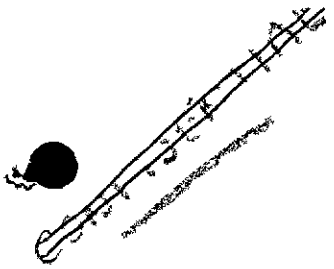


OIL SOURCE-BED ANALYSES OF WINNIPEG SHALE SAMPLES FROM MANITOBA

Core samples of Winnipeg shale were obtained from Mr Hugh McCabe, Winnipeg, Manitoba, in September 1964 These samples have been analyzed for research purposes by Shell Development Company's Exploration and Production Research Laboratory, Houston, Texas

The samples were analyzed, evaluated, and classified on the basis of the method developed by Philippi (Philippi, G T , 1956, Identification of Oil Source Beds by Chemical Means, Proceedings XX International Geological Congress, Mexico City, Section III, Petroleum Geology, p 25-38 -- a reprint is attached) A modification of Philippi's 1956 procedure replaces the separate diisopropyl and diethyl ether extractions of the powdered rock sample with a single benzene-methanol azeotrope extraction The quantities of aromatic and saturate hydrocarbons are determined by chromatographic separations of the benzene-methanol extract The hydrocarbon portion of this extract is comparable to the diisopropyl extract of the older procedure, and the non-hydrocarbon (dominantly complex oxygen, nitrogen, and sulfur compounds) portion is roughly comparable to the diethyl ether extract

Attached are the results of analyses made to determine the oil source-rock potentialities of the shale samples In general, the olive gray to dark gray Winnipeg formation shales are petroleum source rock, whereas the greenish gray to light gray shales are not source rock However, color per se is neither sufficient nor infallible as an indicator of source rock quality The analytical data of these samples plus that of some samples from Saskatchewan suggests that the principal oil source-bed facies of the Winnipeg formation is in the region of the Manitoba-Saskatchewan border

We sincerely appreciate the opportunity of obtaining these Winnipeg shale samples from Manitoba for our research program

