TOC and ROCK-EVAL DATA REPORT

U.S.G.S., Permian Basin

HGS No.	County	State	Operator	Well Name	USGS ID	USGS Well	Top Depth (ft.)	Bottom Depth (ft.)	Median Depth (ft.)	Sample Type	Rock-Eval TOC	S1	S2	S3	Tmax (°C)		Cal. %Ro	Meas. %Ro	HI	OI	S2/S3	S1/TOC	PI	Notes Checks	Notes Pyrogram
05-3115-124312	Lea	NM	Phillips Petro.	9 Santa Fe		A753	4493		4493	core	1.87	3.16	6.04	0.39	438		0.72		323	21	15	169	0.34		n;lts2sh
05-3115-124313	Lea	NM	Phillips Petro.	3 Hale		A756	4132		4132	core	1.23	1.30	4.54	0.34	438		0.72		369	28	13	106	0.22		n
05-3115-124314	Lea	NM	Phillips Petro.	73 Santa Fe		A764	8962		8962	core	0.59	0.62	0.71	0.32	445		0.85		120	54	2	105	0.47		n
05-3115-124315	Lea	NM	Phillips Petro.	8 Woolworth		B014	3431		3431	core	0.26	0.45	0.45	0.19	377	*	-1.00		173	73	2	173	0.50		f
05-3115-124316	Yoakum	TX	Petro Lewis Corp.	1 Harrison		C822	9029		9029	core	0.18	0.12	0.22	0.11	443	*	0.81		122	61	2	67	0.35		n
05-3115-124317	Yoakum	TX	Petro Lewis Corp.	2 Bowden		C823	8925		8925	core	0.09	0.09	0.08	0.10	443	*	0.81		89	111	1	100	0.53		f
05-3115-124318	Yoakum	TX	Petro Lewis Corp.	1 Gentry		C824	8934		8934	core	0.34	0.38	0.65	0.17	442		0.80		191	50	4	112	0.37		n
05-3115-124319	DeBaca	NM	US Operating	1 Good State		DZ17942	4410	4420	4415	cuttings	0.32	0.18	0.24	0.30	486	*	1.59		75	94	1	56	0.43		f
05-3115-124320	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	13900	13910	13905	cuttings	10.15	3.60	2.60	0.44	574		3.17		26	4	6	35	0.58		lts2p;hts2p
05-3115-124321	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	13500	13510	13505	cuttings	1.64	0.97	0.51	0.22	463		1.17		31	13	2	59	0.66		f
05-3115-124322	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	13000	13010	13005	cuttings	4.80	2.95	2.05	0.29	504		1.91		43	6	7	61	0.59		lts2p;hts2p
05-3115-124323	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	12500	12510	12505	cuttings	2.40	1.10	0.97	0.27	473		1.35		40	11	4	46	0.53		n
05-3115-124324	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	12020	12030	12025	cuttings	1.79	0.77	0.84	0.28	464		1.19		47	16	3	43	0.48		n
05-3115-124325	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	11490	11500	11495	cuttings	1.73	0.79	0.92	0.28	469		1.28		53	16	3	46	0.46		n
05-3115-124326	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	10990	11000	10995	cuttings	2.86	1.43	1.82	0.30	459		1.10		64	10	6	50	0.44		n;lts2sh
05-3115-124327	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	10050	10060	10055	cuttings	3.28	2.34	3.26	0.37	454		1.01		99	11	9	71	0.42		n;lts2sh
05-3115-124328	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	9500	9510	9505	cuttings	1.41	1.77	1.96	0.74	447		0.89		139	52	3	126	0.47		n;lts2sh
05-3115-124329	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	9000	9010	9005	cuttings	1.88	2.04	3.06	0.47	450		0.94		163	25	7	109	0.40		n;lts2sh
05-3115-124330	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	8510	8520	8515	cuttings	2.03	1.13	2.14	0.43	444		0.83		105	21	5	56	0.35		n
05-3115-124331	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	8000	8010	8005	cuttings	2.63	1.91	3.95	0.41	446		0.87		150	16	10	73	0.33		n
05-3115-124332	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	7550	7560	7555	cuttings	4.69	3.11	7.53	0.55	443		0.81		161	12	14	66	0.29		n
05-3115-124333	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	6030	6040	6035	cuttings	1.66	1.06	5.29	0.41	441		0.78		319	25	13	64	0.17		n
05-3115-124334	Reeves	TX	Conoco	#1 Caldwell Estate 4		DZ19164	4470	4480	4475	cuttings	2.51	1.35	12.12	0.46	439		0.74		483	18	26	54	0.10		n
05-3115-124335	Lea	NM	Wainoco Oil	3 Aztec State		DZ19276	10280	10290	10285	cuttings	0.23	0.32	0.25	0.22	347	*	-1.00		109	96	1	139	0.56		f
05-3115-124336	Lea	NM	Wainoco Oil	3 Aztec State		DZ19276	10800	10810	10805	cuttings	0.74	0.64	0.77	0.27	453		0.99		104	36	3	86	0.45		n
05-3115-124337	Lea	NM	Wainoco Oil	3 Aztec State		DZ19276	11000	11010	11005	cuttings	1.14	0.72	1.31	0.34	442		0.80		115	30	4	63	0.35		n;lts2sh
05-3115-124338	Lea	NM	Wainoco Oil	3 Aztec State		DZ19276	11370	11375	11372.5	cuttings	0.68	0.62	0.66	0.27	451		0.96		97	40	2	91	0.48		n
05-3115-124339	DeBaca	NM	Hunt Oil	1 Cooper		DZ19403	2902		2902.2	core	0.14	0.11	0.32	0.14	509	*	2.00		229	100	2	79	0.26		f
05-3115-124340	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	11660	11670	11665	cuttings	1.36	0.61	0.93	0.43	460		1.12		68	32	2	45	0.40		n
05-3115-124341	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	11400	11410	11405	cuttings	1.24	0.37	1.02	0.39	465		1.21		82	31	3	30	0.27		n
05-3115-124342	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	10750	10760	10755	cuttings	0.46	0.34	0.39	0.21	458	*	1.08		85	46	2	74	0.47		n
05-3115-124343	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	10020	10030	10025	cuttings	1.11	0.78	1.19	0.36	449		0.92		107	32	3	70	0.40		n
05-3115-124344	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	9500	9510	9505	cuttings	1.45	1.16	1.54	0.43	451		0.96		106	30	4	80	0.43		n
05-3115-124345	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	8900	8910	8905	cuttings	0.75	0.68	1.07	0.28	447		0.89		143	37	4	91	0.39		n
05-3115-124346	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	8100	8110	8105	cuttings	1.04	0.52	1.43	0.27	450		0.94		138	26	5	50	0.27		n
05-3115-124347	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	7400	7410	7405	cuttings	0.82	0.80	0.90	0.28	452		0.98		110	34	3	98	0.47		n
05-3115-124348	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	6900	6910	6905	cuttings	2.05	1.58	4.25	0.34	448		0.90		207	17	12	77	0.27		n
05-3115-124349	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	6500	6510	6505	cuttings	1.02	0.67	0.53	0.26	463		1.17		52	25	2	66	0.56		f
05-3115-124350	Eddy	NM	Southland Royalty	1-8 Holly Federal		DZ19559	6200	6210	6205	cuttings	1.09	0.96	0.99	0.28	452		0.98		91	26	4	88	0.49		n
05-3115-124351	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	11740	11750	11745	cuttings	1.64	0.91	0.71	0.23	464		1.19		43	14	3	55	0.56		n
05-3115-124352	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	11000	11010	11005	cuttings	1.55	0.54	0.88	0.20	447		0.89		57	13	4	35	0.38		n
05-3115-124353	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	10000	10010	10005	cuttings	2.73	1.81	2.85	0.34	454		1.01		104	12	8	66	0.39		n;lts2sh
05-3115-124354	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	9500	9510	9505	cuttings	1.04	1.48	3.92	0.46	444		0.83		377	44	9	142	0.27		n;lts2sh
05-3115-124355	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	8990	9000	8995	cuttings	1.58	1.27	2.28	0.39	447		0.89		144	25	6	80	0.36		n;lts2sh
05-3115-124356	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	8500	8510	8505	cuttings	1.31	1.02	1.49	0.30	450		0.94		114	23	5	78	0.41		n
05-3115-124357	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	8010	8020	8015	cuttings	3.35	2.38	5.26	0.39	446		0.87		157	12	13	71	0.31		n;lts2sh
05-3115-124358	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	7510	7520	7515	cuttings	3.44	2.24	5.98	0.42	444		0.83		174	12	14	65	0.27		n

