NEVADA BUREAU OF MINES AND GEOLOGY

BULLETIN 104

OIL AND GAS DEVELOPMENTS IN NEVADA

LARRY J. GARSIDE, RONALD H. HESS,
KERYL L. FLEMING, AND BECKY S. WEIMER

1988

CONTENTS

INTRODUCTION

This bulletin presents pertinent information on wells drilled for oil and gas in Nevada from 1907 through 1986. It supersedes Nevada Bureau of Mines and Geology (NBMG) Bulletin 52 (Lintz, 1957a), NBMG Report 18 (Schilling and Garside, 1968), and NBMG Report 29 (Garside and others, 1977); however, the detailed stratigraphic descriptions in Bulletin 52 are not repeated here.

The principal purpose of this publication is to provide a ready reference to facilitate geologic research. It is likely that the majority of users of this bulletin will be in the petroleum business; however, anyone interested in subsurface rocks or water flows will find it of value. In many cases, the listing of information available at NBMG will lead researchers to investigate the oil and gas files in person.

The following sections provide data on producing wells and dry holes, brief summaries of the oil fields, and limited information on the exploration history, oil and gas shows during drilling, and oil seeps in each county. Although no wells are included that were issued drilling permits by the Nevada Department of Minerals after December 1986, some data obtained in 1987 were used. Information on drilling permits for wells that were not drilled is included in the appendixes.

Sources of Information

This bulletin was compiled mainly from NBMG data bases and files; other sources are listed below and in the bibliography. NBMG maintains a current computer data base on oil and gas drilling in Nevada (Hess, Schilling, and Loux, 1987). NBMG has extensive files on geology, drilling activity, and oil production in Nevada. Files for individual wells usually include a copy of the permit, completion and plugging data, logs run, and production records. Drill cuttings are available for many wells. Except for confidential information, these files are available for public inspection. If you want to copy logs or examine cuttings, please make an appointment in advance. Xerographic copies of the logs and

Energy Reports (1050 Seventeenth Street, Suite 2550, Denver, CO 80265). Published material from these sources is used, with appropriate citations, in some of the following well descriptions.

Interpretative stratigraphic logs of a number of wells are available from American Stratigraphic Co. (6280 East 39th Avenue, Denver, CO 80207); a few of the "tops" listed for the wells described in this bulletin were taken from those logs.

Well records are often incomplete and may contain conflicting information. In some instances, it is necessary to make a subjective choice between conflicting data. Every effort has been made to give accurate data in this bulletin but some interpretive data may be inaccurate.

Regulation

Approximately 87 percent of Nevada land is owned by the U.S. Government. Until the creation of the Nevada Oil and Gas Conservation Commission in 1953, no Nevada agency regulated the drilling of oil and gas exploration wells. Information on wells drilled before the 1950's is incomplete because only minimal U.S. Government records are available for wells drilled on Federal land, and often there is no information for wells drilled on private land.

The Nevada Department of Minerals (400 W. King Street, Suite 100, Carson City, NV 89710) is the State agency responsible for the regulation of oil and gas drilling, and should be contacted for information on drilling regulations. In addition, for wells drilled on Federal lands, permits are also required from the U.S. Bureau of Land Management (State Office, 850 Harvard Way, Reno, NV 89502). The Bureau of Land Management should also be contacted concerning leasing information on Federal land. Little State land is available for petroleum exploration.

When drilling permits are issued, the information available to the public includes the operator name, Nevada permit number, API (American Petroleum Institute) unique well number, well name, surface location, and elevation. Other general information is often

All wells drilled for oil and gas in Nevada are alphabetically listed in the following text by county, operator, and well name. Abbreviations used are listed inside the back cover. The following information, when available, is listed for each well:

Well Name consists of an operator name and an individual well name. The operator name is as listed on the drilling permit. After a well is drilled its name does not change with changes in ownership.

Location is given by legal subdivision (section, township, and range). Where more detailed information is available, the quarter-quarter-quarter system is used (for example: NE¼SE¼NW¼ sec. 33, T10N, R57E indicates that the well is located within an approximately 10-acre parcel which is the northeast quarter of the southeast quarter of the northwest quarter of section 33, Township 10 North, Range 57 East, Mount Diablo Base and Meridian). The well location is also given by distances from section lines, when available.

Elevation is assumed to be that of the ground surface at the drill site unless the elevation of the kelly bushing (KB) is used; if so this is mentioned in the remarks. The kelly bushing can be 10 to 40 ft above ground level.

