

Open File Envelope

No. 8621

EROMANGA BASIN

GEOLOGICAL STUDIES

REPORTS

Submitted by

Delhi Petroleum Pty Ltd and Santos Ltd
1988

© 23/3/93

This report was supplied as part of the requirement to hold a mineral or petroleum exploration tenement in the State of South Australia.
PIRSA accepts no responsibility for statements made, or conclusions drawn, in the report or for the quality of text or drawings. This report is subject to copyright. Apart from fair dealing for the purposes of study, research, criticism or review as permitted under the Copyright Act, no part may be reproduced without written permission of the Chief Executive of Primary Industries and Resources South Australia, GPO Box 1671, Adelaide, SA 5001.

Enquiries: Customer Services
Ground Floor
101 Grenfell Street, Adelaide 5000

Telephone: (08) 8463 3000
Facsimile: (08) 8204 1880



**PRIMARY INDUSTRIES
AND RESOURCES SA**

ENVELOPE 8621

TENEMENT: Not applicable

TENEMENT HOLDER: Not applicable

CONTENTS OF VOLUME ONE

PLAN		Scale	Company plan no.	MESA NO.	
Plate 3	Magier, P., 1965. Gamma ray correlation of the Mesozoic (enclosure to missing French Petroleum Company [Australia] Pty Ltd regional geology report no. 505, 9/2/65).	1:2 400	RG505/11	8621-1	>A0
REPORTS:	Swindon, V.G. and Moore, P.S., 1984. Exploration and production, Eromanga Basin, Central Australia (August 1984).			8621 R 1 Pgs 3-47	
	Gausden, J., 1979. Landsat interpretation [of the] western Great Artesian Basin (consultant's report for Delhi Petroleum Pty Ltd, June 1979).			8621 R 2 Pgs 48-60	
PLANS		Scale			
Encl. 1	Lineament map.	1:1 000 000		8621-2	>A0
Encl. 2	Interpreted structure map.	1:1 000 000		8621-3	>A0

CONTENTS OF VOLUME TWO

REPORT:	Moore, P.S., 1984. Cretaceous stratigraphy of the southwestern Eromanga Basin. Part 1. General introduction, formation tops and log correlation diagrams for the interval Toolebuc Formation to 'C'-Horizon (Delhi Petroleum Pty Ltd, June 1982).			8621 R 3 Pgs 61-105	
PLANS		Scale	Company plan no.		
Encl. 1	Location of log correlation stratigraphic cross-sections (constructed between wells lying within the areas of PELs 5 and 6 and ATP259P).	1:1 000 000	82XG-1332	8621-4	A0
Encl. 2	Cross section A-B.	1:1 200	81XG-0747	8621-5	>A0
Encl. 3	Cross section C-D.	1:1 200	81XG-0746	8621-6	>A0
Encl. 4	Cross section E-F.	1:1 200	81XG-0744	8621-7	B1
Encl. 5	Cross section C-H.	1:1 200	81XG-0745	8621-8	B1
Encl. 6	Cross section G-J.	1:1 200	81XG-0748	8621-9	A0
Encl. 7	Cross section L-K.	1:1 200	81XG-0742	8621-10	A1
Encl. 8	Cross section K-N.	1:1 200	81XG-0743	8621-11	B1
REPORT:	Taylor S. and Redfearn, J., 1988. Eromanga [oil exploration] potential of the Nappamerri Trough [Oil Project 88-3] (Santos Ltd, September 1988).			8621 R 4 Pgs 106-146	

PLANS		Scale	Company plan no.	MESA NO.	
	Nappamerri Trough stratigraphic cross-sections:				
Encl. 1	Top Cadna-Owie Formation to top Nappamerri Formation.	1:1 572	PEL5-6 094	8621-12	A0
Encl. 2	Top Murta Member to top Namur Sandstone Member.	1:384	PEL5-6 093	8621-13	>A0
	Burley/McLeod/Kirby area time structure maps:				
Encl. 3	'C'-Horizon.	1:50 000	BUMCKI 001	8621-14	A0
Encl. 4	'H'-Horizon.	1:50 000	BUMCKI 002	8621-15	A0
Encl. 5	'C-H' time interval.	1:50 000	BUMCKI 009	8621-16	A0
Encl. 6	'C-V' time interval.	1:50 000	BUMCKI 011	8621-17	A0

CONTENTS OF VOLUME THREE

REPORT: **Hunt, J., 1985.** Regional isopach maps of the Jurassic sequence in the Eromanga Basin: a preliminary approach (Delhi Petroleum Pty Ltd, March 1985). **8621 R 5**
Pgs 147-160

PLANS		Scale		
Encl. 1	Structure and isochron control map.	1:1 000 000	8621-18	A0
Encl. 2	'C-H' interval isopach.	1:1 000 000	8621-19	A0
Encl. 3	Poolowanna Formation [basal Jurassic] plus Hutton Sandstone and correlatives isopach.	1:1 000 000	8621-20	A0
Encl. 4	Birkhead Formation and correlatives isopach.	1:1 000 000	8621-21	A0
Encl. 5	Namur Sandstone Member plus Westbourne Formation plus Adori Sandstone and correlatives isopach.	1:1 000 000	8621-22	A0
Encl. 6	Wallumbilla Formation and Coorikiana Sandstone plus Bulldog Shale and correlatives isopach.	1:1 000 000	8621-23	A0

REPORTS: **Moore, P.S. and Castro, C., 1984.** Petroleum exploration in fluvio-lacustrine sequences, with examples from the [Cooper and] Eromanga Basins (Delhi Petroleum Pty Ltd, Regional Studies Group, Discussion Paper RSG1/84-2). **8621 R 6**
Pgs 161-192

Mathis, M., 1979. Results of a special core analysis [SCAL] study of 9 selected Jurassic sandstone drill core plug samples from wells Namur 2, Mudlalee 2 and Strzelecki 3, to determine formation resistivity index plus formation resistivity factor at both ambient and overburden pressure conditions (Core Laboratories, Inc., Dallas, Texas, contractor's report for Delhi Petroleum Pty Ltd, 12/11/79). **8621 R 7**
Pgs 193-212

Kennaird, A., 1982. Results of a SCAL study of 16 selected Jurassic McKinlay Member and Namur Sandstone Member drill core plug samples from wells Strzelecki 4, 5 and 6 and Dullingari 29, to determine formation resistivity factor plus cation exchange capacity at ambient pressure conditions (Core Laboratories International, Inc., Singapore, contractor's report for Santos Ltd, 24/9/82). **8621 R 8**
Pgs 213-224

REPORTS:

McColl, D., 1982. Petrographic thin section descriptions of 76 selected Jurassic sandstone drill core and cuttings samples from wells Strzelecki 3 and 4, Mudera 1, Mudlalee 2, Murteree 1, Narcoonowie 1 and Pelketa 1 (Amdel Ltd contractor's report no. GS 4070/82 for SADME, 10/3/82).

MESA NO.
8621 R 9
Pgs 225-302

Farrand, M., 1982. Petrographic thin section descriptions of 78 selected Jurassic sandstone drill core and cuttings samples from wells Beanbush 1, Packsaddle 3, Welcome Lake 1 and Cuttapirrie 1, plus results of the determination of sedimentary depositional facies from microlithological observations of rock textural characteristics in nominated core samples (Amdel Ltd contractor's report no. F 4590/82 for SADME, 6/5/82).

8621 R 10
Pgs 303-336

CONTENTS OF VOLUME FOUR

REPORT:

Royle, G., 1988. Preliminary evaluation of Eromanga Basin seals [Oil Project 88-12] (Santos Ltd, 27/10/88).

8621 R 11
[15 pages]

PLANS

		Scale	Company plan no.		
Encl. 1	Regional distribution of the Poolowanna Formation, Cooper Basin (SA portion).	1:250 000	COOSEC 046	8621-24	>A0
Encl. 2	Regional distribution of the Birkhead Formation (Facies 1), Cooper Basin [SA portion].	1:250 000	COOSEC 045	8621-25	>A0
Encl. 3	Regional distribution of the Birkhead Formation (Facies 2), Cooper Basin [SA portion].	1:250 000	COOSEC 047	8621-26	>A0

END OF CONTENTS

Open File Envelope

NUMBER 8621

EROMANGA BASIN

GEOLOGICAL STUDIES

REPORTS

Submitted by

Delhi Petroleum Pty Ltd and Santos Ltd
1988

© 23/3/93

MINES and ENERGY
RESOURCES SOUTH
AUSTRALIA



This report was supplied as part of the requirement to hold a mineral or petroleum exploration tenement in the State of South Australia.
MESA accepts no responsibility for statements made, or conclusions drawn, in the report or for the quality of text or drawings.
All rights reserved under the copyright. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means (electronic, mechanical, photocopying, recording or otherwise) without the written permission of
Mines and Energy Resources South Australia, PO Box 151, Eastwood, SA 5063

Enquiries: Customer Services

Mines and Energy Resources South Australia
191 Greenhill Road, Parkside 5063

Library Telephone: (08) 8274 7522

General Enquiries Telephone: (08) 8274 7500

Facsimile: (08) 8272 7597

CORE LABORATORIES, INC.

