

52 T. C. No. 74

GL03799

TAX COURT OF THE UNITED STATES

ARTHUR E. REICH AND CAROLYN G. REICH, ET AL.<sup>1</sup>, Petitioners v.  
COMMISSIONER OF INTERNAL REVENUE, Respondent

Docket Nos. 2065-65, 2066-65,  
2067-65, 2068-65,  
2069-65, 2088-65,  
2089-65, 2090-65,  
2091-65, 3152-65,  
3353-65, 3214-66,  
3818-66.

Filed July 31, 1969

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<sup>1</sup>Proceedings of the following petitioners are consolidated herewith: Arthur E. Reich, docket No. 2066-65; Carolyn G. Reich, docket No. 2067-65; Allen Smith White and Phyllis D. White, docket No. 2068-65; Virgil H. Koch and Florence V. Koch, docket No. 2069-65; Roy Parodi and Marcella Parodi, docket No. 2088-65; William O. Anderson, and Glenna V. Anderson, docket No. 2089-65; J. Irving Anderson and Grace H. Anderson, docket No. 2909-65; Russell T. Burnham and Doris H. Burnham, docket No. 2091-65; James H. Walraven and Frances A. Walraven, docket No. 3152-65; Fred B. Smales and Florence E. Smales, docket No. 3353-65; Thermal Power Company, docket No. 3214-66; and Fred B. Smales and Florence E. Smales, docket No. 3818-66.



The petitioners participated in ventures to drill for and exploit geothermal steam. One of these ventures was successful and the resulting wells produced sufficient steam to supply electrical generating plants. One of the petitioners claimed percentage depletion against the gross income it received from steam production in the successful venture. All the petitioners expensed the intangible costs of drilling and developing geothermal steam wells. Held, the petitioner which participated in the successful venture is entitled to deduct percentage depletion at the rate of 27½ percent against gross income it received from steam production. Held, further, all petitioners are entitled to expense the intangible costs of drilling and developing geothermal steam wells.

Mark Townsend and John D. Clark, Jr., for the petitioners.

J. Earl Gardner and Richard W. Janes, for the respondent.

FAY, Judge: Respondent determined deficiencies in the petitioners' income taxes as follows:

Docket No	Petitioners	Taxable Year Ended	Deficiency
2065-65	Arthur E. Reich and Carolyn G. Reich	12/31/61	\$ 533.84
2066-65	Arthur E. Reich	12/31/60	120.19
2067-65	Carolyn G. Reich	12/31/60	120.19
2068-65	Allen Smith White and Phyllis D. White	12/31/60 12/31/61	280.23 724.62
2069-65	Virgil H. Koch and Florence V. Koch	12/31/60 12/31/61 12/31/62	312.94 1453.08 107.66
2088-65	Roy Parodi and Marcella Parodi	12/31/60 12/31/61	624.57 688.87
2089-65	William O. Anderson and Glenna V. Anderson	12/31/60 12/31/61 12/31/61	426.92 6146.16 507.79
2090-65	J. Irving Anderson and Grace H. Anderson	12/31/60 12/31/61 12/31/62	112.01 5738.18 723.70
2091-65	Russell T. Burnham and Doris H. Burnham	12/31/60 12/31/61	3400.97 5395.76
3152-65	James H. Walraven and Frances A. Walraven	12/31/62	3808.85
3353-65	Fred B. Smales and Florence E. Smales	12/31/59 12/31/60 12/31/60	947.47 4527.00 6419.00

Docket No.	Petitioners	Taxable		Deficiency
		Year	Year Ended	
3214-66	Thermal Power Company		11/30/63 <sup>2</sup>	76,045.60
			11/30/64	126,104.30
3818-66	Fred B. Smales and Florence E. Smales		12/31/62	\$6,174.87

By the actions of the parties, several issues were dropped from the case by the time the original briefs were filed. The issues remaining for decision are:

Primary Issues:

With respect to Thermal Power Company -

1. Is Thermal Power Company entitled to an allowance for percentage depletion as a deduction against gross income received from production from geothermal steam wells and, if so, what percentage rate is allowable?

With respect to all petitioners -

2. Are the intangible costs of drilling and developing geothermal steam wells deductible under section 263 (c) ?<sup>3</sup>

Alternative Issues:

Alternative issues with respect to drilling and development costs, in the event the Court determines that such costs are not deductible under section 263 (c):

With respect to Thermal Power Company -

1. Are the costs incurred in drilling Thermal No. 4 well and in attempting to seal off a massive blowout which occurred during the drilling of Thermal No. 4 well deductible under section 165?

With respect to all petitioners -

2. Are the costs of drilling and developing geothermal steam wells and fields deductible as exploration and/or development expenditures under sections 615 and/or 616?
3. Are the costs of drilling unproductive "dry" holes in geothermal steam fields deductible under section 165?

FINDINGS OF FACT

Some of the facts were stipulated. The stipulations of facts, together with the exhibits attached thereto, are incorporated herein by this reference.

Petitioner Thermal Power Company (hereinafter referred to as Thermal) has a fiscal taxable year ending on November 30. It filed its Federal corporate income tax returns

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<sup>2</sup>The statutory notice of deficiency received by Thermal Power Company contained adjustments to certain net operating loss carryforwards. Because of these adjustments, the Court has jurisdiction under sec. 6214(b), I.R.C. 1954, to determine the correctness of respondent's adjustments relating to this petitioner's taxable years 1957 through 1962.

<sup>3</sup>All statutory references are to the Internal Revenue Code of 1954, unless otherwise specified.

for the taxable years involved herein with the district director of internal revenue, San Francisco, California. Its principal place of business was San Francisco, California, when it filed its petition in this case.

Thermal was incorporated under the laws of California. It is engaged in the business of drilling for and exploiting geothermal steam.

The remaining petitioners are individuals. All of them are calendar year taxpayers. During the years involved herein, they filed their Federal income tax returns with the district director of internal revenue, Los Angeles, California. Their legal residences were in or near Los Angeles, California, when they filed their petitions in this case.

