ponticula Column 25: Retecapsa schizobrachiata

Column 4: Munarinus sp. Column 15: Prediscosphaera spinosa Column 26: Retecapsa surirella

Column 5: Octocyclus reinhardtii Column 16: Quadrum gartneri Column 27: Retemediaformis teneraretis

Column 6: Octolithus sp. Column 17: Radiolithus planus Column 28: Rhagodiscus angustus

Column 7: Orastrum campanensis Column 18: Radiolithus sp. Column 29: Rhagodiscus plebius

Column 8: Pharus evanescens Column 19: Reinhardtites anthophorus Column 30: Rhagodiscus reniformis

Column 9: Placozygus sigmoides Column 20: Reinhardtites clavicaviformis Column 31: Rhagodiscus splendens

Column 10: Prediscosphaera arkhangelskyi Column 21: Repagulum parvidentatum Column 32: Rotellapillus crenulatus

Column 11: Prediscosphaera cretacea Column 22: Retecapsa angustiforata Column 33: Scapholithus fossilis

Column 34: Seribiscutum primitivum

SectiMicula Micula MunarinOctocycOctolitOrastruPharus PlacozyPrediscPrediscPrediscPrediscPrediscPrediscQuadrumRadioliRadioliReinharReinharRepagulRetecapRetecapRetecapRetecapRetecapRetemedRhagodiRhagodiRhagodiRhagodiRotellaScapholSeribis

0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 1.1 1.5 4.8 0.0 1.1 0.9 7.5 0.0 0.0 2.2 0.7 0.0 0.7 0.0 0.4 0.0 0.0 0.0 0.7 0.9 0.4 0.2 0.0 0.2 0.0 0.0

1 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.7 2.4 8.3 0.0 1.3 1.5 7.0 0.0 0.0 0.4 0.2 0.0 0.7 0.0 0.9 0.0 0.7 0.0 0.0 2.4 0.9 0.0 0.0 1.1 0.9 0.0

2 0.0 0.0 1.3 0.0 0.4 0.0 0.0 0.0 1.1 6.4 0.0 2.0 0.9 8.8 0.0 0.0 0.9 0.4 0.2 0.4 0.9 3.1 0.0 0.2 0.7 0.4 0.7 0.7 0.4 0.2 0.4 0.4 0.0

3 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.4 9.0 0.0 1.5 0.4 9.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 1.8 0.4 0.0

4 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.7 0.7 3.3 0.2 4.4 0.2 4.2 0.0 0.0 0.2 0.4 0.0 0.9 0.0 0.7 0.0 0.0 0.0 0.0 1.3 0.0 0.4 0.0 0.0 2.2 0.0

5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.2 1.8 0.2 2.9 0.4 4.7 0.2 0.0 0.2 1.1 0.0 1.6 0.0 1.6 0.2 0.0 0.2 0.0 2.0 0.0 0.4 0.2 0.9 0.4 0.0

6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 3.5 0.2 1.8 0.2 5.7 0.0 0.0 0.0 0.2 0.0 2.0 0.0 3.5 0.4 0.0 0.4 0.0 0.7 0.0 0.2 0.2 0.7 0.7 0.0

7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.2 3.3 0.0 1.5 0.2 5.5 0.2 0.0 0.0 0.0 0.0 1.3 0.0 2.2 0.0 0.0 0.7 0.0 0.9 0.0 0.0 0.0 0.2 0.9 0.0

8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 3.3 0.2 3.5 0.9 4.6 0.2 0.0 0.0 0.7 0.0 1.1 0.0 1.1 0.2 0.0 0.2 0.4 0.7 0.2 0.0 0.2 1.1 0.4 0.0

8.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.5 0.4 2.4 0.0 2.4 0.7 6.4 0.2 0.0 0.2 0.0 0.0 3.1 0.0 1.1 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.9 1.3 1.3 0.0

8.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.4 2.0 0.2 2.9 0.7 5.7 0.0 0.0 0.0 0.4 0.0 1.1 0.0 1.5 0.2 0.0 0.2 0.0 1.8 0.0 0.4 0.0 0.9 1.8 0.0

9 0.0 0.0 1.8 0.0 0.2 0.0 0.0 0.9 0.2 4.4 0.0 2.2 0.9 3.5 0.2 0.0 0.4 0.2 0.0 1.1 0.0 0.2 0.2 0.0 0.4 0.7 1.3 0.2 0.0 0.9 0.7 0.7 0.0

9.1 0.0 0.0 1.1 0.0 0.2 0.0 0.0 2.2 0.7 6.9 0.2 3.1 1.8 4.9 0.4 0.0 0.0 0.2 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 1.8 0.4 0.0 1.1 1.1 0.0 0.0

9.2 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.0 0.9 3.7 0.7 2.4 1.3 5.5 0.2 0.0 0.2 0.4 0.0 0.7 0.0 0.9 0.0 0.0 0.2 0.0 1.1 0.4 0.4 0.0 0.4 0.4 0.0

9.3 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.4 4.8 0.2 3.3 2.2 5.3 0.2 0.0 0.2 0.2 0.0 0.9 0.0 0.9 0.0 0.0 0.2 0.0 1.3 0.0 0.2 0.0 0.2 0.2 0.0

9.4 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.7 1.3 7.2 0.9 2.8 2.0 2.4 0.4 0.0 0.0 0.2 0.0 0.2 0.0 2.6 0.2 0.0 0.4 0.2 1.3 0.0 0.0 0.4 0.2 0.0 0.0

9.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.9 5.5 0.0 2.6 1.5 3.5 0.4 0.0 0.0 0.7 0.0 0.2 0.0 2.2 0.2 0.0 0.2 0.4 1.1 0.2 0.2 0.4 1.1 0.2 0.0

9.6 0.0 0.0 0.2 0.0 0.0 0.0 0.0 1.1 1.5 6.2 0.0 1.1 1.5 3.7 0.2 0.0 0.0 0.0 0.0 1.1 0.0 0.2 0.2 0.0 0.7 0.4 0.9 0.0 0.4 0.4 0.2 1.1 0.0

9.7 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.4 0.2 4.3 0.2 1.7 2.1 1.1 0.2 0.0 0.0 0.2 0.0 1.1 0.0 1.3 0.0 0.0 0.2 0.0 1.5 0.0 0.2 0.4 1.1 0.4 0.0

9.8 0.0 0.0 0.7 0.0 0.0 0.0 0.0 1.1 0.0 2.6 0.0 1.5 0.9 3.1 0.0 0.0 0.2 0.2 0.0 1.8 0.0 0.7 0.0 0.0 0.2 0.2 1.1 0.0 0.2 0.7 0.7 0.2 0.0

9.9 0.0 0.0 0.4 0.0 0.0 0.0 0.0 1.3 0.7 6.4 0.0 1.1 2.0 3.1 0.0 0.0 0.0 0.0 0.0 1.3 0.0 1.3 0.2 0.0 0.2 0.4 1.8 0.2 0.2 0.0 0.0 0.2 0.0

10 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.9 0.2 3.5 0.0 0.9 1.1 3.9 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.4 0.0 1.5 0.4 0.0 0.0 0.2 0.4 0.0

10.1 0.0 0.0 2.5 0.0 0.2 0.0 0.0 1.1 0.0 3.3 0.0 2.7 0.9 4.2 0.2 0.4 0.0 0.4 0.0 0.7 0.0 2.0 0.0 0.0 0.4 0.0 2.7 0.0 0.2 0.0 1.6 0.9 0.0

10.2 0.0 0.0 0.7 0.0 0.0 0.0 0.2 2.0 0.0 4.1 0.0 1.3 2.4 6.6 0.2 0.0 0.2 0.2 0.0 0.7 0.0 0.4 0.2 0.0 0.2 0.7 1.3 0.0 0.4 0.9 0.4 0.9 0.0

10.3 0.0 0.0 0.4 0.0 0.0 0.0 0.0 2.6 0.4 3.7 0.0 0.6 2.2 4.5 0.0 0.0 0.0 0.0 0.0 0.6 0.0 2.4 0.2 0.0 0.6 0.2 1.5 0.0 0.4 0.2 0.6 1.7 0.0

10.4 0.0 0.0 0.0 0.2 0.0 0.0 0.0 1.3 0.4 7.3 0.0 0.4 0.7 1.5 0.0 0.0 0.0 0.7 0.0 1.1 0.0 3.1 0.0 0.0 0.9 0.9 0.2 0.4 0.0 0.7 0.4 1.3 0.0

10.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.9 6.3 0.0 0.4 0.7 3.5 0.2 0.0 0.0 0.0 0.0 2.6 0.0 2.4 0.0 0.0 0.4 0.4 0.7 0.2 0.0 0.4 0.2 0.9 0.0

10.6 0.0 0.0 0.4 0.0 0.2 0.0 0.0 2.2 0.4 5.7 0.2 1.1 1.8 2.2 0.0 0.2 0.0 0.4 0.0 0.4 0.0 0.4 0.2 0.0 0.7 0.0 1.1 0.0 0.2 0.2 0.4 0.2 0.0

10.7 0.0 0.0 0.0 0.2 0.2 0.0 0.0 1.1 0.2 6.1 0.0 1.1 0.9 3.9 0.0 0.2 0.0 0.0 0.0 1.5 0.0 0.9 0.2 0.0 0.0 0.7 0.7 0.0 0.0 0.0 1.1 0.0 0.0

10.8 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.7 0.9 7.0 0.2 1.5 1.1 4.8 0.0 0.0 0.2 0.2 0.0 1.5 0.0 0.0 0.0 0.0 0.4 0.7 1.5 0.2 0.4 0.4 1.1 0.7 0.0

10.9 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.7 0.7 6.1 0.0 1.5 2.4 3.3 0.2 0.0 1.1 1.3 0.0 0.9 0.2 1.7 0.0 0.0 0.0 0.9 1.3 0.4 0.0 0.2 1.3 0.2 0.0

11 0.0 0.0 1.1 0.2 0.0 0.0 0.0 0.9 1.3 8.1 0.0 0.4 0.7 3.7 0.2 0.0 0.2 0.4 0.0 1.1 0.2 1.5 0.2 0.0 0.2 0.4 1.8 0.0 0.4 0.4 1.1 0.2 0.0

11.1 0.0 0.2 0.9 0.0 0.0 0.0 0.0 1.7 0.2 6.8 0.0 0.4 1.7 5.9 0.2 0.0 0.0 0.7 0.0 0.7 0.0 2.0 0.2 0.0 0.2 0.0 1.1 0.7 0.0 0.4 0.9 0.9 0.0

11.2 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.7 0.9 6.6 0.2 1.5 1.3 9.9 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.9 0.0 0.0 1.1 0.0 2.4 0.4 0.2 0.2 0.9 1.3 0.0

11.3 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.7 0.4 6.4 0.2 0.0 0.9 5.5 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.7 0.0 0.0 1.1 0.4 1.5 0.2 0.4 0.4 0.9 1.3 0.0

11.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.4 7.9 0.0 0.9 3.1 5.5 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.9 0.0 0.0 0.9 0.4 0.2 0.0 0.4 0.2 0.7 0.2 0.0

11.5 0.0 0.0 0.0 0.0 0.7 0.0 0.0 1.1 0.2 3.1 0.0 0.4 2.9 5.0 0.0 0.0 0.0 0.7 0.0 0.2 0.0 0.7 0.0 0.0 0.7 0.2 1.8 0.2 0.0 0.0 2.4 1.1 0.0

11.6 0.0 0.0 0.9 0.2 0.2 0.0 0.0 0.4 0.2 6.4 0.4 1.1 2.2 4.4 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.4 0.0 0.0 0.4 0.0 2.2 0.0 0.2 0.2 0.7 0.4 0.2

11.7 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.4 0.4 8.6 0.0 0.7 1.3 4.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 1.3 0.0 0.0 0.0 0.2 1.3 0.2 0.2 0.2 0.7 1.1 0.0

11.8 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.7 0.7 7.5 0.0 0.9 2.6 6.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.4 2.2 0.2 0.2 0.4 1.5 0.4 0.0

11.9 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.9 6.8 0.0 0.7 1.3 5.9 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.2 0.7 0.9 0.0 0.2 0.4 1.3 0.7 0.0

12 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.9 1.1 12.3 0.2 0.7 2.4 3.5 0.2 0.0 0.4 0.7 0.0 0.2 0.0 1.1 0.0 0.0 0.4 0.4 0.9 0.0 0.0 0.2 1.5 0.7 0.0

12.1 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.4 7.5 0.0 1.5 0.2 11.9 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.2 1.1 1.3 0.9 0.0 0.4 0.4 0.7 0.0

12.2 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.4 0.4 7.9 0.0 0.7 2.4 7.7 0.4 0.0 0.4 1.3 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 1.3 0.4 0.2 0.2 1.5 0.2 0.2

12.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.7 6.4 0.0 1.5 1.1 9.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.4 1.3 0.2 0.0 0.4 1.8 0.7 0.0

12.4 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.7 0.4 6.4 0.0 1.3 1.5 5.7 0.0 0.0 0.0 0.4 0.0 1.3 0.0 0.0 0.2 0.0 0.0 0.2 1.3 0.7 0.0 0.7 0.2 1.8 0.0

12.5 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.9 0.4 6.6 0.2 0.7 0.9 4.8 0.2 0.0 0.2 0.0 0.0 1.5 0.0 0.9 0.0 0.0 0.7 0.0 0.7 0.0 0.0 0.4 0.7 1.3 0.0

12.6 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.4 4.8 0.0 0.4 1.1 4.8 0.2 0.0 0.4 0.2 0.0 1.1 0.0 0.7 0.2 0.0 0.2 0.0 2.2 0.2 0.0 0.4 1.3 0.7 0.0

12.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.4 8.1 0.2 0.7 2.0 3.3 0.2 0.0 0.4 0.2 0.0 0.2 0.0 2.0 0.0 0.0 2.2 0.2 0.7 0.2 0.0 0.9 0.9 0.9 0.0

12.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.7 7.9 0.0 0.2 1.5 6.4 0.0 0.0 0.4 0.2 0.0 1.1 0.2 0.9 0.0 0.0 0.4 0.4 2.2 0.0 0.0 0.4 0.9 0.2 0.0

12.9 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.4 0.7 6.6 0.0 1.1 1.5 7.0 0.0 0.0 0.0 0.2 0.0 0.7 0.0 1.1 0.0 0.0 0.4 0.9 1.8 0.7 0.0 0.4 0.9 0.9 0.0

13 0.0 0.2 1.1 0.0 0.0 0.0 0.0 1.5 0.0 7.9 0.2 0.9 0.7 6.1 0.0 0.0 0.7 0.2 0.0 2.0 0.0 0.7 0.0 0.2 0.2 0.7 0.9 0.2 0.2 0.4 1.3 0.2 0.0

13.1 0.0 0.0 0.2 0.0 0.0 0.0 0.0 2.0 0.7 6.8 0.2 0.9 1.8 8.8 0.0 0.0 0.0 0.4 0.0 0.7 0.0 0.4 0.0 0.0 0.4 0.7 1.5 0.4 0.0 0.0 0.7 0.2 0.0

13.2 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.7 0.9 10.1 0.2 0.4 2.0 4.6 0.0 0.0 0.0 0.0 0.0 0.9 0.0 2.9 0.0 0.0 0.4 0.4 0.4 0.0 0.2 0.2 0.7 2.9 0.0

13.3 0.0 0.0 2.4 0.0 0.4 0.0 0.0 0.9 0.0 9.6 0.0 1.1 1.5 6.4 0.0 0.0 0.2 0.0 0.0 0.9 0.0 0.9 0.0 0.0 0.0 0.4 2.2 0.0 0.0 0.2 1.3 2.6 0.0

13.4 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.7 0.4 8.1 0.0 0.0 2.0 4.2 0.0 0.0 0.0 0.4 0.0 0.7 0.0 0.2 0.0 0.0 0.0 1.5 2.9 0.4 0.4 0.2 0.7 1.3 0.0