TOC and ROCK-EVAL DATA REPORT

U.S.G.S., Permian Basin

HGS No.	County	State	Operator	Well Name	USGS ID	USGS Well	Top Depth (ft.)	Bottom Depth (ft.)	Median Depth (ft.)	Sample Type	Rock-Eval TOC	S1	S2	S3	Tmax (°C)	Cal. %Ro	Meas. %Ro	HI	OI	S2/S3	S1/TOC	PI	Notes Checks	Notes Pyrogram
05-3115-124359	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	7000	7010	7005	cuttings	2.10	1.78	6.36	0.41	446	0.87		303	20	16	85	0.22		n
05-3115-124360	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	6500	6510	6505	cuttings	1.47	0.86	5.65	0.34	440	0.76		384	23	17	59	0.13		n
05-3115-124361	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	6000	6010	6005	cuttings	2.05	1.31	6.81	0.37	441	0.78		332	18	18	64	0.16		n
05-3115-124362	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	5520	5530	5525	cuttings	1.41	0.60	4.21	0.40	439	0.74		299	28	11	43	0.12		n
05-3115-124363	Reeves	TX	Conoco	#2 Caldwell Estate 4		DZ20112	4690	4700	4695	cuttings	1.68	0.61	6.94	0.46	439	0.74		413	27	15	36	0.08		n
05-3115-124364	Kent	TX	Hamilton Brothers	1-39 Wallace		DZ20330	5260	5270	5265	cuttings	0.73	0.55	0.73	0.46	436	0.69		100	63	2	75	0.43		n
05-3115-124365	Yoakum	TX	Tenneco Oil	1 Todd		DZ20473	13000	13010	13005	cuttings	0.66	0.32	1.28	0.26	443	0.81		194	39	5	48	0.20		n
05-3115-124366	Yoakum	TX	Tenneco Oil	1 Todd		DZ20473	12340	12350	12345	cuttings	2.22	0.38	2.57	0.38	442	0.80		116	17	7	17	0.13		n
05-3115-124367	Yoakum	TX	Tenneco Oil	1 Todd		DZ20473	11800	11810	11805	cuttings	0.80	0.20	0.50	0.23	453	0.99		62	29	2	25	0.29		n
05-3115-124368	Yoakum	TX	Tenneco Oil	1 Todd		DZ20473	10900	10910	10905	cuttings	1.03	0.66	2.23	0.33	442	0.80		217	32	7	64	0.23		n
05-3115-124369	Yoakum	TX	Tenneco Oil	1 Todd		DZ20473	10300	10310	10305	cuttings	1.76	0.83	4.49	0.42	439	0.74		255	24	11	47	0.16		n
05-3115-124370	Yoakum	TX	Tenneco Oil	1 Todd		DZ20473	9990	10000	9995	cuttings	2.46	0.67	6.59	0.49	436	0.69		268	20	13	27	0.09		n
05-3115-124371	Yoakum	TX	Tenneco Oil	1 Todd		DZ20473	9500	9510	9505	cuttings	1.11	0.71	2.01	0.35	446	0.87		181	32	6	64	0.26		n
05-3115-124372	Yoakum	TX	Tenneco Oil	1 Todd		DZ20473	9040	9050	9045	cuttings	1.16	0.97	2.47	0.40	442	0.80		213	34	6	84	0.28		n
05-3115-124373	Yoakum	TX	Tenneco Oil	1 Todd		DZ20473	8150	8160	8155	cuttings	1.32	0.80	3.10	0.37	438	0.72		235	28	8	61	0.21		n

Note: "-1" indicates not measured or meaningless ratio

* Tmax data not reliable due to poor S2 peak

TOC = weight percent organic carbon in rock
S1, S2 = mg hydrocarbons per gram of rock
S3 = mg carbon dioxide per gram of rock
Tmax = °C

HI = hydrogen index = S2 x 100 / TOC
OI = oxygen index = S3 x 100 / TOC
S1/TOC = normalized oil content = S1 x 100 / TOC
PI = production index = S1 / (S1+S2)
Calculcated%VRo = 0.0180 x Tmax - 7.16 (Jarvie et al., 2001)
Measured %Ro = measured vitrinite reflectance

Notes:
c = Rock-Eval analysis checked and confirmed
lc = Leco TOC analysis checked and confirmed

Pyrogram:
n=normal
ltS2sh = low temperature S2 shoulder
ltS2p = low temperature S2 peak
htS2p = high temperature S2 peak
f = flat S2 peak
na = printer malfunction pyrogram not available

