New Mexico Bureau of Mines and Mineral Resources
Open File Report No. OF-203

ORGANIC GEOCHEMICAL ANALYSIS, SHELL NO. 1 LEEMAN WELL, SIERRA COUNTY, NEW MEXICO

by Stephen R. Jacobson, James S. Rankin,
and James D. Saxton
Chevron U.S.A., Inc.
Denver, Colorado
December 14, 1982

Sam
F 203

Chevron U.S.A. Inc.
700 South Colorado Blvd., P. O. Box 599, Denver, CO 80201

December 14, 1982

Mr. R. A. Bieberman
New Mexico Bureau of Mines
and Mineral Resources
Socorro, NM 87801

Dear Mr. Bieberman:

Enclosed please find results of organic geochemical work done on the Shell #1 Leeman, Sierra County, New Mexico. I've included a second copy for Mr. Sam Thompson; please forward it to him. Also, please keep these results confidential for one year as we've agreed upon previously.

Thanks again for your help and cooperation with this work.

Yours truly,

James S. Rankin

James S. Rankin

JSR:ksh

Enclosure

cc: G. C. Young, Chevron U.S.A.
M. I. Roberson, Chevron U.S.A.

Chevron U.S.A. Inc.
700 South Colorado Blvd., P. O. Box 599, Denver, CO 80201

December 10, 1982

Mr. Clayton S. Valder
Marshall R. Young Oil Co.
750 West Fifth Street
Fort Worth, TX 76102

Dear Mr. Valder:

Enclosed plese find results of the organic geochemical analysis for the Shell No. 1 Leeman, 1980' FNL, 660' FEL, Section 17, T13S-R1E, Sierra County, New Mexico.

The organic geochemical analysis includes the following tests:

1. Total Organic Carbon (TOC)
2. Rock Eval (Pyrolysis)
3. Microscopic Organic Analysis (MOA)
4. Vitrinite Reflectance (Ro) or Thermal Alteration Index (TAI)

Results on the Gartland No. 1 Brister well, Sierra County, New Mexico, had some inconsistency, thus some of the section was resampled. We will send a report on the Gartland well when the additional data is received.

Yours truly,

M. I. Roberson
District Geologist

JSR:ksh

Enclosures

cc: G. C. Young, Chevron U.S.A.

Discussion of Results:

I. Thermal Maturity

The top of the Cretaceous section is centered in the oil-generation zone. Lower in the Cretaceous section the rocks have moved into the condensate and wet gas zone. The thermal maturity increases fairly uniformly with depth. Permian and the upper part of Pennsylvanian-age rocks are found divided by the wet gas - dry gas boundary. From the lower Strawn downward, all the samples were in the dry gas zone.

II. Organic Richness and Type

Samples from the uppermost part of the Cretaceous section had nearly 1% T.O.C., however, the kerogen type was 90% inertinite. The remainder of Cretaceous age samples had T.O.C. values in the fair range (0.5 to 1.0 wt.%) and kerogen type approximately evenly split between oil-prone, gas-prone, and inertinite. Permian age rocks were mostly clean carbonates, but a shale was encountered near the base of the Glorieta Formation. this sample had T.O.C. value of 1.61 wt.% (good range) and 40% each of oil-prone and gas-prone kerogen.

T.O.C. values for the Pennsylvanian through the bottom of the hole were in the fair range and were either of predominately oil-prone or evenly oil-prone and gas-prone kerogen type.