The individual petitioners herein are partners in four partnerships which engaged in the business of drilling for geothermal steam. The names of these partnerships are Endogenous Power Company, Vulcan Thermal Power Company, Geothermal Resources Company, and Casa Diablo Exploration Company.

In 1847 a bear hunter in California discovered a canyon with steam pouring out along a quarter-mile of its length. The steam was coming from natural fumaroles in the ground. The area came to be known as The Geysers. During the 1860s it was developed into a tourist attraction.

The Geysers area is located about 75 miles north of San Francisco. The area contains four subareas commonly known as Big Geysers, Little Geysers, Sulphur Bank, and Happy Jack.

In 1921 there was an attempt to develop The Geysers' power potential by drilling wells to obtain steam. By 1925 eight wells were completed. However, the project was not commercially successful and it was abandoned.

On February 9, 1955, the Magma Power Company (hereinafter referred to as Magma), a Nevada corporation, obtained a steam lease covering approximately 3200 acres in The Geysers. The lessor was The Geysers Development Company, a California corporation. The Geysers Development Company was the fee owner of the land subject to the lease. The purpose of the lease was to drill for and exploit the natural steam in the area.

Pursuant to this lease, Magma drilled a well in The Geysers area. After completing the well, Magma entered into an agreement with Thermal to form a partnership (hereinafter referred to as Magma-Thermal) to conduct drilling and development operations in The Geysers. The agreement was dated December 17, 1956. Pursuant to this agreement, Magma assigned to Thermal an undivided one-half interest in its steam lease in The Geysers.

Drilling operations by or on behalf of Magma-Thermal began in 1957. The following table indicates the number of wells, both commercially productive and not commercially productive, which were completed and the year of completion.<sup>4</sup>

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<sup>4</sup>These wells are in addition to the one completed by Magma prior to the formation of Magma-Thermal.

<u>Year</u>	<u>No. of Wells Completed</u>
1957	5
1958	0
1959	6
1960	0
1961	3
1962	0
1963	8
1964	9
1965	5
1966	5
1967	0
1968	1 <sup>1</sup>

<sup>1</sup>This figure is based on data up to the time of the trial herein, March 1968.

Magma-Thermal made the following expenditures in drilling geothermal wells at The Geysers during the fiscal years indicated:

<u>Fiscal Year Ended June 30</u>	<u>Amount</u>
1958	\$114,551.00
1959	49,974.93
1960	269,557.16
1961	-0-
1962	242,132.67
1963	128,148.80
1964	431,102.50

In October 1958 Pacific Gas & Electric Company (hereinafter referred to as P.G.&E.) entered into a contract with Magma-Thermal to build an electric generating plant which would utilize the steam from certain of the wells in The Geysers. The first generator unit, Unit No. 1, began operation in 1960. It had a capacity of 12,500 kilowatts. In 1963 a second generating unit, Unit No. 2, was added to the plant. The second unit had a capacity of 14,000 kilowatts. In 1967 a second generating plant was put into operation. It contained a generator unit, Unit No. 3, which had a capacity of 27,500 watts. At the time of the trial herein, another generator unit, Unit No. 4, was being added to the second plant. The new unit was to have a capacity of 27,500 kilowatts.

The generator units used by P.G.&E. at The Geysers are turbine generators. These generators are rotary engines which are activated by the impulse of steam against a series of curved blades on a central rotating spindle. The impulse of the steam is in its pressure. While heat is the source of the pressure-energy in steam, heat alone will not drive the generators.

The steam which drives the generators comes directly from the wells. The wells are connected by a pipeline to the inlets of the generator units.

P.G.&E. makes montly payments to Magma-Thermal for the steam delivered to the generating plants. The amount of the payments is based on the amount of electricity which the plants deliver to the transmission lines.

Magma-Thermal received gross income from P.G.&E. for the fiscal years 1961, 1963, and 1964, less amounts paid to The Geysers Development Company, as follows:

<u>Fiscal Year</u> <u>Ended June 30</u>	<u>Gross Income</u>
1961	\$176,985.00
1963	843,780.00
1964	944,874.00

The Geysers thermal area is at the west end of a northwest-trending graben, 5½ miles long by 1 mile wide, 5 miles southeast of Clear Lake basin. Numerous thermal areas, of which The Geysers is the largest, are situated within the graben. The Geysers graben is flanked on the northeast by Cobb Mountain, a horst block capped by a rhyolite extrusion. Cobb Mountain is bordered on the southwest by a small graben containing two thermal areas, Castle Rock and Anderson Springs. The majority of thermal areas in the Mayacmas Mountains are located in The Geysers and Anderson Springs graben. Rainfall over most of The Geysers averages close to 40 inches per year.

The Big Geysers, Sulphur Bank, Little Geysers, and Happy Jack areas are underlain by rock of the Franciscan formation. The Franciscan rock formation appears at the surface and is present under a thin cover of loose alluvium over an area of several hundred square miles.

The center of the earth consists of a solid iron core surrounded by a molten iron outer core with approximate temperatures of 7000 degrees Fahrenheit. From this molten iron core located thousands of miles below the surface of the earth, the temperature decreases rather regularly toward the surface of the earth where at a depth of some 120 miles the temperatures approximate 3000 degrees Fahrenheit. While the earth thus contains an enormous supply of heat at depth, this supply is inaccessible and cannot be utilized from the surface.

Most of the earth's mantle at a depth below 120 miles is at its melting temperature. From time to time small parts of the mantle melt, or bodies of melt accumulate, and move upward towards the surface. This molten rock, or magma, moving up from depth can pour out of the earth's surface as lava flow or volcanic activity or can freeze off in the crust of the earth near the surface.

In order to have a geothermal system, it is necessary not only to have a penetration of magma near the surface of the earth but also to have above this heat source a zone of fractured rock containing a supply of water. Heat from the freezing magma is transmitted upward through a zone of essentially solid rock to the zone of fractured rock by conduction, an extremely slow process.

The heat source at The Geysers consists of such a body of magma which penetrated close to the surface of the earth and then commenced to freeze. Heat over a period of many years was transmitted upward by conduction through a solid layer of rock to heat the fractured rock containing the supply of water.