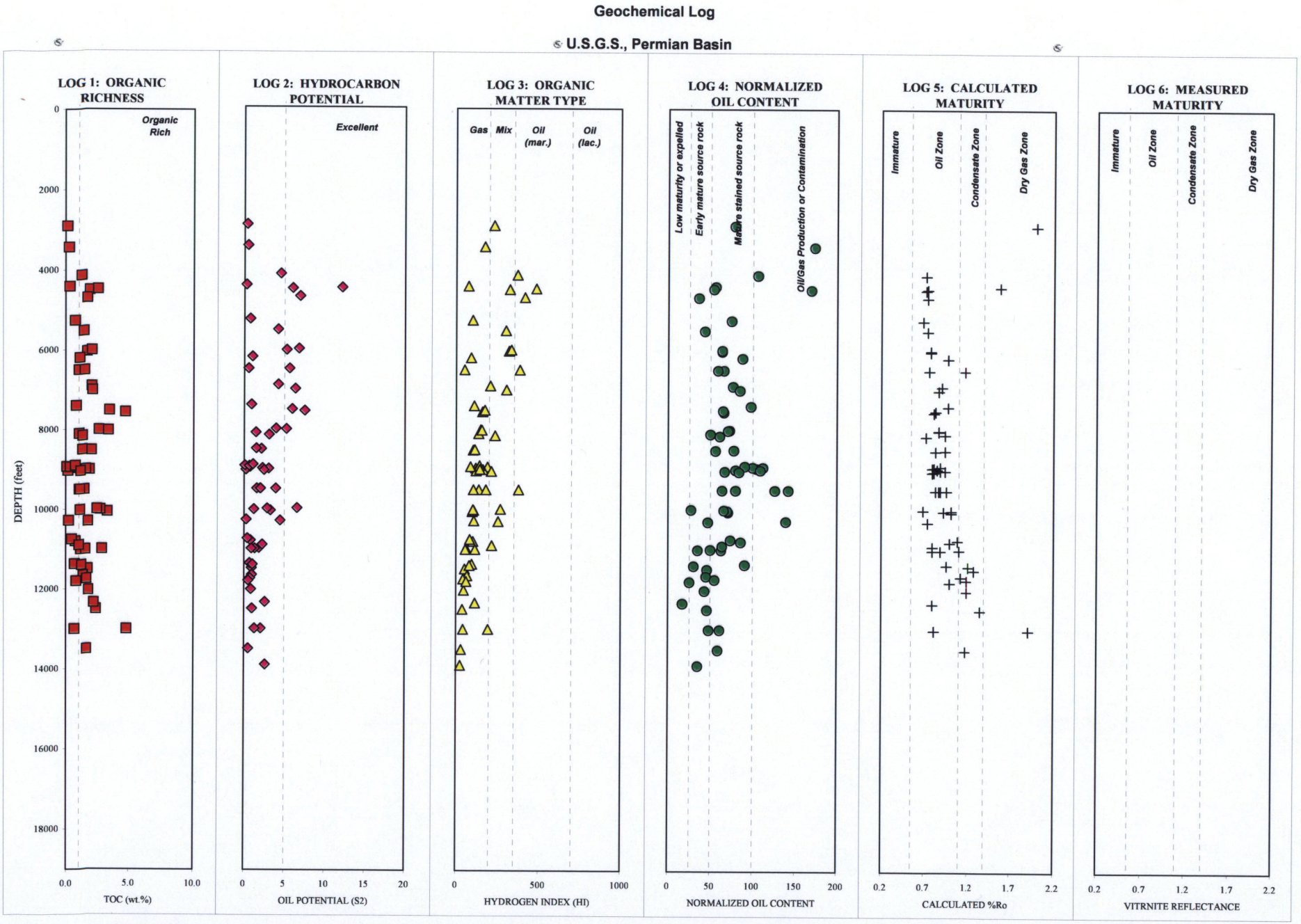

Figure 1. Geochemical log of TOC, remaining potential (S2), kerogen type (HI), normalized oil content, and calculated and measured vitrinite reflectance.

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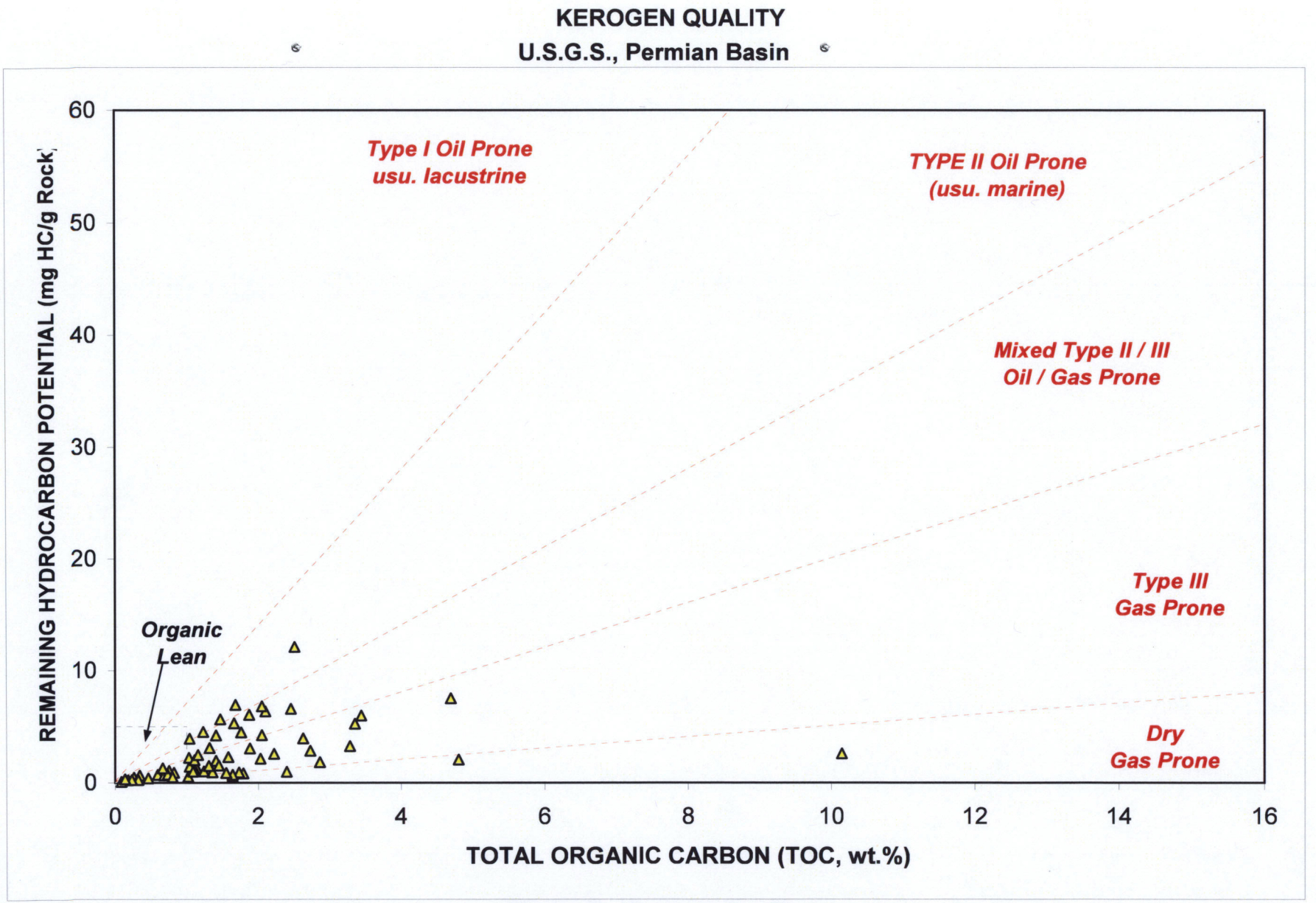