COFRC #	DEPTH (FT)	TYPE	AGE	FORM	DESCRIPTION	S1	S2	S3	TMAX S2	S1/ S1+S2	S2/S3	WT % TOC	HI	OI
40909-001	215-250	D	Ucret	Mesa Ver	Shale	.2	.3	.6	466	.4	.4	.97	26	59
40909-002	290-370	D	Ucret	Mesa Ver	Drk shale	.2	.2	.5	449	.5	.5	.88	25	52
40909-003	550-770	D	Ucret	Mesa Ver	Drk shale	.3	.5	.7	442	.4	.7	.92	51	74
40909-004	830-1000	D	Ucret	Manchos	Drk shale	.2	.1	.8		.6	.2	.76	17	104
40909-005	1100-1270	D	Ucret	Manchos	Drk shale	.3	.4	.7		.4	.6	.96	45	70
40909-006	1300-1390	D	Ucret	Dakota	Drk shale	.3	.3	.8		.5	.4	.71	46	117
40909-007	3100-3220	D	Perm	Glorieta	Drk shale	.4	.2	.9		.7	.2	1.61	10	56
40909-008	4230-4400	D	Perm	Abo	Calc shale	.1	**	1.5		.8	.0	.53	8	283
40909-009	4430-4450	D	Perm	Wlfcmp	Shale	.2	**	.5		.8	.1	.50	8	96
40909-010	5060-5235	D	Penn	Cisco	Gry calc sh	.3	.2	.6		.7	.3	.37	41	149
40909-011	5235-5450	D	Penn	Cisco	Gry calc sh	.4	.1	.5		.8	.2	.86	9	53
40909-012	5680-5860	D	Penn	Canyon	Gry calc sh	.5	.1	.5		.8	.2	1.03	12	50
40909-013	5900-6400	D	Penn	Strawn	Gry calc sh	.2	.1	.5		.7	.2	.57	18	86
40909-014	6400-6580	D	Penn	Strawn	Gry calc sh	.3	.1	.5		.8	.2	.88	11	55
40909-015	6890-7085	D	Penn	Atoka	Gry calc sh	.2	.1	.6		.7	.2	.71	13	91
40909-016	7100-7140	D	Miss	L Valley	Gry calc sh	.2	.1	.7		.7	.2	.75	17	98
40909-017	7180-7215	D	Dev	Percha S	Sh gry sh	.5	.2	.8		.8	.2	.59	31	128
40909-018	7293-7340	D	Sil	Fslman	Sh gry sh	.4	.4	.7		.5	.6	.88	44	80

(** = Value less than 0.1 which is below the detectable limit).

S1: MG HC'S/GM Rock, a measure of the bitumen content and, therefore, of amount of generation that has occurred.

S2: MG HC'S/GM Rock, a measure of the generating capacity. Is a function of the quantity, oil proneness and maturity of the organic matter.

S3: MG CO2/GM Rock, a measure of the ability of the OM to generate non-hydrocarbons, also depends upon quantity, oil proneness and maturity of the OM.

TMAX: Temperature (Deg C.) at which rate of hydrocarbon generation peaks. A function of maturation of the OM.

S1/S1+S2: Ration of amount generated to total generative potential; a maturation indicator.

S2/S3: A measure of the oil proneness of the OM.

HI (Hydrogen Index = 100S2/TOC): MG HC'S/GM organic carbon; a measure of the oil proneness of a unit amount of OM.

OI (Oxygen Index = 100S3/TOC): MG CO2/GM organic carbon; a measure of the ability of a unit amount of the OM to generate non-hydrocarbons.

Type D indicates drill cuttings (picked by a geologist).