Special Core Analysis



November 12, 1979

Delhi Petroleum Pty. Ltd.
33 King William Street
Adelaide, South Australia, 5000

Attention: Mr. J. N. Mulready

Subject: Special Core Analysis Study
Namur No. 2, Mudlalee No. 2,
Strzelecki No. 3 Wells
Jurassic Sandstone
Great Artesian Basin
South Australia
File Number: SCAL-79181-I



Gentlemen:

By letter dated May 4, 1979, Mr. J. N. Mulready of Delhi Petroleum Pty. Ltd., requested that Core Laboratories, Inc., perform the following on sandstone core material recovered from the subject wells: (1) Formation Resistivity Index Measurements; and (2) Formation Resistivity Factor Measurements at room conditions and at increasing overburden pressures. Submitted herewith are the results of the requested analyses. The samples tested are lithologically described and identified as to sample number, well name, and depth interval on Page 1.

Nine plug-size samples, representing depth intervals ranging from 5142 feet to 6167 feet, were submitted for use in this study. Each core plug was leached of salt with methyl alcohol, and dried. Following drying, air permeabilities and Boyle's law porosities were determined for each of the samples. The core plugs were then evacuated and saturated with a brine containing 6000 ppm sodium chloride.

The electrical resistivities of the brine and the nine brine-saturated core plugs were measured. These measurements were repeated over a period of several days until the electrical resistivities stabilized, indicating that ionic equilibrium within the core plugs had been attained. Each core plug was desaturated using a porous-plate cell with a final desaturation point in a high-speed centrifuge. The electrical resistivities were measured at each equilibrium saturation attained. The results of the formation resistivity

Delhi Petroleum Pty. Ltd.
Great Artesian Basin
Page Two

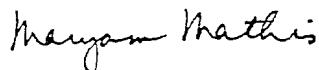
factor and formation resistivity index measurements at 0 psi overburden pressure are presented in tabular form on Pages 2 and 3, and in graphical form on Pages 4 through 13. The formation resistivity index-saturation relationships yield calculated saturation exponents "n" which range from 0.89 to 1.73. A composite plot of the formation resistivity index-saturation relationships yields a saturation exponent of 1.43. It is conceivable that the relatively low "n" values might be due to particular properties of minerals present within the samples. In order to determine lithological elements in the formation which might explain these resistivity index results, it is recommended that Delhi Petroleum Pty. Ltd. consider petrographic analyses and/or mineral content determinations by X-ray diffraction for these samples.

Each core plug was reprepared for formation resistivity factor measurements as a function of increasing overburden pressures using the same procedures as discussed previously. The electrical resistivities of the brine and the brine-saturated core plugs were measured at room conditions (0 psi effective overburden pressure) and effective overburden pressures of 200 psi, 1800 psi, and 3600 psi. The results of these formation resistivity factor measurements are presented in tabular form on Page 14, and in graphical form on Pages 15 through 18. Using Archie's equation, a cementation exponent "m" of 1.76 is calculated at 0 psi effective overburden pressure. The cementation exponent increases to 1.82, 1.88, and 1.91 at effective overburden pressures of 200 psi, 1800 psi, and 3600 psi, respectively. The samples exhibit a normal trend of increasing cementation exponents with increasing overburden pressures.

It has been a pleasure to provide Delhi Petroleum Pty. Ltd. with this study. Should you have any questions or require further assistance, please do not hesitate to contact us.

Very truly yours,

Core Laboratories, Inc.



Maryam Mathis
for Duane L. Archer, Manager
Special Core Analysis

MM:mc
7 cc. - Addressee

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS 75247

000195

Page 1 of 18
File SCAL-79181-I

Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well As Noted County _____
Field Great Artesian Basin State South Australia

Identification and Description of Samples

<u>Sample Number</u>	<u>Depth, Feet</u>	<u>Lithological Description</u>
<u>Well: Namur No. 2</u>		
2A	5426	Ss, bf, fn gr, mod/indurated, sl/mic, carb stks
21	5446	Ss, bf, crs gr, mod/indurated, sl/vug
48	5473	Ss, bf, fn gr, mod/indurated, sl/mic
59	5485	Ss, bf, fn gr, mod/indurated, sl/frac, sl/mic
68	5493	Ss, bf, fn gr, mod/indurated, sl/mic
<u>Well: Mudlalee No. 2</u>		
9	5142	Ss, bf, fn gr, mod/indurated, lam
7	5153	Ss, bf, fn gr, mod/indurated
<u>Well: Strzelecki No. 3</u>		
10	5591	Ss, bf, crs-med gr, mod/indurated, sl/frac, sl/mic
8	6167	Ss, bf, med gr, mod/indurated, sl/mic

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
 DALLAS, TEXAS 75247

Page 2 of 18
 File SCAL-79181-I

Formation Factor and Resistivity Index Data

Resistivity of Saturating Brine, Ohm-Meters: 0.8816 @ 74°F.

<u>Sample Number</u>	<u>Air Permeability, Millidarcies</u>	<u>Porosity, Percent</u>	<u>Formation Factor</u>	<u>Brine Saturation, Percent Pore Space</u>	<u>Resistivity Index</u>
<u>Well: Namur No. 2</u>					
2A	0.97	13.5	27.1	100.0	1.00
				86.6	1.13
				59.6	1.59
21	81	14.4	33.4	100.0	1.00
				28.3	5.86
				25.0	6.38
				20.5	6.61
				18.0	9.00
48	3.3	11.5	51.0	100.0	1.00
				60.1	1.90
				38.0	3.06
				29.8	3.55
				16.8	8.24
59	3.0	12.4	37.5	100.0	1.00
				96.4	1.09
				59.9	2.00
				56.3	2.91
				29.9	5.16
68	49	15.5	26.0	100.0	1.00
				44.2	3.97
				37.8	4.88
				29.8	5.58
				26.2	6.91

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgement of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS 75247

000197

Page 3 of 18
File SCAL-79181-I

Formation Factor and Resistivity Index Data

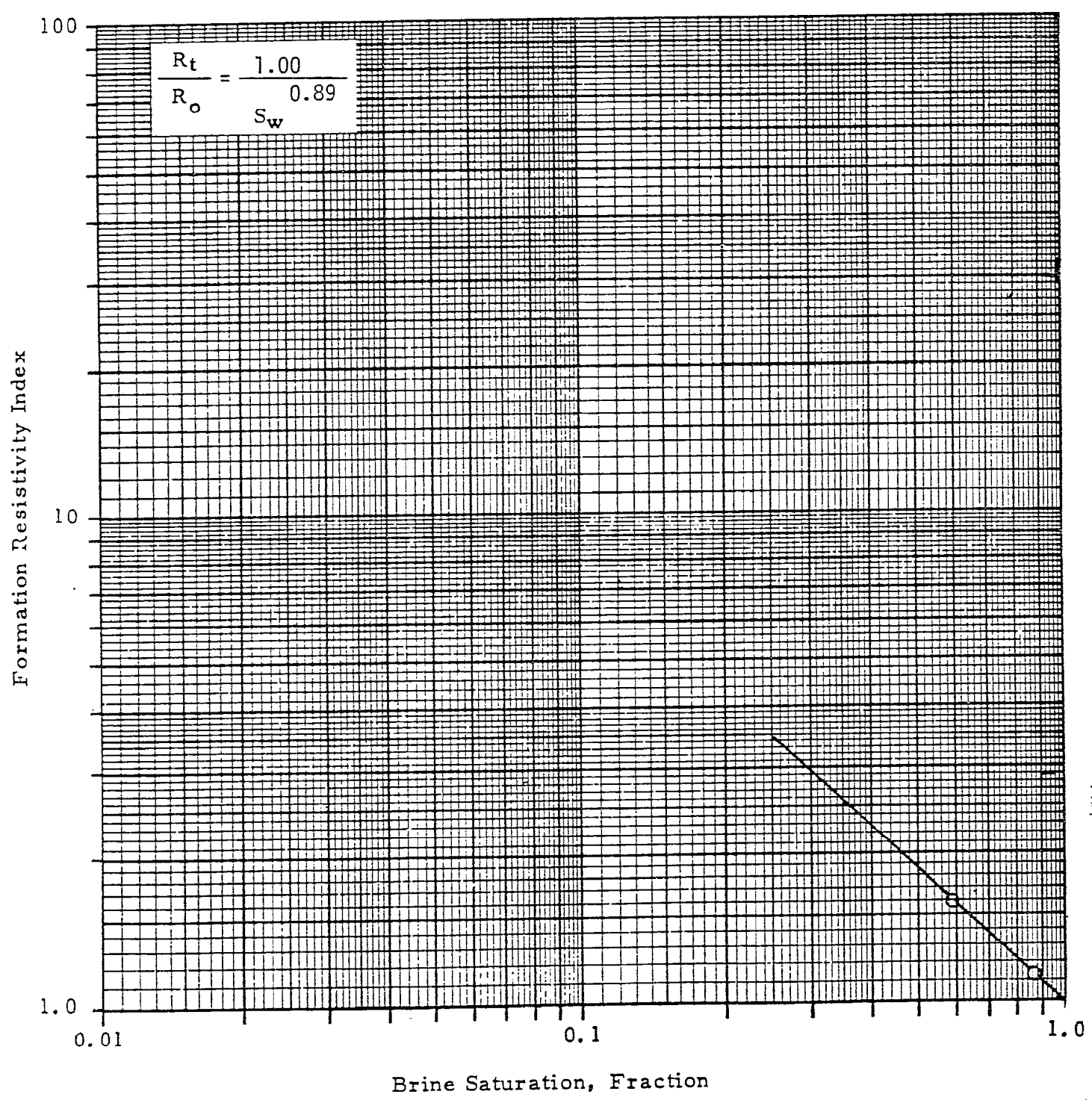
Resistivity of Saturating Brine, Ohm-Meters: 0.8816 @ 74°F.