H D Olson
Shell Development Company
September 1965

Rec'd from R J Gurnett, Division Geol., Shell Canada Ltd Oct 13, 1965

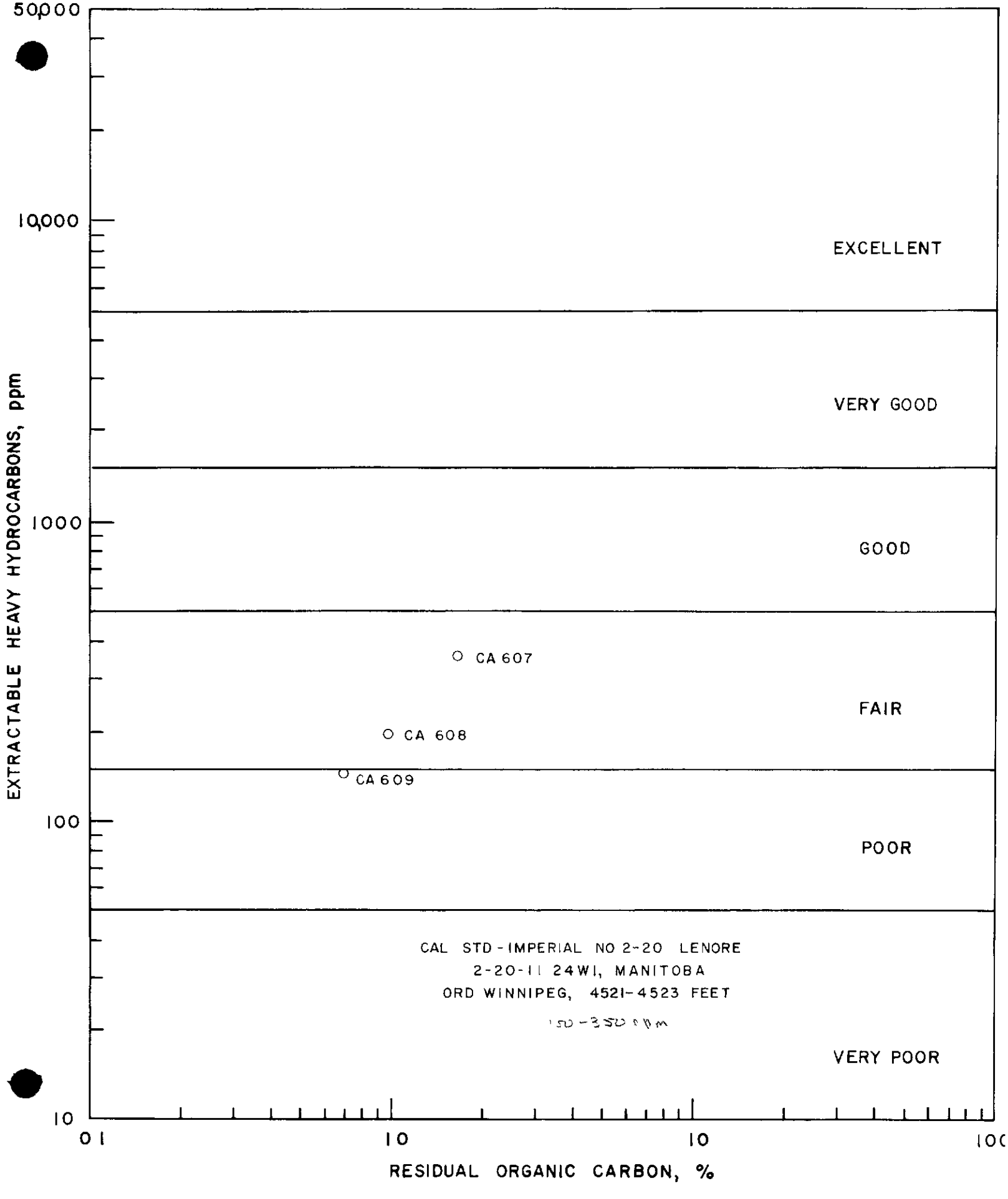
ANALYSES OF ORDOVICIAN WINNIPEG SHALE SAMPLES FROM MANITOBA

Rock Sample No CA	Depth Feet	CO_2 as $CaCO_3$ %	Benzene-Methanol Extractables Hydrocarbons Aromatics ppm	Hydrocarbons Saturates ppm	Hydrocarbons Total ppm	Non-Hydrocarbons ppm	In Extracted Sample Nitrogen %	In Extracted Sample Carbon[a] %
California Standard-Imperial, Lenore No 2-20 2-20-11-24W1								
607	4521	1 8	209	145	354	1940	0 09	1 64
608	4522	1 8	95	99	194	419	0 06	0 96
609	4523	0 6	53	90	143	464	0 05	0 69
Souris Valley, Warnez No 13-5 5-13-5-22W1								
610	5035	1 8	13	47	60	83	0 04	0 22
611	5042	1 8	23	27	50	191	0 05	0 30
612	5044	1 2	23	69	92	237	0 05	0 58
613	5045	1 7	24	75	99	154	0 04	0 46
614	5046	1 4	20	43	63	405	0 05	0 43
615	5050	3 2	27	67	94	132	0 04	0 46
Dome et al, Greenway No 16-33 16-33-4-13W1								
616	3245	1 2	11	18	29	32	0 06	0 12
617	3252	1 2	36	57	93	352	0 07	1 30