Figure 2. Kerogen Quality

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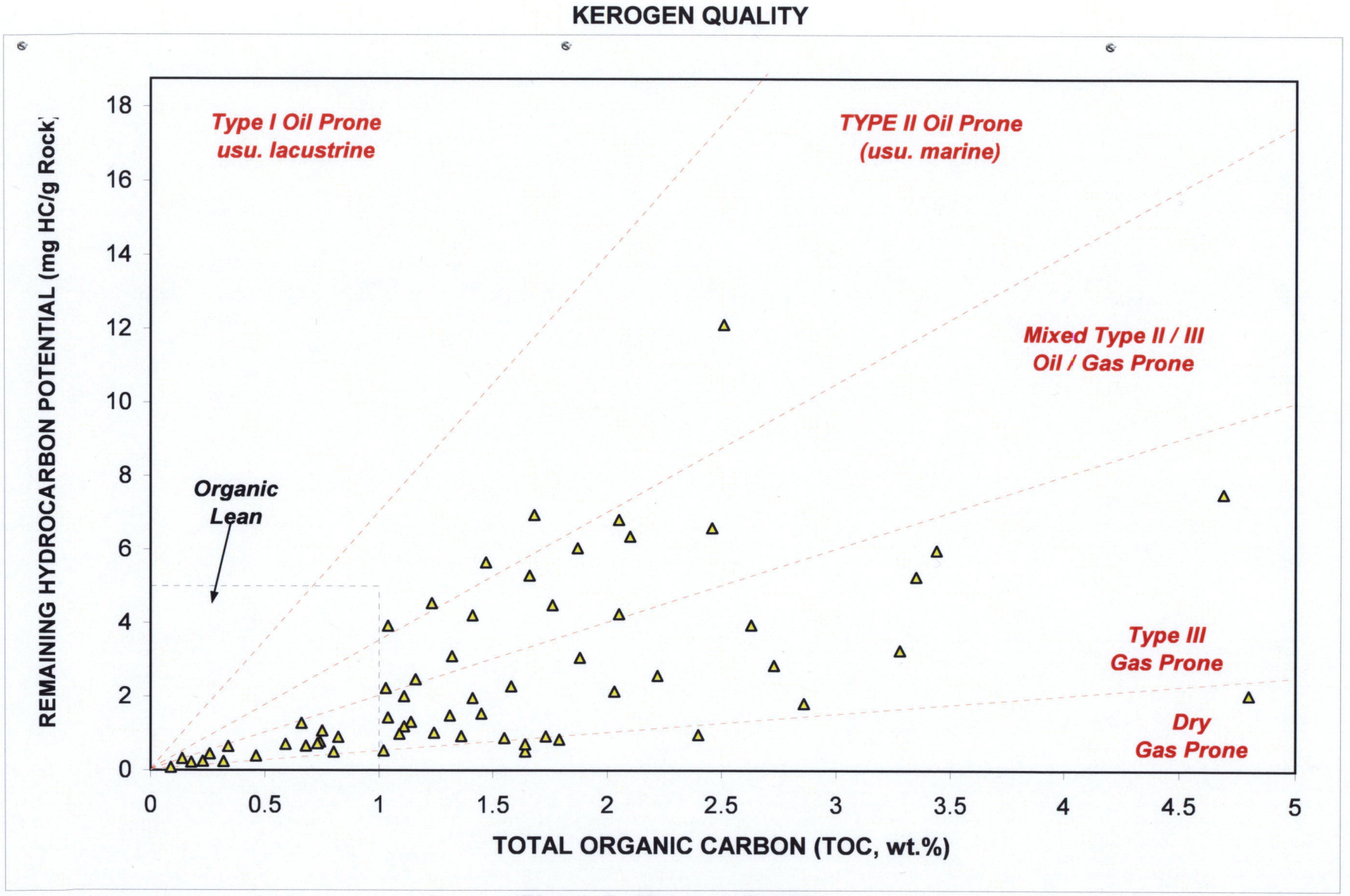