The water contained in the zone of fractured rock is meteoric in origin. The steam zones at The Geysers are physically separated from the magma below, from the surrounding areas containing ground water under normal hydrostatic pressure, and from the surface of the earth by impermeable zones. The impermeable boundaries were caused by the filling of fractures and fissures in the following

manner: The heat from the magma was conducted upward to the zone of fractured rock bearing meteoric water, and as the water became heated, a convective system was generated. In this convective system, the hot water and steam flowed upward and outward while cold water moved into the now heated fractured rock, and in turn, became heated and flowed upward and outward. The hot water and steam caused dissolution of silica from the rocks and the silica was borne upward and outward by the hot water and steam until colder regions were reached where the silica was deposited. The cold water moving into the area of heated rock carried calcium carbonate which was deposited as the water heated. This convective system gradually built a tight impermeable seal around the area of heated fractured rock by virtue of deposition of silica and calcium carbonate in, and thus sealing, the fractures in the rocks in the areas surrounding the central area.

The isolation of the central area by a zone of impermeable rock has resulted in the formation of a sealed off, isolated, irregularly shaped reservoir of steam with relatively uniform internal pressures differing significantly from the hydrostatic pressures of the normal ground water environment outside the reservoir. Measurements of pressure taken in the bore hole and at the well head of many wells at The Geysers establish a uniform low pressure zone within the sealed off reservoir with pressures at depth considerably less than hydrostatic pressures. As an example, at a depth of 5000 feet the pressure within the reservoir is on the order of 450 pounds per square inch compared to pressures outside the reservoir at the same depth of some 2300 pounds per square inch. While the most recent measurements of pressure within the reservoir were commenced in January 1967 and were conducted up to the time of trial, pressure measurements made in 1927 reflected that pressures within the reservoir at shallow depths of 500 feet at that time exceeded outside hydrostatic pressure.

The producing formation at The Geysers is Franciscan greywacke, a sandstone containing much clay. Fractures in samples taken near the surface were effectively sealed by quartz (silica), forming quartz seams. This deposition formed the impermeable "cap rock" for the steam producing formation. The top of the cap rock is approximately 250 feet below the surface of the earth. The bottom is approximately 400 feet below the surface. The cap rock has 1 percent porosity and negligible permeability.

Temperature increases rapidly near the top of the steam formation and increases more gradually with depth in the steam formation. There has been no significant temperature change within the steam formation from 1926 to the present. The maximum net heat recharge rate is on the order of 6/10ths of 1 percent of the current production rate.

During the drilling in the Big Geysers area from 1957 to 1959, initial static pressures were found in the range of 160 to 180 pounds per square inch. Static pressures are determined when the wells are shut in. Such pressures are preferred for reservoir engineering studies rather than flowing pressures which would be affected by withdrawal of the steam around the individual wells. From 1957 through 1967 many static pressures were measured at wells within the Big Geyser's area, which was the only area in production over this period of time. These measurements establish that during this 11-year period of production there was a decline in static pressure in the Big Geysers area from 180 pounds per square inch to 130 pounds per square inch, a decline of 50 pounds per square inch.

In 1926 pressures in the Big Geysers area were reported in the range of 200 to 270 pounds per square inch. Thus, the pressure decline in the 32-year period from



1926 through 1957, the date when commercial operations began, was at least 20 pounds per square inch.

Steam from many of the wells in the Big Geysers field is superheated. This indicates that there is no significant boiling of liquid within the major portion of the reservoir. It also indicates that the reservoir contains steam and no significant quantities of liquid.

There are at least two steam zones within the closed reservoir at The Geysers. There is some slight intercommunication between those zones. One zone is areally located in the Big Geysers producing area between 400 feet and 2000 feet subsurface. It is referred to as the Big Geysers shallow zone. The other steam zone includes the Sulphur Bank and Happy Jack areas and the deep zone of the Big Geysers located below 2000 feet subsurface.

The Big Geysers area of The Geysers has had producing wells since 1957 in the shallow zone whereas the wells in the Sulphur Bank area and Happy Jack area have produced at high rate only since April 1967. Therefore, the Big Geysers area production history and particularly the shallow steam zone were used to complete a gas reservoir engineering study permitting estimation of future performance for the Big Geysers shallow zone area. The result of this study was the determination that the ultimate steam recovery for the Big Geysers shallow production zone was 110 billion pounds. Of this amount, 47 billion pounds, or 42.7 percent, had been produced by January 1968. This left producible steam reserves of 63 billion pounds.

Performance estimates for the deep Big Geysers zone and the Sulphur Bank and Happy Jack areas had not been made at the time of the trial because of limited production history. However, measurable pressure decline had been measured at every well in those areas where a sequence of static pressures had been recorded. This decline indicates a similar reservoir behaviour as for the shallow zone.

The application of a general heat, material, and volumetric balance formula indicates there can neither be significant water present in the steam reservoir, nor liquid recharge and that the reservoir is essentially a closed volume of steam. It is a volumetric reservoir. The presence of water in a few of the wells does not affect this determination and is due to condensation, leakage from the surface, and injection during drilling. The application of normal gas reservoir engineering techniques explains both the entire reservoir and individual well performance.

Modern tritium tests establish that the age of the steam at The Geysers is at least more than 50 years old. Such tests establish only minimum age and actual age could be much greater, i.e. thousands of years.

It has been necessary to drill new wells and drill some of the old wells to greater depth to maintain required volumes of production and production pressures. The general decline in pressures is not due to plugging or clogging of wells.

Steam is a gaseous form of  $H_2O$ . It fills the confines of any container into which it is placed regardless of the volume of the container.

The first power generating station to utilize natural steam was established at Larderello, Italy, in 1904. Today Larderello can produce more than 400,000 kilowatts of electricity.

After Italy, the second country to investigate the possibilities of geothermal power was New Zealand. The necessity for rapid development of power resources during the postwar period prompted the New Zealand government to initiate a geothermal power project at Wairakei, North Island, in 1950. Today the project is generating some 400,000 kilowatts.