[a] Noncarbonate Carbon

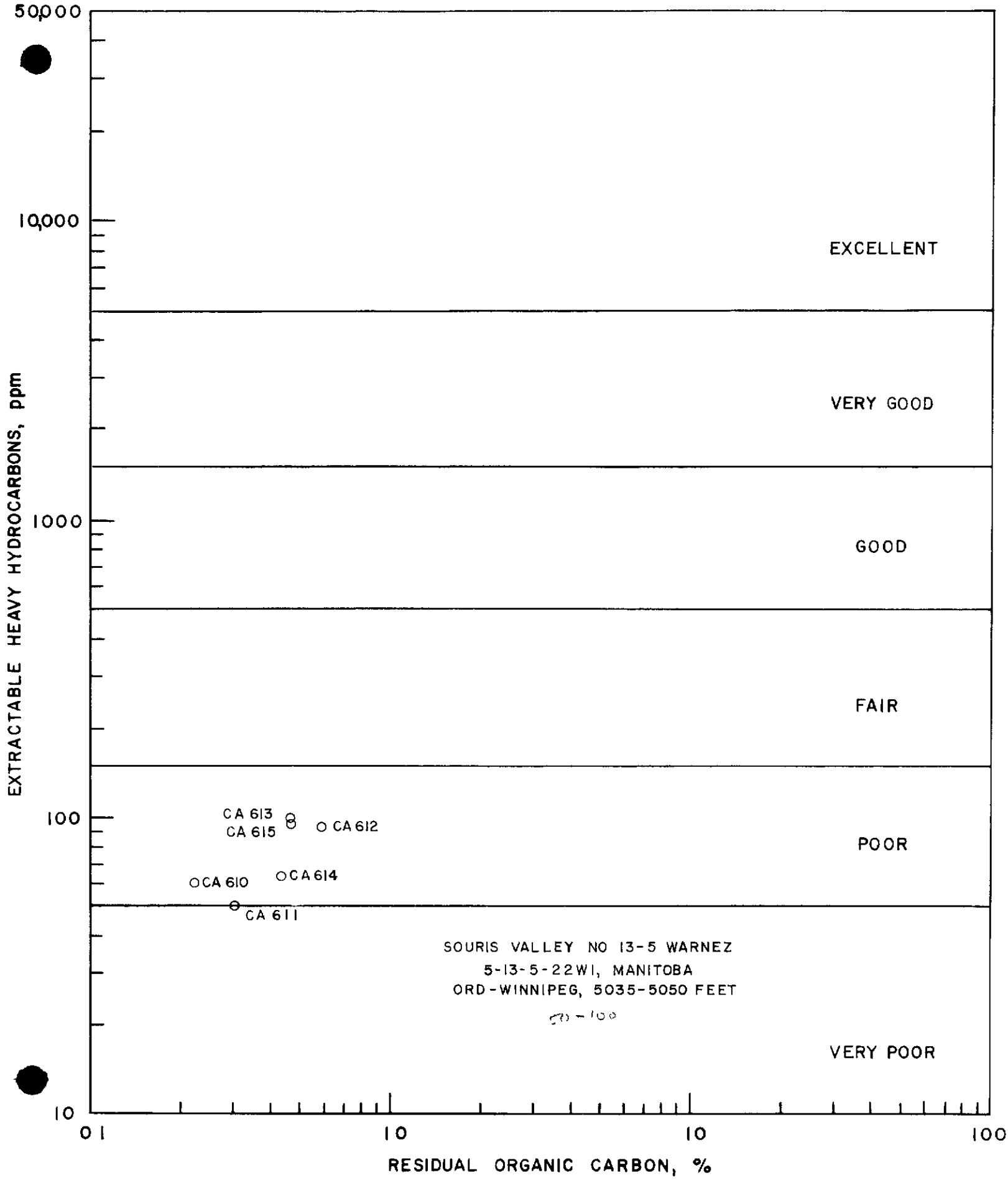
OIL SOURCE - ROCK CLASSIFICATION

CA 607-609



OIL SOURCE - ROCK CLASSIFICATION

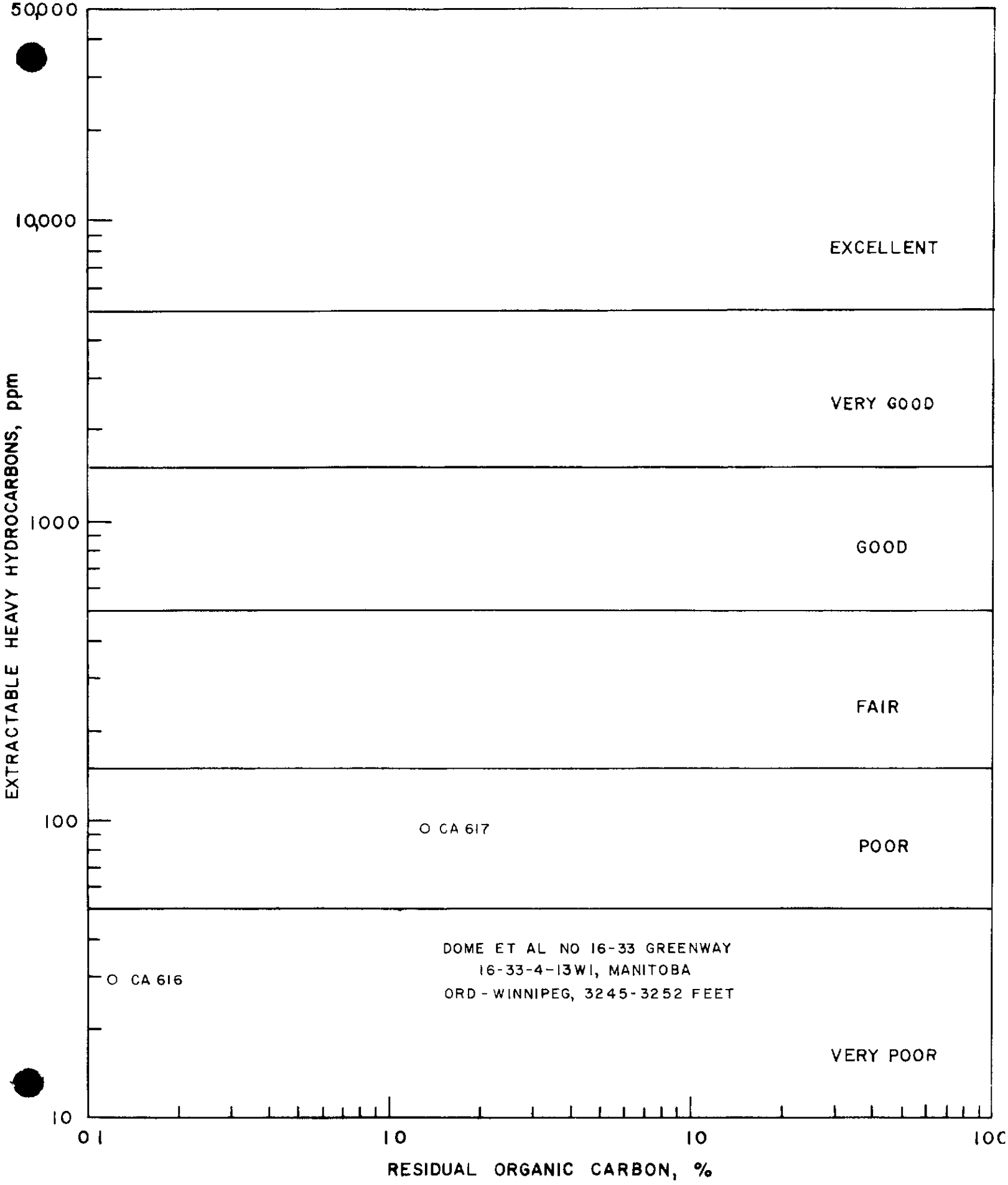
CA 610-615



(Fig 5

OIL SOURCE - ROCK CLASSIFICATION

CA616-617



CONGRESO GEOLOGICO INTERNACIONAL

XX^a^ SESION — CIUDAD DE MEXICO, 1956

G. T. PHILIPPI

IDENTIFICATION OF OIL SOURCE BEDS BY CHEMICAL MEANS

Sobretiro de la

SECCION III — GEOLOGIA DEL PETROLEO

págs. 25-38, 12 figs., 1 tabla

MEXICO, D. F.

1957

IDENTIFICATION OF OIL SOURCE BEDS BY CHEMICAL MEANS *

G T PHILIPPI * *

ABSTRACT

Since 1943 the Royal Dutch Shell Group have systematically investigated the hydrocarbon content and residual organic content of many types of sediments present in oil basins Quite generally it was found that small amounts of hydrocarbons, usually ranging from 5 to 5000 parts per million by weight (0 12 to 120 barrels per acre foot), are present in dense sediments such as shales silty shales marls and argillaceous lime tones Presently this conclusion is based on the study of oil basins from all over the world and of sediments ranging in age from Recent to Ordovician

The method for oil source rock identification presented in this paper is based on a technique for differentiating between indigenous and migrated oil Sediments with indigenous oil are considered oil source bed In basins sufficiently far developed to permit such a study it was found that the portion of the indigenous hydrocarbons left in hydrocarbon generating sediments is several to many times greater than the oil originally present in all known oil fields combined Hence in the cases which permitted study only a small part of the oil generated by the source beds was released to reservoirs Quite likely the mechanism of release of hydrocarbon is inefficient in a great many cases It follows that in many instances the amount of hydrocarbons now present in source beds is of the same order of magnitude as the total amount that was generated In such cases the amount of hydrocarbon now present can be used to estimate source rock quality

Source rock quality is defined as the amount of hydrocarbons generated per unit weight of dry rock In order to determine source rock quality the full range of naturally occurring indigenous hydrocarbon content values has been divided into six subranges according to a logarithmic scale On a purely empirical basis, to each of these subranges one of the following qualifications was assigned excellent very good good fair poor (marginal commercial) and very poor (noncommercial) A simple graphical method is described for determining the quality of oil source beds from the analytical data obtained in the identification procedure

Information on source beds can lead to knowledge about the migration pattern of petroleum A three dimensional general picture of the migration of oil in many instances will be valuable in petroleum exploration because it will assist in locating new fields and trends of fields

* *Publication No 101, Shell Development Company Exploration and Production Research Division Houston Texas*

* * *Senior Research Geologist Shell Development Co Houston Texas*