Completion Date is generally that reported by the operator. When the exact date of completion is not known, only the month or year of completion is provided.

Status is based on information available at the time this report was completed. A plugged and abandoned (P & A) well is one that is known to be plugged; no plugging information is available on wells listed as drilled and abandoned (D & A). Junked and abandoned (J & A) wells are [illegible] junk in the hole. A shut-in status is generally [illegible] to wells that have produced but are not expected to have any production in the near future. Injection wells, used for the disposal of water produced with the oil, may have been producers in the past.

Oil Field Name is listed only for producing wells.

Total Depth is that reported by the operator, usually in the well completion report. Depths reported on wireline logs or driller's reports may not always agree exactly with this number. Some wells may have been deepened; this is reported in the Remarks.

Tops are the reported depths at which the tops of rock units were encountered. This reported depth is usually measured from the kelly bushing, which is 10 to 40 ft above ground level. Tops may have been picked by sample examination or from wireline logs. No attempt was made by the authors to confirm these tops, which are usually those reported by the operator unless noted otherwise. Picking tops is often difficult; it is likely that many of the tops reported are somewhat in error. The rock formation names listed are usually those in general usage in Nevada (see Meeuwig, 1987). The geologic age terms used represent the most commonly cited or are the [illegible]

used for the log names are listed inside the back cover.

Under the *Samples* heading are listed the depth intervals for which drill cuttings or, less commonly, cores are stored in the NBMG Sample Library. These samples are available for inspection, usually by prior arrangement.

Information not easily listed elsewhere is included under the *Remarks* heading. This information includes: oil and hydrocarbon gas shows, water flow intervals, producing intervals, initial production, and the availability at NBMG of certain more detailed information such as source-rock studies or water analyses. Because oil and gas shows are important data for petroleum exploration, the well records were carefully searched for any mention of them. The shows are usually those reported by the operator or service companies, although other sources may have been used. No attempt was made to classify the shows uniformly or to separately confirm them; they include both live and dead oil, cut fluorescence, and gas reported during drilling or on drill stem tests. See LeRoy and others (1977) and Asquith and Gibson (1982) for further discussion of oil and gas drilling terminology and practices.

The bibliography includes all references directly related to Nevada petroleum of which we are aware. A partial bibliography of early 1900's newspaper articles on Nevada oil exploration, compiled by Phillip Earl of the Nevada Historical Society, has been incorporated in the bibliography, but later newspaper accounts have not been included. Garside and Weimer (1987) describe some recent developments in Nevada petroleum; similar descriptions may be found in earlier volumes of NBMG Special Publications on the Nevada Mineral Industry. In addition, a few references on [illegible] of interest are also included, but no attempt was made to be complete. Stewart (1980) contains an excellent summary of Nevada geology, and a companion map (Stewart and Carlson, 1978) illustrates the geologic units and structures described. A partial list of articles that illustrate modern thought in Nevada petroleum exploration includes Dolly (1979), Eaton (1979), Foster (1979), Maughan (1979), Vreeland and Berrong (1979), Harris and others (1980), [illegible] and others (1983), Sandberg (1983), Meissner and others (1984), Poole and Claypool (1984), and Bortz (1985a,b).

Appendix 1 is a sequential list of all Nevada permit numbers issued, including permits for which no well was drilled (indicated by an asterisk). Appendix 1 also includes wells drilled before any Nevada permit numbers were assigned; these are identified by a two-letter county designation followed by one or two numbers. Appendix 2 is a sequential list by API number of all Nevada wells. API numbers were assigned to many older wells long after they were drilled. More recently, API numbers have been assigned when the Nevada drilling permit is issued; some of the "wells" assigned API numbers after [illegible]

[illegible] wells drilled in Nevada. Appendix 4 [illegible] Nevada oil production statistics [illegible] of all Nevada wells that have re- [illegible] Appendix 6 is a table, arranged [illegible]

[illegible] sists only of those logs available in the NBMG files. In some cases, logs may have been run on wells but copies were not submitted by the operator. The abbreviations

[illegible] is a compilation [illegible] Appendix 5 is a li[illegible] corded oil produc[illegible]

alphabetically by county and operator, of selected source-rock data from petroleum-exploration wells in Nevada.

