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REPT.BK.NO. 81/53
BIOSTRATIGRAPHIC EXAMINATION OF
SELECTED ORDOVICIAN SAMPLES
FROM THE AMADEUS BASIN,
NORTHERN TERRITORY
(Client: Pan Continental

Department of Mines and Energy

South Australia

SOUTH AUSTRALIA

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BIOSTRATIGRAPHIC EXAMINATION OF SELECTED ORDOVICIAN SAMPLES FROM THE AMADEUS BASIN, NORTHERN TERRITORY

(Client: Pan Continental Petroleum Ltd.)

GEOLOGICAL SURVEY

by

DR. BARRY J. COOPER
BIOSTRATIGRAPHY SECTION

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DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

Rept.Bk. No. 81/53
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BIOSTRATIGRAPHIC EXAMINATION OF SELECTED ORDOVICIAN SAMPLES FROM THE AMADEUS BASIN, NORTHERN TERRITORY

(Client: Pan Continental Petroleum Ltd.)

ABSTRACT

Sparse conodont collections from eight different boreholes in the Amadeus Basin all compare with Early Ordovician (Arenig) faunas described from outcropping Horn Valley Siltstone by Cooper (1981).

INTRODUCTION

Conodonts from eighteen subsurface samples from the Amadeus Basin are considered in this report for J.D. Gorter, Pan Continental Petroleum Ltd. The samples were processed and picked at the Bureau of Mineral Resources, Geology and Geophysics, Canberra. An evaluation of conodont colour was also completed for the samples by the B.M.R. (Nicoll, 1981). This report identifies the collection and provides an age determination.

All samples were collected from the Cambro-Ordovician Larapinta Group. Conodont recovery from the cutting samples was poor, a fact undoubtedly due to the finely crushed nature of the materials. In fact, recognition of conodonts from these samples probably results from the fact that the Horn Valley Siltstone is one of the world's most prolific conodont producers. Should further conodont investigations be anticipated then samples crushed no smaller than 1 cm are highly desirable. The three core samples produced worthwhile conodont collections.

Determinable conodonts were readily compared with collections of mid Arenig age recently described from outcropping Horn Valley Siltstone (Cooper, 1981). Only Protopanderodus rectus (Lindström) had not previously been described from this unit. Of special significance is the occurrence of well preserved representatives of Oepikodus evae (Lindström) in the Palm Valley No. 1 core at 5566'7" (1697m), which is a zonal indicator within the Arenig (top Latorp) of the Baltic Ordovician succession (Löfgren, 1978). Other taxa which have short and useful stratigraphic ranges include Baltoniodus sp., Bergstroemognathus extensus (Graves and Ellison) and Protoprioniodus spp. Acodus emanuelensis McTavish, Prioniodus amadeus Cooper and Trigonodus larapintinensis (Crespin) are probably short ranging but have not yet been widely reported.

RESULTS

Mereenie No. 1

Depth: 3400-3500 feet (1035-1065m), cuttings

Formation: Horn Valley Siltstone

Conodonts: Acodus emanuelensis McTavish

Bergstroemognathus(?) sp.

Drepanoistodus sp.

Trigonodus larapintinensis (Crespin)

unknown Trigonodus sp.

Biostratigraphy: The conodonts are consistent with collections studied from outcropping Horn Valley Siltstone.

Mereenie No. 1

Depth: 3500-3600 feet (1065-1095m), cuttings

Formation: Horn Valley Siltstone

Conodonts: Acodus emanuelensis McTavish

Drepanoistodus sp. cf. D. suberectus (Branson and Mehl)

Erraticodon sp. cf. E. patu Cooper

Oistodus sp.

Trigonodus larapintinensis (Crespin)

Biostratigraphy: The conodonts are consistant with collections studied from outcropping Horn Valley Siltstone.

Mereenie No. 1

Depth: 3600-3700 feet (1095-1125m), cuttings

Formation: Horn Valley Siltstone

Conodonts: Acodus emanuelensis McTavish

Oistodus sp.

Prioniodus amadeus Cooper

Scalpellodus latus (van Wamel)

Trigonodus larapintinensis (Crespin)

Biostratigraphy: Early Ordovician (Arenig) age. These conodonts are common throughout outcropping sections of the Horn Valley Siltstone.

East Mereenie No. 1

Depth: 3431 feet (1045.8m), Core

Formation: Horn Valley Siltstone

Conodonts: Acodus emanuelensis (McTavish)

Drepanoistodus sp. cf. D. pitjanti Cooper

Erraticodon patu Cooper

Prioniodus sp. cf. P. amadeus Cooper

Protoprioniodus aranda Cooper

Trigonodus larapintinensis (Crespin)

Biostratigraphy: Early Ordovician (Arenig) age. This good collection of conodonts is readily comparable with those found in outcropping Horn Valley Siltstone.

East Mereenie No. 1

Depth: 3510-3580 feet (1070-1091m), cuttings

Formation: Horn Valley Siltstone

Conodonts: Acodus emanuelensis McTavish

Drepanoistodus pitjanti Cooper

Erraticodon patu Cooper

Oistodus sp.