Exploration and development programs for geothermal resources have been recently initiated in Iceland, Mexico, El Salvador, Japan and Russia, as well as in the United States.

Endogenous Power Company was a limited partnership. It was in turn a partner in Magma-Endogenous Power Project, a partnership, whose other partners were Magma and Nevada Thermal Power Company, a Nevada corporation. Magma and Nevada Thermal Power Company contributed to the partnership certain leaseholds. Endogenous Power Company contributed cash. Magma-Endogenous Power Project engaged in drilling operations in Mono County, California. It expended the following amounts in drilling geothermal wells at such locations in the years indicated:

<u>Year</u>	<u>Amount</u>
1960	\$86,823.70
1961	40,534.07

Vulcan Thermal Power Company was a limited partnership. It was turn a partner in Magma-Vulcan Thermal Power Project with Magma. Magma contributed to the partnership certain leaseholds. Vulcan Thermal Power Company contributed cash. Magma-Vulcan Thermal Power Project engaged in drilling operations in Lander and Eureka Counties, Nevada. It expended the following amounts in drilling geothermal wells at such locations in the years indicated:

<u>Year</u>	<u>Amount</u>
1960	\$28,448.72
1961	66,246.97

Geothermal Resources Company was a limited partnership. It was in turn a partner in a partnership with Magma formed in 1962. Magma contributed to the partnership certain leaseholds. Geothermal Resources Company contributed cash. The Magma-Geothermal Resources partnership engaged in drilling operations in Nevada and California. It expended \$74,369.24 in drilling geothermal wells at such locations in 1962.

Casa Diablo Exploration Company was a limited partnership. It was engaged in drilling operations in Mono County, California. It expended \$47,775.10 in drilling geothermal wells at such location in 1962.

Of the petitioners and partnerships involved herein, only Magma-Thermal has commercially exploited geothermal wells. It has done so only at The Geysers.

On its Federal income tax returns for the taxable years relevant herein, Thermal deducted percentage depletion at the rate of 27½ percent against gross income received from geothermal steam wells at The Geysers. In his statutory notice of deficiency relating to Thermal for the taxable years involved herein, respondent disallowed the claimed percentage depletion deductions.

On their Federal income tax returns for the taxable years relevant herein, all the petitioners, including Thermal, deducted the intangible costs of drilling and developing geothermal steam wells. In his statutory notices of deficiency relating to the petitioners and taxable years involved herein, respondent disallowed the claimed deductions for the intangible costs of drilling and developing geothermal steam wells.

#### ULTIMATE FINDINGS OF FACT

The commercial product of the geothermal wells at The Geysers is steam.

Geothermal steam is a gas.

The geothermal steam at The Geysers is contained within a closed reservoir in a finite amount with no significant liquid influx to or boiling within its confines. The geothermal steam at The Geysers is an exhaustible natural resource which has depleted and is continuing to deplete.

#### OPINION

The first issue is whether Thermal is entitled, pursuant to section 613,<sup>5</sup> to deduct percentage depletion at the rate of 27½ percent against gross income received from geothermal steam wells at The Geysers. To resolve the issue, we must first decide three factual questions.

The first question is whether the commercial product of the wells at The Geysers is steam or heat. Respondent's position--which he characterizes as his primary stance in the case--is that the commercial product of the wells is the internal heat of the earth. It follows, respondent contends, that the product of the wells is not depletable because the earth's heat is inexhaustible.

In order to establish his position that the product of the wells is heat, respondent constructs an elaborate argument. He begins with the premise that steam is nothing more than a combination of heat and water. He then points out that at The Geysers'

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#### <sup>5</sup>SEC. 613. PERCENTAGE DEPLETION

- (a) General Rule. --In the case of the mines, wells, and other natural deposits listed in subsection (b), the allowance for depletion under section 611 shall be the percentage specified in subsection (b), of the gross income from the property excluding from such gross income an amount equal to any rents or royalties paid or incurred by the taxpayer in respect of the property. Such allowance shall not exceed 50 percent of the taxpayer's taxable income from the property (computed without allowance for depletion). \* \* \* In no case shall the allowance for depletion under section 611 be less than it would be if computed without reference to this section.
- (b) Percentage Depletion Rates. --The mines, wells, and other natural deposits, and the percentages, referred to in subsection (a) are as follows:
- (1) 27½ percent--oil and gas wells.

electrical generating plants the water in the steam is discarded after the steam is used to turn the turbines. He concludes that of the two elements in steam, only the heat is commercially useful because the water is thrown away. Thus, he says, the water serves only as a conductor to carry the earth heat to the turbines.

We do not agree. Were it not for the seriousness with which respondent urges his argument, we would think he is resorting to a mere play on words. For purposes of the commercial enterprise at The Geysers, steam is much more than heat and water. It is heat and water combined in a way that results in tremendous pressure. And it is the pressure of the steam which drives the turbines. Heat alone would not drive them.<sup>6</sup> It follows that the commercial product of the wells at The Geysers is steam, not heat.

The second question is whether steam is a "gas" as that term is used in sections 611(a)<sup>7</sup> and 613(b)(1). Respondent concedes that for purposes of this case the term "gas" as used in those sections is not limited to hydrocarbon gases. He takes the position, however, that in spite of this concession steam is not a "gas". He accordingly concludes that Thermal is not entitled to 27½ percent depletion pursuant to the "oil and gas well" provision in section 613(b)(1).

To support his position that steam is not a "gas", respondent argues that the term "gas" as it is used in the relevant statutory provisions includes only those fluids which maintain a gaseous state at ordinary room temperature and pressure. Because steam condenses into water at ordinary room temperature and pressure, respondent argues, it cannot be considered a "gas".