Figure 2. Kerogen Quality

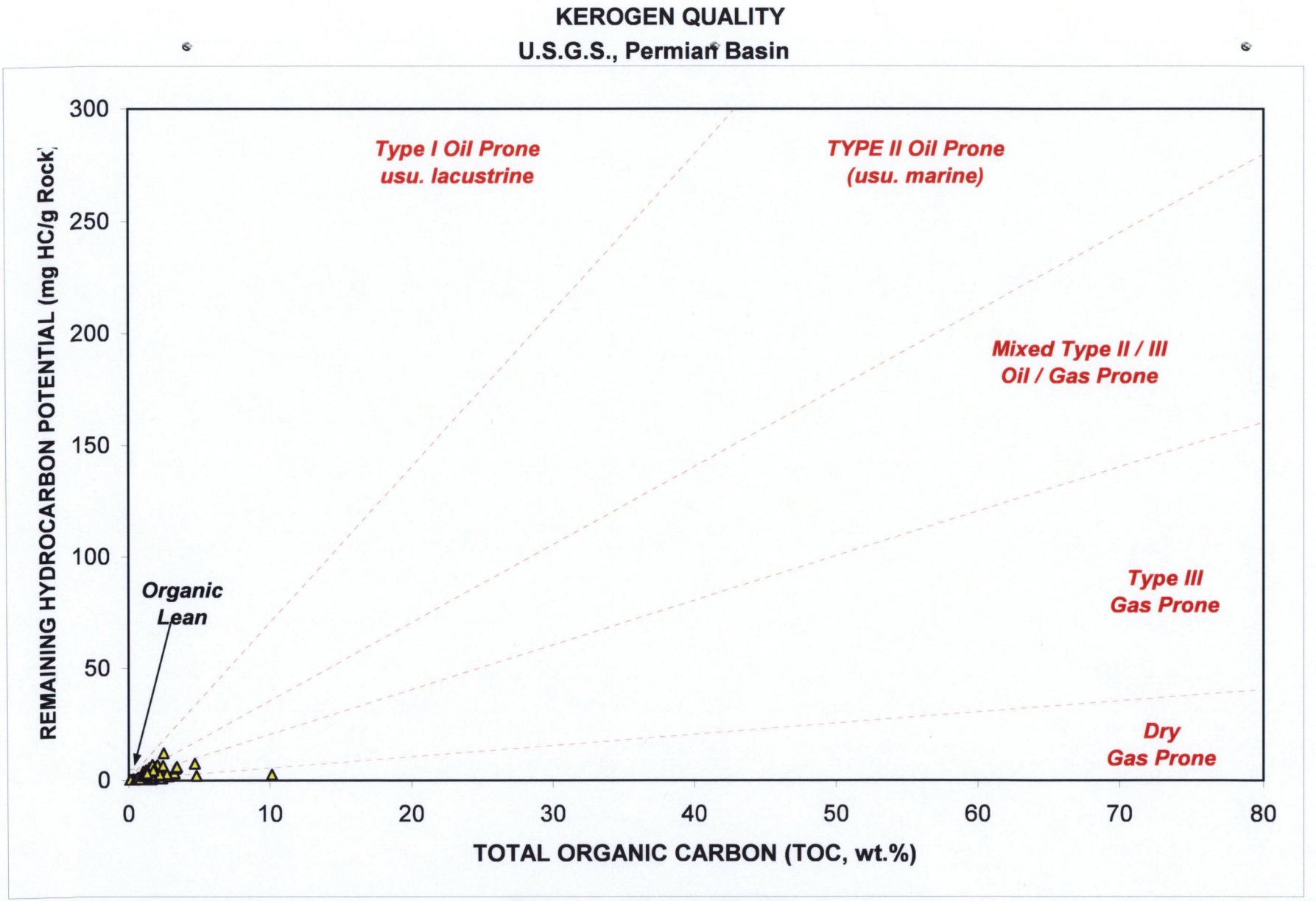

Figure 2. Kerogen Quality

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KEROGEN TYPE
U.S.G.S., Permian Basin

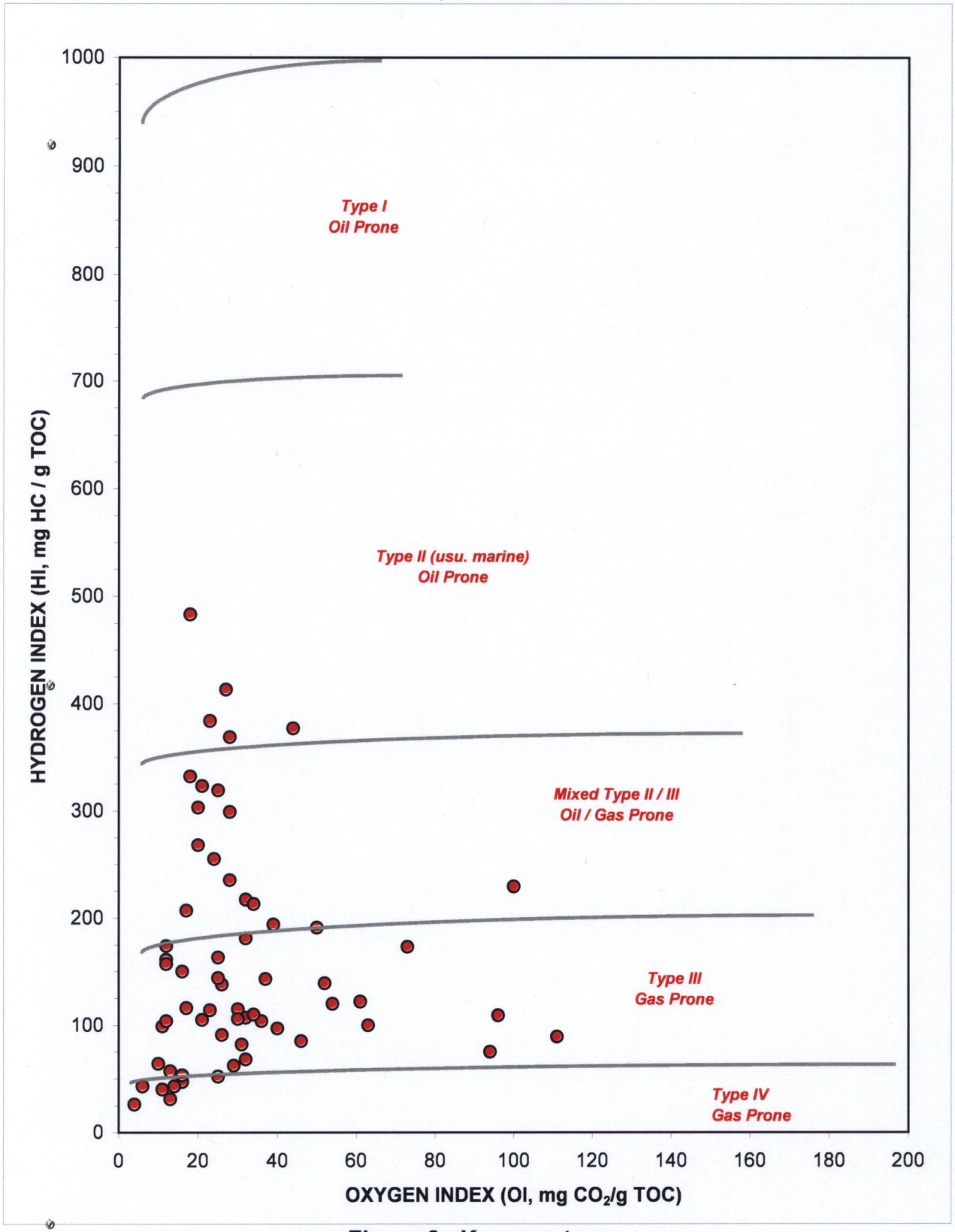

Figure 3. Kerogen type

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KEROGEN TYPE and MATURITY
U.S.G.S., Permian Basin