Scalpellodus latus (van Wamel)

Biostratigraphy: Early Ordovician age. The conodonts are similar to collections studied from outcropping Horn Valley Siltstone.

West Mereenie No. 1

Depth: 1700-1800 feet (515-550m), cuttings

Formation: Stokes Siltstone

Conodonts: Indeterminate Fragments.

West Mereenie No. 1

Depth: 3500-3550 feet (1065-1082m), cuttings

Formation: Horn Valley Siltstone

Conodonts: indeterminate oistodontiform element
Scalpellodus(?) sp.

Biostratigraphy: The conodonts indicate a probable Ordovician age.

West Mereenie No. 1

Depth: 3600-3700 feet (1095-1130m), cuttings

Formation: Horn Valley Siltstone

Conodonts: indeterminable fragments.

West Mereenie No. 1

Depth: 3700-3750 feet (1130-1145m), cuttings

Formation: Horn Valley Siltstone

Conodonts: indeterminable fragments

West Mereenie No. 1

Depth: 4950-5100 feet 1510-1555m (cuttings)

Formation: Horn Valley Siltstone

Conodonts: indeterminable fragments

West Waterhouse No. 1

Depth: 5780-5870 feet 1760-1790m (cuttings)

Formation: Horn Valley Siltstone

Conodonts: Acodus emanuelensis McTavish

Baltoniodus sp.

Prioniodus sp. cf. P. amadeus Cooper

Scalpellodus latus (van Wamel)

cf. Trigonodus larapintinensis (Crespin)

Biostratigraphy: Ordovician (?Arenig) age. This fauna is consistent with collections described from the top two thirds of outcropping Horn Valley Siltstone.

East Johnny Creek No. 1

Depth: 200-360 feet (70-110m), cuttings

Formation: Horn Valley Siltstone

Conodonts: Acodus emanuelensis McTavish

Drepanoistodus sp. aff. D. pitjanti Cooper

D. suberectus (Branson & Mehl)

Oistodus sp.

Prioniodus sp. cf. P. amadeus Cooper

Protoprioniodus aranda Cooper

P. nyinti Cooper

Trigonodus sp. cf. T. larapintinensis (Crespin)

Biostratigraphy: Early Ordovician (early-mid Arenig) age. This fauna is similar to that described from outcropping Horn Valley Siltstone.

Orange No. 1

Depth: 2400-2416 feet 731-736m cuttings

Formation: Horn Valley Siltstone

Conodonts: Acodus emanuelensis McTavish

Bergstroemognathus extensus (Graves & Ellison)

Drepanoistodus sp. cf.

D. suberectus (Branson & Mehl)

Protopanderodus(?) sp.

cf. Trigonodus larapintinensis (Crespin)

Biostratigraphy: Early Ordovician (early-mid Arenig) age. These conodonts occur low in the outcrop succession of the Horn Valley Siltstone at its type section on Ellery Creek.

Palm Valley No. 1

Depth: 5340-5360 feet (1628-1634m), cuttings

Formation: Horn Valley Siltstone

Conodonts: indeterminable fragments

Palm Valley No. 1

Depth: 5490-5580 feet (1673-1701m), cuttings

Formation: Horn Valley Siltstone

Conodonts: Fragments of Acodus sp. and Trigonodus sp.

Biostratigraphy: no useful age determination possible.

Palm Valley No. 1

Depth: 5565-5573 feet 1696-1699m cuttings

Formation: Horn Valley Siltstone

Conodonts: Protoprioniodus sp. cf. P. aranda Cooper fragments.

Biostratigraphy: Early Ordovician (Arenig) age.

Palm Valley No. 1

Depth: 5566 feet 7 inches (1696.7m),Core

Formation: Horn Valley Siltstone

Conodonts: Bergstroemognathus extensus (Graves & Ellison)

Drepanoistodus suberectus (Branson & Mehl)

Oepikodus evae (Lindström)

Protopanderodus rectus (Lindström)

Protoprioniodus aranda Cooper

P. nyinti Cooper

Biostratigraphy: Early Ordovician (Arenig) age. The conodonts include the index species of the Oepikodus evae Zone of the Baltic Platform. This well preserved fauna is very similar to the conodonts from the basal half of the Horn Valley Siltstone at Ellery Creek.

Palm Valley No. 3

Depth: 6500-6560 feet 1980-2000m, cuttings

Formation: Horn Valley Siltstone

Conodonts: Acodus sp.

Erraticodon patu Cooper

Biostratigraphy: These conodonts are not especially age diagnostic but are similar to forms common in outcrop sections of the Horn Valley Siltstone.

Palm Valley No. 3

Depth: 6630-6690 feet (2020-2040m), cuttings

Formation: Horn Valley Siltstone

Conodonts: *Prioniodus* sp.

Scalpellodus latus (van Wamel)

Biostratigraphy: These conodonts occur in outcropping Horn Valley Siltstone and indicate an Early Ordovician age.

BJC:ZV

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