Acknowledgements

The authors are grateful to a number of people who were of assistance during the preparation of this report. Kathy Loomis of the Nevada Department of Minerals provided much useful information on oil production statistics, regulations, and active wells. Scott McDaniel provided information on some wells as well as some references the authors were unaware of. Phillip Earl of the Nevada Historical Society helped in finding older oil well photographs and supplied the list of old newspaper articles included in the bibliography. Herb Duey supplied published and unpublished information on the Railroad Valley oil fields. Jim Rigby and Donna Flanigan reviewed the manuscript, and their comments improved the final report. The historical summary was written by Donna Flanigan, who has firsthand knowledge of Nevada petroleum history and production; we owe her a special debt for her efforts.

HISTORICAL SUMMARY OF NEVADA OIL AND GAS DEVELOPMENTS

The first well drilled for oil in Nevada was an 1,890-foot-deep dry hole drilled in Washoe County in 1907. Few wells were drilled in the State from 1907 to the early 1950's; these dry holes are all poorly known because no permits or other records were required until 1953. Figure 1 is a graphic illustration of 1976–1986 oil production and figure 2 shows the numbers of wells and total footage drilled annually from 1949 through 1986.

In 1954, Shell Oil Co. drilled and completed the Eagle Springs No. 1-35 well in Railroad Valley, Nye County; this well became the first commercial oil producer in Nevada. The Eagle Springs field included 14 wells with average production of nearly 20,000 barrels of oil per well per year by 1968. In 1985, ten wells still produced in the field; two wells made 18,000 barrels of oil and the rest averaged 2,800 barrels for the year. Most Eagle Springs field wells were shut in (not produced) for most of 1986 because of low crude oil prices. Initial estimates of recoverable reserves for the field were 4 million barrels of oil; by the end of 1986, 3.8 million barrels had been produced.

The second discovery that resulted in commercial oil production in Nevada came in 1976, when Northwest Exploration Co. drilled and completed the Trap Spring No. 1 well in Railroad Valley, 5 miles west of the Eagle Springs field. One hundred and forty-five dry holes had been drilled in Nevada after the Eagle Springs discovery