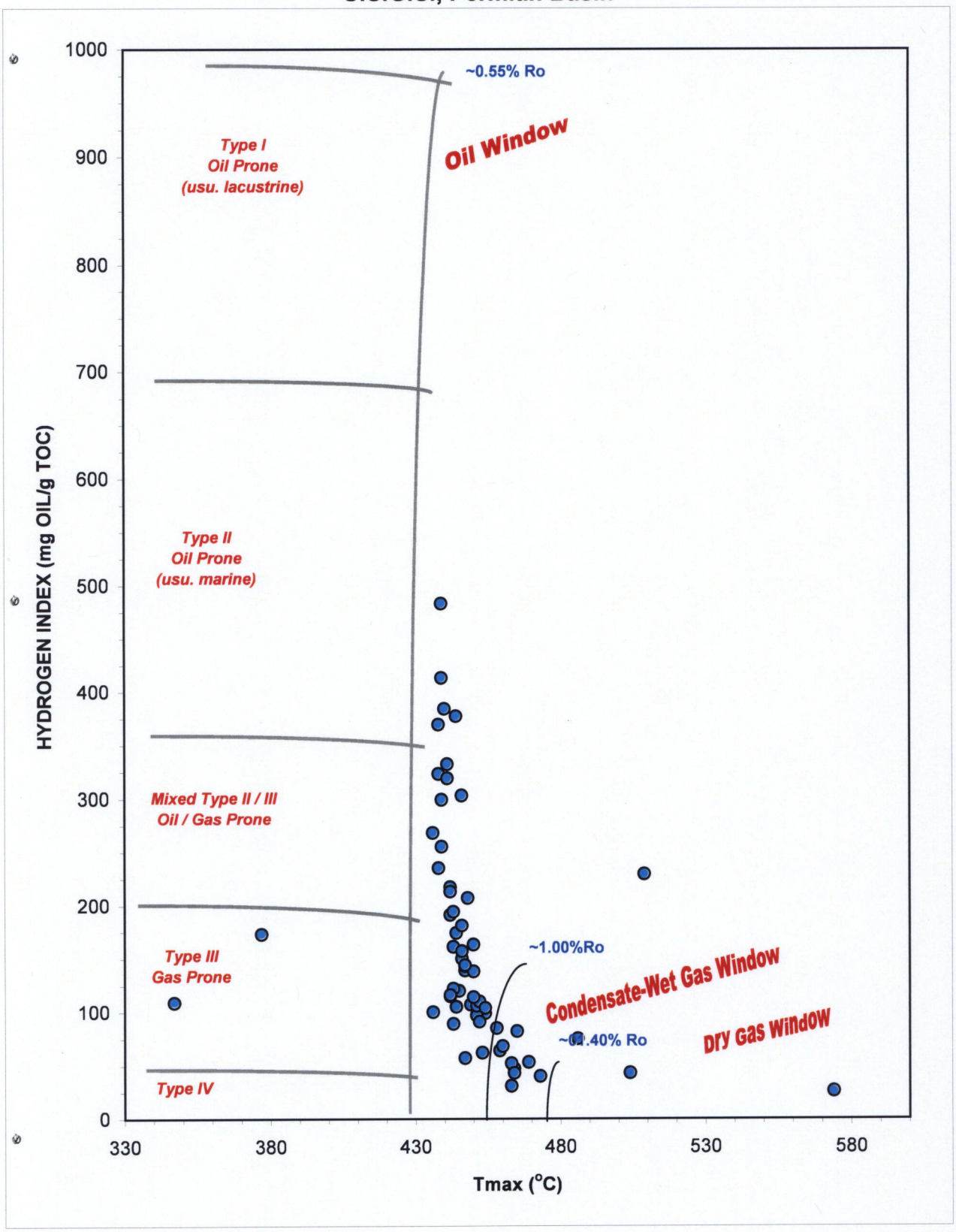

Figure 4a. Kerogen Type and Maturity (Tmax)

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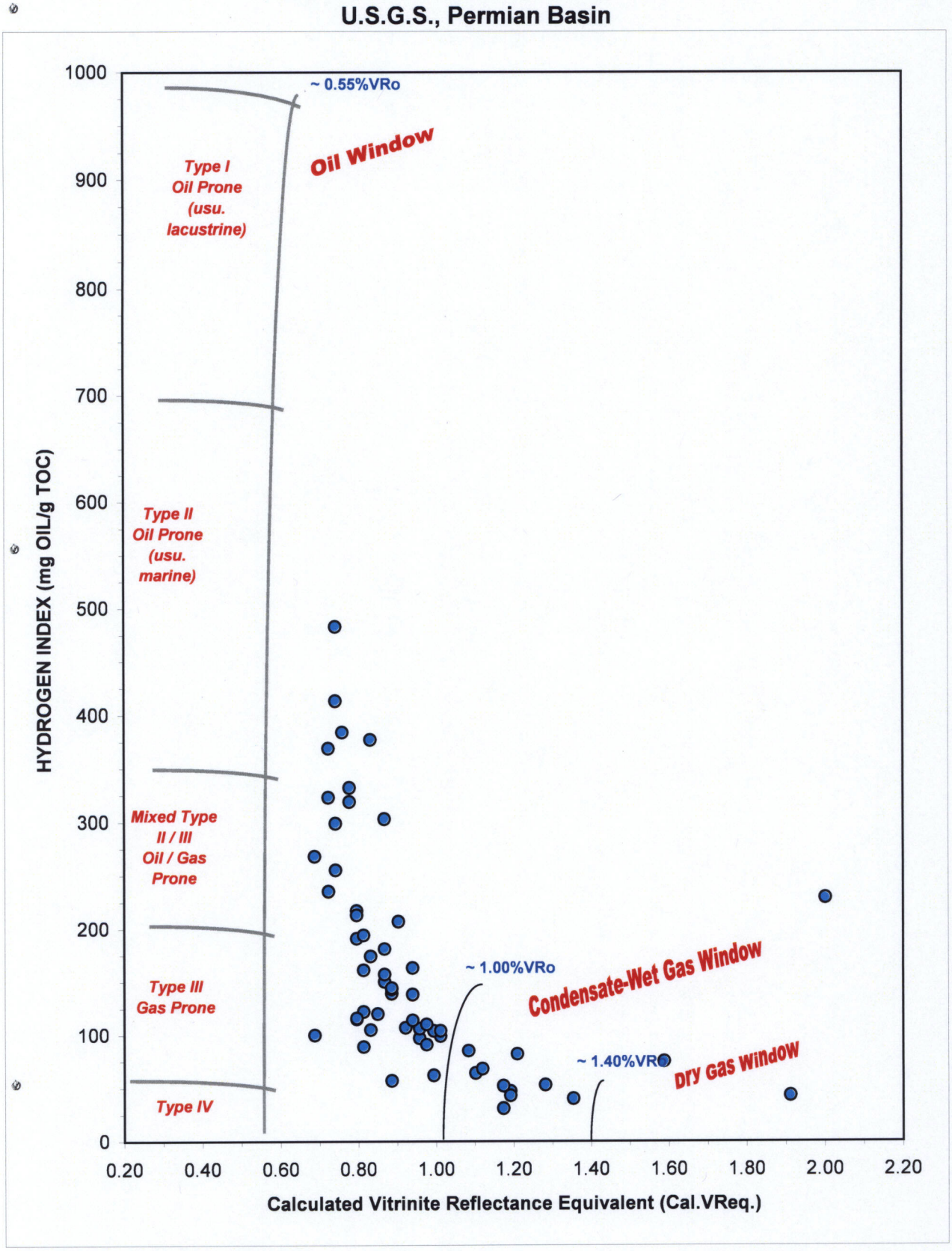