We do not agree. We must construe the terms used in the depletion statutes in light of their ordinary commercial usage. Quartzite Stone Co., 30 T.C. 511 (1958), affd. 273 F.2d 738 (C.A. 10, 1961); Blue Ridge Stone Corporation v. United States, 170 F. Supp. 569 (W.D. Va. 1959). On the basis of the record as a whole, we conclude that in the common parlance of the industries involved herein the term "gas" includes steam. The testimony of every expert witness in the trial of this case, except Joseph Berman who is an employee of respondent, included references to steam as a "gas". Even Berman conceded that other people disagree with his limited use of the term "gas". Moreover, the tenor of the record as a whole convinces us that people involved on a daily basis in the industries in question think of steam as a "gas".

In arguing that steam is not a "gas", respondent relies heavily on the definition of "gas" in the Mineral Resources Regulations, 30 C.F.R. section 221.2(o).<sup>7A</sup> That definition is as follows:

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<sup>6</sup>Alp Hanson, a mechanical engineer who has much experience with turbine generators, made this very clear in his testimony.

<sup>7</sup>SEC. 611. ALLOWANCE OF DEDUCTION FOR DEPLETION

- (a) General Rule.--In the case of mines, oil and gas wells, other natural deposits and timber, there shall be allowed as a deduction in computing taxable income a reasonable allowance for depletion and for depreciation of improvements, according to the peculiar conditions in each case; such reasonable allowance in all cases to be made under regulations prescribed by the Secretary or his delegate. \* \* \*

<sup>7A</sup>Code of Federal Regulations, Title 30--Mineral Resources, Chapter II--Geological Survey, Department of the Interior, page 302.

Gas. Any fluid, either combustible or non-combustible, which is produced in a natural state from the earth and which maintains a gaseous or rarefied state at ordinary temperature and pressure conditions.

Respondent makes the following statement on brief regarding this definition:

Section 221.44 of these same regulations provides that the standard of pressure shall be 10 ounces above an atmospheric pressure of 14.4 pounds to the square inch, and the standard of temperature is 60 degrees Fahrenheit. These above prescribed conditions of pressure and temperature are "ordinary" or "room" conditions.

Reading the latter conclusions into the quoted definition, respondent concludes that the Mineral Resources Regulations limit the term "gas" to fluids which maintain a gaseous state at ordinary room temperature and pressure. Respondent accordingly argues that the Mineral Resources Regulations--as he construes them--are authority to support his view that the term "gas" as used in sections 611(a) and 613(b)(1) of the Internal Revenue Code is limited to fluids maintaining a gaseous form at room temperature and pressure.

We see no reason, and respondent suggests none, why the Mineral Resources Regulations should control the case at bar. Furthermore, we are not convinced that respondent correctly interprets the Mineral Resources Regulations. There is nothing in the structure of those Regulations to indicate that section 221.44 modifies section 221.2 as respondent suggests. The former section is under the heading "Measurement of Production and Computation of Royalties". Section 221.2 is under the heading "Introduction; Definitions". The fact that definitions are under a separate heading of the Regulations indicates that they are complete in themselves and require no modification by provisions under other headings. Furthermore, the text of section 221.44, set out in the footnote below,<sup>8</sup> does not in any way suggest that it is a modification of the definitions in section 221.2. As its title suggests, we think section 221.44 is concerned only with the measurement of gas, not with the definition of gas.

In his Reply Brief, respondent asserts that "The parties also agree upon an applicable definition of 'gas' to the issues here." Respondent then asserts that under the agreed upon definition, steam is not a "gas". These assertions are tantamount to a claim that petitioners conceded this vital question on brief. We think these assertions are an incorrect interpretation of petitioners' brief and require no further comment.

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<sup>8</sup>Sec. 221.44. Measurement of gas.

Gas of all kinds (except gas used for purposes of production on the leasehold or unavoidably lost) is subject to royalty, and all gas shall be measured by meter (preferably of the orifice-meter type) unless otherwise agreed to by the supervisor. All gas meters must be approved by the supervisor and installed at the expense of the lessee at such places as may be agreed to by the supervisor. For computing the volume of all gas produced, sold, or subject to royalty, the standard of pressure shall be 10 ounces above an atmospheric pressure of 14.4 pounds to the square inch, regardless of the atmospheric pressure at the point of measurement, and the standard of temperature shall be 60° F. All measurements of gas shall be adjusted by computation to these standards, regardless of the pressure and temperature at which the gas was actually measured, unless otherwise authorized in writing by the supervisor.

Because of the considerations we discuss above, we conclude that steam is a "gas" as that term is used in sections 611(a) and 613(b)(1).

The third question is whether the steam at The Geysers is an exhaustible resource. It is undisputed that if the steam is inexhaustible, Thermal is not entitled to an allowance for depletion. See Income Tax Regs. section 1.611-1(a)(1). Accordingly, respondent takes the position that the steam is inexhaustible and Thermal takes the contrary position.

The question presented is a difficult one for a judicial body. It involves the resolution of geological and engineering disputes. It must be remembered that we are not sitting as a scientific forum. We are sitting as a court. We must accordingly decide the question for one party or the other. In so doing, we hope the witnesses will be clear that our conclusions are not based upon a lack of credibility, but upon our best attempt to resolve a difficult theoretical dispute.

Based upon our consideration of the record as a whole, including the lengthy testimony, the documentary evidence, and all the arguments raised in the briefs, we conclude that the steam at The Geysers is an exhaustible resource. We have made detailed findings of fact to support this conclusion. It is not necessary to repeat the findings here. Nor is it necessary to detail the evidence supporting our findings.<sup>9</sup> However, we want to comment on the expert witnesses who testified during the trial.

Petitioners' geologist, George C. Kennedy, and their petroleum engineer, Henry J. Ramey, Jr., are highly qualified in their profession. Both men conducted extensive field studies at The Geysers prior to testifying at the trial. Both men were exceedingly strong witnesses. Although they did not use exactly the same terminology, the testimony of each man was consistent with that of the other as to essential details. We say this despite respondent's argument to the contrary. We think his argument is based on an incorrect interpretation of Kennedy's testimony.