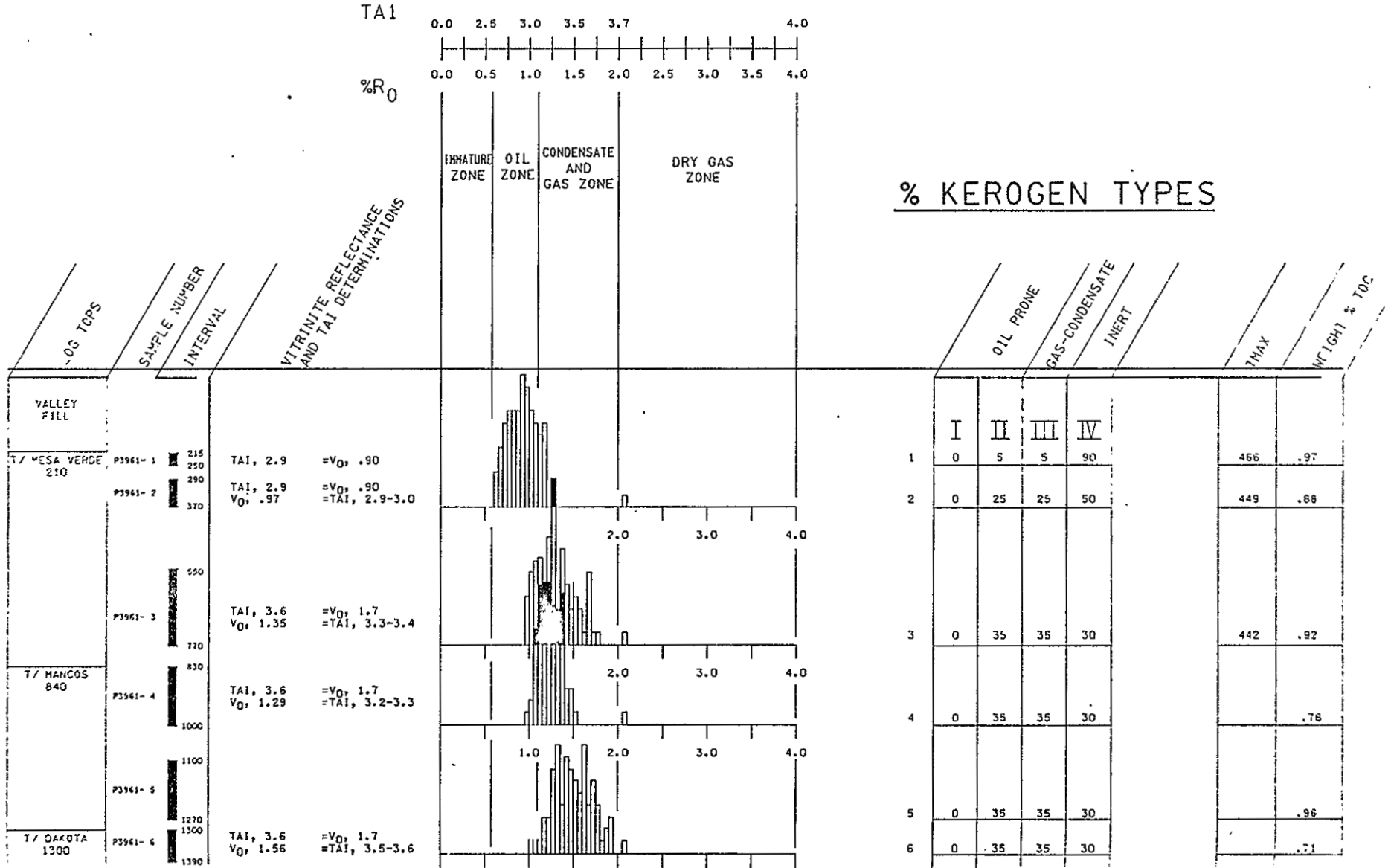
Color key for rock descriptions: gry=gray, drk gry=dark gray, blk=black, lt=light, AA=as above