Figure 4b. Kerogen Type and Maturity (Tmax calculated %VRo)

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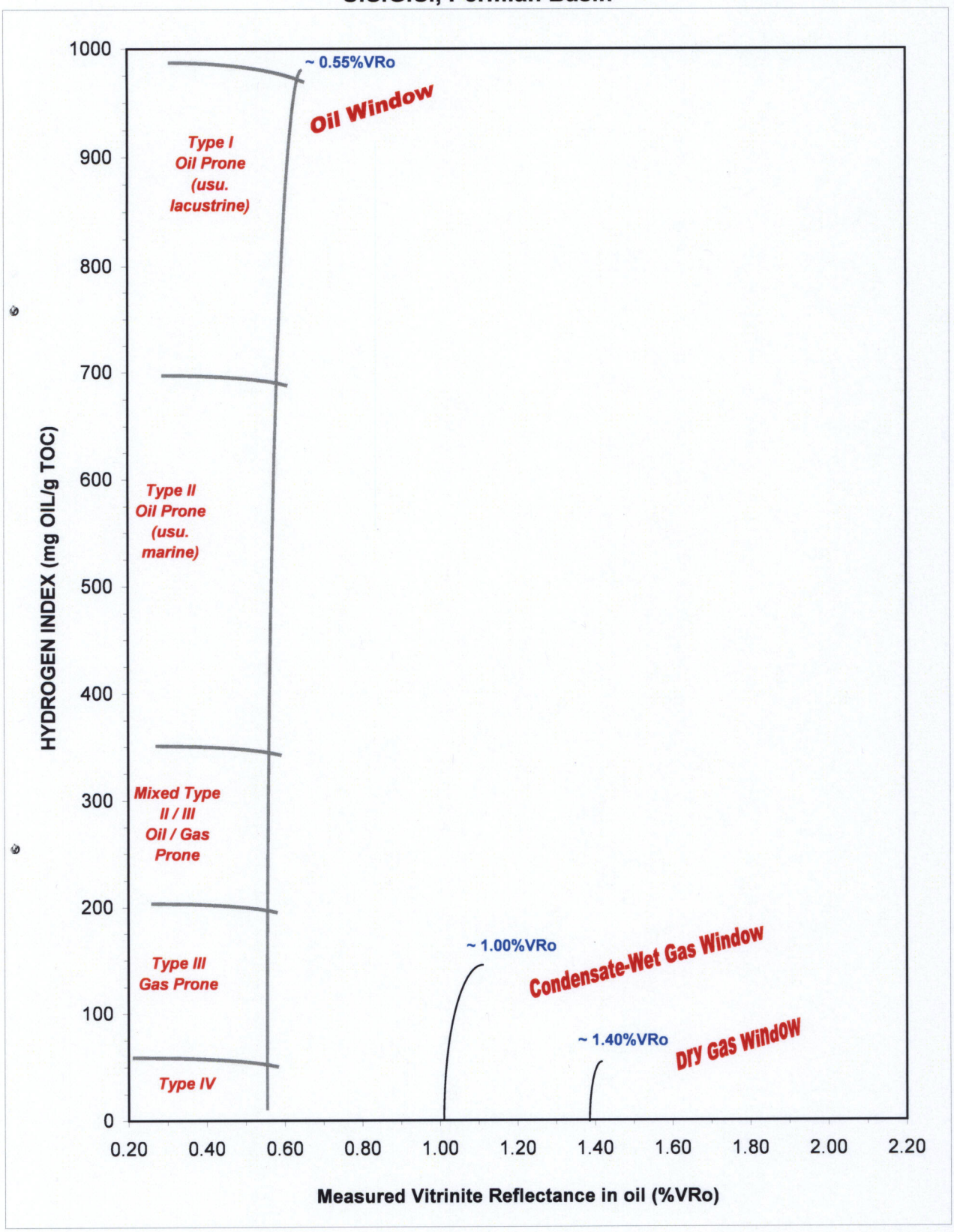

Figure 4c. Kerogen Type and Maturity (Measured vitrinite reflectance)