<u>Sample Number</u>	<u>Air Permeability, Millidarcies</u>	<u>Porosity, Percent</u>	<u>Formation Factor</u>	<u>Brine Saturation, Percent Pore Space</u>	<u>Resistivity Index</u>
<u>Well: Mudlalee No. 2</u>					
7	34	18.5	20.3	100.0	1.00
				67.0	2.19
				58.3	2.65
				49.1	3.31
				44.5	4.02
9	19	18.0	21.2	100.0	1.00
				78.3	1.58
				67.0	2.03
				55.8	2.36
				48.3	3.33
<u>Well: Strzelecki No. 3</u>					
8	94	18.7	20.0	100.0	1.00
				44.3	3.97
				39.9	4.33
				30.3	4.93
				27.6	6.34
10	233	18.0	22.2	100.0	1.00
				40.3	3.84
				36.8	4.33
				27.9	5.33
				24.8	7.21

These analyses, opinions or interpretations are based on observations and material supplied by the client to whom, and for whose exclusive and confidential use, this report is made. The interpretations or opinions expressed represent the best judgement of Core Laboratories, Inc. (all errors and omissions excepted); but Core Laboratories, Inc. and its officers and employees, assume no responsibility and make no warranty or representations as to the productivity, proper operation, or profitableness of any oil, gas or other mineral well or sand in connection with which such report is used or relied upon.

Company Delhi Petroleum Pty.Ltd. Formation Jurassic Sandstone
 Well Namur No. 2 County _____
 Field Great Artesian Basin State South Australia

Sample Number: 2A

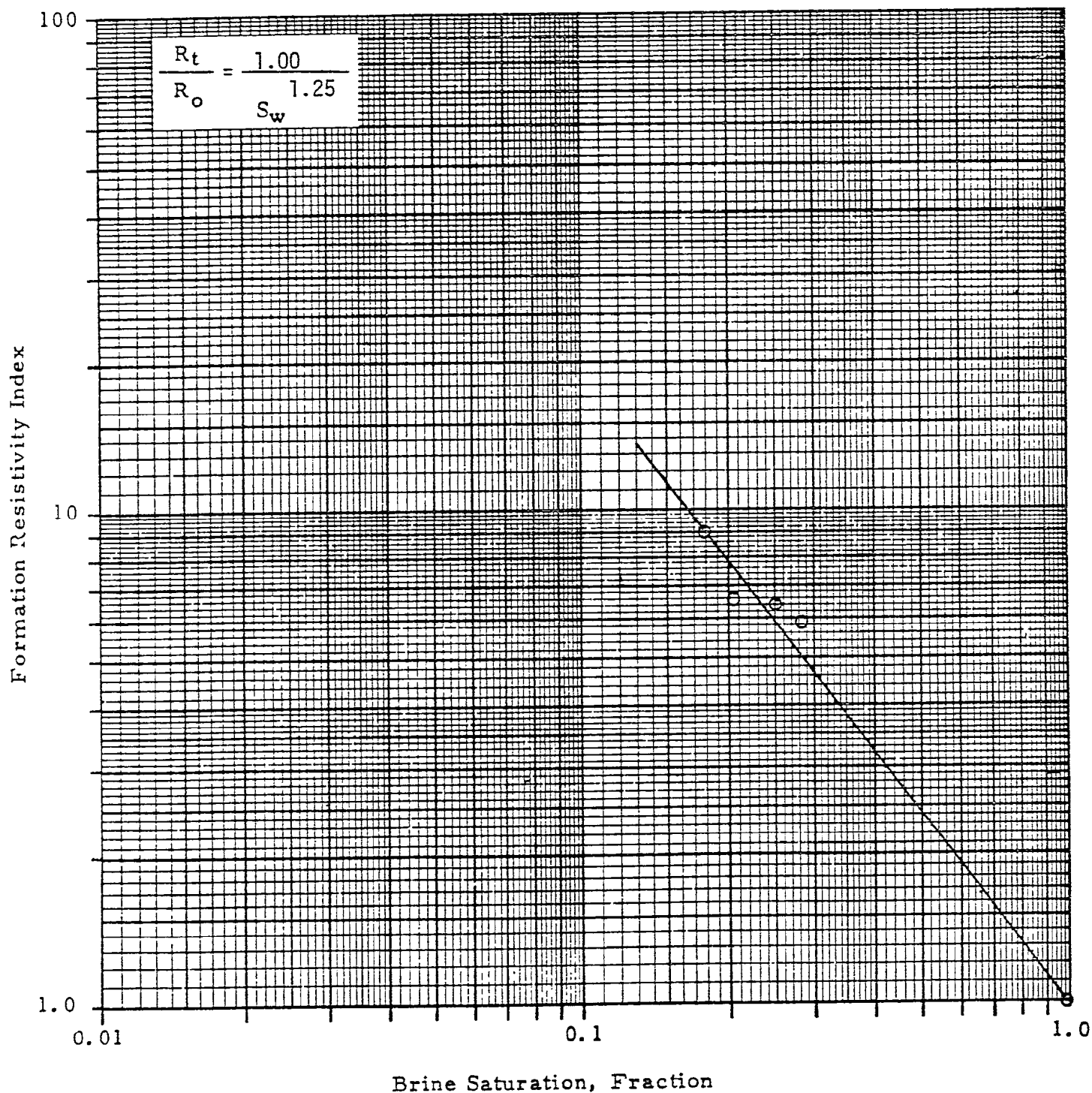


CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page 5 of 18
File SCAL-79181-I