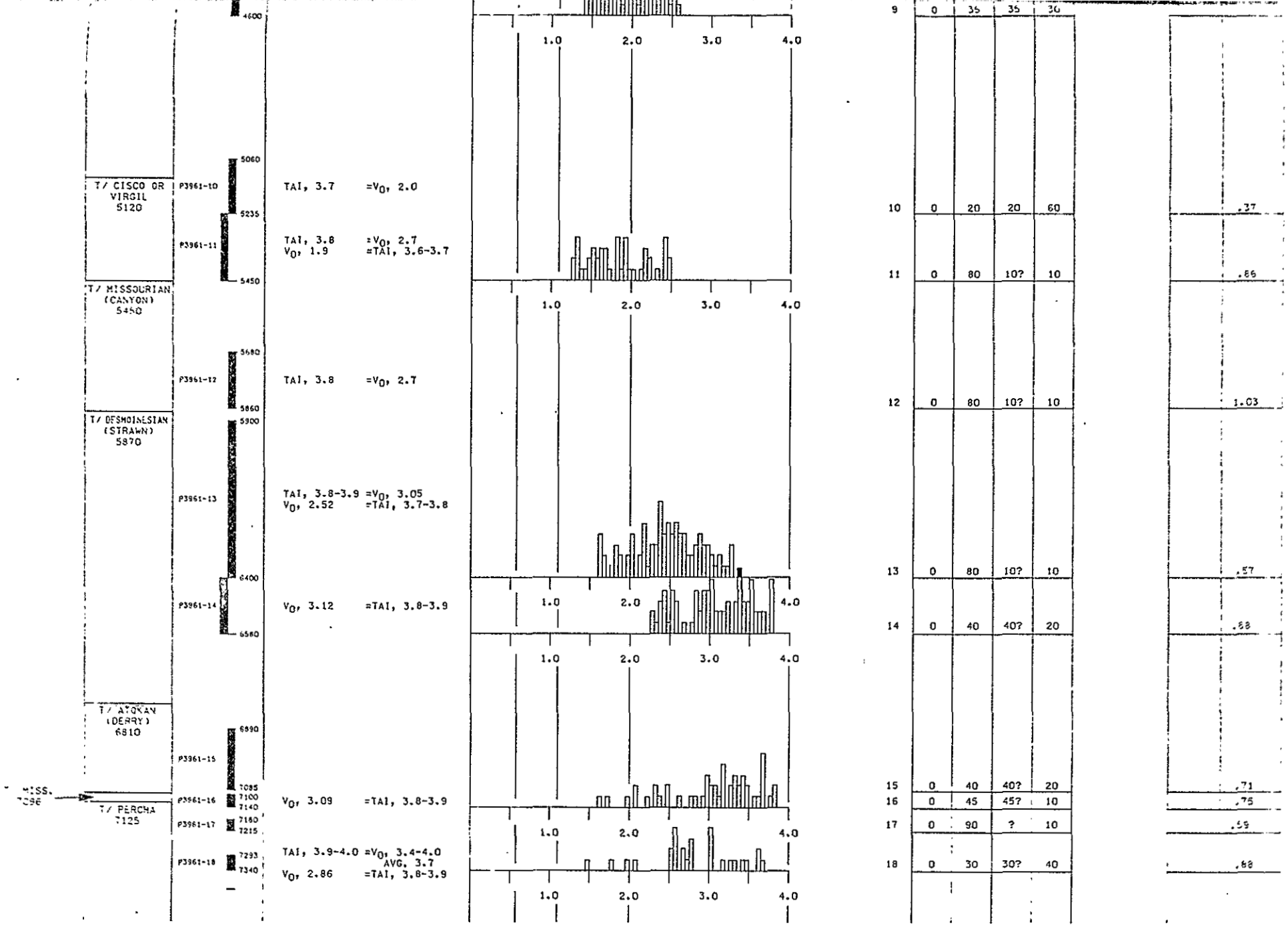
SHELL #1 LEEMAN FED
SEC. 17 - 13S - 1E

SIERRA CO., NEW MEXICO

HYDROCARBON GENERATION ZONES

BIOSTUDY NO. 1089





BIOSTRAT 1589
J.D. SAXTON
11/82

T/ DAKOTA
1330

P3961- 6
1390

T/ SAN ANDRES
1413

T/ GLORIETTA
2096

T/ YESO
2130

P3961- 7
3100
3220

T/ ABO
3246

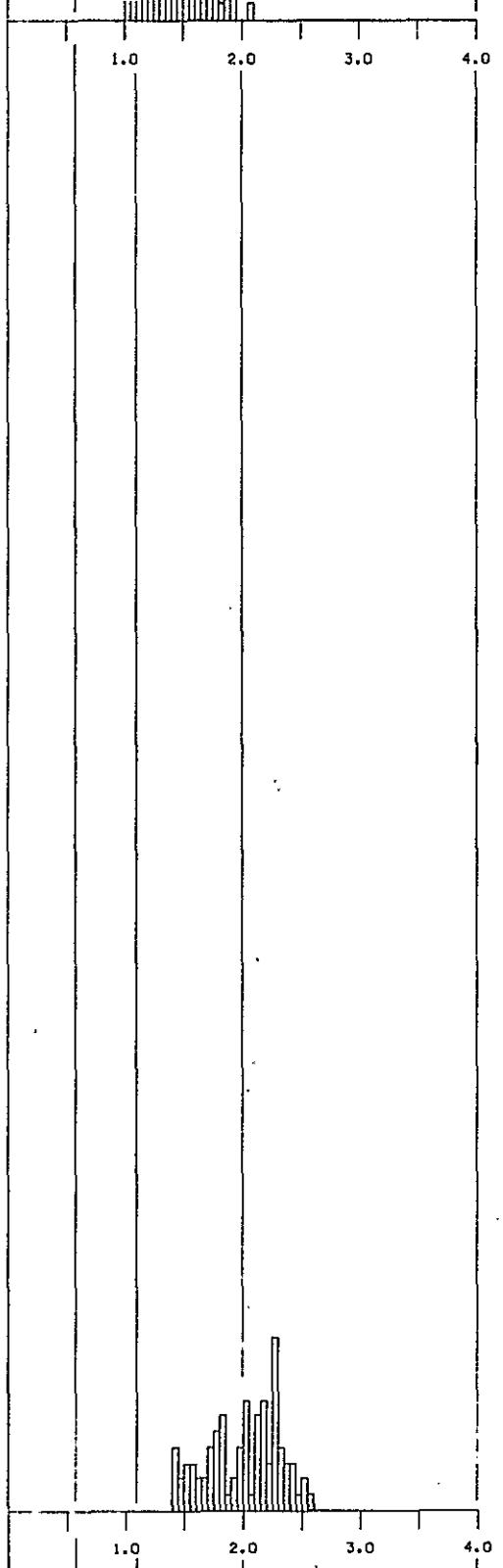
P3961- 8
4230
4400

T/ WOLFCAMP
4380

P3961- 9
4430
4600