Respondent's geologist, Thomas S. Lovering, is highly qualified in his field. As a witness, however, he tended to waver. At times he came very close to agreeing with the basic theories of Kennedy and Ramey, albeit with different phraseology. At other times, however, he disagreed with their basic theories in the plainest terms possible. Moreover, Lovering had never visited The Geysers area prior to the trial. His testimony was therefore not founded upon a field study. While he did visit The Geysers during a weekend recess in the trial which came after his testimony on direct and cross-examination, his field examination of the area appeared to have been hurried and superficial. In the absence of personal field study, he often relied upon data furnished by Joseph Berman. As we indicate below, we are not convinced that Berman was qualified to do many of the things he was asked to do in the presentation of the respondent's case.

Joseph Berman is an employee of respondent. From his testimony as a whole, we gather that most of his training and experience is in the areas of petrography and mineralogy. These fields concern the character and classification of rocks. While

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<sup>9</sup>In his reply brief, respondent objects to certain testimony based on a publication by Allen and Day in 1927. He bases his objection on the hearsay rule. We think the objection is not well taken. It is a recognized exception to the hearsay rule that an expert may give opinions based on knowledge gained from treatises in his field. McCormick, Evidence, sec. 296, p. 620. Furthermore, respondent does not cite any place in the transcript where he objected to the testimony in question during the trial.

Berman was a sincere witness, we feel he was working outside of his field in this case. He was called upon to study and testify about matters that had little or nothing to do with the identification of rocks. Much of his testimony, for example, dealt with matters which are in the province of petroleum engineering.

In addition to arguing his positions on the three factual questions discussed above, respondent presents several legal arguments to persuade us that Thermal is not entitled to 27½ percent depletion deduction. His first argument involves section 613(b)(7)<sup>10</sup> which allows a 15 percent depletion deduction for "all other minerals" not enumerated in section 613(b)(1) through section 613(b)(6). Respondent focuses on subsection 613(b)(7)(A) which excludes "water" from the category "all other minerals", thereby denying a 15 percent deduction for "water". Seizing upon this denial, respondent argues as follows:

Since Congress in Section 613(b)(7) specifically denied a depletion allowance of 15 percent to water and did not include it in any other percentage depletion provision of Section 613 of the Code, it is obvious that Congress did not intend that water existing in the form of steam should be granted the even larger depletion rate of 27½ percent given for "gas wells" by Section 613(b)(1) of the Code.

We do not agree. We think respondent's argument is based upon a confusion of two ways in which the word "water" is used.<sup>11</sup> In a chemical sense, "water" is any substance with the chemical composition of H<sub>2</sub>O. Chemically speaking, H<sub>2</sub>O has three forms--gaseous, liquid, and solid. Again speaking chemically, any of these three forms of H<sub>2</sub>O is "water". In common parlance, however, there are separate and distinct words to describe the three forms of H<sub>2</sub>O:

Gaseous H<sub>2</sub>O -- Steam, vapour  
Liquid H<sub>2</sub>O -- Water  
Solid H<sub>2</sub>O -- Ice

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<sup>10</sup>SEC. 613. PERCENTAGE DEPLETION.

(b) (7) 15 Percent--all other minerals (including, but not limited to, aplite, barite, borax, calcium carbonates, diatomaceous earth, dolomite, feldspar, fullers earth, garnet, gilsonite, granite, limestone, magnesite, magnesium carbonates, marble, mollusk shells (including clam shells and oyster shells), phosphate rock, potash, quartzite, slate, soapstone, stone (used or sold for use by the mine owner or operator as dimension stone or ornamental stone), thenardite, tripoli, trona, and (if paragraph (2) (b) does not apply) bauxite, flake graphite, fluorspar, lepidolite, mica, spodumene, and talc, including pyrophyllite, except that, unless sold on bid in direct competition with a bona fide bid to sell a mineral listed in paragraph (3), the percentage shall be 5 percent for any such other mineral (other than slate to which paragraph (5) applies) when used, or sold for use, by the mine owner or operator as rip rap, ballast, road material, rubble, concrete aggregates, or for similar purposes. For purposes of this paragraph, the term "all other minerals" does not include:

- (A) soil, sod, dirt, turf, water, or mosses; or  
(B) minerals from sea water, the air, or similar inexhaustible sources.

<sup>11</sup>In passing we wish to point out that we think respondent made this error several times during the trial and in the preparation of his briefs.

In respondent's argument, he takes the term "water" in section 613(b) (7) (A) to mean H<sub>2</sub>O, or "water" in the chemical sense. Thus he argues that if Congress specifically excluded H<sub>2</sub>O from section 613(b) (7), it must not have thought that H<sub>2</sub>O is included in sections 613(b) (1) through (b) (6).

We think, however, that the term "water" in section 613(b) (7) (A) does not refer to H<sub>2</sub>O, or "water" in the chemical sense. We think it refers to "water" in the ordinary sense, or liquid H<sub>2</sub>O. We are convinced of this because many, if not all, of the other terms in section 613(b) are clearly not chemical terms. Examples of such terms are "clay", "sand", "stone", "clam shells", "rip rap", and "sod". Furthermore, courts interpret the terms used in the depletion statute in light of their ordinary usage. Quartzite, supra; Blue Ridge, supra.

Respondent's second argument also involves the term "water". This argument runs as follows:

It may be noted that Congress and the Code employed only the terms "water" and "gas"; such terms as "gaseous water" or "liquid water" were not used. Petitioners' position, it would seem, demands Congress should have employed such positive terms as "gaseous gas" or "liquid oil", or such negative terms as "non-solid water" or "non-solid-non-gaseous water".

Respondent concludes from this that Thermal's position is incorrect and that it is accordingly not entitled to 27½ percent depletion.

We think this argument is answered by the discussion of the first argument. We think Congress did, in effect, use the phrase "liquid water" in section 613(b) (7) (A), in the sense in which respondent is using the phrase "liquid water". The word "water" as respondent uses it in the phrase "liquid water" means H<sub>2</sub>O. The liquid form of H<sub>2</sub>O is "water", as that word is used in common parlance. Because Congress used the word "water" in its ordinary sense, it in effect used the phrase "liquid water" in the sense in which respondent uses that phrase.