13.5 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.4 6.3 0.2 0.4 1.7 5.3 0.2 0.0 0.2 0.2 0.0 0.6 0.0 0.2 0.0 0.0 0.2 0.6 1.5 0.0 0.0 0.2 0.4 0.8 0.0

13.6 0.0 0.0 0.2 0.0 0.0 0.0 0.0 1.1 0.4 2.2 0.0 1.5 0.7 4.6 0.4 0.0 0.0 0.0 0.0 0.7 0.0 0.7 0.0 0.0 0.0 0.4 1.8 0.4 0.0 0.4 0.2 1.3 0.0

13.7 0.0 0.0 0.4 0.0 0.0 0.0 0.0 1.8 0.2 3.3 0.0 0.4 1.1 5.0 0.0 0.0 0.0 0.4 0.0 1.1 0.0 1.1 0.0 0.2 0.0 0.4 0.9 0.0 0.2 1.1 0.0 0.4 0.0

13.8 0.0 0.0 0.2 0.0 0.0 0.0 0.0 1.1 0.7 4.8 0.0 0.7 0.2 5.9 0.0 0.0 0.2 0.2 0.2 0.7 0.0 0.4 0.0 0.0 0.0 0.4 1.8 0.0 0.0 0.2 0.7 0.7 0.0

13.9 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.4 0.7 8.8 0.0 0.0 0.9 5.7 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.4 1.3 0.0 0.4 0.7 1.3 2.4 0.0

14 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.7 6.4 0.2 0.4 2.0 4.2 0.2 0.0 0.9 0.4 0.0 0.2 0.0 0.2 0.2 0.0 0.2 0.4 1.5 0.9 0.2 0.9 0.2 0.4 0.0

14.1 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 1.3 5.0 0.4 0.2 1.8 5.7 0.0 0.0 0.0 0.4 0.0 0.7 0.0 0.0 0.0 0.0 0.4 0.0 2.0 0.9 0.0 0.7 1.3 0.9 0.0

14.2 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.4 3.5 0.4 0.7 0.7 4.8 0.2 0.2 0.0 0.2 0.0 0.4 0.0 0.2 0.0 0.0 0.4 0.2 0.9 0.0 0.2 0.7 0.9 1.3 0.0

14.3 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.2 1.3 5.3 0.2 0.4 0.7 4.8 0.4 0.2 0.2 0.9 0.0 0.7 0.0 0.2 0.0 0.0 0.2 0.9 0.2 0.2 0.0 0.7 0.7 0.4 0.2

14.4 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.7 4.0 0.0 0.7 1.5 5.1 0.0 0.0 0.0 0.2 0.0 1.3 0.0 1.8 0.0 0.0 0.2 0.2 0.4 0.4 0.2 0.4 1.1 1.3 0.0

14.5 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.9 7.0 0.4 0.4 1.8 2.9 0.0 0.0 0.0 0.4 0.0 0.4 0.0 0.7 0.0 0.0 0.2 0.7 0.7 1.3 0.0 0.0 1.3 0.4 0.0

14.6 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.7 0.9 6.8 0.2 0.7 2.0 5.3 0.9 0.0 0.2 0.2 0.0 1.3 0.0 0.4 0.0 0.0 0.2 0.2 3.3 0.0 0.0 0.0 1.5 1.8 0.0

14.7 0.0 0.2 1.1 0.0 0.0 0.0 0.0 0.0 0.9 8.1 0.2 1.1 1.1 9.4 0.4 0.0 0.0 0.7 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 1.3 0.2 0.0 0.0 1.1 0.4 0.0

14.8 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9 6.6 0.2 1.3 2.2 5.9 0.4 0.0 0.0 1.1 0.0 0.7 0.0 0.2 0.0 0.0 0.4 0.4 0.4 0.4 0.0 0.0 0.4 0.0 0.0

14.9 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.0 0.2 5.0 0.0 0.9 1.5 7.2 0.4 0.0 0.0 0.2 0.0 0.4 0.0 0.4 0.0 0.0 0.0 0.2 0.2 0.7 0.0 0.2 0.2 0.4 0.0

15 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.4 0.4 3.1 0.2 1.5 1.5 5.3 0.0 0.0 0.0 0.9 0.0 0.4 0.0 0.4 0.0 0.0 0.2 0.7 0.2 1.1 0.0 0.7 0.4 0.0 0.0

15.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9 1.1 6.6 0.0 1.5 1.8 3.3 0.0 0.0 0.0 0.4 0.0 0.4 0.0 0.7 0.0 0.0 0.2 0.2 1.8 0.9 0.0 0.4 1.1 0.7 0.0

15.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.7 4.4 0.0 1.1 2.2 5.5 0.2 0.0 0.0 0.9 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.0 0.9 0.7 0.0

15.3 0.0 0.0 0.4 0.0 0.0 0.0 0.0 1.3 0.4 5.3 0.0 0.2 2.0 4.2 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.4 0.7 0.7 0.0 0.9 0.2 1.5 0.0

15.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 4.6 0.0 0.9 2.9 5.0 0.4 0.0 0.0 0.2 0.0 0.2 0.0 0.7 0.0 0.0 0.4 0.0 0.0 0.4 0.4 0.4 0.7 0.2 0.0

15.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.7 7.0 0.0 1.8 1.1 6.8 0.0 0.7 0.2 0.2 0.0 0.7 0.0 0.7 0.0 0.0 0.4 1.1 1.3 0.2 0.4 1.5 0.4 1.1 0.0

15.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.4 9.0 0.2 0.7 3.1 2.6 0.2 0.0 0.0 0.4 0.0 0.4 0.0 0.2 0.0 0.0 0.9 0.7 0.7 0.0 0.2 0.4 0.2 1.8 0.0

15.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.4 6.8 0.0 0.9 3.1 5.3 0.2 0.0 0.2 0.4 0.0 0.9 0.0 0.4 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.2 1.5 0.2 0.0

15.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9 8.6 0.0 0.9 2.4 6.4 0.2 0.2 0.0 0.2 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.2 0.7 0.4 0.4 0.0 1.1 0.2 0.0

15.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 5.3 0.0 0.0 5.0 3.1 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.7 0.0 0.0 0.0 0.7 0.4 0.0 0.0 0.4 0.7 0.0 0.0

16 0.0 0.4 0.0 0.0 0.0 0.0 0.0 2.2 0.7 7.7 0.4 1.1 2.6 4.4 0.0 0.0 0.4 0.9 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 1.3 0.9 0.0 0.0 0.7 0.7 0.0

16.1 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 1.3 7.2 0.2 2.2 1.8 4.4 0.0 0.0 0.0 0.7 0.0 0.4 0.2 0.9 0.0 0.0 0.2 0.7 0.2 0.4 0.2 0.2 1.3 0.2 0.0

16.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.7 0.2 4.1 0.2 2.6 1.3 3.7 0.4 0.0 0.4 1.3 0.0 0.0 0.0 0.7 0.0 0.0 0.7 0.2 2.0 0.2 0.0 0.2 0.2 0.9 0.0

16.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.4 5.5 0.2 0.4 1.5 3.5 0.0 0.0 0.7 0.4 0.0 0.2 0.0 0.4 0.0 0.0 0.2 0.4 0.9 0.7 0.0 0.2 1.8 2.6 0.0

2d. Smoky Hill calcareous nannofossil census data, upper section, part 4 of 5

Column 1: Section Height (m) Column 12: Staurolithites sp. 2 Column 23: Tranolithus exiguus

Column 2: Sm. P. sigm, Z. erec, etc… Column 13: Staurolithites zoensis Column 24: Tranolithus gabalus

Column 3: Sollasites barringtonensis Column 14: Stoverius asymmetricus Column 25: Tranolithus macleodiae

Column 4: Sollasites sp. Column 15: Stoverius sp. Column 26: Tranolithus manifestus

Column 5: Staurolithites crux Column 16: Stoverius biarcus Column 27: Tranolithus minimus

Column 6: Stuarolithites dorfii Column 17: Stoverius coronatus Column 28: Tranolithus phacelosus

Column 7: Staurolithites ellipticus Column 18: Stradnerlithus rhombicus Column 29: Watznaueria barnasae

Column 8: Staurolithites imbricatus Column 19: Tegumentum stradneri Column 30: Watznaueria biporta

Column 9: Staurolithites mielnicensis Column 20: Tetrapodorhabdus copt/dec Column 31: Watznaueria fossicincta

Column 10: Stuarolithites mitcheneri Column 21: Thiersteinia ecclesiastica Column 32: Watznaueria ovata

Column 11: Staurolithites sp. 1 Column 22: Tortolithus dodekachelyon Column 33: Watznaueria quadriradiata

Column 34: Zeug. Pseudanthophorus

SectiSm. P. SollasiSollasiStaurolStuarolStaurolStaurolStaurolStuarolStaurolStaurolStaurolStoveriStoveriStoveriStoveriStradneTegumenTetrapoThierstTortoliTranoliTranoliTranoliTranoliTranoliTranoliWatznauWatznauWatznauWatznauWatznauZeug. P

0 1.5 0.0 0.0 1.3 0.0 0.4 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 2.4 0.2 0.0 0.7 2.2 0.2 11.0 0.0 0.2 0.0 0.9 0.0

1 1.1 0.0 0.0 1.1 0.0 1.3 0.0 0.0 0.2 0.0 0.0 0.4 0.0 0.0 0.0 0.4 0.2 0.0 0.4 0.0 0.0 2.0 0.0 0.0 0.4 2.0 0.4 9.0 0.0 0.0 0.2 0.2 0.0

2 1.8 0.0 0.0 0.9 0.2 2.0 0.7 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.4 0.0 1.5 0.4 0.2 0.4 1.5 0.7 14.5 0.0 0.4 0.0 2.9 0.0

3 1.5 0.0 0.0 2.2 0.0 1.5 0.2 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 2.0 0.0 0.0 0.2 1.1 0.0 11.2 0.0 0.4 0.4 0.0 0.0

4 0.0 0.0 0.0 2.0 0.0 4.9 0.7 0.0 0.0 0.9 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.0 2.9 0.9 6.0 0.2 0.2 0.0 0.4 0.0

5 0.0 0.0 0.0 1.6 0.0 0.9 0.4 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.2 0.4 0.0 0.0 1.6 0.2 0.0 0.0 2.7 0.7 16.6 0.0 0.2 0.4 1.1 0.0

6 0.0 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 1.1 0.2 0.0 0.0 2.2 0.7 18.5 0.2 0.2 0.4 0.0 0.0

7 0.0 0.0 0.0 0.9 0.0 1.3 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.0 1.5 0.0 0.0 0.2 3.3 1.1 17.1 0.0 0.4 0.0 2.4 0.0

8 0.0 0.0 0.0 1.1 0.0 0.4 0.2 0.0 0.0 0.4 0.7 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.4 0.9 16.8 0.0 0.7 0.4 0.0 0.0

8.8 0.0 0.0 0.0 0.2 0.0 2.9 0.0 0.0 0.0 0.2 0.9 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.4 0.0 0.0 1.1 0.0 0.0 0.0 1.8 0.4 14.3 0.0 0.2 0.4 2.6 0.0

8.9 0.0 0.0 0.0 1.5 0.0 2.4 0.4 0.0 0.0 0.9 1.3 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 1.5 0.2 0.0 0.0 1.3 0.4 16.0 0.0 0.7 0.2 1.5 0.0

9 0.0 0.0 0.0 0.9 0.0 2.0 0.0 0.0 0.0 0.7 1.1 0.2 0.0 0.0 0.2 0.7 0.0 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.2 2.2 0.4 9.2 0.2 0.2 0.0 3.9 0.0

9.1 0.0 0.0 0.0 0.4 0.0 1.6 0.2 0.0 0.0 0.7 0.7 0.0 0.0 0.0 0.2 0.7 0.0 0.0 0.4 0.0 0.0 0.4 0.0 0.0 0.2 1.6 1.3 11.1 0.0 0.2 0.0 1.1 0.0

9.2 0.0 0.0 0.0 0.7 0.0 2.4 0.2 0.0 0.0 0.9 0.9 0.0 0.0 0.7 0.9 2.0 0.0 0.0 0.2 0.0 0.0 1.8 0.0 0.0 0.0 0.9 0.9 20.6 0.0 0.9 0.4 5.0 0.0

9.3 0.0 0.0 0.0 0.7 0.0 4.4 0.0 0.0 0.0 0.9 1.3 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.9 0.2 20.8 0.2 0.7 0.0 2.4 0.0

9.4 0.0 0.0 0.0 0.4 0.0 3.1 0.0 0.0 0.0 0.7 0.9 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 2.2 0.0 0.0 0.2 0.0 0.9 14.9 0.0 1.1 0.0 2.8 0.0

9.5 0.0 0.0 0.0 0.4 0.0 5.7 0.0 0.0 0.0 1.1 2.4 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 5.7 0.0 0.0 0.2 0.2 0.9 15.1 0.0 1.3 0.2 5.5 0.0

9.6 0.0 0.0 0.0 0.2 0.0 2.6 0.0 0.0 0.0 0.7 1.1 0.4 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 4.2 0.0 0.0 0.4 0.4 0.4 17.4 0.2 0.4 0.2 2.4 0.0

9.7 0.0 0.0 0.0 0.4 0.0 3.2 0.0 0.0 0.0 1.3 1.3 0.2 0.0 0.0 0.2 0.4 0.0 0.4 0.2 0.0 0.0 3.4 0.0 0.0 0.2 0.9 0.2 18.6 0.2 1.3 0.2 2.4 0.0

9.8 0.0 0.2 0.0 0.4 0.0 4.8 0.2 0.0 0.0 0.4 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.2 3.3 0.0 11.6 0.2 1.1 0.2 3.9 0.0

9.9 0.0 0.0 0.2 0.2 0.0 6.2 0.2 0.0 0.0 0.7 1.1 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 2.9 0.2 0.0 0.2 1.1 0.0 14.1 0.0 0.9 0.0 1.8 0.0

10 0.0 0.0 0.0 0.9 0.0 5.2 0.2 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 2.6 0.0 0.0 0.2 1.3 0.2 12.7 0.2 0.2 0.0 3.7 0.0

10.1 0.0 0.0 0.0 0.4 0.0 8.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.2 0.7 0.0 11.4 0.0 0.9 0.2 4.5 0.0

10.2 0.0 0.0 0.0 0.4 0.0 5.5 0.4 0.0 0.0 0.2 0.9 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.0 0.0 0.4 0.2 11.4 0.0 0.7 0.2 4.1 0.0

10.3 0.0 0.0 0.0 0.2 0.0 4.1 0.2 0.0 0.0 0.4 0.6 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.5 0.6 0.2 0.2 0.4 0.2 13.5 0.0 0.4 0.0 2.2 0.0

10.4 2.0 0.0 0.2 0.0 0.0 2.2 0.4 0.0 0.0 0.4 0.4 0.0 0.7 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.5 0.2 0.0 0.9 2.4 0.4 17.4 0.0 0.4 0.4 2.0 0.0

10.5 2.8 0.0 0.0 0.0 0.0 5.5 0.4 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.2 0.0 0.0 2.2 0.4 12.9 0.0 0.9 0.0 2.6 0.0

10.6 1.8 0.2 0.0 0.0 0.0 4.4 0.0 0.0 0.0 0.2 0.4 0.0 0.4 0.4 0.2 1.3 0.0 0.0 0.2 0.0 0.0 1.5 0.0 0.0 0.0 2.9 1.1 15.6 0.0 0.2 0.0 1.8 0.0

10.7 5.9 0.2 0.0 0.0 0.0 2.6 0.4 0.0 0.0 0.0 0.7 0.2 0.2 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 1.1 0.0 0.0 0.7 1.7 0.9 9.6 0.0 1.1 0.2 0.9 0.0

10.8 1.1 0.0 0.0 0.2 0.0 6.1 0.2 0.0 0.0 0.0 0.4 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.4 0.2 0.0 0.2 1.8 0.4 12.9 0.0 0.4 0.2 2.4 0.0