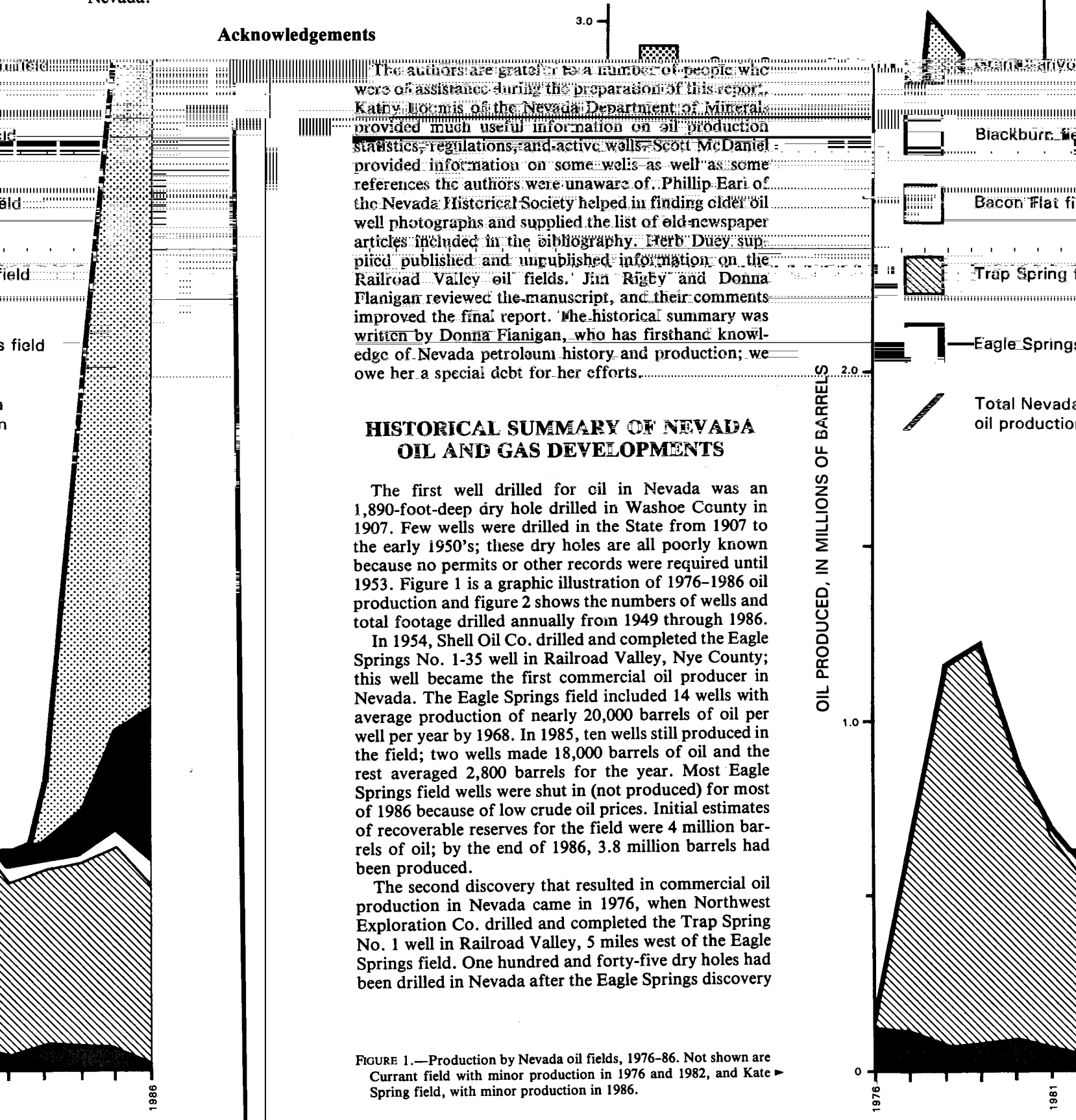
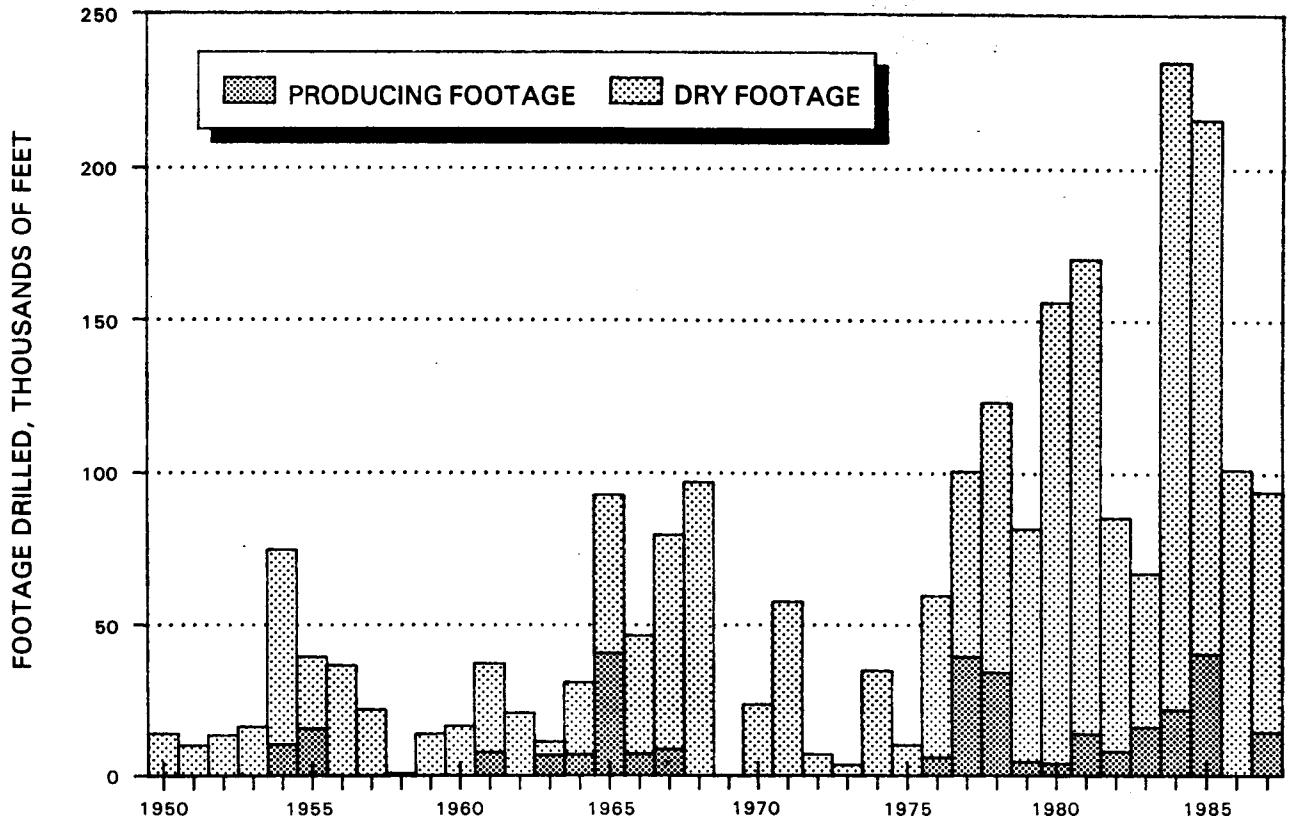