Respondent's third argument is that Congress never considered geothermal steam when it enacted section 613(a) and (b). Respondent concludes from this that Thermal is not entitled to 27½ percent depletion on geothermal steam.

We do not agree. There is no indication in the record that Congress did not consider geothermal steam when it enacted section 613(a) and (b). It would indeed be perilous to cast the burden of taxation on the basis of speculation about specific cases actually envisioned by Congress when it enacted a statute using general terms such as "gas". Furthermore, we know of no rule, and respondent cites none, that a taxpayer must show that Congress actually envisioned his specific situation when it employed general terms to enact legislation the benefit of which he seeks.

Respondent's final argument focuses on the composition of the steam at The Geysers. He argues that the steam is a combination of earth heat and water. He argues further that percentage depletion is not allowable separately either for earth heat or for water. He then says that "it strains logic to conclude that Congress intended a combination of these two components (to) achieve what was denied them separately."

As we indicate above, the steam at The Geysers is more than its component parts. It is not simply earth heat and water. These elements in combination produce a gaseous



fluid with tremendous pressure. The pressure makes the steam more than mere heat and water. Viewed in this manner, we find no logical difficulty in concluding that the steam at The Geysers is subject to percentage depletion, even assuming arguendo that earth heat and water considered separately are not subject to such depletion.

We thus conclude against respondent on each of the legal arguments he raises. Because we also decide the factual questions against him, we hold on the first issue that Thermal is entitled to deduct percentage depletion at the rate 27½ percent against gross income received from geothermal steam wells at The Geysers.

The second issue is whether all petitioners including Thermal are entitled to deduct under section 263(c)<sup>12</sup> the intangible costs of drilling and developing geothermal steam wells. In his original brief, respondent states that if we conclude that the product of geothermal steam wells is a "gas" as that term is used in section 613(b)(1), then the section 263(c) issue is resolved.<sup>13</sup> Because we conclude above that geothermal steam is a "gas" as that term is used in section 613(b)(1), we hold for the petitioners on the second issue.

Because of our disposition of the first two issues, or the primary issues, the alternative issues are moot.

Reviewed by the Court.

Decisions will be entered  
under Rule 50.

FEATHERSTON, J., did not participate in the consideration and disposition of this case.

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<sup>12</sup>SEC. 263. CAPITAL EXPENDITURES

(c) Intangible Drilling and Development Costs in the Case of Oil and Gas Wells.-- Notwithstanding subsection (a), regulations shall be prescribed by the Secretary or his delegate under this subtitle corresponding to the regulations which granted the option to deduct as expenses intangible drilling and development costs in the case of oil and gas wells and which were recognized and approved by the Congress in House Concurrent Resolution 50, Seventy-ninth Congress.

<sup>13</sup>Respondent concedes that for purposes of this case the term "gas" as used in sec. 263(c) is not limited to hydrocarbon gases.



SIMPSON, J., concurring: I have agreed with the decision of the majority, but I wish to make clear that my conclusion was reached without considering whether the term "gas" as used in section 613(b) (1) should be limited to hydrocarbonaceous products. The respondent conceded that for purposes of this case the term was not so limited, and as a result of that concession, the parties have not presented and developed the factual and legal arguments relating to whether the legislative history indicates that when Congress allowed 27½ percent depletion for gas, it had in mind only carbonaceous gases. This issue is such that it is inadvisable for us to consider it without development by the parties and impracticable to request the parties to develop such issue. Accordingly, I have reached my conclusion simply on the basis of the issue that was developed in the case--whether the term "gas" as generally used and understood includes steam--and I agree that it does. Webster's New International Dictionary (3d ed. 1961).

DRENNEN, IRWIN, and STERRETT, JJ., agree with this concurring opinion.

RAUM, J., dissenting: This is depletion run riot. I cannot believe that Congress ever intended to confer these extraordinary tax benefits at the 27½ percent rate, wholly unrelated to taxpayer's investment in the property in circumstances such as are present here, whatever may have been its alleged intention to further a national policy of encouraging the extraction of petroleum or other like natural resources. Regardless of whether steam may technically be regarded as "gas", it is at best doubtful that it is so generally considered in common usage. Accordingly, I would not reach this rather eccentric result, cf. Nix v. Hedden, 149 U.S. 304, particularly since petitioner is seeking to obtain a highly artificial tax benefit and it has long been established that deductions and exemptions from taxation are to be narrowly construed. Cf. Bingler v. Johnson, 394 U.S. 741, 752; Commissioner v. Jacobson, 336 U.S. 28, 49; United States v. Stewart, 311 U.S. 60, 71; Helvering v. Northwest Steel Mills, 311 U.S. 46, 49; New Colonial Co. v. Helvering, 292 U.S. 435, 440. Indeed, it has been said that "a well founded doubt is fatal to the claim (of the tax exemption)". Bank of Commerce v. Tennessee, 161 U.S. 134, 146. When one considers that Congress has provided for percentage depletion measured by less than 27½ percent in respect of natural resources other than from "oil and gas wells" and that it has specifically indicated that there is to be no percentage depletion whatever in respect of "water" (section 613(b)), it seems almost beyond belief that it intended to grant a 27½ percent bonanza for water vapour.

Nor is the contrary conclusion required by reason of the Commissioner's so-called concession as to the meaning of the term "gas" as used in the statute, for that is a question of law and it has been firmly established that concessions or stipulations of law are not binding on the courts. Swift & Co. v. Hocking Valley Ry. Co., 243 U.S. 281, 289; Estate of Sanford v. Commissioner, 308 U.S. 39, 51; Nelson v. Montgomery Ward, 312 U.S. 373, 376; First-Mechanics Nat. Bank v. Commissioner, 117 F. 2d 127, 131 (C.A.3); London-Butte Gold M. Co. v. Commissioner, 116 F. 2d 478, 480 (C.A. 10); Commissioner v. Ehrhart, 82 F. 2d 338, 339 (C.A.5); John A. Nelson Co. v. Commissioner, 75 F. 2d 696, 697 (C.A. 7), reversed on other grounds, 296 U.S. 374; Smith v. Commissioner, 59 F. 2d 533, 538 (C.A. 7); Ernst Kerry Co., 1 T.C. 249, 265; Volunteer State Life Insurance Co., 35 B.T.A. 491, 496, reversed on other grounds, 110 F. 2d 879 (C.A. 6); Ohio Clover Leaf Dairy Co., 8 B.T.A., 1249, 1256, affirmed per curiam 34 F. 2d 1022 (C.A. 6), certiorari denied 280 U.S. 588. I know of no exception to this rule that would justify an erroneous interpretation of the statute merely "for purposes of this case".