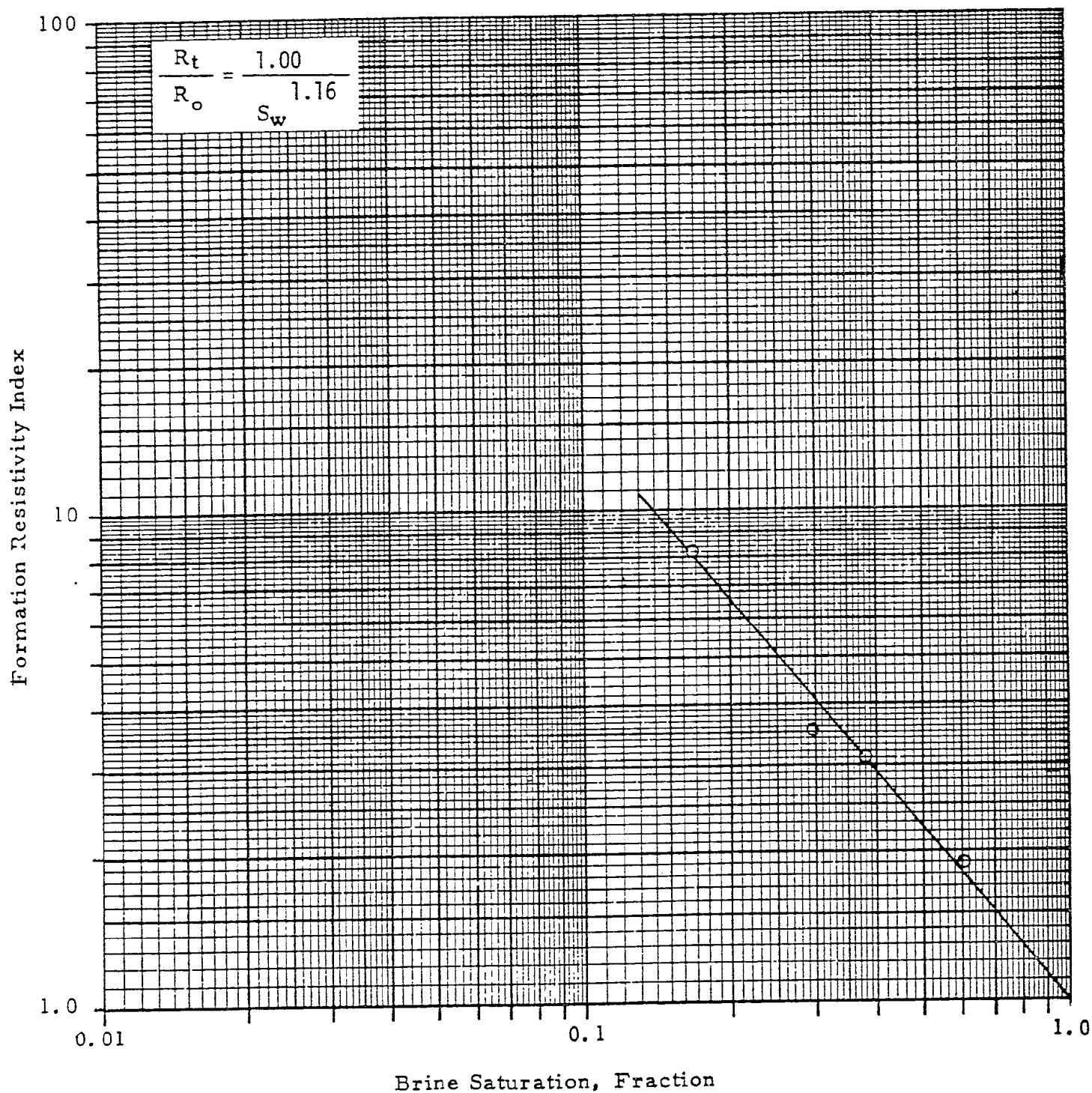
Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well Namur No. 2 County _____
Field Great Artesian Basin State South Australia

Sample Number: 21



Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well Namur No. 2 County _____
Field Great Artesian Basin State South Australia

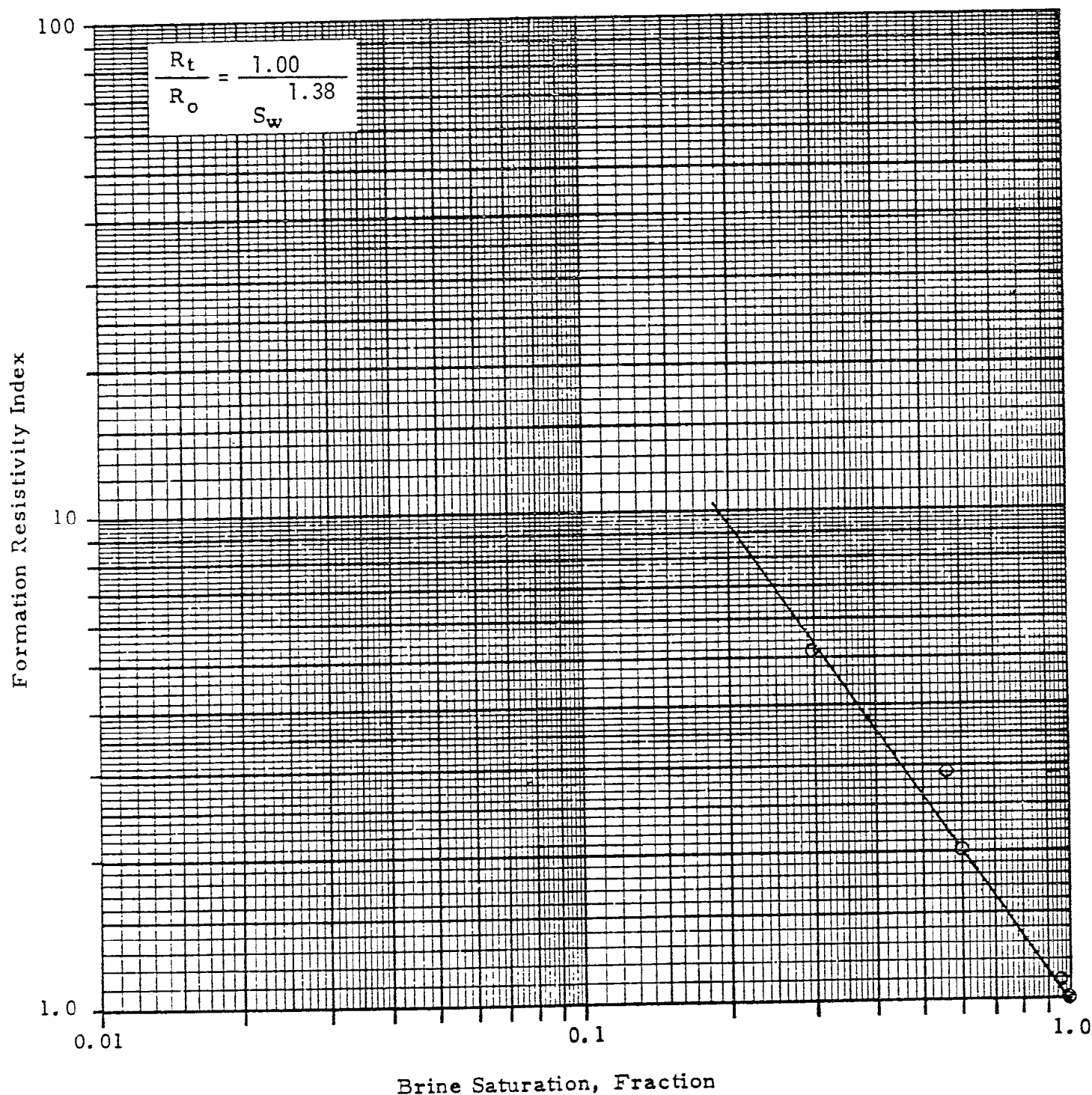
Sample Number: 48



CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXASPage 7 of 18
File SCAL-79181-I

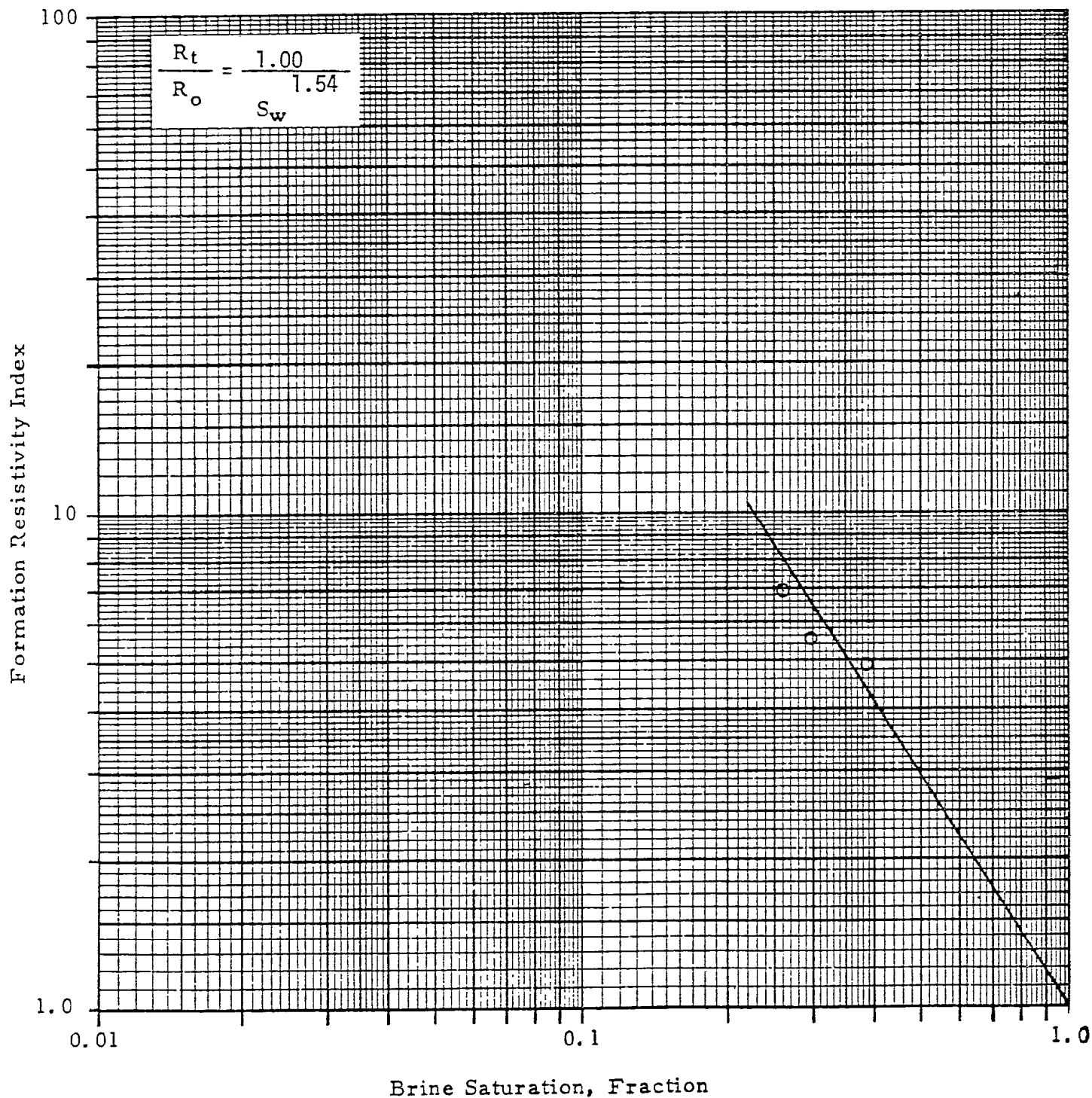
Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well Namur No. 2 County _____
Field Great Artesian Basin State South Australia