10.9 2.2 0.0 0.0 0.2 0.0 5.9 0.2 0.0 0.0 0.0 0.9 0.2 0.4 0.4 0.2 0.2 0.0 0.0 0.0 0.0 0.0 2.4 0.7 0.0 0.0 0.9 0.4 10.0 0.0 0.0 0.2 2.8 0.0

11 1.1 0.0 0.0 0.2 0.0 3.5 0.4 0.0 0.0 0.2 0.7 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.6 0.2 0.0 0.0 1.8 0.9 15.6 0.0 0.9 0.2 2.2 0.0

11.1 2.2 0.0 0.0 0.2 0.0 4.1 0.2 0.0 0.0 0.7 1.1 0.0 0.4 0.4 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.2 0.9 0.0 13.1 0.0 0.9 0.0 2.2 0.0

11.2 2.2 0.4 0.0 0.2 0.0 2.9 0.0 0.0 0.7 0.0 0.4 0.2 0.2 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.0 1.1 0.0 0.0 0.2 0.9 0.2 11.9 0.2 0.0 0.0 3.5 0.0

11.3 3.7 0.4 0.0 0.0 0.0 0.4 0.4 0.0 0.0 0.2 0.4 0.4 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.2 0.0 1.1 0.2 0.0 0.0 1.8 0.2 10.7 0.0 0.2 0.0 2.4 0.0

11.4 1.1 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.2 0.4 0.4 0.4 0.0 0.0 0.2 0.0 0.0 0.2 0.2 0.0 0.0 1.5 0.2 0.0 0.2 5.5 0.2 9.8 0.0 0.0 0.0 4.1 0.0

11.5 5.0 0.2 0.2 1.3 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.2 0.7 0.2 0.0 0.2 0.0 0.4 0.2 0.0 0.0 2.0 0.0 0.0 0.0 5.0 0.4 6.6 0.0 0.0 0.0 2.0 0.0

11.6 4.6 0.2 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.0 0.0 0.7 0.2 0.0 0.0 0.2 0.0 0.0 0.4 0.0 0.0 2.0 0.0 0.0 0.4 3.3 0.2 7.0 0.2 0.2 0.0 1.5 0.0

11.7 3.1 0.0 0.0 0.4 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 3.1 0.2 0.4 0.7 2.4 0.4 9.9 0.0 0.0 0.2 3.3 0.0

11.8 1.8 0.0 0.0 0.4 0.0 0.9 0.2 0.0 0.0 0.0 0.2 0.2 0.4 0.0 0.4 0.2 0.0 0.0 0.2 0.0 0.0 1.3 0.7 0.0 0.0 2.2 0.2 7.7 0.0 0.2 0.0 3.3 0.0

11.9 2.8 0.2 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.4 0.2 0.2 0.4 0.0 0.0 0.0 0.0 0.0 2.8 0.4 0.0 0.0 0.7 0.0 9.0 0.0 0.4 0.0 1.3 0.0

12 1.1 0.2 0.0 0.4 0.0 0.9 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.2 0.0 1.8 0.0 0.0 0.0 0.4 0.9 10.7 0.2 0.9 0.0 2.6 0.0

12.1 1.5 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.4 0.0 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.2 0.0 1.8 0.2 0.0 0.7 1.1 0.7 7.7 0.0 0.4 0.0 0.0 0.0

12.2 0.4 0.4 0.0 0.7 0.0 0.2 0.2 0.0 0.0 0.4 0.0 0.4 0.0 1.3 0.0 0.7 0.0 0.2 0.0 0.0 0.0 2.2 0.0 0.0 0.0 0.4 0.4 16.1 0.2 0.0 0.0 3.3 0.2

12.3 6.6 0.9 0.0 0.7 0.0 0.7 0.4 0.0 0.0 0.4 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 3.7 0.0 0.2 0.0 0.4 0.4 8.8 0.0 0.4 0.7 2.9 0.0

12.4 4.4 0.2 0.0 0.2 0.0 0.9 0.2 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 2.6 0.0 0.0 0.2 1.3 0.7 9.6 0.2 0.0 0.9 3.3 0.0

12.5 1.1 0.7 0.0 1.3 0.0 1.3 0.2 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 2.4 0.7 0.0 0.9 2.4 0.4 8.6 0.0 0.7 0.2 1.8 0.0

12.6 1.5 0.0 0.0 0.9 0.0 1.3 0.0 0.0 1.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.8 0.2 0.7 0.2 0.9 0.0 5.9 0.2 0.2 0.0 2.0 0.0

12.7 1.5 0.2 0.0 0.4 0.0 0.4 0.0 0.0 0.4 0.0 0.2 0.4 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.2 0.0 1.3 0.0 0.0 0.4 1.3 0.7 9.4 0.2 0.2 0.0 2.4 0.0

12.8 6.0 0.7 0.0 0.9 0.0 1.1 0.2 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.2 0.0 0.0 4.4 0.2 0.0 0.4 1.5 1.1 5.3 0.4 0.2 0.0 4.4 0.0

12.9 1.3 0.9 0.0 0.4 0.0 0.4 0.2 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.0 0.4 0.0 0.2 0.2 0.0 0.0 3.5 0.2 0.0 0.2 0.2 0.4 8.3 0.0 0.4 0.0 2.9 0.0

13 0.9 0.4 0.0 0.4 0.0 1.5 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.7 0.0 2.2 0.2 0.2 0.2 0.2 0.4 5.9 0.2 0.9 0.0 1.5 0.0

13.1 0.7 0.0 0.0 0.2 0.0 0.2 0.7 0.0 0.2 0.0 0.2 0.2 0.0 0.4 0.0 0.4 0.0 0.0 0.0 0.2 0.0 0.9 0.0 0.0 0.0 1.1 0.0 4.4 0.0 0.4 0.0 1.3 0.0

13.2 1.5 0.0 0.0 0.9 0.0 1.3 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 3.3 0.0 0.4 0.0 0.7 0.7 10.3 0.2 0.0 0.4 4.6 0.0

13.3 3.3 0.0 0.0 0.9 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.8 0.0 0.0 0.0 1.3 1.3 7.5 0.0 0.2 0.0 2.4 0.0

13.4 1.1 0.2 0.0 0.0 0.0 2.6 0.4 0.0 0.0 0.2 0.7 0.2 0.0 0.9 0.0 0.0 0.0 0.2 0.0 0.0 0.0 1.8 0.0 0.0 0.0 2.2 1.1 9.4 0.0 0.7 0.0 1.5 0.0

13.5 0.4 0.4 0.0 0.6 0.0 1.1 0.0 0.0 0.4 0.0 0.6 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 1.9 0.0 0.0 0.2 2.7 0.8 11.6 0.4 0.2 0.0 4.4 0.0

13.6 2.6 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.4 0.0 0.9 0.2 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.2 1.3 0.9 9.0 0.0 0.4 0.2 1.1 0.0

13.7 0.7 0.2 0.0 0.7 0.0 0.0 0.0 0.0 0.2 0.2 0.4 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.0 0.7 0.9 11.8 0.4 0.0 0.2 2.4 0.0

13.8 2.4 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.2 0.4 0.9 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.7 0.9 0.7 5.0 0.4 0.2 0.0 1.3 0.0

13.9 2.9 0.7 0.2 0.7 0.0 0.7 0.2 0.0 0.0 0.0 0.4 0.2 0.2 0.2 0.0 0.2 0.0 0.4 0.0 0.0 0.0 1.5 0.2 0.2 0.7 0.9 1.5 9.2 0.0 0.2 0.0 1.5 0.0

14 1.1 0.0 0.0 1.1 0.0 0.4 0.2 0.0 0.2 0.0 0.4 0.2 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.2 0.0 2.4 0.2 0.0 0.0 2.0 0.4 11.2 0.2 0.4 0.2 3.7 0.0

14.1 3.1 0.0 0.0 0.4 0.0 0.2 0.2 0.0 0.4 0.0 0.4 0.0 0.2 0.4 0.0 0.4 0.0 0.4 0.0 0.2 0.2 1.8 0.2 0.4 0.2 3.1 0.9 10.3 0.0 1.1 0.7 2.9 0.0

14.2 5.3 0.7 0.0 1.3 0.0 0.0 0.2 0.0 0.4 0.2 1.1 0.7 0.4 0.2 0.0 0.2 0.0 0.2 0.0 0.2 0.0 1.5 0.0 0.0 0.4 1.8 0.9 7.9 0.0 0.2 0.0 2.0 0.0

14.3 4.2 0.0 0.0 1.1 0.0 0.2 0.4 0.0 0.2 0.0 0.4 0.4 0.9 0.4 0.0 0.4 0.0 0.4 0.2 0.0 0.0 1.8 0.0 0.0 0.0 0.9 1.3 9.2 0.0 0.0 0.4 0.7 0.0

14.4 2.9 0.2 0.0 0.4 0.0 0.2 0.2 0.0 0.0 0.2 0.7 0.7 0.0 0.2 0.0 0.2 0.0 0.2 0.0 0.2 0.0 1.8 0.0 0.0 0.2 1.8 0.9 7.0 0.0 0.2 0.2 1.1 0.0

14.5 1.3 0.4 0.0 0.4 0.0 1.3 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.2 0.2 0.0 0.4 0.0 0.4 0.0 0.9 0.2 0.0 0.0 0.9 0.4 9.0 0.2 0.4 0.0 0.7 0.0

14.6 1.5 0.7 0.0 0.7 0.0 0.4 0.2 0.0 0.4 0.0 0.4 0.4 0.2 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.9 0.2 7.0 0.0 0.4 0.4 0.4 0.0

14.7 1.5 0.0 0.0 0.2 0.0 0.9 0.4 0.0 0.2 0.4 0.2 0.0 0.2 0.0 0.0 0.4 0.0 0.0 0.0 0.2 0.0 1.5 0.2 0.0 0.0 1.1 0.4 14.2 0.0 0.2 0.7 0.4 0.0

14.8 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.4 0.0 0.2 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.2 0.2 0.7 21.4 0.0 0.7 0.7 0.0 0.0

14.9 0.7 0.0 0.0 0.9 0.0 0.4 0.0 0.0 0.0 0.4 0.7 0.4 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.0 0.7 0.4 16.4 0.0 0.2 0.9 0.0 0.0

15 0.2 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.4 0.2 25.3 0.4 0.7 0.9 0.0 0.0

15.1 2.6 0.0 0.0 1.3 0.0 0.0 0.4 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 1.3 0.0 0.2 15.1 0.7 0.4 0.4 0.0 0.0

15.2 1.3 0.0 0.0 1.1 0.0 0.2 0.2 0.0 0.0 0.2 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.2 0.0 0.2 1.8 0.0 0.2 0.9 1.3 0.4 18.2 0.2 0.4 0.4 0.9 0.0

15.3 1.5 0.2 0.0 0.2 0.0 0.4 0.2 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.7 0.2 0.2 0.7 1.5 0.2 13.2 0.0 0.0 0.0 0.9 0.0

15.4 0.9 0.2 0.0 0.7 0.0 2.2 0.4 0.0 0.2 0.4 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 2.0 0.0 0.0 0.4 0.4 0.4 13.8 0.4 0.4 0.0 0.0 0.0

15.5 2.4 0.0 0.0 0.2 0.0 0.7 0.2 0.0 0.0 0.7 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.2 1.1 0.2 8.1 0.2 0.0 0.2 0.0 0.0

15.6 1.1 0.0 0.0 0.9 0.0 0.7 0.0 0.0 0.2 0.0 0.7 0.2 0.0 0.2 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.9 12.1 0.4 0.0 0.2 0.2 0.0

15.7 0.0 0.2 0.0 0.9 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.0 1.3 0.2 0.0 0.4 0.4 0.2 9.7 0.0 0.2 0.7 0.2 0.0

15.8 1.8 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.7 0.0 0.0 0.0 0.2 0.0 10.4 0.0 0.0 0.2 0.4 0.0

15.9 1.5 0.0 0.0 0.4 0.0 0.7 0.0 0.0 0.2 0.4 0.2 0.2 0.0 0.7 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.9 0.0 17.8 0.4 0.9 0.2 0.2 0.0

16 2.2 0.0 0.0 0.7 0.0 1.3 0.2 0.0 0.0 0.4 0.0 0.2 0.2 0.4 0.2 0.2 0.0 0.2 0.0 0.0 0.0 1.8 0.4 0.2 0.9 0.2 0.4 13.8 0.2 1.3 0.0 0.7 0.0

16.1 1.1 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.4 0.2 1.3 0.0 0.9 0.0 0.2 0.0 0.0 0.2 1.5 0.2 0.0 0.9 0.9 0.2 12.3 1.1 2.0 1.3 0.0 0.2

16.2 2.8 0.0 0.0 0.2 0.0 0.7 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.4 0.0 2.0 0.2 0.2 0.4 2.2 0.0 9.2 0.0 0.2 0.9 0.2 0.0

16.3 0.7 0.0 0.0 0.9 0.0 0.7 1.1 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.7 0.0 0.2 0.0 0.4 0.0 0.9 0.0 0.0 0.7 0.7 0.4 11.6 0.4 1.1 0.0 0.2 0.0

2e. Smoky Hill calcareous nannofossil census data, upper section, part 5 of 5

Column 1: Section Height (m)