FIGURE 1.—Production by Nevada oil fields, 1976–86. Not shown are Currant field with minor production in 1976 and 1982, and Kate Spring field, with minor production in 1986. ►



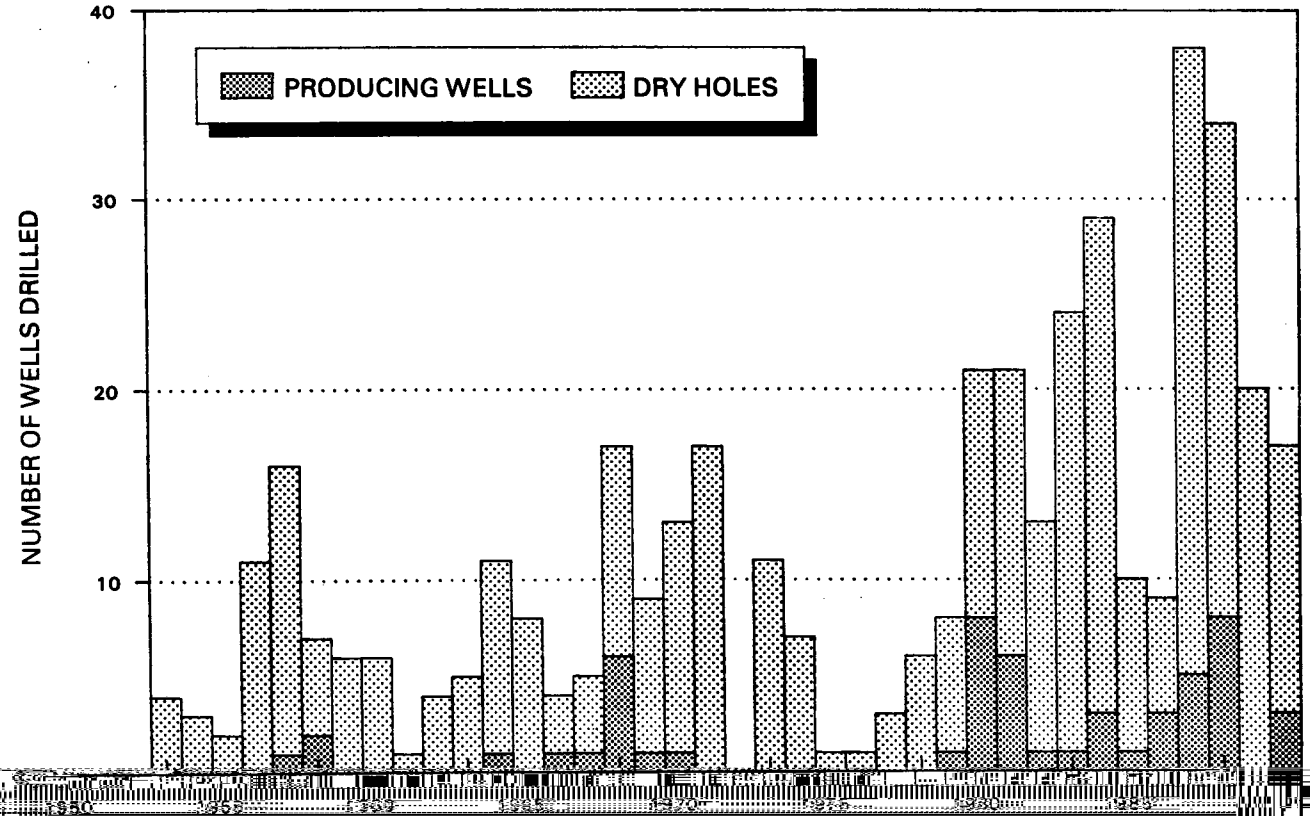


FIGURE 2.—Annual footages and numbers of oil wells drilled in Nevada from 1949 through 1987.

and before the Trap Spring discovery. By 1980 there were 15 wells in the Trap Spring field, with an average production of 76,700 barrels of oil per well per year. In 1985 there were 27 wells in the field, with an average production for the year of 18,600 barrels of oil per well. Recoverable reserves were initially estimated to be 10 million barrels of oil; by the end of 1986, 6.8 million barrels had been produced.