Sample Number: 59



Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well Namur No. 2 County _____
Field Great Artesian Basin State South Australia

Sample Number: 68

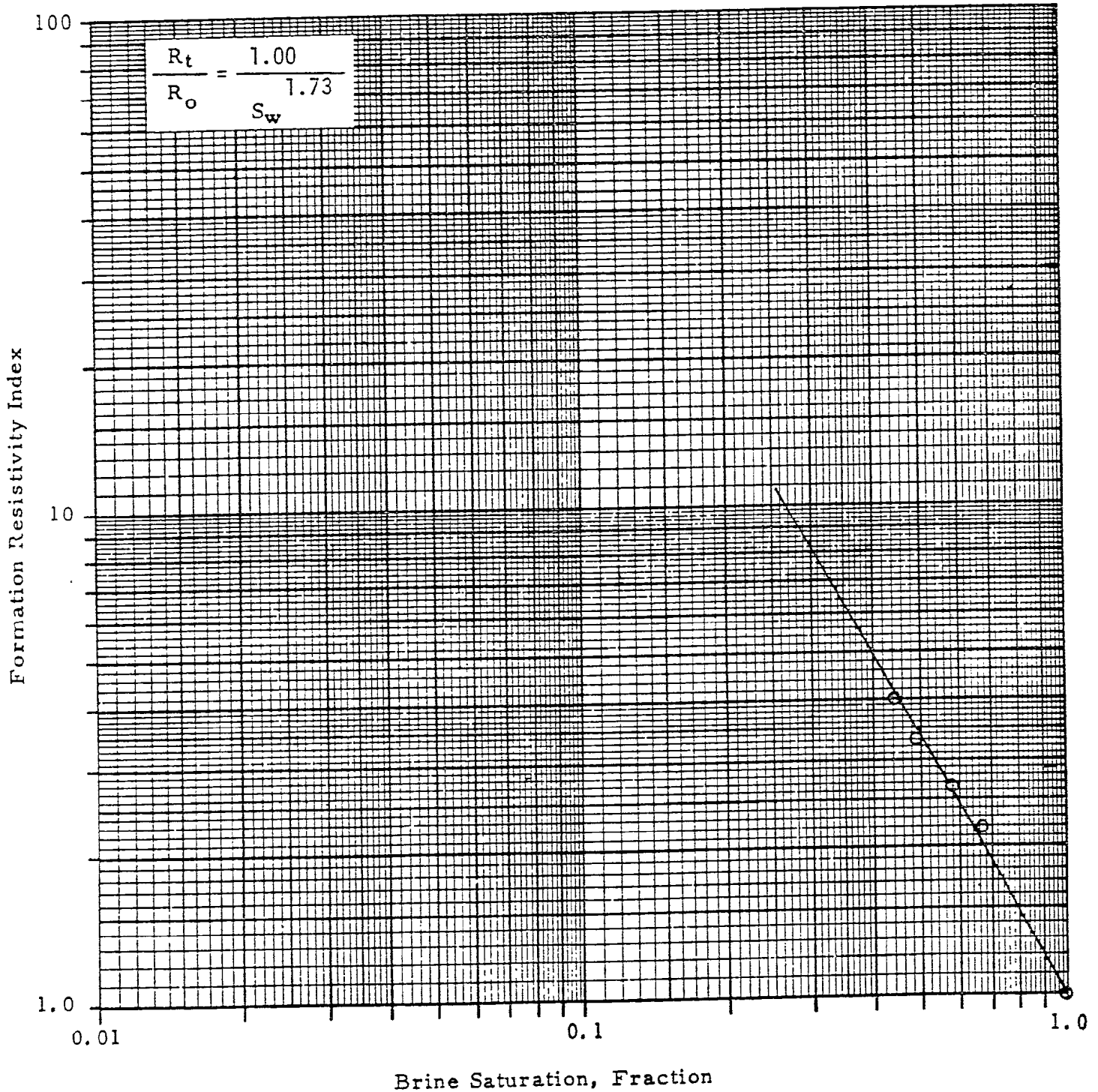


CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page 9 of 18
File SCAL-79181-I

Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well Mudlalee No. 2 County _____
Field Great Artesian Basin State South Australia

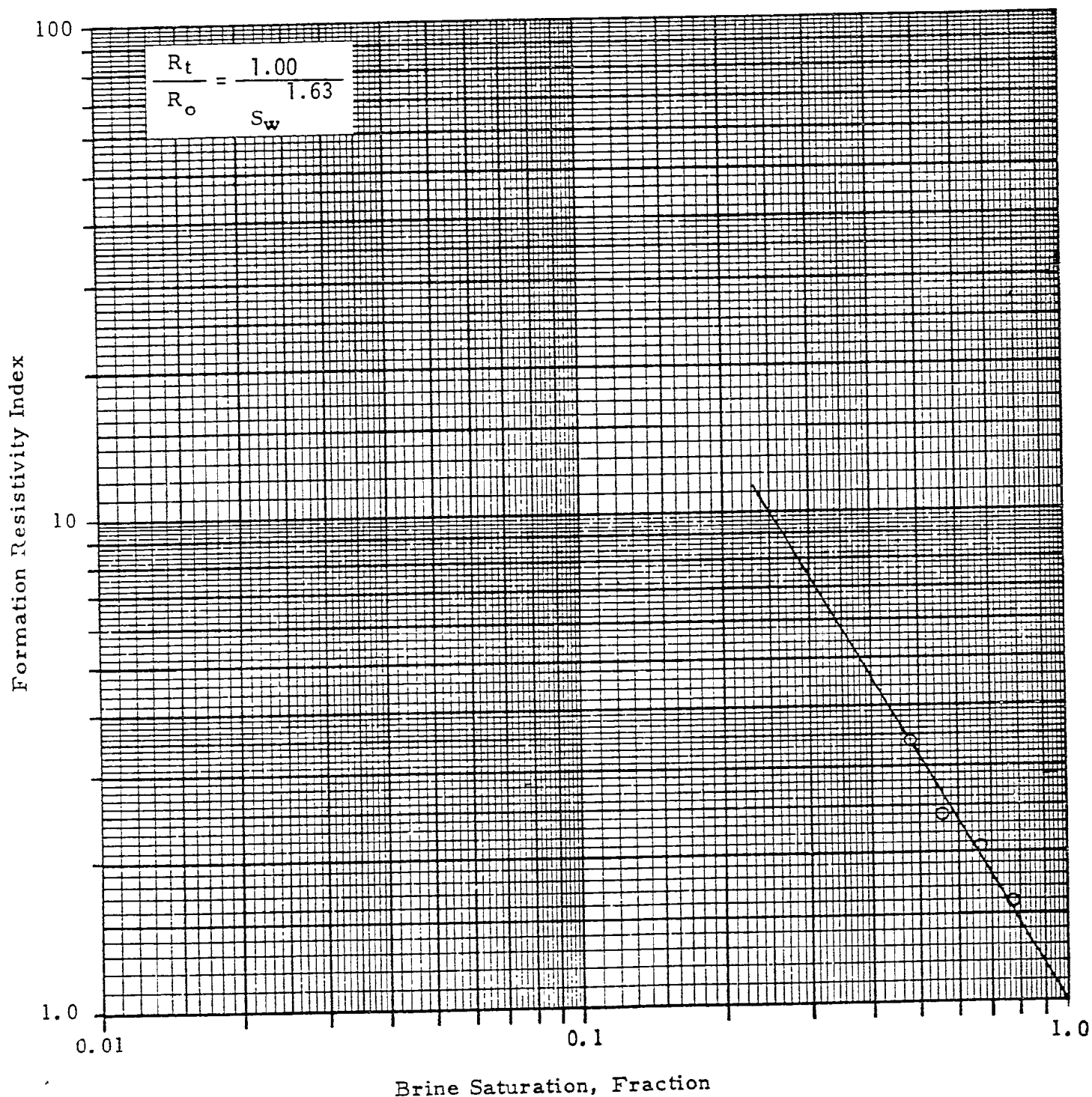
Sample Number: 7



CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXASPage 10 of 18
File SCAL-79181-I

Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well Mudlalee No. 2 County _____
Field Great Artesian Basin State South Australia

Sample Number: 9

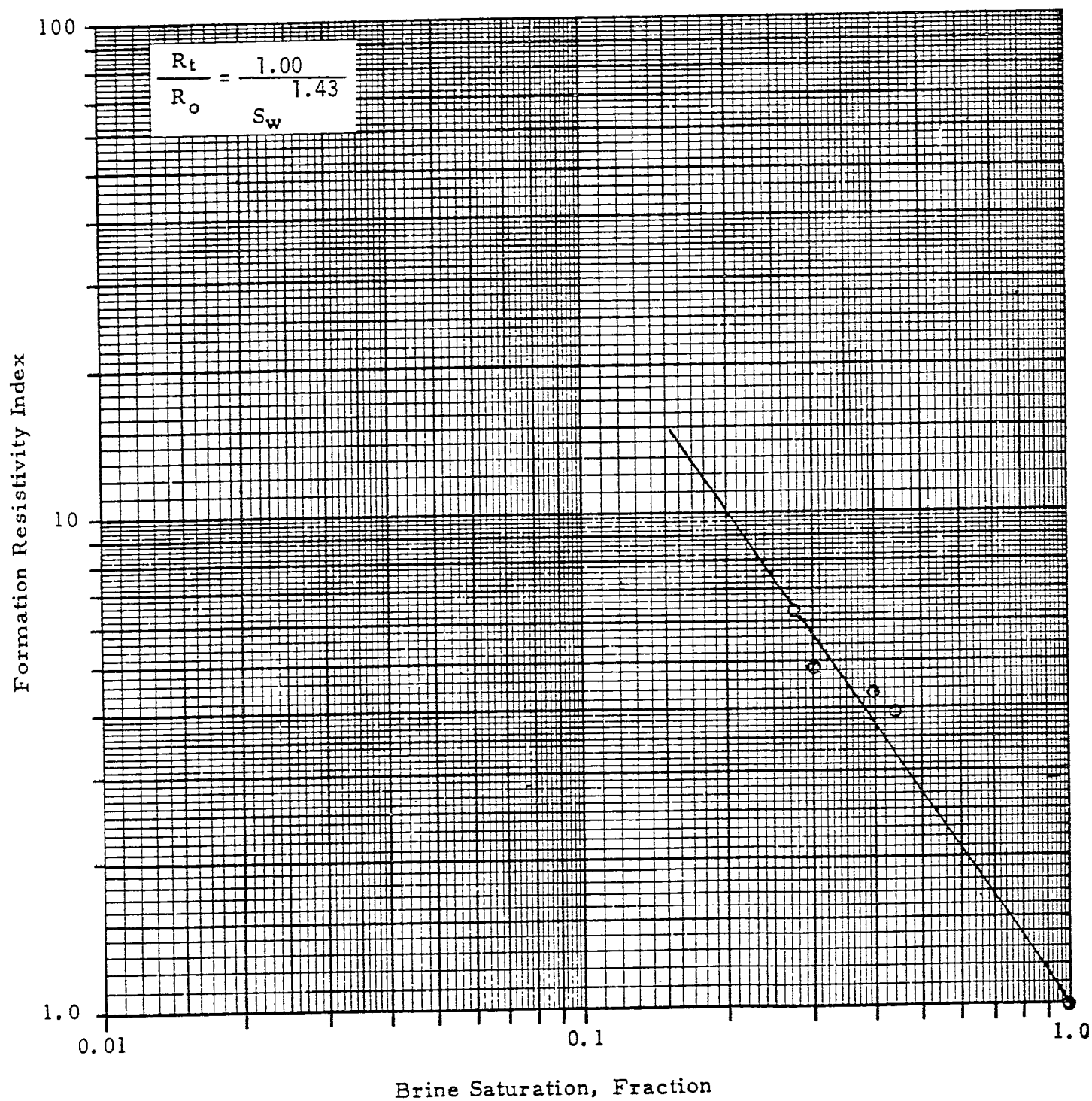


CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page 11 of 18
File SCAL-79181-I

Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well Strzelecki No. 3 County _____
Field Great Artesian Basin State South Australia