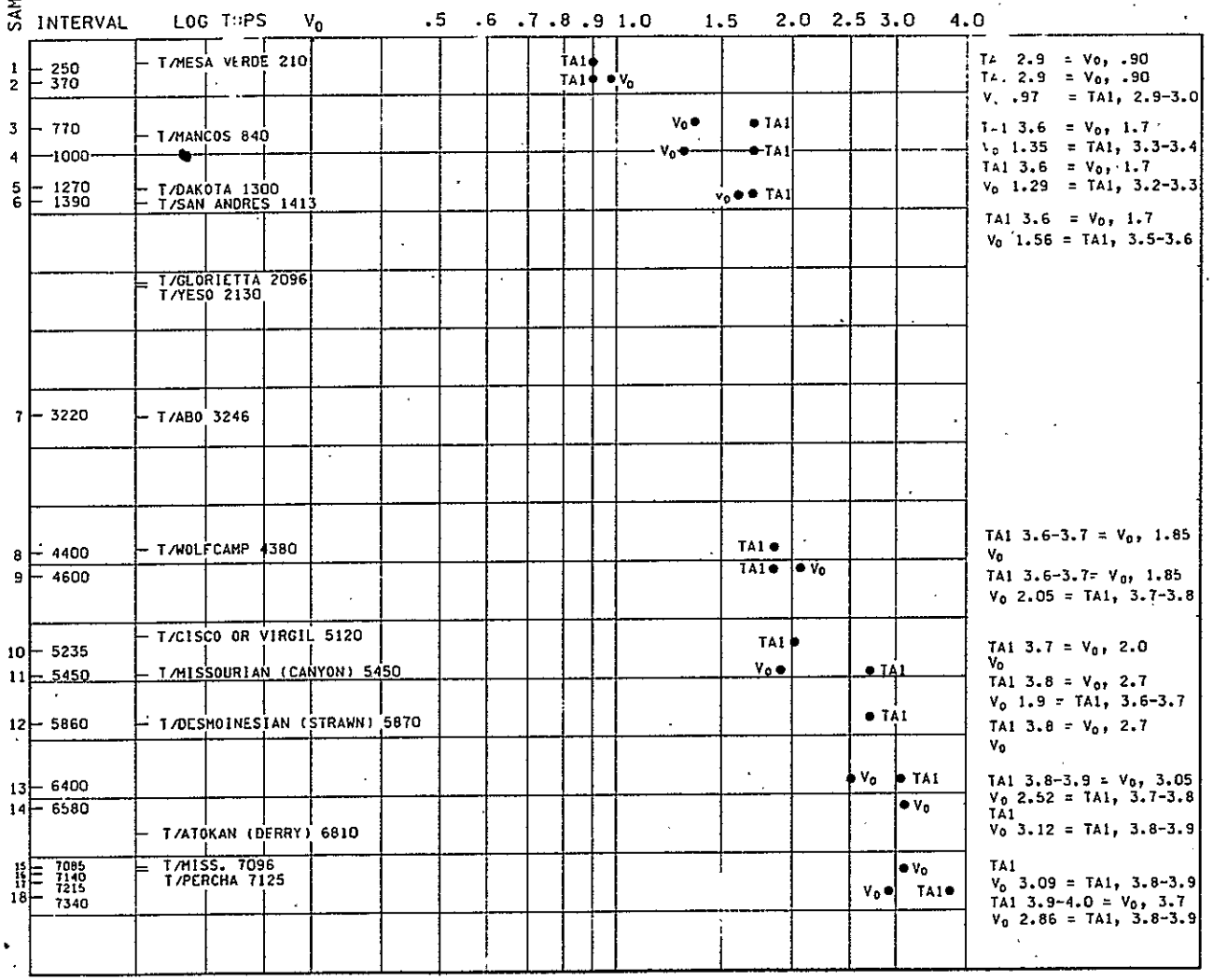
TAI, 3.6-3.7 =V_D, 1.7-2.0
V_D, 1.56 =TAI, 3.5-3.6

TAI, 3.6-3.7 =V_D, 1.7-2.0
V_D, 2.05 =TAI, 3.7-3.8



6	0	35	35	30	.71
7	0	40	40	20	1.61
8	0	35	35	30	.53 .50
9	0	35	35	30	

SHELL #1 - LEEMAN FED.
SIERRA CO., NEW MEXICO



TA 2.9 = V_0, .90
TA 2.9 = V_0, .90
V_0 .97 = TA1, 2.9-3.0

TA1 3.6 = V_0, 1.7
V_0 1.35 = TA1, 3.3-3.4
TA1 3.6 = V_0, 1.7
V_0 1.29 = TA1, 3.2-3.3

TA1 3.6 = V_0, 1.7
V_0 1.56 = TA1, 3.5-3.6

TA1 3.6-3.7 = V_0, 1.85
V_0
TA1 3.6-3.7= V_0, 1.85
V_0 2.05 = TA1, 3.7-3.8

TA1 3.7 = V_0, 2.0
V_0
TA1 3.8 = V_0, 2.7
V_0 1.9 = TA1, 3.6-3.7
TA1 3.8 = V_0, 2.7
V_0

TA1 3.8-3.9 = V_0, 3.05
V_0 2.52 = TA1, 3.7-3.8
TA1
V_0 3.12 = TA1, 3.8-3.9

TA1
V_0 3.09 = TA1, 3.8-3.9
TA1 3.9-4.0 = V_0, 3.7
V_0 2.86 = TA1, 3.8-3.9

J.D. SAXTON
11/12/82

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COMPUTER DRAFTED