Column 2: Zeugrhabdotus diplogrammus

Column 3: Zeugrhabdotus erectus

Column 4: Zeug. pseudanthophorus

Column 5: Zeugrhabdotus scutula

Column 6: Zeugrhabdotus spiralis

Column 7: Zeugrhabdotus trivectus

Column 8: Zeugrhabdotus wynnhayi

Column 9: Helicolithus varolii

SectiZeugrhaZeugrhaZeugrhaZeugrhaZeugrhaZeugrhaHelicolithus varoli

0 0.0 9.2 2.2 0.0 0.0 0.0 0.2

1 0.7 13.8 0.9 0.0 0.2 0.0 0.0

2 0.2 4.6 0.9 0.4 0.2 0.0 0.0

3 0.2 11.2 2.6 0.0 0.0 0.0 0.0

4 0.2 9.6 1.6 0.9 0.0 0.0 0.0

5 1.1 6.1 2.2 0.4 0.4 0.0 0.0

6 0.7 9.3 0.2 0.4 0.0 0.0 0.0

7 0.7 7.0 2.4 0.4 0.2 0.0 0.0

8 0.4 8.1 0.2 0.4 0.0 0.0 0.0

8.8 0.7 9.6 0.7 0.9 0.0 0.0 0.2

8.9 0.2 8.1 0.0 0.9 0.2 0.0 0.0

9 0.7 14.0 0.4 0.7 0.2 0.0 0.0

9.1 0.7 9.8 0.0 0.7 0.0 0.0 0.0

9.2 0.9 5.7 0.4 0.9 0.0 0.0 0.0

9.3 0.0 3.1 0.0 1.3 0.4 0.0 0.0

9.4 0.7 6.6 0.7 0.2 1.3 0.0 0.0

9.5 0.2 4.6 1.3 0.7 0.2 0.0 0.4

9.6 0.0 4.8 0.9 0.7 0.0 0.0 0.0

9.7 0.0 7.5 0.4 2.6 0.2 0.0 0.0

9.8 0.2 11.2 0.4 2.2 0.0 0.0 0.0

9.9 0.2 7.5 0.4 2.4 0.7 0.0 0.0

10 0.0 10.0 0.2 2.8 0.2 0.0 0.0

10.1 0.2 7.4 0.0 2.9 0.0 0.0 0.0

10.2 0.0 6.3 0.2 2.2 0.2 0.0 0.0

10.3 0.6 9.5 0.4 1.3 0.0 0.0 0.0

10.4 0.7 9.0 0.0 2.9 0.2 0.0 0.0

10.5 0.2 10.1 0.4 1.8 0.4 0.0 0.0

10.6 0.2 9.0 0.4 1.1 0.0 0.0 0.0

10.7 0.0 15.3 0.4 2.2 0.2 0.7 0.0

10.8 0.2 6.6 0.7 1.8 0.0 0.2 0.0

10.9 0.0 9.2 0.0 0.4 0.0 0.0 0.0

11 0.2 7.7 0.0 1.8 0.4 0.0 0.0

11.1 0.0 10.9 0.0 1.7 0.2 0.0 0.0

11.2 0.2 7.0 0.0 0.4 0.0 0.0 0.0

11.3 0.4 10.3 0.7 2.0 0.2 0.0 0.0

11.4 0.2 9.0 1.1 1.1 0.0 0.0 0.0

11.5 0.2 8.6 1.1 0.7 0.2 0.0 0.0

11.6 0.2 6.8 2.0 0.7 0.2 0.2 0.0

11.7 0.0 8.6 0.9 1.8 0.0 0.2 0.0

11.8 0.2 10.7 2.9 2.4 0.2 0.0 0.0

11.9 0.9 19.0 0.9 1.5 0.2 0.0 0.0

12 0.2 12.3 1.1 2.4 0.2 0.2 0.0

12.1 0.7 13.8 0.0 1.1 0.2 0.2 0.0

12.2 0.2 6.2 0.2 0.9 0.4 0.9 0.0

12.3 0.0 14.9 0.2 2.0 0.2 0.0 0.0

12.4 0.0 13.6 0.4 1.8 0.0 0.2 0.0

12.5 0.7 12.7 0.0 2.0 0.2 0.0 0.0

12.6 0.2 23.0 1.8 0.9 0.2 0.0 0.0

12.7 0.7 12.1 9.2 1.1 0.2 0.2 0.0

12.8 0.2 16.1 0.0 0.4 0.0 0.2 0.0

12.9 0.4 23.9 0.4 0.9 0.0 0.0 0.0

13 0.0 17.2 0.4 5.9 0.0 0.2 0.0

13.1 0.2 16.4 0.0 4.6 0.0 0.0 0.0

13.2 0.0 5.7 4.2 0.2 0.4 0.2 0.0

13.3 0.0 7.5 6.6 1.8 0.2 0.0 0.0

13.4 0.0 9.6 5.0 0.4 0.0 0.2 0.0

13.5 0.4 10.1 9.5 0.6 0.0 0.2 0.0

13.6 0.4 10.5 20.0 0.2 0.0 0.2 0.0

13.7 0.0 9.2 11.2 0.2 0.0 0.2 0.0

13.8 0.2 7.2 20.8 0.2 0.4 0.0 0.0

13.9 0.0 9.9 6.2 0.4 0.0 0.2 0.0

14 0.4 7.9 5.1 1.3 0.2 0.0 0.0

14.1 0.2 11.0 3.9 0.4 0.0 0.0 0.0

14.2 0.2 13.8 2.4 0.4 0.0 0.0 0.0

14.3 0.2 5.0 9.9 0.9 0.0 0.0 0.0

14.4 0.0 14.3 7.9 0.4 0.0 0.0 0.0

14.5 0.0 7.9 12.1 1.5 0.0 0.0 0.0

14.6 0.2 14.3 5.9 0.4 0.0 0.0 0.0

14.7 0.2 10.1 0.4 0.9 0.0 0.0 0.0

14.8 0.4 9.9 8.6 0.0 0.2 0.0 0.0

14.9 0.0 14.4 12.3 0.0 0.0 0.0 0.0

15 0.4 7.0 0.4 0.2 0.2 0.0 0.0

15.1 0.0 11.8 0.2 1.1 0.0 0.0 0.0

15.2 0.2 15.8 3.9 0.4 0.0 0.0 0.0

15.3 0.2 13.6 2.2 0.2 0.0 0.0 0.0

15.4 0.2 9.2 6.1 0.7 0.2 0.4 0.2

15.5 0.0 10.3 6.6 1.5 0.4 0.0 0.0

15.6 0.2 11.8 9.0 0.7 0.0 0.2 0.0

15.7 0.2 13.2 16.5 0.0 0.0 0.0 0.0

15.8 0.0 14.3 16.3 0.7 0.0 0.0 0.0

15.9 0.0 11.0 14.9 0.2 0.0 0.0 0.0

16 0.4 6.6 9.0 0.4 0.0 0.0 0.0

16.1 0.0 8.6 13.2 0.0 0.0 0.2 0.0

16.2 0.2 6.5 9.4 1.5 0.0 0.0 0.2

16.3 0.2 5.5 8.8 1.8 0.2 0.4 0.0

2f. Smoky Hill calcareous nannofossil census data, lower section, part 1 of 5

Column 1: Section Height (m) Column 12: Biscutum notaculum Column 23: Corollithion exiguum

Column 2: Ahmuellerella octoradiata Column 13: Biscutum zulloi Column 24: Corollithion madagascarensis

Column 3: Amphizygus brooksii Column 14: Braarudosphaera bigelowii Column 25: Corollithion signum

Column 4: Amphizygus oculomammutus Column 15: Broinsonia matalosa Column 26: Cretarhadus conicus

Column 5: Arkhangelskiella confusa Column 16: Broinsonia signata Column 27: Cribrosphaera circula

Column 6: Arkhangelskiella cymbiformis Column 17: Bukrylithus ambiguus Column 28: Cribrosphaerella ehrenbergii

Column 7: Axopodorhabdid sp. Column 18: Calculites obscurus Column 29: Cribrosphaerella pelta

Column 8: Biscutum blacki Column 19: Calculites ovalis Column 30: Cyclogelosphaera margharelli

Column 9: Biscutum constans Column 20: Chiastozygus amphipons Column 31: Cyclogelosphaera rotaclypeata

Column 10: Biscutum dissimilis Column 21: Chiastozygus litterarius Column 32: Cylindralithus nudus

Column 11: Biscutum hattneri Column 22: Corrollithion ellipticum Column 33: Discorhabdus ignotus

Column 34: Eiffellithus eximius

SectiAhmuellAmphizyAmphizyArkhangArkhangAxopodoBiscutuBiscutuBiscutuBiscutuBiscutuBiscutuBraarudBroinsoBroinsoBukryliCalculiCalculiChiastoChiastoCorrollCorolliCorolliCorolliCretarhCribrosCribrosCribrosCyclogeCyclogeCylindrDiscorhEiffell

16.4 0.7 0.0 0.2 0.0 0.0 0.0 0.0 7.4 0.0 0.9 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.2 0.7 0.0 0.7 0.0 0.0 1.5 0.0 0.0 0.0 0.0 0.0 0.0 0.0 5.7 2.6

16.5 0.0 0.0 0.0 0.7 0.0 0.0 0.5 5.3 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 3.8 0.0 0.0 0.2 0.0 0.7 0.0 0.0 3.1 1.7

16.6 0.7 0.0 0.0 0.4 0.0 0.2 0.2 5.5 0.0 4.6 0.0 0.9 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 2.0 0.2 0.0 0.4 0.0 0.0 0.0 0.2 2.0 0.0 0.0 2.2 2.2

16.7 0.5 0.0 0.0 0.2 0.0 0.0 0.2 6.5 0.2 3.1 0.0 0.5 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.2 1.9 0.0 0.5 0.0 0.0 0.0 0.7 0.0 1.2 0.0 0.0 3.8 1.4

16.8 0.0 0.7 0.2 0.0 0.0 0.2 0.2 4.2 0.0 2.0 0.0 0.2 0.0 0.0 0.7 0.0 0.0 0.0 0.2 0.2 0.4 0.2 0.0 1.3 0.0 0.0 0.2 0.4 1.8 0.0 0.0 3.5 4.4

16.9 0.0 0.0 0.0 0.0 0.0 0.4 0.2 4.1 0.0 2.0 0.0 0.9 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.2 0.4 0.0 0.0 1.7 0.0 0.0 0.2 0.4 2.0 0.0 0.2 1.7 3.9

17 0.7 0.2 0.0 0.0 0.0 0.2 0.4 6.8 0.0 0.9 0.2 0.7 0.0 0.0 0.7 0.7 0.0 0.2 0.2 0.4 0.7 0.4 0.0 0.4 0.0 0.0 0.2 0.4 2.4 0.0 0.0 3.1 1.5

17.1 1.1 0.0 0.0 0.4 0.0 0.0 0.7 6.1 0.0 1.1 0.0 1.3 0.0 0.0 0.2 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.4 1.1 0.0 0.2 1.5 1.5

17.2 0.9 0.2 0.0 0.2 0.0 0.4 0.4 5.0 0.0 0.7 0.0 1.1 0.0 0.0 0.2 0.0 0.0 0.0 0.9 0.7 0.0 0.4 0.0 0.0 0.0 0.2 0.7 0.9 1.5 0.0 0.2 1.5 1.1

17.3 0.4 0.0 0.0 0.0 0.0 0.0 0.0 7.0 0.0 1.8 0.0 0.4 0.0 0.0 0.2 0.2 0.4 0.4 0.4 0.0 0.2 0.2 0.0 0.4 0.0 0.0 0.0 0.4 3.7 0.0 0.0 4.6 1.8

17.4 0.2 0.2 0.0 0.2 0.0 0.2 0.0 2.6 0.0 0.4 0.0 0.7 0.0 0.4 0.0 0.0 0.0 0.7 0.2 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 1.3 0.0 0.2 0.9 3.3

17.5 0.7 0.0 0.0 0.4 0.0 0.0 0.0 7.0 0.0 0.9 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.2 0.0 0.4 0.0 0.0 0.2 0.0 0.2 0.0 0.0 2.2 1.3

17.6 0.4 0.0 0.0 0.2 0.0 0.0 0.0 8.4 0.0 3.3 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.2 0.4 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 2.6 1.5

17.7 1.1 0.0 1.5 0.0 0.0 0.2 0.9 13.0 0.0 2.1 0.0 1.7 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.4 0.0 0.2 0.9 0.0 1.5 0.0 0.0 4.7 2.3

17.8 0.0 0.2 0.0 0.0 0.0 0.2 0.0 10.1 0.0 2.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.4 0.2 0.0 0.0 0.0 0.4 0.4 0.2 0.7 0.0 0.2 2.4 1.5

17.9 0.2 0.2 0.0 0.0 0.0 0.0 0.7 8.8 0.0 3.7 0.0 0.4 0.2 0.0 0.0 0.2 0.0 0.0 0.2 0.2 0.9 0.7 0.0 0.0 0.0 0.0 0.2 0.2 1.1 0.0 0.0 5.5 0.9

18 0.2 0.2 0.0 0.2 0.0 0.0 0.0 7.9 0.0 4.4 0.2 1.8 0.0 0.0 0.0 0.0 0.2 0.4 0.4 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.0 0.4 1.1 0.0 0.0 1.8 1.8

18.1 0.2 0.4 0.0 0.0 0.0 0.0 0.4 6.3 0.0 0.7 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.2 0.0 0.0 0.0 0.0 0.0 0.7 0.2 0.0 0.0 0.0 3.1 2.0

18.2 1.3 0.2 0.0 0.0 0.0 0.0 0.0 7.0 0.0 0.7 0.0 1.1 0.7 0.0 0.2 0.0 0.4 0.2 0.2 0.2 0.4 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.7 2.0

18.3 0.9 0.0 0.0 0.2 0.0 0.0 0.2 5.8 0.0 0.9 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.4 0.9 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 1.1 2.8

18.4 0.2 0.9 0.0 0.0 0.0 0.0 0.0 10.6 0.0 2.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.2 0.0 0.2 4.0 2.2

18.5 0.2 0.2 0.0 0.4 0.0 0.0 0.2 14.7 0.0 2.9 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.0 0.7 0.2 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 1.1 0.0 0.0 1.8 1.5

18.7 0.7 0.0 0.2 0.0 0.0 0.0 0.4 6.1 0.0 0.4 0.0 1.8 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.2 0.0 1.3 0.0 0.0 0.0 0.4 0.7 0.0 0.0 2.6 0.7

18.8 0.4 0.2 0.2 0.0 0.0 0.0 0.2 6.1 0.0 1.5 0.0 1.3 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.7 0.2 0.0 0.4 0.0 0.0 0.9 0.0 0.2 0.2 0.0 3.9 0.9

18.9 0.9 0.4 0.2 0.0 0.0 0.2 0.2 8.1 0.2 0.7 0.0 1.8 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 2.4 0.0 0.0 0.2 0.0 0.9 0.0 0.0 3.3 1.5

19 0.7 0.2 0.9 0.0 0.0 0.0 0.4 7.2 0.0 0.2 0.0 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.2 0.0 1.8 0.0 0.0 0.0 0.0 0.0 0.2 0.2 3.1 1.3

19.1 0.0 0.4 0.0 0.0 0.0 0.0 0.0 8.3 0.0 0.0 0.0 0.2 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.9 0.0 0.4 0.0 3.1 0.0 0.0 0.0 0.2 0.9 0.0 0.0 5.5 3.3

19.2 0.2 0.7 0.0 0.0 0.0 0.4 1.8 6.6 0.0 0.7 0.0 1.5 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.2 4.0 0.0 0.2 0.0 0.2 1.1 0.0 0.0 2.2 2.4

19.3 0.7 0.0 0.0 0.2 0.0 0.0 0.7 13.6 0.0 0.0 0.0 2.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 3.3 0.0 0.0 0.2 0.2 0.9 0.0 0.0 4.2 1.1

19.4 0.7 0.9 0.0 0.0 0.0 0.0 0.2 9.6 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.8 0.0 0.0 0.4 0.0 0.2 0.0 0.0 1.8 1.1

19.5 0.7 0.0 0.0 0.0 0.0 0.0 0.0 7.3 0.0 1.1 0.2 2.2 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 1.5 0.0 0.0 0.0 0.4 1.1 0.2 0.0 3.3 1.1

19.6 0.4 0.2 0.0 0.0 0.0 0.0 0.4 7.7 0.0 1.8 0.0 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.2 2.9 0.0 0.0 0.0 0.0 1.1 0.0 0.0 2.9 0.9

19.7 1.1 0.4 0.0 0.2 0.0 0.0 0.2 6.6 0.0 0.0 0.0 2.2 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 1.1 0.2 0.0 0.9 0.0 0.0 0.0 0.2 0.9 0.0 0.2 2.2 1.8

19.8 0.9 0.4 0.0 0.2 0.0 0.0 0.2 12.3 0.0 0.0 0.4 1.5 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.2 0.0 0.4 0.0 0.4 0.0 0.0 0.2 0.0 1.1 0.0 0.0 6.3 2.8

19.9 0.9 0.2 0.0 0.0 0.0 0.0 0.4 8.7 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.0 0.2 0.0 0.0 2.4 4.8

20 0.2 0.2 0.2 0.0 0.0 0.0 0.0 6.8 0.0 0.0 0.0 5.0 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.0 0.0 0.0 4.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 3.7 3.1

20.1 0.4 0.0 0.0 0.0 0.0 0.0 0.0 6.6 0.0 0.0 0.0 3.5 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.4 0.4 0.0 8.5 0.0 0.0 0.2 0.0 1.1 0.0 0.0 2.2 1.3

20.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 19.5 0.0 0.0 0.0 3.1 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.2 0.0 3.5 0.0 0.0 0.4 0.0 1.1 0.0 0.4 2.2 2.2

20.3 0.2 0.0 0.0 0.2 0.0 0.0 0.0 15.6 0.0 0.0 0.0 1.8 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.2 0.9 0.0 0.0 4.2 0.0 0.0 0.7 0.0 0.9 0.0 0.2 2.6 1.5

20.4 0.2 0.0 0.0 0.0 0.0 0.0 0.2 18.7 0.0 0.0 0.0 2.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 1.8 0.0 0.0 0.2 0.0 0.9 0.0 0.0 1.8 3.5

20.5 0.9 0.4 0.0 0.0 0.0 0.2 0.4 19.9 0.0 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.2 0.0 0.0 0.0 0.7 0.2 1.1 0.0 0.0 3.9 0.4

20.6 0.7 0.2 0.2 0.0 0.0 0.0 0.0 11.8 0.0 0.0 0.0 2.8 0.0 0.0 0.0 0.2 0.0 0.0 0.4 0.0 0.2 0.9 0.7 1.1 0.0 0.0 0.0 0.2 0.9 0.0 0.0 5.7 3.7

