QUANTIFYING MULTIPLE WORKING HYPOTHESES GEOLOGY AND COMPETITIVE OFFSHORE LEASE BIDDING

R. W. Boebel¹ New Orleans, La. 70130

ABSTRACT

The establishment and application of multiple working hypotheses has been basic to the scientific method and is a standard preliminary to interpretive petroleum exploration. Such assumptions, requiring original conceptuality and final thoughtful selection, are emphasized in the present competitive bidding environment of the federal waters of the Gulf of Mexico, south of Louisiana.

The usual judgment procedure for bid determination, directed at the acquisition of exploration prospects, includes factors involving description, techniques, operations, economics and theory. Critical parameters range from precise measurements of costs and physical characteristics through a reconstruction of the trap. its cause, extent, and reservoirs. A final ingredient is the assignment of credibility values to the derived quantities. Such a chain proceeds from the absolute to the least known, and in this order of increasing variance, geology and geological assumptions can effectively dictate the decision.

The geologic hypotheses used emerge from measured data, primarily geophysical, and are refined by the application of the basic theory of our profession. Their final form and the assignment of numerical values of quantity and probability rest heavily on specific analogies and inference.

In the near future an assessment may be possible of how well the "state-of-the-art" and our professional capabilities answered these demands of quantification. Analyses of statistical probabilities and mathematical models have been applied to the bidding procedure but the isolation of geological judgments from such efforts is difficult. A number of relationships from the December 1970 general sale can be tabulated now and these are presented for consideration. They are, for the most part, empirical and thus are bases for additional comparison. The patterns shown have both rough similarities and definite divergencies. The similarities show the contribution of the more absolute ingredients including general geologic agreement in qualitative description. The divergencies, critical to the result, are believed to be a result of the spread in quantified hypotheses.

10il and Gas Futures, Inc.

In lieu of a paper several illustrations (Figs. 1-5) are submitted along with the abstract.

Parameters Controlling Exploratory Offshore Bid Judgement in Order of Increasing Variance *

- I Cost of drilling, production, and operations
- II Revenue
 - A) Price per marketable quantity
 B) Rate of extraction
- III Reservoir Recovery Efficiency
- Collection and entrapment history, present configuration and area of accumulation
- ▼ Sedimentary history, environment and functional reservoir thickness
- WI Hydrocarbon characteristics, liquid and/or gas
- VII Individual and group credibility of all of these

FIGURE 1 - Parameters controlling exploratory offshore bid judgment in order of increasing variance.

The problem (uniform) and political factors are not contemplated (i.e. inflation, international lenergy relationships difference in tinencial largestives, etc.)

	<u>A</u>	В	c	CI	E	F	G	н	<u>I</u>	<u>J</u>
TRACTS BID	35	95	27	66	l 2	14	54	58	19	45
ACQUIRED	7	5	2	11	1	6	14	7	1	9
SUCCESS %	20.0	5.2	7.4	16.7	8.3	42.9	26.0	12.1	5.3	20.0
TRACTS 2ND HIGH B1D	8	5	2	5	1	. 2	2	7	1	7
ACQUIRED & 2ND %	42.9	10.4	14.8	24.2	16.7	57.1	29.6	24.1	10.6	35.6
TOTAL BID \$1000's	219,138	158,702	77,600	152,278	48,399	85,204	230,736	116,261	61,331	323,580
TOTAL SPENT	122,494	18,342	8,330	31,324	4,378	41,347	137,113	13,296	4,627	153,324
% SPENT	55.9	11.6	10.7	20.1	9.0	48.5	54.6	11.4	7.5	47.4
AVERAGE COST ACQUIRED TRACTS	17,499	3,668	4,165	2,847		6,891	9,793	1,899		17,036
TOTAL WINNING BIDS ON ALL TRACTS BID	422,923	766,531	247,233	542,593	167,540	162,393	527,025	432,806	288,084	510,615
AVERAGE WINNING BID - ALL TRACTS	12,083	8,069	9,156	8,221	13,961	11,599	9,759	7,462	15,162	11,347
EXPOSURE % TOTAL BIDS/TOTAL WIN- NING BIDS ON TRACTS BID	51.8	20.7	31.4	28.1	28.9	52.5	47.6	26.9	21.3	63.4
AVERAGE NUMBER COMPETITORS TRACTS ACQUIRED	10.3	4	9	7	7	11	9.1	3.3	10	11.3
AVERAGE % COST ABOVE 2ND B1D ON TRACTS ACQUIRED	21.6	41.4	22.5	36.2	9	30.5	50.6	53.2	24	44.7
	к	T.	м	N	o	р	Q	R	s	т
TRACTS BID	73	5.2 9	7	108	13	40	55	58	19	59
ACQUIRED SUCCESS %	14	17.3	14.3	10 9.3	0	9	.;	15	8	9
TRACTS	15.2	17.3	14.3	9	5	22.5	7.3	25.9	42.1	15.3
2MD HIGH BID	6	11	5	15		6	ሩ	7	2	5
ACQUIRED & 2ND %	27.4	38.7	85.7	23.1		37.5	14.5	37.9	52,6	23.7
TOTAL BID \$1000's	161,045	229,166	57,350	159,779	30,000	219,786	127,407	242,546	191,588	215,078
TOTAL SPENT	34,944	64,282	12,630	19,849		67,984	29,820	105,363	101,812	47,630
% SPENT	21.7	25.9	22.1	12.4		30.9	23.4	43.4	53.1	22.1
AVERAGE COST ACQUIRED TRACTS	2,496	7,142		1,985		7,554	7,455	7,024	12,726	5,292
TOTAL WINNING BIDS ON ALL TRACTS BID										
	571,449	573,887	88,08	731,741	175,587	468,344	549,610	489,299	290,666	604,630
AVERAGE WINNING BID - ALL TRACTS	571,449 7,828	573,887 13,036	80,888	731,741 6,775	175,587	468,344 11,708	549,610 9,992	489, 299 8,436	290,666	604,630
AVERAGE WINNING										
AVERAGE WINNING BID - ALL TRACTS EXPOSURE % TOTAL BIDS/TOTAL WIN- NING BIDS ON TRACTS	7,828	13,036	11,555	6,775	13,506	11,708	9,992	8,436	15,298	10,247