Sample Number: 8

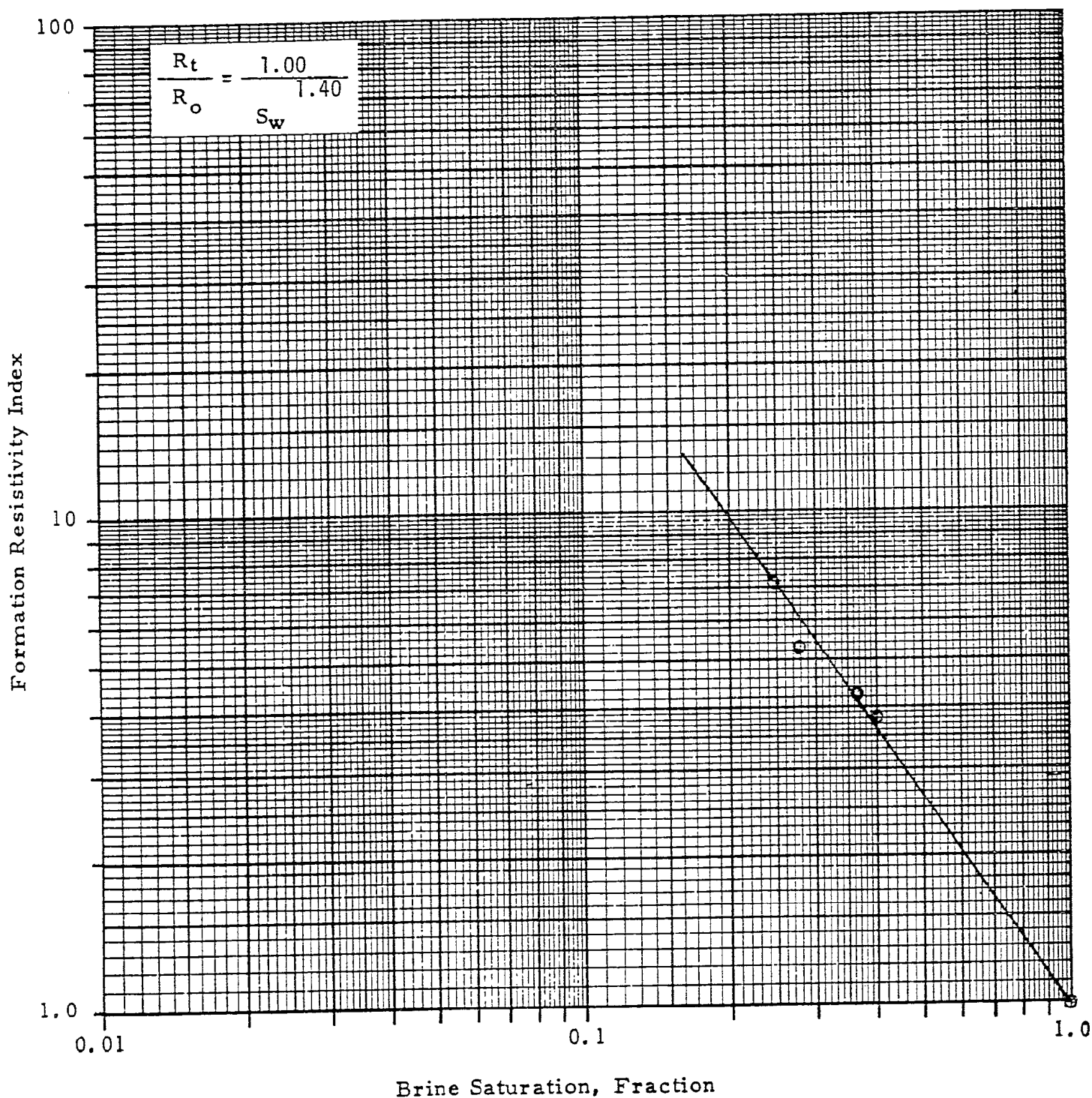


CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS

Page 12 of 18
File SCAL-79181-I

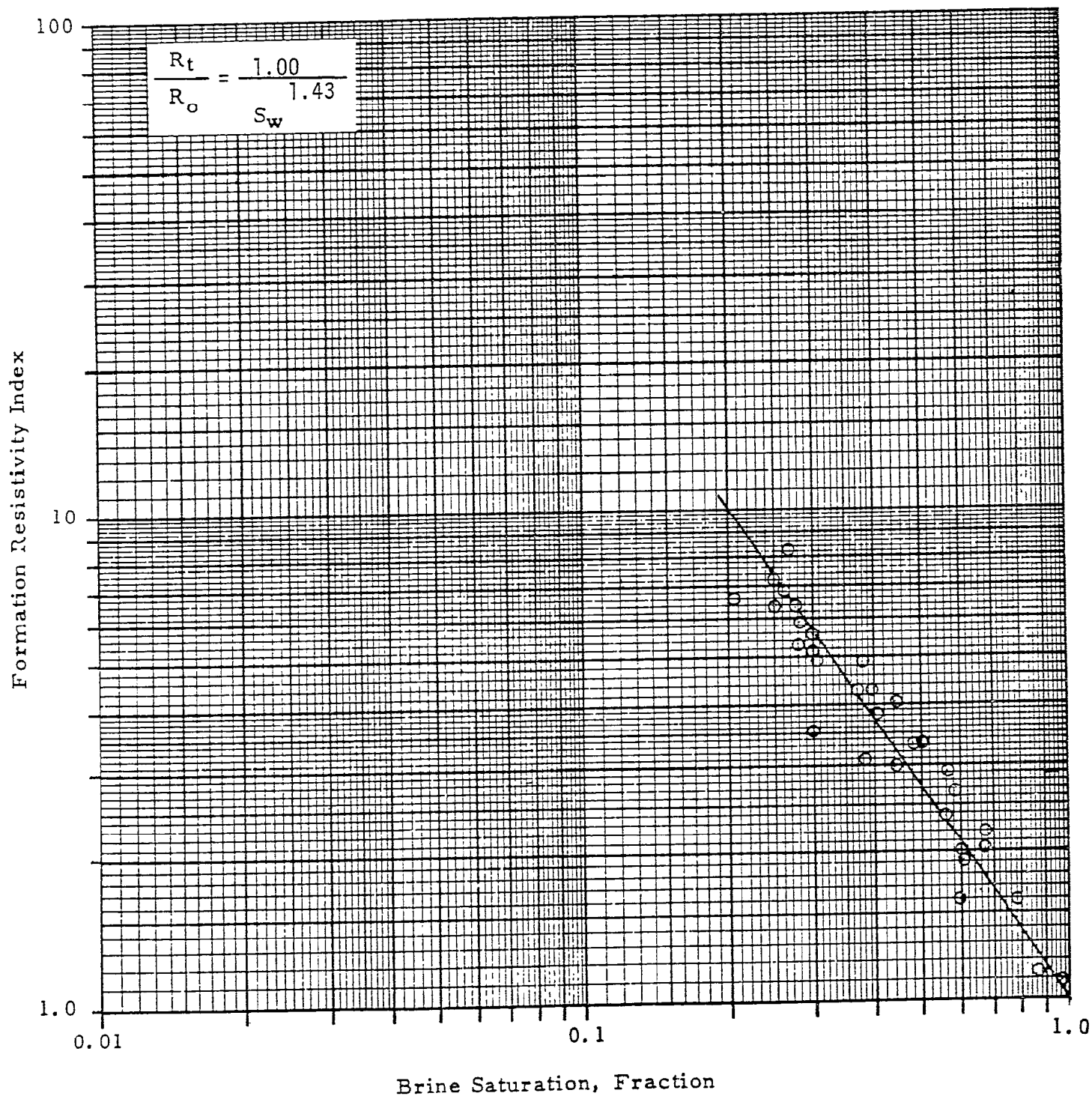
Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well Strzelecki No. 3 County _____
Field Great Artesian Basin State South Australia

Sample Number: 10



Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well _____ County _____
Field Great Artesian Basin State South Australia

Composite



CORE LABORATORIES, INC.
Petroleum Reservoir Engineering
DALLAS, TEXAS 75247

000208

Page 14 of 18
File SCAL-79181-I

Overburden Formation Factor Data

Saturant: Simulated Formation Water

Resistivity of Saturant, Ohm-Meters: 0.8816 @ 74.0 °F.

Sample Number	Depth, Feet	Permeability, Millidarcies	Porosity, Percent	Effective Overburden Pressure, PSI			
				0.0	200	1800	3600
				Formation Resistivity Factor			

Well: Namur No. 2

2A	5426	0.97	13.5	27.1	29.3	33.9	36.2
21	5446	81	14.4	33.4	36.6	44.0	47.0
48	5473	3.3	11.5	51.0	55.0	66.4	72.5
59	5485	3.0	12.4	37.5	43.6	53.4	58.7
68	5493	49	15.5	26.0	30.3	34.1	35.7

Well: Mudlalee No. 2

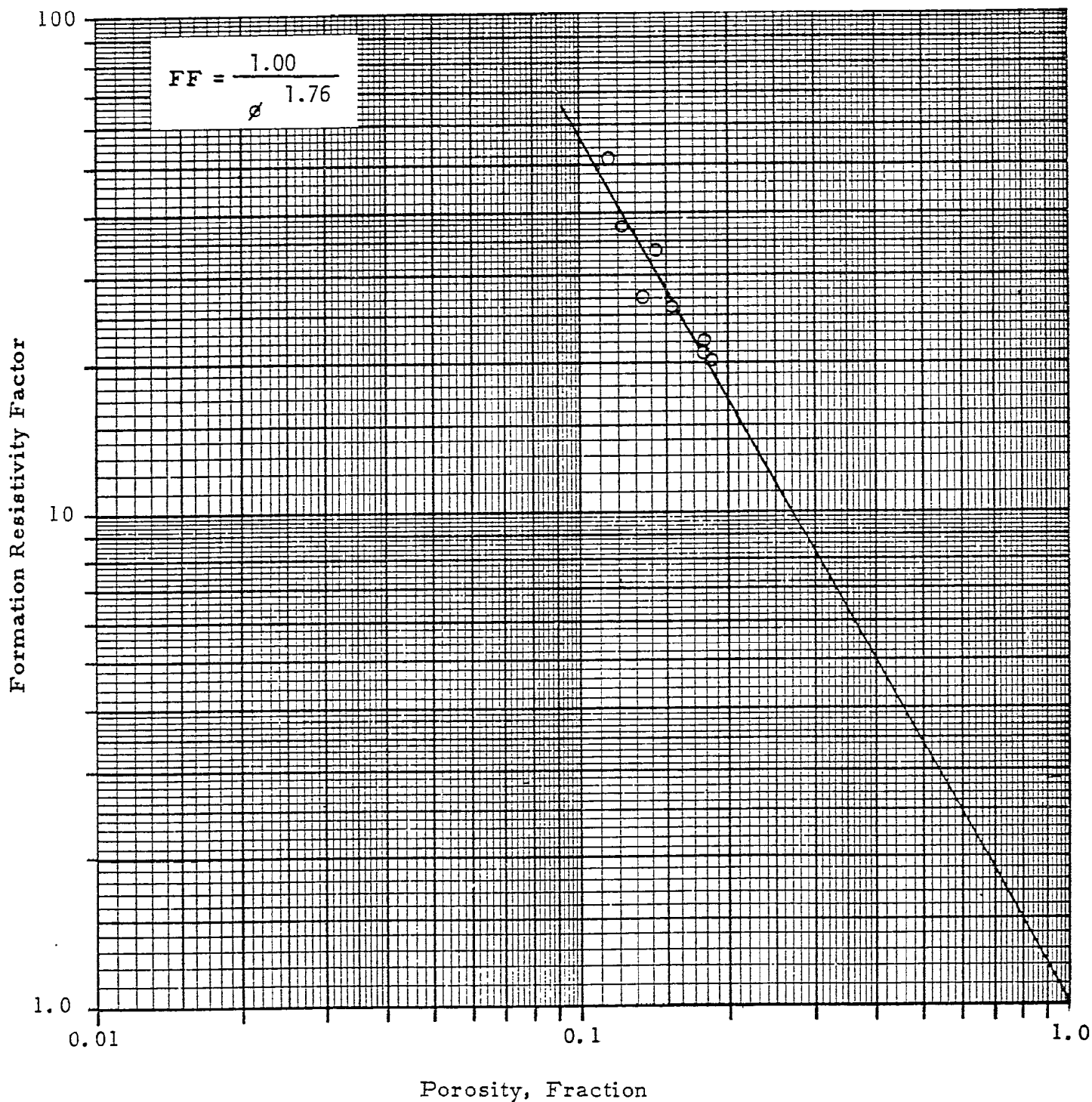
9	5142	19	18.0	21.2	22.9	25.6	26.2
7	5153	34	18.5	20.3	21.4	23.7	24.5