20.7 0.7 0.0 0.2 0.0 0.0 0.0 0.4 9.8 0.0 0.0 0.0 1.5 0.2 0.0 0.2 0.0 0.0 1.3 0.2 0.4 1.3 1.1 0.0 0.4 0.0 0.0 1.1 0.0 0.4 0.0 0.0 4.6 1.8

20.8 0.9 0.0 0.2 0.0 0.0 0.0 0.0 10.5 0.0 0.4 0.0 2.6 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.9 0.0 4.4 0.0 0.0 0.4 0.2 0.7 0.0 0.0 6.4 0.4

20.9 1.1 0.0 0.0 0.0 0.0 0.0 0.2 4.8 0.0 0.0 0.0 2.8 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.4 0.0 0.4 0.9 0.0 0.0 0.2 0.0 0.7 0.0 0.2 2.2 1.5

21 0.9 0.4 0.0 0.0 0.0 0.0 0.0 7.0 0.0 0.2 0.0 1.3 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.2 0.2 0.0 0.4 2.4 0.0 0.0 0.4 0.4 1.1 0.0 0.0 2.4 3.3

21.1 0.9 0.0 0.0 0.2 0.0 0.4 0.4 13.2 0.0 0.0 0.0 0.7 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.2 0.2 0.2 0.4 3.3 0.0 0.2 0.2 0.2 0.2 0.0 0.2 2.0 3.3

21.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 16.4 0.0 0.0 0.0 1.1 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.4 0.2 0.0 1.1 0.0 0.0 0.4 0.0 0.7 0.0 0.0 5.5 1.1

21.3 1.1 0.2 0.0 0.0 0.0 0.2 0.0 15.1 0.0 0.0 0.0 0.9 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.2 0.0 0.2 0.0 0.4 0.0 0.0 0.2 0.0 0.2 0.0 0.0 3.9 2.0

21.4 0.4 0.0 0.0 0.7 0.0 0.2 0.2 11.8 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.2 0.9 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.4 0.4 0.0 0.0 1.1 3.5

21.5 0.9 0.0 0.0 0.0 0.0 0.0 0.2 10.2 0.0 0.0 0.0 2.9 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.9 0.0 0.0 0.2 0.0 0.4 0.0 0.0 3.1 2.0

21.6 0.4 0.0 0.0 0.4 0.0 0.2 0.2 6.4 0.0 0.0 0.0 2.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.2 0.0 0.9 0.0 0.0 0.7 0.0 0.0 0.0 0.0 3.1 4.0

21.7 0.2 0.7 0.0 0.4 0.0 0.0 0.7 13.0 0.0 0.0 0.0 2.9 0.0 0.0 0.2 0.0 0.2 1.5 0.7 0.0 0.4 0.0 0.0 0.2 0.0 0.0 1.1 0.2 1.1 0.0 0.0 0.9 5.5

21.8 0.7 0.2 0.2 0.0 0.0 0.0 0.2 16.4 0.0 0.0 0.0 2.4 0.0 0.0 0.2 0.2 0.0 1.1 0.4 0.2 0.9 0.0 0.0 1.1 0.0 0.0 0.4 0.0 0.9 0.0 0.2 2.9 4.2

22 0.7 0.2 0.2 0.0 0.0 0.0 0.0 15.1 0.0 0.0 0.0 2.6 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.0 0.4 0.2 0.0 0.4 0.0 0.0 0.4 0.0 0.7 0.0 0.0 3.3 3.7

23 0.0 0.0 0.0 0.0 0.0 0.0 0.2 10.8 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.2 1.1 0.0 0.0 0.9 0.0 0.4 0.0 0.2 4.2 3.5

24 0.2 0.2 0.0 0.0 0.0 0.2 0.0 17.9 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.0 0.4 0.0 0.2 0.4 0.2 0.2 0.0 0.2 0.9 1.7 0.2 0.0 0.0 3.5 2.4

25 0.0 0.4 0.0 0.0 0.0 0.0 0.4 10.0 0.0 0.0 0.0 0.9 0.0 0.0 0.4 1.3 0.2 0.0 0.0 0.0 0.7 0.2 1.1 0.4 0.0 0.0 1.3 1.7 0.2 0.2 0.0 3.3 1.5

26 0.4 0.0 0.0 1.1 0.0 0.0 0.2 10.5 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 2.2 0.0 0.0 1.5 0.7 0.2 0.2 0.4 1.5 5.5

27 0.7 0.0 0.0 0.5 0.0 0.0 0.5 8.6 0.0 0.0 0.0 1.6 0.0 0.0 0.5 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.2 1.9 0.0 0.0 0.2 0.2 0.7 0.0 0.0 0.0 2.1

27.5 0.2 1.3 0.0 2.0 0.0 0.0 0.7 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 6.4

2g. Smoky Hill calcareous nannofossil census data, lower section, part 2 of 5

Column 1: Section Height (m) Column 12: Helicolithus compactus Column 23: Loxolithus armilla

Column 2: Eiffellithus gorkae Column 13: Helicolithus anceps Column 24: Lucianorhabdus cayeuxii

Column 3: Eiffellithus turriseiffelii Column 14: Helicolithus aphantofissus Column 25: Lucianorhabdus maleformis

Column 4: Gaarderella granulifera Column 15: Helicolithus trabeculatus Column 26: Manivitella pemmatoidea

Column 5: Gartnerago clarusora Column 16: Helicolithus turonicus Column 27: Marthasterites sp.

Column 6: Gartnerago costatum Column 17: Isocrystallithus sp. Column 28: Marthasterites crassus

Column 7: Gartnerago margaritatus Column 18: Kamptnerius magnificus Column 29: Marthasterites furcatus

Column 8: Gartnerago segmentatum Column 19: Kamptnerius punctata Column 30: Microrhabdulus belgicus

Column 9: Glaukolithus bicrescenticus Column 20: Lithastrinus grillii Column 31: Microrhabdulus decoratus

Column 10: Glaukolithus biperforatus Column 21: Lithastrinus septenarius Column 32: Micula concava

Column 11: Grantnarhabdus coronadventis Column 22: Lithraphidites carniolensis Column 33: Micula cubiformis

Column 34: Micula decussata

SectiEiffellEiffellGaarderGartnerGartnerGartnerGartnerGlaukolGlaukolGrantnaHelicolHelicolHelicolHelicolHelicolIsocrysKamptneKamptneLithastLithastLithrapLoxolitLucianoLucianoManivitMarthasMarthasMarthasMicrorhMicrorhMicula Micula Micula

16.4 1.1 1.3 0.2 0.4 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.7 1.5 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.7 0.0 0.0 0.2 0.2 0.4 2.2 0.2 0.0 0.7 1.1

16.5 1.0 2.2 0.5 0.2 0.0 0.0 0.2 0.2 0.0 0.2 1.0 0.2 0.0 3.1 0.0 0.0 0.0 0.0 0.5 0.2 0.5 0.2 0.0 0.0 0.2 0.0 0.0 0.5 0.5 0.5 0.0 0.2 0.2

16.6 0.4 2.9 0.9 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 1.1 1.5 2.2 0.0 0.2 0.0 0.0 0.0 0.0 0.7 0.2 0.4 0.0 0.0 0.0 0.0 0.2 2.6 1.1 0.0 0.2 0.2

16.7 1.0 0.5 1.4 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.5 0.5 2.4 0.0 0.0 0.0 0.0 0.0 0.0 2.2 0.0 0.5 0.0 0.0 0.0 0.0 0.0 2.4 1.0 0.0 0.2 0.7

16.8 0.7 3.3 0.4 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.4 1.1 2.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.0 0.0 0.2 0.0 2.0 0.7 0.0 1.1 1.3

16.9 0.4 2.0 1.1 0.0 0.0 0.0 0.2 0.4 0.0 0.2 0.7 0.9 1.1 2.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 1.7 2.0 0.0 0.0 0.4

17 1.3 4.2 0.2 0.0 0.0 0.0 0.0 0.7 0.2 0.4 0.4 0.7 2.2 1.5 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.4 0.0 0.2 0.0 0.4 0.4 0.9 0.9 0.0 0.9 0.2

17.1 2.8 3.5 0.0 0.2 0.0 0.0 0.0 0.4 0.0 0.4 0.4 0.4 2.2 3.7 0.0 0.2 0.4 0.0 0.0 0.0 0.9 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.4 0.7 0.0 0.9 0.9

17.2 1.1 4.2 0.0 0.2 0.0 0.0 0.4 0.0 0.0 0.2 1.8 0.2 2.0 3.3 0.0 0.4 0.0 0.0 0.2 0.2 0.7 0.0 0.4 0.0 0.0 0.0 0.2 0.4 1.3 0.0 0.0 0.0 1.1

17.3 0.7 3.9 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.0 0.4 0.0 1.8 1.3 0.0 0.2 0.0 0.0 0.0 0.0 0.7 0.0 0.2 0.2 0.0 0.0 0.2 0.0 2.2 1.1 0.0 0.4 0.4

17.4 0.7 6.3 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.0 0.4 0.9 2.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 3.1 0.4 0.0 0.0 0.0 0.0 1.1 0.9 0.0 1.3 1.1

17.5 0.7 1.3 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.4 0.4 2.4 1.3 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.2 0.0 0.0 0.0 1.1 2.2 0.0 0.4 0.2

17.6 2.2 3.7 0.4 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.7 0.0 1.8 2.4 0.0 0.0 0.0 0.0 0.2 0.2 1.3 0.0 0.2 0.2 0.0 0.0 0.4 0.0 1.3 0.4 0.0 0.4 0.4

17.7 1.1 3.8 0.9 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.2 0.2 0.6 2.3 0.0 0.2 0.0 0.0 0.6 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.5 0.6 0.0 1.1 0.6

17.8 0.4 2.0 1.1 0.2 0.0 0.2 0.0 0.2 0.0 0.0 0.9 0.0 1.1 0.7 0.0 0.9 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.0 0.0 0.0 0.4 1.8 0.2 0.0 0.4 0.2

17.9 1.1 2.9 1.1 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.7 1.3 1.5 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.4 1.3 0.9 0.0 0.0 0.7

18 0.9 2.0 0.2 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.2 0.2 1.1 5.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 1.3 0.7 0.0 0.2 1.3

18.1 2.0 4.4 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.7 0.7 2.0 3.5 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.9 0.4 0.0 0.4 1.3

18.2 1.1 3.5 0.2 0.0 0.9 0.2 0.4 0.4 0.9 0.7 1.3 0.9 2.6 5.7 0.0 0.0 0.2 0.0 0.0 0.0 0.7 0.9 0.4 0.2 0.0 0.0 0.0 0.2 1.1 0.2 0.0 0.9 0.9

18.3 1.7 4.1 0.0 0.0 0.0 0.0 0.2 0.4 0.2 0.9 0.9 0.4 5.6 4.9 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.2 1.1 0.2 0.0 0.0 0.0 0.4 1.1 0.6 0.0 1.1 0.9

18.4 1.1 2.9 0.4 0.0 0.2 0.0 0.0 0.2 0.0 0.2 0.9 0.4 3.7 4.0 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.2 0.0 0.2 0.0 0.4 0.2 0.9 0.4 0.0 0.4 0.9

18.5 0.2 1.5 0.9 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.4 0.0 2.0 5.0 0.0 0.0 0.2 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.5 0.4 0.0 1.8 1.8

18.7 1.5 3.5 0.4 0.0 0.0 0.0 0.0 0.7 0.2 0.2 0.7 0.7 1.3 0.9 0.0 0.4 0.2 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.0 0.0 0.2 1.1 0.2 0.0 0.4 1.5

18.8 0.7 2.6 1.3 0.0 0.0 0.0 0.0 0.2 0.0 0.7 1.5 1.5 0.9 5.3 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.7 0.0 0.0 0.0 0.0 0.2 0.0 0.9 0.7 0.0 0.2 0.7

18.9 1.1 2.6 0.9 0.0 0.0 0.2 0.2 0.0 0.2 0.7 1.1 0.7 2.0 1.3 0.0 0.0 0.0 0.0 0.2 0.7 0.0 0.0 0.4 0.0 0.2 0.0 0.4 0.2 1.1 0.0 0.0 0.7 0.4

19 1.1 2.6 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.4 0.9 0.4 1.3 2.9 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.9 1.1 0.0 0.0 0.0 0.0 0.2 0.9 0.2 0.0 0.2 0.7

19.1 1.3 2.6 0.0 0.0 0.0 0.0 0.4 0.2 0.2 1.3 0.7 0.4 2.2 0.0 0.0 0.7 0.0 0.0 0.2 0.0 0.4 0.0 0.2 0.2 0.2 0.0 0.0 0.7 0.2 0.0 0.0 0.0 1.8

19.2 0.4 1.8 0.7 0.0 0.0 0.2 0.0 0.4 0.4 0.4 0.7 0.7 1.3 2.4 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.0 0.0 0.2 1.3 0.2 0.0 0.7 1.3

19.3 0.2 1.1 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 2.2 2.2 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.2 0.0 0.2 0.0 0.0 0.4 2.0 0.4 0.0 0.9 0.4

19.4 0.4 2.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.2 1.1 1.5 2.0 0.0 0.4 0.2 0.0 0.4 0.0 0.7 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.4 0.0 1.8 1.5

19.5 1.3 1.5 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.4 0.7 0.9 0.4 0.7 0.0 0.9 0.0 0.0 0.0 0.2 0.4 0.4 0.0 0.0 0.0 0.0 0.0 0.0 1.3 0.4 0.0 0.4 0.7

19.6 2.0 2.6 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 1.3 0.9 0.9 0.9 0.0 1.1 0.0 0.0 0.0 0.2 0.9 0.4 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.2 0.0 0.4 0.9

19.7 0.7 4.2 0.4 0.0 0.0 0.2 0.2 0.2 0.2 0.0 2.2 1.3 1.1 1.8 0.0 0.0 0.2 0.0 0.4 0.2 0.4 0.7 0.0 0.0 0.2 0.0 0.4 0.0 0.4 0.0 0.0 0.2 2.9

19.8 0.2 2.0 0.0 0.0 0.0 0.2 0.2 0.2 0.2 0.0 0.2 0.4 0.9 3.3 0.0 0.4 0.2 0.0 0.7 0.0 0.7 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.4 0.7 0.0 0.2 0.9

19.9 0.7 4.4 0.4 0.0 0.0 0.2 0.2 0.2 0.0 0.4 0.9 0.4 1.1 2.6 0.0 0.9 0.2 0.0 0.4 0.0 0.2 0.7 0.2 0.0 0.0 0.0 0.0 0.7 1.5 0.0 0.0 0.2 1.3

20 0.2 2.0 0.4 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.7 0.0 2.0 3.1 0.0 0.4 0.0 0.0 0.4 0.2 0.2 0.0 0.7 0.0 0.0 0.0 0.0 0.2 1.1 0.0 0.0 0.4 0.9

20.1 1.1 3.9 1.1 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.9 1.5 2.8 2.8 0.0 0.0 0.0 0.0 0.2 0.4 0.2 0.4 0.2 0.2 0.0 0.0 0.0 0.2 0.4 0.7 0.0 0.0 0.4

20.2 0.4 0.9 0.2 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.4 0.9 3.3 2.6 0.0 0.2 0.0 0.0 0.0 0.4 0.9 0.0 0.0 0.2 0.0 0.0 0.0 0.0 1.1 0.2 0.0 0.7 0.4

20.3 1.5 2.4 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.7 1.3 2.2 3.3 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.7 0.7

20.4 0.9 1.3 0.2 0.0 0.0 0.0 0.0 0.7 0.0 0.2 0.4 0.7 1.5 2.2 0.0 0.2 0.0 0.0 0.4 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.9 0.0 0.7 0.4

20.5 0.4 0.7 0.2 0.0 0.0 0.0 0.0 0.7 0.0 0.0 1.5 1.3 1.3 2.8 0.0 0.2 0.0 0.0 0.2 0.0 0.7 0.4 0.0 0.0 0.0 0.0 0.0 0.2 1.5 0.2 0.0 0.2 0.0