Nevada's third discovery well, the Northwest Exploration Co. Currant No. 1, was drilled in 1978, also in Railroad Valley, 6 miles north of the Eagle Springs field. This well produced only 646 barrels of oil before it was plugged and abandoned in 1986. [illegible] per day. The well produced 1,500 barrels of oil before it was shut in because of engineering problems and low prices for crude oil.

Drilling activity in 1986 was limited because of unstable and low oil prices, but operators continue to permit wells in Nevada. Future increases in drilling activity will be related to increased prices for crude oil. Federal oil and gas leasing policies, favorable State oil and gas regulations, and recently published articles in petroleum industry journals should all continue to encourage petroleum exploration and production activity in Nevada. Drilling will probably be concentrated in [illegible]

[illegible] potential based on the presence of source rocks [illegible] and others, 1986) and reported surface and subsurface hydrocarbon shows (plate 1).

[illegible] Railroad Valley was essentially [illegible] early oil leases were taken, making it difficult or expensive for new companies to explore in the valley. Nearly two-thirds of all wells drilled [illegible] have been drilled in Railroad Valley. In the valleys, there has been little drilling and leases were still available and cheap. Since the Blackburn field discovery, exploration has expanded throughout Nevada, and by the end of 1986 less than half of all wells ever drilled in Nevada were in Railroad Valley.

The most prolific oil field in Nevada was discovered in 1983, when Northwest Exploration Grant Canyon No. 1 was drilled and completed. The Grant Canyon field is in Railroad Valley, less than a mile east of the Bacon Flat field. The discovery well watered out and was shut in by early 1986; at year-end the remaining two field wells continued to produce at average rates of 2,200 and 4,100 barrels of oil per day. For a time, Grant Canyon No. 3 was the most prolific onshore oil well in the continental United States, flowing up to 4,300 barrels of oil per day. Recoverable reserve estimates are 13 million barrels of oil; 5.3 million barrels had been produced by the end of 1986.

The most recent oil discovery in Nevada was drilled in 1986: the Marathon Oil Co. Kate Spring No. 1, in Railroad Valley less than a mile south of the Eagle Springs field. This discovery well had an initial flowing potential of 345 barrels of oil and 1,371 barrels of water