FIGURE 2—Tabulation of effort and results of bidding entities in the December 1970 Western Louisiana Federal Offshore Sale.

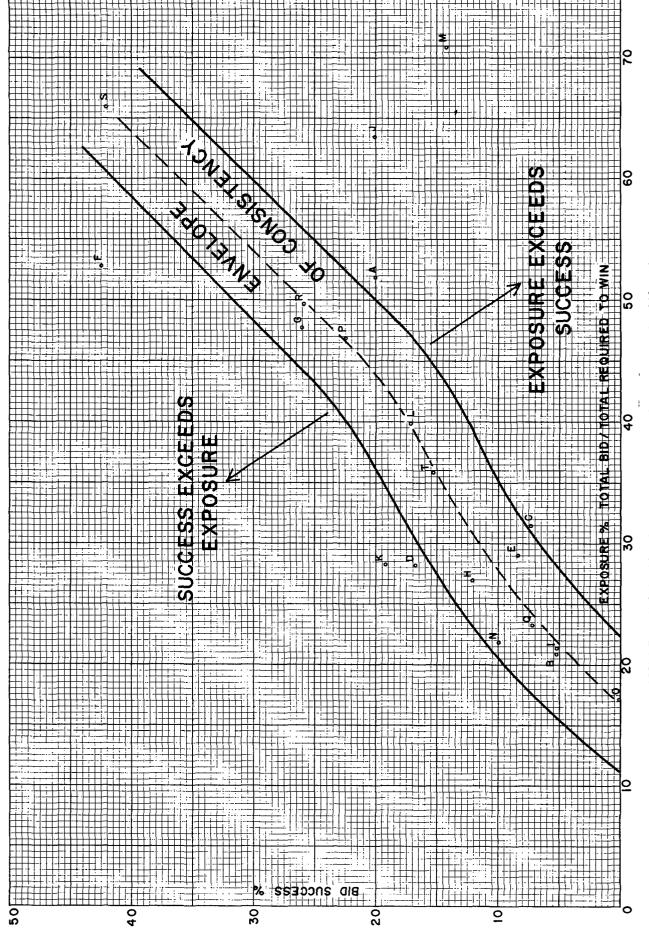


FIGURE 3-Relationship of success to proportional exposure in 1970 bid results.

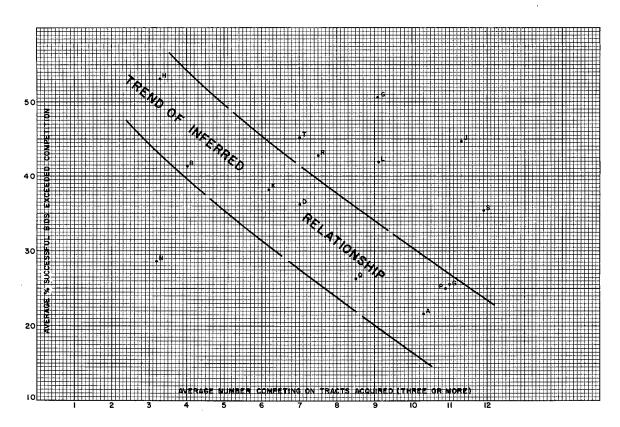


FIGURE 4—Prospect desirability (number competing) as a control of common value assessment (excess bid) in 1970 Western Louisiana Federal Offshore Sale.

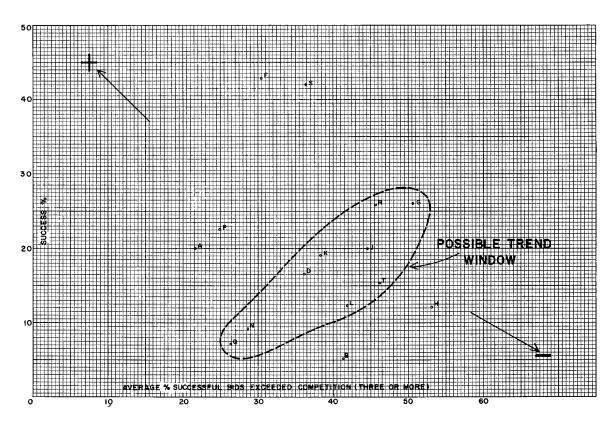


FIGURE 5-A plot of success related to "Money Left on the Table" in 1970 Western Louisiana Federal Offshore Sale.