20.6 0.0 1.5 1.1 0.0 0.0 0.0 0.0 0.4 0.0 0.2 3.3 0.9 1.3 3.3 0.0 0.2 0.0 0.0 0.2 0.0 0.7 0.0 0.0 0.0 0.2 0.0 0.0 0.4 1.1 0.7 0.0 0.0 0.7

20.7 0.4 3.3 0.7 0.0 0.0 0.0 0.4 0.0 0.0 0.0 1.1 0.4 2.0 4.2 0.0 0.0 0.2 0.0 0.4 0.2 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.4 0.7 0.0 0.2 1.1

20.8 0.9 0.9 0.7 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.4 1.1 3.1 3.9 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.2 0.2 0.2 0.0 0.0 0.0 0.4 2.9 0.4 0.0 0.2 0.2

20.9 0.9 2.2 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.4 5.0 0.9 0.2 4.8 0.0 0.0 0.0 0.0 0.0 0.2 0.9 0.2 0.2 0.0 0.0 0.0 0.0 0.2 1.1 0.9 0.0 0.2 1.1

21 0.0 2.0 0.0 0.0 0.0 0.2 0.0 0.9 0.0 0.4 3.1 1.1 1.1 7.5 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.4 0.0 0.4 0.0 0.0 0.0 0.4 2.0 0.2 0.0 0.0 1.1

21.1 0.2 1.5 0.2 0.0 0.0 0.0 0.2 0.2 0.9 0.7 2.6 1.1 0.9 1.1 0.0 0.2 0.0 0.0 0.0 0.0 1.5 0.4 0.0 0.4 0.0 0.0 0.0 0.4 1.3 0.4 0.0 0.0 1.5

21.2 0.4 0.9 0.9 0.0 0.0 0.0 0.0 0.2 0.2 0.0 1.1 0.4 3.1 0.4 0.0 1.1 0.0 0.0 0.0 0.0 0.4 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.9 0.2 0.0 0.2 0.2

21.3 1.3 0.9 0.4 0.0 0.0 0.0 0.2 0.0 0.0 0.7 0.9 0.2 2.8 0.4 0.0 0.0 0.2 0.0 0.4 0.0 1.3 1.3 0.0 0.0 0.0 0.0 0.0 0.2 0.9 0.7 0.0 0.4 1.5

21.4 0.2 0.9 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.0 1.1 1.1 0.9 0.9 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.7 0.0 0.0 0.0 0.0 0.0 0.4 0.7 0.4 0.0 0.2 0.2

21.5 0.7 1.3 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.5 0.7 3.5 1.3 0.0 0.0 0.0 0.0 0.0 0.0 1.5 0.0 0.7 0.4 0.0 0.0 0.0 0.4 0.9 0.7 0.0 0.0 1.1

21.6 0.2 2.2 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.7 0.7 1.3 2.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 1.8 0.4 0.2 0.0 0.0 0.0 2.2 0.4 0.0 0.4 0.7

21.7 0.2 2.6 0.2 0.0 0.0 0.0 0.2 0.4 0.2 0.2 0.9 0.9 0.9 0.7 0.0 0.0 0.0 0.0 0.2 0.0 1.3 0.0 1.3 0.0 0.4 0.0 0.0 0.0 0.9 0.4 0.2 0.7 1.5

21.8 0.2 0.7 0.2 0.0 0.0 0.0 0.9 0.2 0.2 0.0 0.9 0.9 2.4 0.0 0.0 0.0 0.0 0.0 0.4 0.2 1.1 0.0 0.2 0.0 0.0 0.0 0.0 0.7 1.5 1.1 0.0 0.7 1.5

22 0.4 1.3 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.4 0.2 0.4 2.4 0.7 0.0 0.0 0.0 0.0 0.4 0.0 0.9 0.2 0.2 0.0 0.2 0.0 0.0 0.4 1.8 0.4 0.2 0.4 0.2

23 0.0 1.8 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.9 0.4 2.4 0.7 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 1.8 0.4 0.0 0.2 0.4

24 0.0 0.4 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.2 2.4 0.4 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 1.1 0.9 0.0 0.2 0.2

25 0.9 1.3 0.2 0.2 0.2 0.0 0.2 0.4 0.0 0.2 1.3 1.7 3.3 2.8 0.0 0.4 0.0 0.0 0.4 0.0 0.9 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.9 0.2 0.2 0.2 0.2

26 0.4 3.3 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.4 0.9 2.6 2.2 2.6 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.7 0.4 0.4 0.0 0.7

27 0.5 3.7 0.2 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.9 0.2 2.6 0.5 0.0 0.0 0.2 0.0 0.5 0.5 1.4 0.2 0.0 0.0 0.2 0.0 0.0 0.0 1.2 1.4 0.0 0.7 1.6

27.5 0.4 2.6 0.0 0.0 0.0 0.0 0.4 0.2 0.0 1.3 0.9 2.0 0.0 1.5 0.0 0.0 0.0 0.0 0.4 0.2 2.0 0.9 0.4 0.7 0.2 0.0 0.0 0.0 0.2 1.1 0.2 0.9 2.0

2h. Smoky Hill calcareous nannofossil census data, lower section, part 3 of 5

Column 1: Section Height (m) Column 12: Prediscosphaera grandis Column 23: Retecapsa crenulata

Column 2: Micula swastica Column 13: Prediscosphaera intercisa Column 24: Retecapsa ficula

Column 3: Micula sp. Column 14: Prediscosphaera ponticula Column 25: Retecapsa schizobrachiata

Column 4: Munarinus sp. Column 15: Prediscosphaera spinosa Column 26: Retecapsa surirella

Column 5: Octocyclus reinhardtii Column 16: Quadrum gartneri Column 27: Retemediaformis teneraretis

Column 6: Octolithus sp. Column 17: Radiolithus planus Column 28: Rhagodiscus angustus

Column 7: Orastrum campanensis Column 18: Radiolithus sp. Column 29: Rhagodiscus plebius

Column 8: Pharus simulacrum Column 19: Reinhardtites anthophorus Column 30: Rhagodiscus reniformis

Column 9: Placozygus sigmoides Column 20: Reinhardtites clavicaviformis Column 31: Rhagodiscus splendens

Column 10: Prediscosphaera arkhangelskyi Column 21: Repagulum parvidentatum Column 32: Rotellapillus crenulatus

Column 11: Prediscosphaera cretacea Column 22: Retecapsa angustiforata Column 33: Scapholithus fossilis

Column 34: Seribiscutum primitivum

SectiMicula Micula MunarinOctocycOctolitOrastruPharus PlacozyPrediscPrediscPrediscPrediscPrediscPrediscQuadrumRadioliRadioliReinharReinharRepagulRetecapRetecapRetecapRetecapRetecapRetemedRhagodiRhagodiRhagodiRhagodiRotellaScapholSeribis

16.4 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.2 0.4 7.9 0.2 0.7 2.4 6.6 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.9 0.4 0.2 0.0 1.1 0.7 0.0

16.5 0.0 0.0 1.0 0.0 0.0 0.0 0.0 0.2 0.5 10.3 0.0 1.2 2.9 7.7 0.2 0.0 0.2 0.5 0.0 0.2 0.0 0.2 0.0 0.2 0.2 0.5 1.2 1.7 0.0 0.2 0.7 1.2 0.0

16.6 0.0 0.0 0.9 0.0 0.0 0.0 0.0 1.5 0.0 3.3 0.0 2.0 1.3 5.3 0.2 0.0 0.2 0.4 0.0 0.4 0.0 0.4 0.0 0.0 0.2 0.4 2.9 0.9 0.2 0.4 0.7 0.2 0.0

16.7 0.0 0.7 0.2 0.0 0.0 0.0 0.0 1.4 0.2 6.7 0.0 2.2 2.2 5.3 0.2 0.0 0.7 0.7 0.0 1.2 0.0 0.7 0.0 0.0 0.5 0.7 1.9 0.0 0.2 0.0 0.5 1.9 0.0

16.8 0.0 0.4 0.0 0.0 0.0 0.0 0.0 1.5 0.2 5.7 0.2 0.4 1.5 5.5 0.4 0.0 0.2 0.7 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.4 0.9 0.0 0.2 2.0 0.4 1.1 0.0

16.9 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.9 6.5 0.2 0.7 2.8 6.5 0.2 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.4 0.0 0.9 0.2 0.4 0.7 0.4 2.0 0.0

17 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 1.1 5.5 0.2 0.7 1.5 4.4 0.4 0.0 0.2 0.4 0.0 1.1 0.0 0.2 0.0 0.0 0.7 0.2 1.5 0.9 0.0 0.4 0.9 1.3 0.0

17.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 1.1 8.5 1.3 0.9 2.2 3.5 0.2 0.0 0.4 1.5 0.0 0.0 0.0 0.7 0.0 0.0 0.2 0.7 1.1 0.4 0.7 0.2 0.0 0.9 0.0

17.2 0.0 0.2 0.0 0.0 0.0 0.2 0.0 1.1 0.9 7.9 0.7 1.3 1.8 3.9 0.0 0.2 0.4 1.1 0.0 0.2 0.0 0.2 0.0 0.0 0.7 0.2 0.7 0.0 0.0 0.4 0.4 0.2 0.0

17.3 0.0 0.0 1.1 0.0 0.2 0.0 0.0 0.4 0.0 6.8 0.2 1.5 1.5 6.3 0.2 0.0 0.2 0.2 0.0 0.4 0.0 0.2 0.0 0.0 0.4 0.4 2.2 0.0 0.2 0.4 1.1 1.8 0.0

17.4 0.0 0.0 1.1 0.0 0.0 0.0 0.0 2.4 0.7 7.9 0.0 2.0 3.7 6.1 0.0 0.0 0.2 2.0 0.0 0.2 0.0 0.2 0.0 0.0 0.4 0.4 2.4 0.9 0.2 1.3 1.1 0.7 0.0

17.5 0.0 0.0 0.2 0.0 0.0 0.0 0.0 2.0 0.4 4.8 0.0 0.2 0.4 9.9 0.0 0.0 1.1 0.7 0.0 1.3 0.0 0.2 0.0 0.0 0.4 1.1 2.9 0.9 0.0 0.7 2.0 3.1 0.0

17.6 0.0 0.0 0.4 0.0 0.0 0.0 0.0 1.8 0.0 5.5 0.2 0.2 2.9 7.0 0.4 0.0 0.0 0.7 0.0 0.0 0.0 0.7 0.0 0.0 0.0 0.4 1.5 1.3 0.0 0.0 1.5 0.7 0.0

17.7 0.0 0.4 0.4 0.0 0.0 0.0 0.0 0.4 1.3 7.0 0.0 1.1 1.1 4.5 0.2 0.0 0.0 0.2 0.2 0.9 0.0 0.4 0.0 0.0 0.4 0.9 0.9 0.4 0.2 0.6 1.5 1.9 0.0

17.8 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.7 10.7 0.0 0.9 1.8 5.7 0.4 0.2 0.2 0.2 0.0 0.2 0.0 1.3 0.0 0.0 1.1 0.9 1.1 0.7 0.2 0.7 0.9 2.2 0.0

17.9 0.0 0.0 1.5 0.0 0.0 0.0 0.0 0.9 1.3 7.0 0.0 1.3 1.1 5.0 0.2 0.0 0.2 0.2 0.0 0.2 0.0 0.2 0.0 0.0 0.4 0.0 1.5 0.9 0.0 0.2 1.8 1.5 0.0

18 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.9 0.4 4.2 0.0 1.1 2.6 4.2 0.2 0.0 0.2 0.9 0.0 0.0 0.0 0.7 0.0 0.0 0.7 0.2 1.1 0.7 0.9 0.7 1.5 1.8 0.0

18.1 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 1.1 4.8 0.0 2.0 0.7 5.3 0.2 0.0 0.2 0.4 0.0 0.0 0.0 0.7 0.0 0.0 0.4 0.7 2.6 0.9 0.9 0.7 0.4 1.3 0.0

18.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 6.8 0.2 0.7 3.5 3.9 0.0 0.0 0.0 0.0 0.0 1.1 0.0 1.3 0.0 0.0 0.9 0.2 2.0 0.7 0.4 0.4 0.9 1.8 0.0

18.3 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.2 0.4 7.3 0.2 1.1 3.7 5.6 0.0 0.0 0.0 1.7 0.0 0.2 0.0 0.9 0.0 0.0 0.2 0.9 3.0 0.4 0.0 0.6 0.9 0.9 0.0

18.4 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.0 0.0 6.2 1.3 1.8 2.9 11.5 0.0 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 2.9 0.4 0.0 0.9 0.9 0.7 0.0

18.5 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.2 3.9 0.2 1.5 2.0 6.8 0.7 0.2 0.0 1.1 0.0 0.4 0.0 0.7 0.0 0.0 0.7 0.2 3.3 2.0 0.4 0.4 0.7 0.4 0.0

18.7 0.0 0.4 0.2 0.0 0.0 0.0 0.0 0.7 1.3 7.4 1.3 1.1 1.3 4.2 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.7 0.0 0.0 0.7 0.7 2.0 0.4 0.0 0.2 0.4 0.7 0.0

18.8 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.7 1.1 5.0 0.2 1.1 0.7 4.2 0.0 0.2 0.0 0.2 0.0 0.7 0.0 0.7 0.2 0.2 0.2 0.0 0.4 1.5 0.2 0.0 0.2 0.4 0.0

18.9 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.2 0.9 5.5 0.0 0.4 3.1 4.2 0.0 0.0 0.0 0.2 0.0 0.7 0.0 1.1 0.0 0.2 0.2 0.0 0.7 2.0 0.0 0.4 0.7 0.9 0.0

19 0.0 0.4 0.2 0.0 0.0 0.0 0.0 0.0 1.8 7.0 0.7 1.1 0.4 3.7 0.0 0.0 0.0 0.2 0.0 0.7 0.0 0.9 0.0 0.0 0.4 0.7 2.6 0.4 0.2 0.2 1.1 0.4 0.0

19.1 0.0 0.0 0.7 0.0 0.0 0.4 0.0 0.2 0.9 3.5 0.2 1.1 1.1 6.4 0.4 0.0 0.0 0.7 0.0 0.4 0.0 0.7 0.0 0.0 0.2 0.2 0.7 0.2 0.4 0.2 0.4 0.7 0.0

19.2 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.9 5.1 0.0 0.7 1.1 4.8 0.2 0.0 0.0 0.7 0.2 0.2 0.0 1.1 0.0 0.2 0.4 0.4 0.9 0.2 0.0 0.2 0.0 0.7 0.0

19.3 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.7 1.8 3.5 0.0 1.5 0.7 5.5 1.1 0.0 0.0 0.4 0.0 0.4 0.0 1.1 0.0 0.0 0.2 0.4 0.4 0.7 0.4 0.7 0.4 0.9 0.0

19.4 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.7 6.8 0.2 0.9 0.7 5.5 0.2 0.0 0.0 0.0 0.0 1.3 0.0 1.3 0.0 0.2 0.0 0.4 1.3 0.4 0.2 0.9 0.2 0.2 0.0

19.5 0.2 0.2 1.1 0.0 0.0 0.0 0.0 0.2 1.5 3.7 0.0 0.7 0.0 3.5 0.0 0.0 0.2 0.0 0.0 0.2 0.2 1.3 0.2 0.2 0.2 0.9 1.8 0.4 0.0 0.2 0.7 0.4 0.0

19.6 0.0 0.2 0.9 0.0 0.0 0.0 0.0 0.2 0.9 5.5 0.4 1.3 0.4 3.3 0.0 0.0 0.0 0.0 0.0 1.1 0.0 0.9 0.0 0.2 0.4 0.7 0.4 0.2 0.0 0.2 0.4 1.1 0.0

19.7 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.0 1.5 4.6 0.4 0.7 0.9 4.6 0.0 0.0 0.0 0.4 0.0 0.7 0.2 0.2 0.0 0.2 0.0 0.2 1.3 0.2 0.2 0.4 0.7 0.4 0.0

19.8 0.0 0.2 0.0 0.0 0.0 0.2 0.0 0.2 1.1 5.5 0.2 0.7 0.9 3.9 0.4 0.2 0.0 0.7 0.4 0.9 0.0 2.0 0.0 0.2 0.2 0.4 0.2 1.8 0.0 0.7 0.2 0.7 0.0