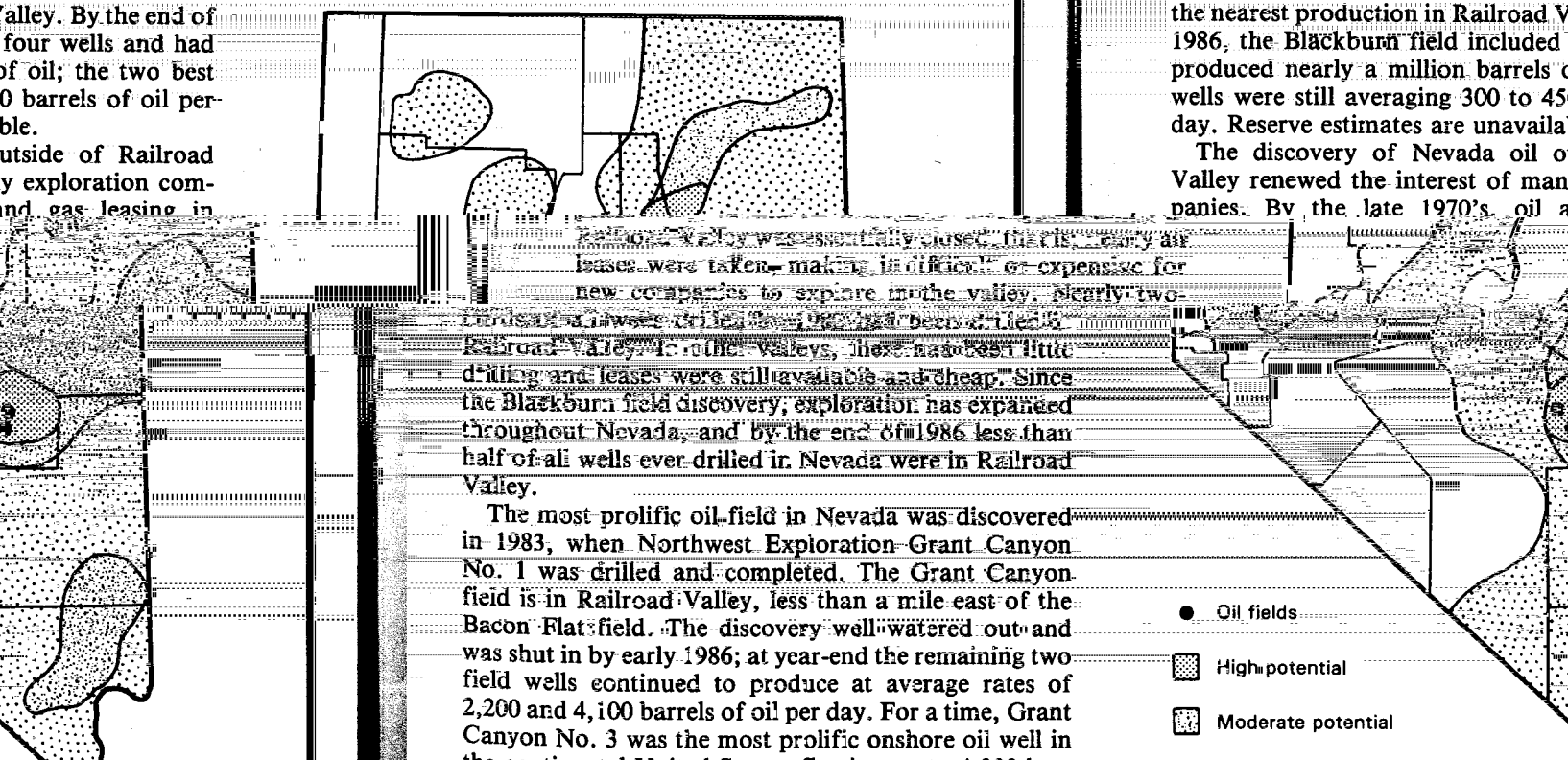


FIGURE 3.—Nevada petroleum pot[illegible]

ABBREVIATIONS

LOGS

BHCS	Borehole compensated sonic
Cal	Caliper
CBL	Cement bond log
CN	Compensated neutron
CNL	Compensated neutron log
Com/Pro	Computer-processed log
DI	Dual induction log
DIL	Dual induction laterolog
DLL	Dual laterolog
DM	Dipmeter
ES	Electric log
EP	Electromagnetic propagation
FDC	Compensated formation density
FDL	Formation density log
FIL	Fracture identification/indication log
GR	Gamma ray
IES	Induction electric log
LL	Laterolog
LSS	Long spaced sonic
ML	Microlog/minilog
MLL	Microlaterolog
N	Neutron
PL	Proximity log
PML	Proximity microlog
S	Sonic/acoustilog
SNP	Sidewall neutron porosity log
SP	Spontaneous potential
TS	Temperature survey
VDL	Variable density log

STATUS

D & A	Drilled and abandoned
J & A	Junked and abandoned
P & A	Plugged and abandoned
TA	Temporarily abandoned

FORMATION

Formal	*Informal*	
Cgl.	cgl.	Conglomerate
Dol.	dol.	Dolomite
Fm.	fm.	Formation
Gp.	gp.	Group
Ls.	ls.	Limestone
Mbr.	mbr.	Member
Qtz.	qtz.	Quartzite
Sh.	sh.	Shale
Ss.	ss.	Sandstone
Sts.	sts.	Siltstone
Volc.	volc.	Volcanics

OTHER

API	American Petroleum Institute
bbl.	Barrels (42 gallons)
BOPD	Barrels of oil per day
BWPD	Barrels of water per day
BWPM	Barrels of water per minute
DF	Derrick floor
DST	Drill stem test
GPM	Gallons per minute
KB	Kelly bushing
MCF	Thousand cubic feet
NBMG	Nevada Bureau of Mines and Geolo
PI	Petroleum Information
PSI	Pounds per squre inch
PT	Production test
TD	Total depth