TIETJENS and TANNENWALD, JJ., agree with this dissent.



Arthur E. REICH and Carolyn G. Reich, Arthur E. Reich, Carolyn G. Reich, Allen Smith White and Phyllis D. White, Virgil H. Koch and Florence V. Koch, Roy Parodi and Marcella Parodi, William O. Anderson and Glenna V. Anderson, J. Irving Anderson and Grace H. Anderson, Russell T. Burnham and Doris H. Burnham, James H. Walraven and Frances A. Walraven, Fred B. Smales and Florence E. Smales and Thermal Power Company, Red B. Smales and Florence E. Smales, APPELLEES v. COMMISSIONER of Internal Revenue, APPELLANT. George D. Rowan and Virginia H. Rowan, George D. Rowan, Robert A. Rowan and Carolyn P. Rowan, Appellees v. Commissioner of Internal Revenue, Appellant. U.S. Court of Appeals, Ninth Circuit, Nos. 25,902 and 25,903, Jan. 21, 1972. 52 TC 700 (Opinion by Fay, J.) affirmed. Years 1959-1964. Decision for taxpayer.

1. DEPLETION--Who can deduct--economic interest--miscellaneous natural resources. 27½% depletion deduction allowed for geothermal steam used to generate electricity. Steam is gas; is exhaustible; isn't same as "water" or combination of heat and water. Reference: 1972 P-H Fed. 22,050(12).

2. DEPLETION--Cost of depletion computation--intangible drilling and development costs--option to expense or capitalize--scope of costs includible under option. Deduction allowed for cost of drilling for geothermal steam: Steam is depletable gas under Sec. 613(b)(1). Reference: 1972 P-H Fed. 22,169(20).

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On Appeals from the Decisions of the United States Tax Court.

Before JERTBERG and WRIGHT, Circuit Judges, and WILLIAMS, District Judge \*

WRIGHT, Circuit Judge:

These appeals from Tax Court decisions present two questions: (1) Are the taxpayers' reserves of geothermal steam an exhaustible natural resource? (2) Is geothermal steam a "gas" within the meaning of Internal Revenue Code 263(c), 611(a), and 613(b), which allow a percentage depletion deduction for the intangible costs of drilling and developing oil and gas wells?

(1-2) The Tax Court held in favour of the taxpayers on each question. *Reich v. Commissioner*, 52 T.C. 700 (1969) and *Rowan v. Commissioner*, 28 Tax Ct. Mem. 797 + 69,160 P-H Memo TC (1969).

The Commissioner appeals. We affirm.

Taxpayers are all engaged in the business of drilling for geothermal steam in an area 75 miles north of San Francisco known as The Geysers. First discovered by a bear hunter in 1847, this canyon of steam fumaroles and geysers later became a tourist attraction. Successful commercial development of the steam field for geothermal power began in 1955.

Between 1957 and 1969 the taxpayers drilled 42 wells and the Pacific Gas and Electric Company built an electric generating plant to convert the energy in the superheated steam into electricity. The plant employs turbine generators, which are activated by the impulse of steam under pressure against a series of curved blades on a central rotating spindle. It has a capacity of 81,500 kilowatts. Pacific Gas and Electric is not a party to this appeal, and has no interest in the taxpayers' claims.

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\*Honourable David W. Williams, Judge of the United States District Court for the Central District of California, sitting by designation.

I

The principal factual dispute between the parties before the Tax Court concerned the nature and exhaustibility of the steam reserves at The Geysers. After reviewing extensive documentary evidence and hearing expert testimony from geologists and engineers, the Tax Court made these findings of fact:

Geothermal Steam is a gas. The geothermal steam at The Geysers is contained within a closed reservoir in a finite amount with no significant liquid influx to or boiling within its confines. The geothermal steam at The Geysers is an exhaustible natural resource which has depleted and is continuing to deplete.

Our review of the record convinces us that ample evidence supports this factual conclusion.

II

The more difficult question is whether geothermal steam is subject to the depletion allowance. Internal Revenue Code 611(a) says:

"In the case of mines, oil and gas wells, other natural deposits, and timber, there shall be allowed as a deduction in computing taxable income a reasonable allowance for depletion..."

Section 613(b) fixed the depletion percentage for oil and gas wells at 27½ percent for the tax years here at issue.

The depletion allowance is designed to stimulate resource exploitation by ensuring that a developer can recover the capital invested in wasting assets.

"An allowance for depletion has been recognized in our revenue laws since 1913. It is based on the theory that the extraction of minerals gradually exhausts the capital investment in the mineral deposit. Presently, the depletion allowance is a fixed percentage of gross income which Congress allows to be excluded . . . . The present allowance, however, bears little relationship to the capital investment, and the taxpayer is not limited to a recoupment of his original investment. The allowance continues so long as minerals are extracted, and even though no money was actually invested in the deposit." Commissioner v. Southwest Exploration Co., 350 U.S. 308, 313 (48 AFTR 683) (1956).

The Commissioner's position is that this favourable tax treatment applies only to petroleum and hydrocarbonaceous natural gas deposits, and cannot be construed to cover geothermal steam reserves. The Tax Court disagreed, holding that the steam deposit at The Geysers is a gas within the meaning of "oil and gas well" in the Code.

We are persuaded by the Tax Court's reasoning on this legal issue. The decisions are affirmed on the basis of the Tax Court's opinion: Reich v. Commissioner, 52 T.C. 700 (1969).