19.9 0.0 0.2 0.4 0.0 0.0 0.2 0.0 0.0 0.7 6.1 0.4 0.7 0.7 7.2 0.4 0.2 0.0 0.0 0.7 0.7 0.0 2.0 0.0 0.0 0.0 0.0 1.3 0.7 0.0 0.4 0.2 1.1 0.0

20 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.9 9.6 0.0 0.4 0.2 5.9 0.2 0.2 0.0 0.4 0.2 0.2 0.0 0.7 0.0 0.0 0.0 0.4 1.1 0.2 0.2 0.2 0.4 1.5 0.0

20.1 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.7 7.9 0.4 1.5 0.4 5.0 0.2 0.0 0.0 0.2 0.0 0.2 0.0 1.3 0.0 0.0 0.2 0.0 0.9 0.2 0.2 0.4 0.2 2.6 0.0

20.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.4 1.1 5.9 0.4 1.8 0.7 8.8 0.2 0.2 0.0 0.2 0.2 1.3 0.4 0.4 0.0 0.0 0.4 0.2 1.3 0.7 0.2 0.0 0.7 0.7 0.0

20.3 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.4 1.5 6.4 0.2 1.5 0.4 7.7 0.0 0.0 0.2 0.9 0.0 0.2 0.2 0.7 0.0 0.0 0.2 0.2 1.1 0.0 0.2 0.2 0.7 0.9 0.0

20.4 0.0 0.2 0.7 0.0 0.0 0.0 0.0 0.7 2.0 8.4 0.2 1.8 0.7 7.0 0.0 0.0 0.0 0.2 0.0 0.4 0.2 1.5 0.0 0.0 0.0 0.0 0.4 1.1 0.9 0.0 0.0 0.0 0.0

20.5 0.0 0.2 0.7 0.0 0.0 0.0 0.2 0.4 0.2 6.8 0.4 1.3 0.2 5.5 0.0 0.2 0.0 0.4 0.0 0.2 0.0 0.2 0.0 0.0 0.2 0.2 0.9 0.0 0.0 0.0 0.0 1.8 0.0

20.6 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.2 1.8 5.9 0.2 2.4 0.0 8.1 0.0 0.0 0.0 1.8 0.0 0.0 0.0 0.7 0.0 0.2 0.0 0.2 1.1 0.0 0.2 0.2 0.4 0.2 0.0

20.7 0.0 0.0 1.8 0.0 0.0 0.2 0.0 0.2 0.7 7.4 0.2 1.8 0.9 7.2 0.0 0.0 0.2 0.7 0.0 0.4 0.0 0.7 0.0 0.2 0.4 0.7 2.2 0.7 0.0 0.4 0.2 0.9 0.0

20.8 0.0 0.0 2.9 0.0 0.0 0.2 0.0 1.8 0.4 2.2 0.0 1.1 0.4 5.3 0.2 0.0 0.0 0.0 0.2 0.4 0.0 0.9 0.0 0.0 0.2 0.0 1.3 0.0 0.0 0.9 0.7 2.0 0.0

20.9 0.0 0.0 2.0 0.0 0.0 0.0 0.0 2.6 0.4 4.6 0.4 1.7 1.1 3.7 0.0 0.0 0.0 0.4 0.2 0.4 0.2 0.9 0.0 0.0 0.0 1.1 1.1 0.9 0.2 0.2 0.7 0.7 0.0

21 0.0 0.0 1.3 0.0 0.0 0.0 0.0 2.0 0.9 7.5 0.9 1.5 0.2 3.3 0.0 0.0 0.0 0.4 0.0 0.0 0.0 1.1 0.0 0.0 0.2 0.7 1.3 0.2 0.4 0.2 0.4 0.2 0.0

21.1 0.0 0.0 0.7 0.0 0.0 0.0 0.0 0.4 1.5 6.8 0.7 1.1 0.9 6.1 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.2 0.2 0.0 0.4 0.2 1.1 0.2 0.2 0.2 0.4 0.2 0.0

21.2 0.0 0.2 0.4 0.0 0.0 0.0 0.0 0.2 0.9 5.5 0.0 1.3 0.4 5.5 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.4 0.0 0.0 0.2 0.4 1.1 0.4 0.2 0.0 0.0 0.9 0.0

21.3 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.0 4.8 0.2 0.7 0.0 9.8 0.0 0.0 0.0 0.2 0.4 0.0 0.2 0.2 0.0 0.0 1.8 0.2 1.5 0.4 0.0 0.7 0.4 0.9 0.0

21.4 0.0 0.0 0.9 0.0 0.0 0.0 0.0 1.7 1.1 3.9 0.2 2.6 0.4 8.1 0.2 0.0 0.0 1.3 0.4 0.0 0.9 1.1 0.0 0.2 0.9 0.2 1.5 0.7 0.0 0.0 0.4 0.2 0.0

21.5 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.9 1.3 5.8 0.4 1.1 1.1 4.0 0.2 0.0 0.0 0.0 0.0 0.4 0.0 2.0 0.0 0.2 0.2 0.0 0.7 0.4 0.2 0.9 1.3 1.3 0.0

21.6 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.9 0.2 12.3 0.7 2.4 1.8 6.8 0.0 0.0 0.2 1.1 0.4 0.0 0.7 0.7 0.0 0.0 0.9 0.7 0.4 0.9 0.0 0.2 0.4 0.2 0.0

21.7 0.0 0.0 1.5 0.0 0.0 0.0 0.0 0.4 0.2 6.6 0.9 1.3 1.5 7.3 0.7 0.0 0.0 0.2 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.2 0.7 0.9 0.0 0.4 0.7 0.2 0.0

21.8 0.0 0.2 1.1 0.0 0.0 0.0 0.0 0.2 0.9 6.6 1.3 2.6 1.1 6.8 0.4 0.0 0.0 0.7 0.7 0.2 0.4 0.4 0.0 0.0 0.2 0.2 1.5 0.0 0.0 0.2 0.7 0.0 0.0

22 0.0 0.2 1.5 0.0 0.0 0.0 0.0 0.2 0.7 5.7 0.9 2.4 1.3 7.7 0.0 0.0 0.0 0.9 0.4 0.2 0.0 1.1 0.0 0.0 0.0 0.2 1.3 0.7 0.2 0.2 0.0 0.0 0.0

23 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.0 0.7 5.3 1.3 2.0 0.2 10.4 0.0 0.0 0.9 0.2 0.7 0.2 0.4 0.4 0.0 0.0 0.4 0.4 0.7 0.9 0.0 0.7 0.2 0.9 0.0

24 0.0 0.9 0.2 0.0 0.0 0.0 0.0 0.0 0.7 7.8 0.2 0.4 0.9 9.2 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.2 1.5 0.0 0.2 0.2 0.4 0.9 0.0

25 0.0 0.0 1.3 0.0 0.0 0.0 0.0 0.0 2.0 5.0 0.4 2.0 0.4 4.6 0.2 0.0 0.0 0.9 0.0 0.4 0.2 0.4 0.0 0.0 0.2 1.1 0.7 0.2 0.0 0.0 0.2 0.4 0.0

26 0.2 0.0 1.8 0.0 0.0 0.0 0.0 0.4 0.4 8.1 0.0 0.7 0.7 5.0 0.2 0.0 0.0 0.0 0.4 0.0 0.2 0.2 0.0 0.0 0.2 0.0 0.9 0.0 0.7 0.2 0.2 0.2 0.0

27 0.0 0.0 1.4 0.0 0.0 0.0 0.0 0.7 1.6 10.9 0.5 0.9 0.2 20.4 0.0 0.0 0.0 0.5 0.5 0.2 0.0 0.7 0.0 0.0 0.0 0.2 0.7 0.2 0.0 0.2 0.5 0.7 0.0

27.5 0.0 0.0 1.8 0.0 0.0 0.0 0.0 0.2 2.2 12.1 0.0 0.9 3.3 3.1 0.2 0.0 0.0 1.8 0.2 0.0 0.4 0.7 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.0 0.0 0.0 0.0

2i. Smoky Hill calcareous nannofossil census data, lower section, part 4 of 5

Column 1: Section Height (m) Column 12: Staurolithites sp. 2 Column 23: Tranolithus exiguus

Column 2: Sm. P. sigm, Z. erec, etc… Column 13: Staurolithites zoensis Column 24: Tranolithus gabalus

Column 3: Sollasites barringtonensis Column 14: Stoverius asymmetricus Column 25: Tranolithus macleodiae

Column 4: Sollasites sp. Column 15: Stoverius sp. Column 26: Tranolithus manifestus

Column 5: Staurolithites crux Column 16: Stoverius biarcus Column 27: Tranolithus minimus

Column 6: Stuarolithites dorfii Column 17: Stoverius coronatus Column 28: Tranolithus phacelosus

Column 7: Staurolithites ellipticus Column 18: Stradnerlithus rhombicus Column 29: Watznaueria barnasae

Column 8: Staurolithites imbricatus Column 19: Tegumentum stradneri Column 30: Watznaueria biporta

Column 9: Staurolithites mielnicensis Column 20: Tetrapodorhabdus copt/dec Column 31: Watznaueria fossicincta

Column 10: Stuarolithites mitcheneri Column 21: Thiersteinia ecclesiastica Column 32: Watznaueria ovata

Column 11: Staurolithites sp. 1 Column 22: Tortolithus dodekachelyon Column 33: Watznaueria quadriradiata

Column 34: Zeug. Pseudanthophorus

SectiSm. P. SollasiSollasiStaurolStuarolStaurolStaurolStaurolStuarolStaurolStaurolStaurolStoveriStoveriStoveriStoveriStradneTegumenTetrapoThierstTortoliTranoliTranoliTranoliTranoliTranoliTranoliWatznauWatznauWatznauWatznauWatznauZeug. P

16.4 2.4 0.0 0.0 0.7 0.0 0.4 0.0 0.0 0.4 0.0 0.4 0.4 0.4 0.4 0.0 0.2 0.0 0.0 0.4 0.0 0.0 0.7 0.0 0.0 0.4 1.5 0.0 6.8 0.0 0.4 0.2 0.0 0.0

16.5 0.2 0.0 0.0 0.7 0.0 0.2 0.2 0.0 0.2 0.0 0.7 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.2 1.2 0.0 0.0 0.2 0.2 0.0 7.5 0.2 0.7 0.2 0.0 0.0

16.6 0.9 0.4 0.0 0.7 0.0 1.3 0.2 0.0 0.2 0.2 0.2 0.2 0.4 0.0 0.0 1.1 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.0 0.7 0.4 0.7 3.7 0.0 0.2 0.2 0.2 0.0

16.7 1.4 0.2 0.0 0.7 0.0 0.5 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 1.0 0.0 0.0 0.0 1.4 0.2 7.5 0.0 1.0 0.0 0.0 0.0

16.8 2.0 0.0 0.0 0.7 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.7 0.0 0.0 0.4 0.0 0.0 0.4 2.0 0.2 16.7 0.2 0.9 0.0 0.9 0.0

16.9 2.2 0.4 0.0 1.1 0.2 0.0 0.0 0.0 0.2 0.0 0.2 0.2 0.2 0.0 0.0 0.0 0.9 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.4 1.5 0.2 12.4 0.2 0.9 0.4 0.4 0.0

17 0.2 0.4 0.0 1.8 0.4 0.2 0.2 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.4 0.4 0.2 0.0 0.0 0.0 2.6 0.0 0.2 0.4 1.1 0.4 11.4 0.0 0.9 0.2 1.5 0.0

17.1 1.3 0.0 0.0 2.0 0.4 0.2 0.0 0.0 0.0 0.4 0.2 0.2 0.7 0.0 0.0 0.9 0.4 0.2 0.2 1.1 0.0 2.4 0.0 0.0 0.0 0.0 0.4 14.2 0.2 0.4 0.2 3.3 0.0

17.2 1.8 0.0 0.0 0.7 0.4 0.0 0.0 0.0 0.0 0.0 0.7 0.4 0.2 0.0 0.2 0.7 0.2 0.2 0.0 0.7 0.0 2.0 0.0 0.0 0.4 0.0 0.2 16.2 1.3 0.4 0.2 3.7 0.0

17.3 2.2 0.0 0.0 0.7 0.0 0.4 0.2 0.0 0.4 0.0 0.9 0.2 0.0 0.2 0.0 0.0 0.9 0.2 0.2 0.0 0.0 1.3 0.4 0.0 0.2 3.7 0.0 9.4 0.0 0.0 0.2 0.0 0.0

17.4 1.5 0.2 0.0 1.1 0.4 0.7 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.0 1.1 0.4 0.0 0.0 1.1 0.7 13.8 0.0 0.7 0.0 0.0 0.0

17.5 1.3 0.0 0.0 0.7 0.0 1.1 0.0 0.0 0.0 0.4 1.8 0.0 0.7 0.0 0.7 0.0 0.7 0.0 0.0 0.7 0.0 0.9 0.9 0.0 0.0 0.0 0.2 8.1 0.0 1.1 0.7 0.0 0.0

17.6 2.4 0.2 0.0 0.4 0.2 1.3 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.4 0.2 0.0 0.2 1.5 0.0 0.9 0.0 0.0 0.4 1.1 0.4 6.6 0.0 0.4 0.4 0.0 0.0

17.7 2.1 0.2 0.0 0.6 0.2 0.2 0.4 0.0 0.0 0.4 0.4 0.2 0.0 0.2 0.4 0.0 0.2 0.0 0.0 0.4 0.0 1.3 0.2 0.0 0.6 0.0 0.6 8.1 0.4 0.6 0.0 0.0 0.0

17.8 3.9 0.0 0.0 0.2 0.2 0.2 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.7 0.0 1.1 0.4 0.0 0.0 0.0 0.0 2.2 0.0 0.0 0.4 2.6 0.7 7.7 0.0 0.2 0.0 0.9 0.0

17.9 4.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.2 0.7 0.0 0.0 0.4 0.0 0.0 2.9 0.7 10.5 0.0 0.0 0.2 1.1 0.0

18 7.2 0.0 0.0 0.9 0.0 0.4 0.4 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.2 0.0 1.3 0.0 0.2 0.4 0.9 0.4 10.5 0.0 0.4 0.2 1.3 0.0

18.1 4.4 0.0 0.0 1.1 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.7 0.0 0.4 0.0 0.2 0.0 0.7 0.0 2.4 0.4 0.0 0.9 2.0 0.7 14.0 0.4 0.0 0.7 1.1 0.0

18.2 1.8 0.2 0.0 0.4 0.2 0.4 0.2 0.0 0.0 0.0 0.4 0.0 0.2 0.2 0.0 0.0 0.2 0.0 0.0 1.8 0.0 1.8 0.2 0.4 1.3 0.2 0.9 9.0 0.2 0.0 0.2 2.0 0.0

18.3 1.5 0.0 0.0 1.9 0.0 0.9 0.0 0.0 0.0 0.4 1.3 0.0 0.0 0.2 0.0 0.4 0.2 0.0 0.0 0.9 0.0 2.8 0.4 0.0 0.2 0.2 1.5 8.2 0.2 0.4 0.2 1.1 0.0

18.4 1.5 0.2 0.0 1.8 0.2 0.2 0.0 0.0 0.2 0.0 0.9 0.2 0.0 0.0 0.4 0.2 0.4 0.2 0.0 0.9 0.0 2.0 0.0 0.0 0.0 0.7 0.4 5.1 0.0 0.9 0.0 0.7 0.0

18.5 1.3 0.0 0.0 1.1 0.2 0.9 0.2 0.0 0.0 0.0 0.7 0.0 0.2 0.2 0.0 0.2 0.2 0.0 0.0 0.2 0.0 1.1 0.2 0.0 0.0 0.4 0.7 9.4 0.2 0.2 0.0 1.5 0.0