Well: Strzelecki No. 3

10	5591	233	18.0	22.2	23.8	25.7	26.1
8	6167	94	18.7	20.0	21.5	24.0	24.6

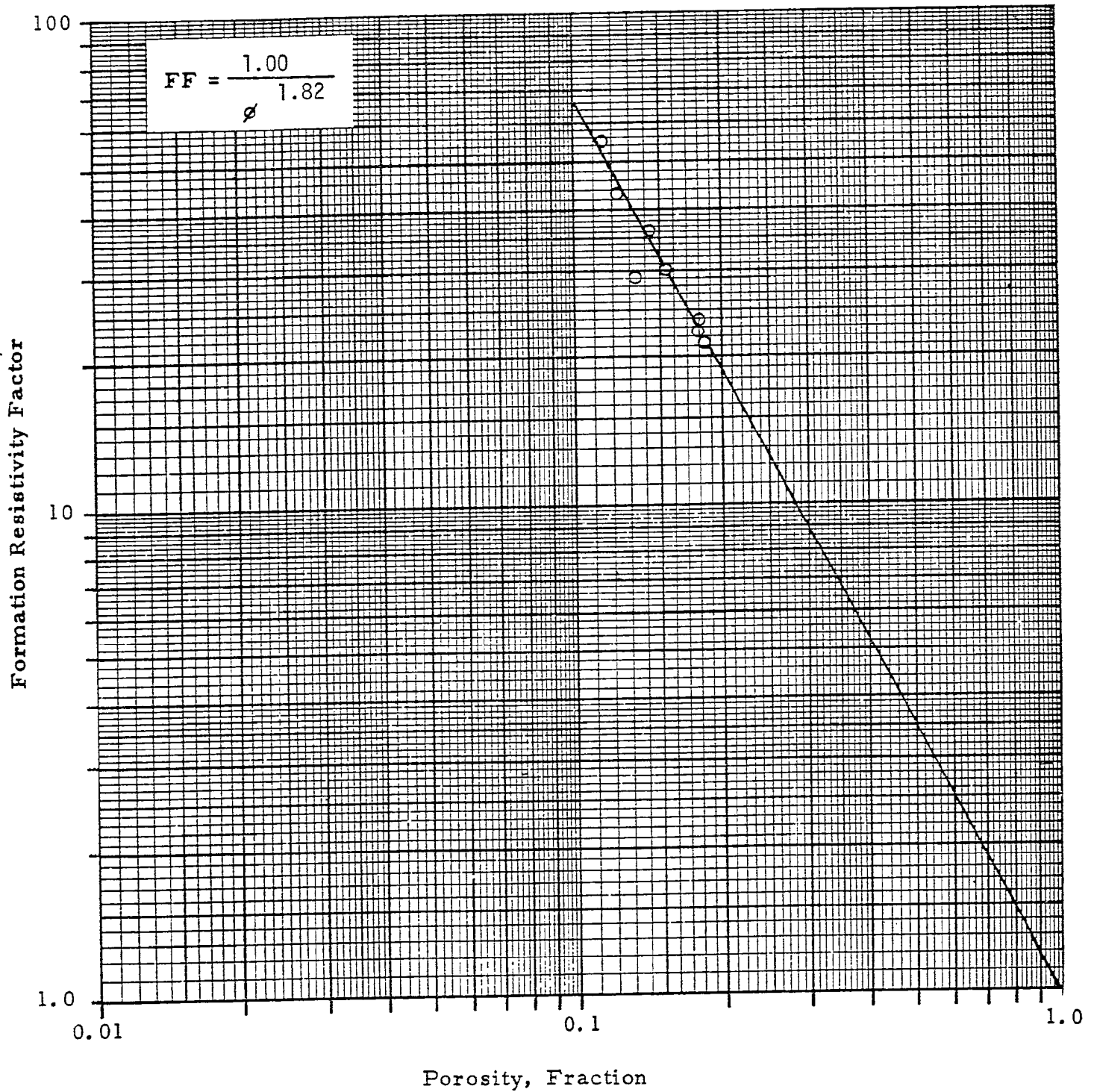
Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well _____ County _____
Field Great Artesian Basin State South Australia

Effective Overburden Pressure: 0.0 psi



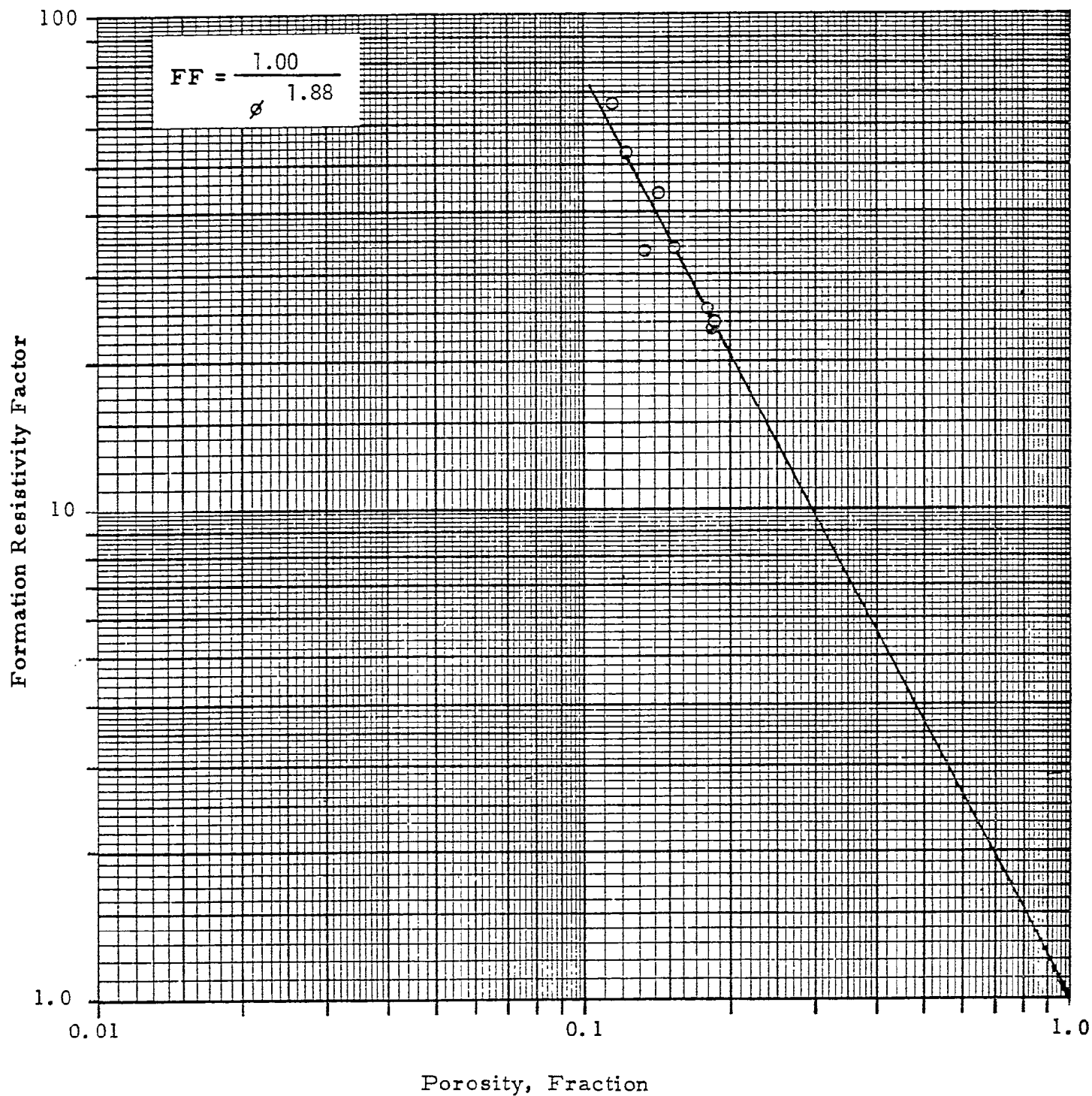
Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well _____ County _____
Field Great Artesian Basin State South Australia

Effective Overburden Pressure: 200 psi



Company Delhi Petroleum Pty. Ltd. Formation Jurassic Sandstone
Well _____ County _____
Field Great Artesian Basin State South Australia

Effective Overburden Pressure: 1800 psi



Company Delhi Petroleum Ltd. Ltd. Formation Jurassic Sandstone
Well _____ County _____
Field Great Artesian Basin State South Australia

Effective Overburden Pressure: 3600 psi