18.7 6.8 0.2 0.0 1.1 0.4 2.8 0.0 0.0 0.0 0.4 0.9 0.7 0.0 0.0 0.0 0.2 0.0 0.0 1.3 0.0 0.0 1.1 0.4 0.0 0.2 2.6 0.2 9.8 0.2 0.7 1.1 0.9 0.0

18.8 3.9 0.4 0.0 1.1 0.0 1.8 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.7 0.0 1.1 0.2 0.0 0.2 3.3 0.0 18.6 0.4 1.1 0.2 0.2 0.2

18.9 1.8 0.0 0.0 1.1 0.0 3.1 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.4 0.2 0.2 0.2 0.4 0.0 1.5 0.2 0.0 0.4 2.0 0.7 12.5 0.2 0.7 0.2 1.5 0.0

19 2.4 0.0 0.0 1.3 0.4 2.2 0.2 0.0 0.2 0.0 0.7 0.2 0.0 0.4 0.2 0.4 0.0 0.0 0.2 0.0 0.0 1.1 0.2 0.2 0.4 2.2 0.2 14.7 0.0 0.9 0.2 1.3 0.0

19.1 2.6 0.0 0.0 2.0 0.4 1.5 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.4 0.0 0.0 0.4 0.0 1.1 0.0 0.4 0.4 2.9 0.4 13.8 0.2 0.2 0.0 0.9 0.0

19.2 2.2 0.0 0.0 1.8 0.7 2.9 0.0 0.0 0.0 0.7 0.2 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.7 0.0 0.7 0.7 2.4 0.4 18.7 0.4 1.1 0.0 0.7 0.0

19.3 7.2 0.0 0.0 0.4 0.7 1.5 0.2 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 1.8 0.4 0.0 0.7 1.1 0.4 7.9 0.0 0.0 0.7 0.7 0.0

19.4 7.0 0.0 0.0 1.1 0.2 3.9 0.2 0.0 0.0 0.4 0.7 0.4 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 2.2 0.0 0.0 0.0 1.3 0.0 15.6 0.2 1.3 0.4 0.0 0.0

19.5 6.4 0.0 0.0 2.6 0.0 2.6 0.0 0.0 0.4 0.0 0.7 0.0 0.0 0.4 0.0 0.2 0.2 0.2 0.0 0.2 0.2 1.5 0.4 0.0 0.2 1.1 0.7 13.2 0.0 0.4 0.2 0.2 0.0

19.6 9.6 0.2 0.0 1.5 0.7 1.1 0.2 0.0 0.7 0.0 0.0 0.2 0.4 0.0 0.0 0.7 0.0 0.2 0.0 0.0 0.0 2.2 0.0 0.0 0.2 2.6 0.2 6.8 0.0 0.4 0.2 1.1 0.0

19.7 2.0 0.2 0.0 2.2 0.2 2.2 0.0 0.0 0.0 0.0 0.9 0.0 0.4 0.4 0.0 0.7 0.2 0.0 0.0 0.2 0.2 2.4 0.0 0.0 0.4 1.8 0.9 14.7 0.0 0.2 0.4 1.8 0.0

19.8 2.2 0.2 0.0 0.9 0.2 4.2 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.2 0.0 2.8 0.0 0.0 0.4 1.3 0.2 16.8 0.0 0.2 0.4 0.4 0.0

19.9 4.8 0.4 0.0 1.5 0.2 2.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 1.7 0.0 0.0 0.2 0.9 0.7 12.4 0.0 0.4 0.2 1.1 0.0

20 3.7 0.2 0.0 0.4 0.4 0.9 0.4 0.0 0.2 0.0 0.7 0.2 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.7 0.0 1.3 0.0 0.0 0.0 3.7 0.7 10.1 0.0 0.2 0.0 0.9 0.0

20.1 7.0 0.0 0.0 0.4 0.2 1.7 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.4 0.7 0.0 1.1 0.0 0.0 0.0 1.1 0.2 7.6 0.0 0.0 0.0 0.4 0.0

20.2 1.8 0.0 0.0 0.0 0.0 0.9 0.0 0.0 0.0 0.2 0.4 0.0 0.4 0.2 0.2 1.3 0.0 0.0 0.4 0.9 0.0 0.7 0.2 0.0 0.0 0.7 0.7 5.0 0.0 0.2 0.0 3.1 0.0

20.3 3.1 0.0 0.0 1.1 0.7 0.7 0.4 0.0 0.0 0.0 1.3 0.2 0.2 0.4 0.2 0.7 0.2 0.0 0.2 1.1 0.0 2.4 0.4 0.0 0.7 0.0 0.2 6.1 0.4 0.2 0.0 0.2 0.0

20.4 5.9 0.0 0.0 0.9 0.2 1.1 0.0 0.0 0.0 0.0 0.2 0.2 0.2 0.0 0.2 0.4 0.7 0.0 0.2 1.1 0.0 1.8 0.2 0.0 0.4 0.2 0.0 7.9 0.0 0.4 0.2 0.0 0.0

20.5 4.2 0.0 0.0 2.6 0.2 2.4 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 0.0 0.0 1.5 0.0 0.0 0.4 0.9 0.2 9.2 0.2 0.4 0.2 1.1 0.0

20.6 1.1 0.0 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.0 0.4 0.0 0.2 0.0 0.2 0.2 0.4 0.0 0.0 0.2 0.0 1.3 0.2 0.0 0.2 2.6 0.7 6.6 0.2 0.2 0.0 0.9 0.0

20.7 2.2 0.0 0.0 2.2 0.2 0.0 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.2 0.2 0.4 0.0 0.0 0.0 0.2 2.2 0.0 0.0 0.2 0.7 0.9 9.4 0.2 0.2 0.4 0.4 0.0

20.8 3.1 0.0 0.0 1.3 0.4 3.7 0.2 0.0 0.0 0.0 0.2 0.2 0.0 0.2 0.2 0.4 0.7 0.0 0.2 0.2 0.0 1.5 0.0 0.0 0.0 3.5 0.9 3.5 0.0 0.4 0.0 0.2 0.0

20.9 6.8 0.0 0.0 0.7 0.2 1.7 0.0 0.0 0.0 0.0 0.7 0.0 0.2 0.4 0.0 0.2 0.0 0.0 0.2 0.2 0.0 3.1 0.0 0.2 0.2 2.6 0.7 7.6 0.7 0.2 0.0 0.0 0.0

21 3.3 0.0 0.0 2.4 0.0 0.9 0.0 0.0 0.0 0.0 0.7 0.2 0.2 0.0 0.0 0.2 0.2 0.0 0.2 0.4 0.2 2.6 0.0 0.0 0.2 0.2 0.9 6.4 0.0 0.2 0.0 0.2 0.0

21.1 3.9 0.0 0.0 2.4 0.7 4.8 0.0 0.0 0.0 0.0 1.1 0.2 0.4 0.4 0.2 0.2 0.2 0.0 0.2 0.2 0.0 2.6 0.0 0.0 0.7 0.7 1.1 6.1 0.2 0.7 0.0 0.0 0.0

21.2 3.5 0.2 0.0 2.0 0.0 3.1 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.0 0.0 0.0 0.9 0.0 0.2 0.0 0.0 2.2 0.0 0.0 0.7 3.7 0.4 4.6 0.0 0.2 0.0 1.3 0.0

21.3 4.4 0.0 0.0 1.1 0.0 1.3 0.2 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.9 0.0 1.3 0.0 0.0 0.2 1.3 0.4 7.2 0.0 0.4 0.4 0.7 0.0

21.4 2.0 0.0 0.0 0.9 0.2 1.7 0.0 0.0 0.2 0.0 0.7 0.0 0.2 0.2 0.0 0.0 0.2 0.0 0.0 0.2 0.0 2.4 0.2 0.2 0.9 0.2 0.7 13.9 0.0 0.7 0.7 0.2 0.0

21.5 2.9 0.0 0.0 1.3 0.2 0.0 0.0 0.0 0.2 0.0 0.9 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.4 0.4 0.0 1.1 0.4 0.0 0.2 1.1 1.3 7.3 0.4 0.7 0.4 0.0 0.0

21.6 1.3 0.0 0.0 2.0 0.0 0.4 0.2 0.2 0.0 0.0 0.4 0.0 0.2 0.9 0.0 0.7 0.0 0.0 0.2 0.4 0.0 1.8 0.2 0.0 0.4 0.9 2.0 12.3 0.2 0.9 0.0 0.0 0.7

21.7 1.1 0.0 0.0 2.2 0.0 0.4 0.0 0.0 0.0 0.0 0.4 0.2 0.0 0.2 0.0 0.2 0.0 0.2 0.0 0.7 0.0 3.1 0.2 0.0 0.7 0.4 0.9 10.8 0.0 0.7 0.0 0.0 0.0

21.8 2.0 0.0 0.0 0.9 0.4 0.7 0.0 0.0 0.0 0.0 0.4 0.0 0.0 0.2 0.0 0.0 0.0 0.0 0.2 0.0 0.0 2.2 0.0 0.0 0.0 0.9 0.0 12.5 0.2 0.2 0.0 0.7 0.0

22 1.3 0.0 0.0 1.5 0.0 0.2 0.2 0.0 0.2 0.0 1.3 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.7 0.0 2.0 0.0 0.0 0.4 1.1 0.4 7.7 0.0 0.2 0.2 0.4 0.0

23 1.1 0.0 0.0 1.5 0.0 0.7 0.0 0.0 0.2 0.0 0.9 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.2 0.0 0.0 4.0 0.0 0.2 0.2 1.1 0.4 13.0 0.0 0.9 0.0 1.1 0.0

24 1.7 0.0 0.0 1.1 0.2 0.2 0.0 0.0 0.2 0.0 0.4 0.0 0.0 0.0 0.0 0.2 0.2 0.0 0.0 0.0 0.0 1.3 0.0 0.0 0.2 0.7 0.4 7.0 0.0 0.4 0.4 1.1 0.0

25 2.6 0.0 0.0 1.1 0.2 1.1 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.0 0.4 0.4 0.0 2.4 0.2 0.2 0.0 0.2 1.5 12.4 0.2 0.7 0.0 0.2 0.0

26 4.2 0.0 0.0 1.1 0.0 2.2 0.2 0.0 0.0 0.0 1.1 0.4 0.0 0.2 0.2 0.7 0.2 0.0 0.2 1.3 0.0 2.4 0.0 0.0 0.0 0.4 0.7 4.4 0.4 0.0 0.0 0.9 0.0

27 0.5 0.0 0.0 1.4 0.0 0.5 0.0 0.0 0.0 0.0 0.5 0.2 0.2 0.2 0.0 0.2 0.0 0.0 0.0 0.5 0.0 1.2 0.0 0.0 0.2 1.2 0.0 0.7 0.2 0.5 0.0 0.0 0.0

27.5 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.2 0.0 0.2 0.0 0.0 0.2 0.2 0.0 2.4 0.0 0.0 0.0 0.0 3.5 20.8 2.2 3.9 0.2 0.7 0.0

2j. Smoky Hill calcareous nannofossil census data, lower section, part 5 of 5

Column 1: Section Height (m)

Column 2: Zeugrhabdotus diplogrammus

Column 3: Zeugrhabdotus erectus

Column 4: Zeugrhabdotus scutula

Column 5: Zeugrhabdotus spiralis

Column 6: Zeugrhabdotus trivectus

Column 7: Zeugrhabdotus wynnhayi

Column 8: New species

SectiZeugrhaZeugrhaZeugrhaZeugrhaZeugrhaZeugrhaNew species

16.4 0.0 12.0 13.8 0.4 0.2 0.0 0.0

16.5 0.2 11.1 14.4 0.5 0.0 0.0 0.0

16.6 0.4 8.1 19.1 0.0 0.2 0.0 0.0

16.7 1.0 4.3 15.9 0.2 0.0 0.0 0.0

16.8 0.7 5.7 7.9 0.4 0.2 0.4 0.2

16.9 0.4 8.5 10.9 1.1 0.0 0.0 0.0

17 0.7 6.8 6.8 0.9 0.0 0.4 0.0

17.1 0.7 6.1 2.2 0.0 0.0 0.2 0.0

17.2 0.7 9.4 0.9 0.0 0.0 0.0 0.0

17.3 0.4 11.4 2.6 0.2 0.0 0.0 0.2

17.4 0.0 9.8 1.5 0.2 0.0 0.2 0.0

17.5 0.2 17.1 2.6 0.7 0.2 0.0 0.0

17.6 1.1 18.9 0.7 0.4 0.0 0.2 0.0

17.7 0.9 6.4 1.9 0.6 0.4 0.0 0.0

17.8 0.9 11.4 2.2 0.9 0.0 0.0 0.0

17.9 0.2 12.5 0.9 0.7 0.2 0.0 0.0

18 0.4 10.9 1.1 0.4 0.2 0.2 0.0

18.1 0.4 8.3 1.8 1.3 0.0 0.2 0.0

18.2 0.0 5.9 3.9 1.1 0.0 0.2 0.2

18.3 0.2 5.2 1.5 0.9 0.0 0.0 0.0

18.4 0.0 9.0 0.4 1.3 0.0 0.0 0.0

18.5 0.0 11.4 0.4 0.2 0.4 0.0 0.0

18.7 0.0 10.1 2.0 0.7 0.0 0.0 0.0

18.8 0.2 8.6 0.7 0.9 0.0 0.0 0.0

18.9 0.0 11.2 2.0 0.0 0.2 0.0 0.2

19 0.0 10.1 1.1 0.2 0.4 0.0 0.0

19.1 0.4 11.6 0.9 0.4 0.2 0.0 0.4

19.2 0.0 7.3 1.1 0.7 0.2 0.0 0.0

19.3 0.4 10.7 0.4 0.7 0.2 0.0 0.4

19.4 0.2 8.6 1.1 0.4 0.0 0.0 0.0

19.5 0.0 14.7 2.4 0.2 0.2 0.0 0.2

19.6 0.2 15.8 1.5 0.2 0.0 0.0 0.0

19.7 0.0 9.2 1.8 0.2 0.0 0.2 0.0

19.8 0.0 6.6 0.0 0.0 0.0 0.0 0.0

19.9 0.4 8.5 0.7 0.2 0.0 0.0 0.0

20 0.0 10.5 0.9 0.4 0.0 0.0 0.9

20.1 0.0 9.0 0.4 0.7 0.2 0.4 0.0

20.2 0.0 6.8 1.1 0.9 0.2 0.0 0.0

20.3 0.2 7.2 1.1 0.9 0.0 0.0 0.2

20.4 0.2 7.3 0.2 0.7 0.2 0.2 0.7

20.5 0.0 5.5 4.6 1.5 0.4 0.0 0.0

20.6 0.2 9.0 3.3 0.4 0.0 0.2 0.0

20.7 0.0 6.1 1.3 0.7 0.4 0.4 0.0

20.8 0.0 7.5 2.6 1.8 0.0 0.2 0.0

20.9 0.2 10.9 1.5 0.9 0.0 0.0 0.0

21 0.0 12.5 0.9 1.5 0.0 0.0 0.0

21.1 0.0 4.4 1.5 0.7 0.4 0.0 0.4

21.2 0.4 16.2 1.5 1.1 0.0 0.0 0.0

21.3 0.2 13.6 0.0 1.1 0.2 0.0 0.0

21.4 0.0 15.0 0.2 0.7 0.4 0.0 0.0

21.5 0.0 18.1 0.2 0.4 0.0 0.0 0.0

21.6 0.0 5.1 0.2 0.4 0.7 0.4 0.2

21.7 0.0 7.3 0.2 0.0 0.7 0.2 0.2

21.8 0.2 4.2 0.4 0.0 0.0 0.2 0.0

22 0.2 12.9 0.4 0.4 0.2 0.0 0.0

23 0.0 10.6 2.2 0.0 0.4 0.2 0.0

24 0.0 15.0 7.0 0.2 0.2 0.2 0.2

25 0.2 10.5 2.6 0.4 0.0 0.2 0.0

26 0.4 10.1 2.6 1.5 0.0 0.2 0.2

27 0.0 14.2 0.7 0.0 0.0 0.0 0.7

27.5 0.0 1.8 3.5 0.4 0.0 0.0 0.0