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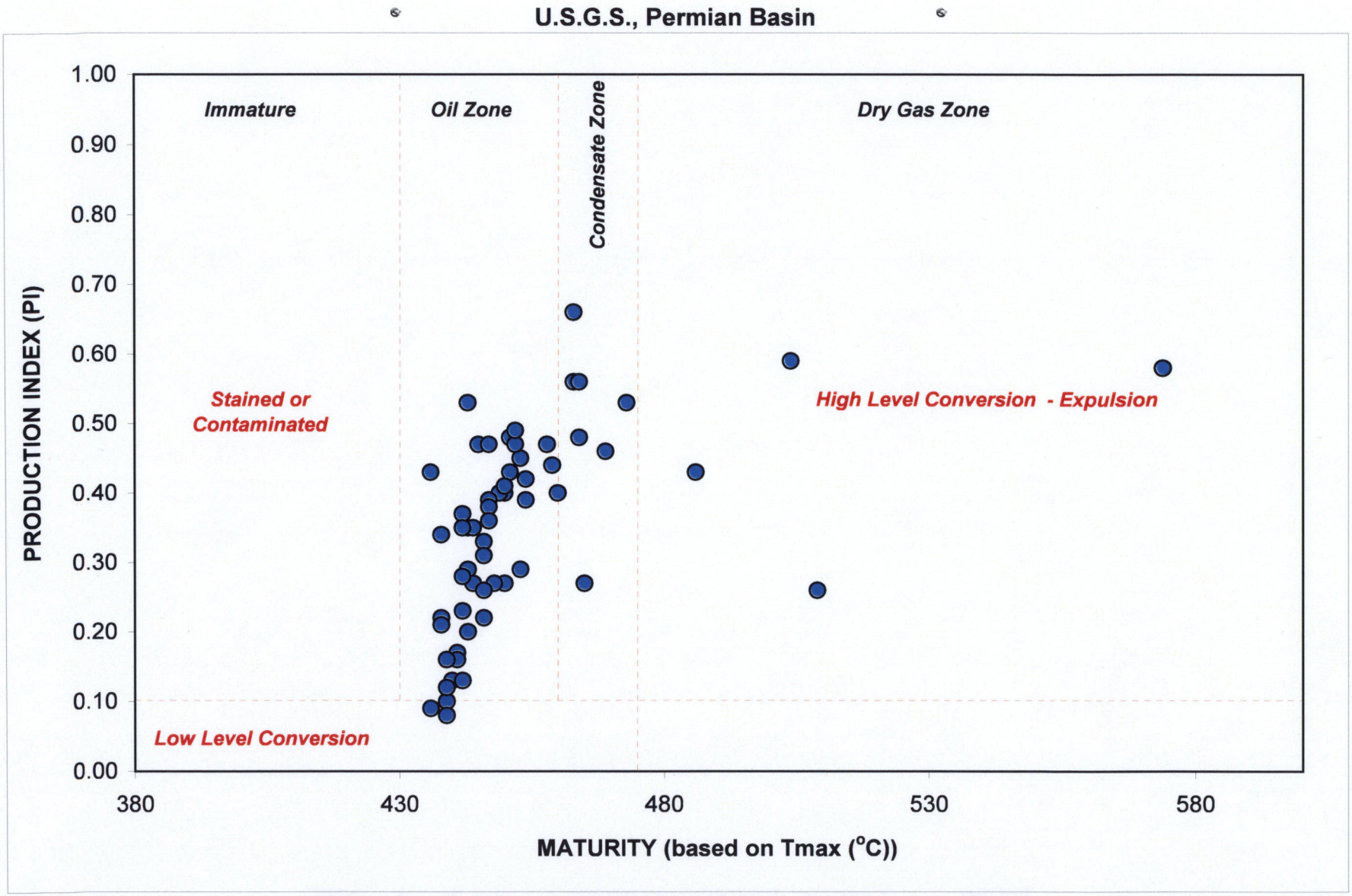

Figure 5a. Kerogen conversion and maturity (based on Tmax).

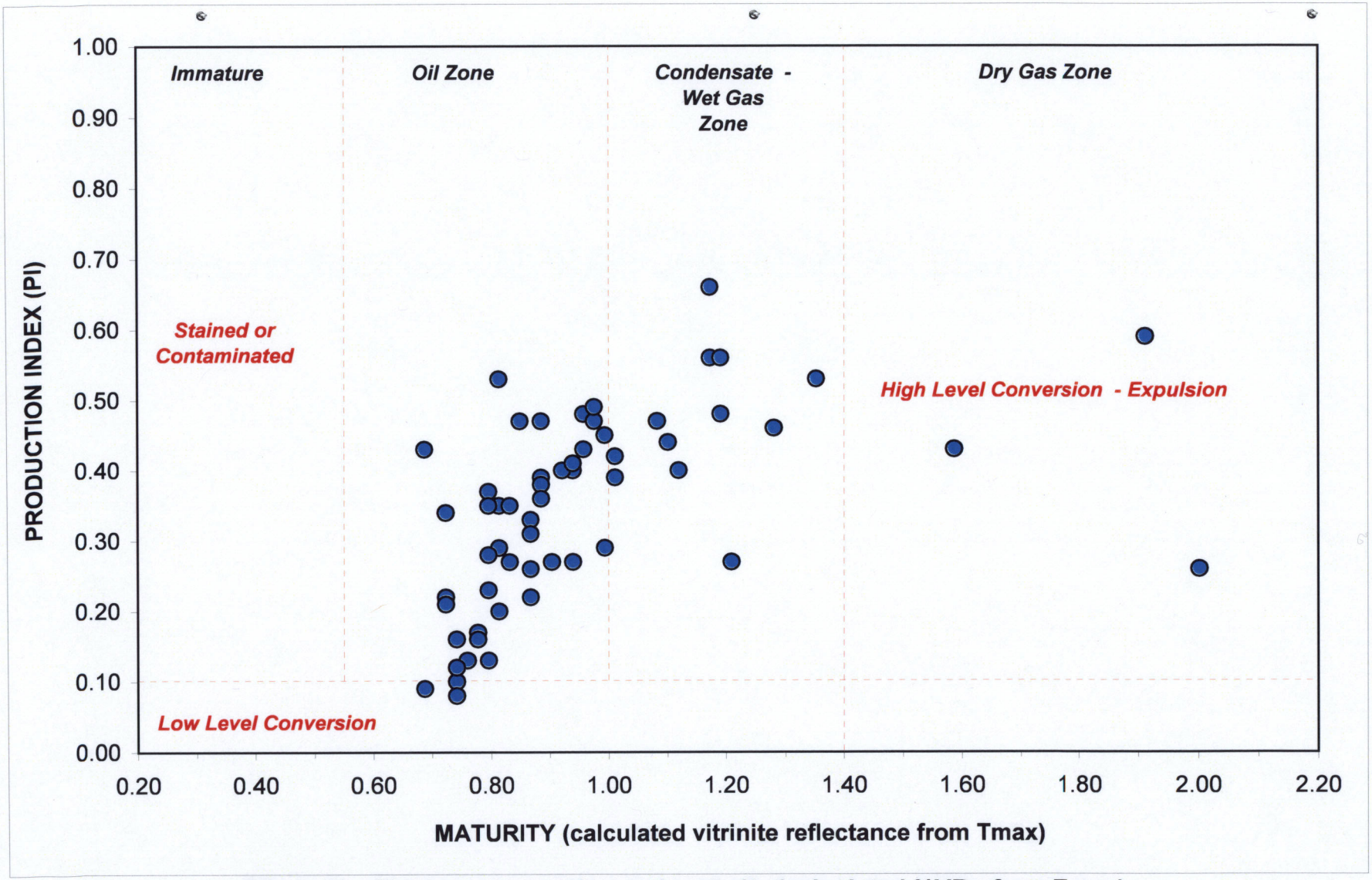

Figure 5b. Kerogen conversion and maturity (calculated %VRo from Tmax).

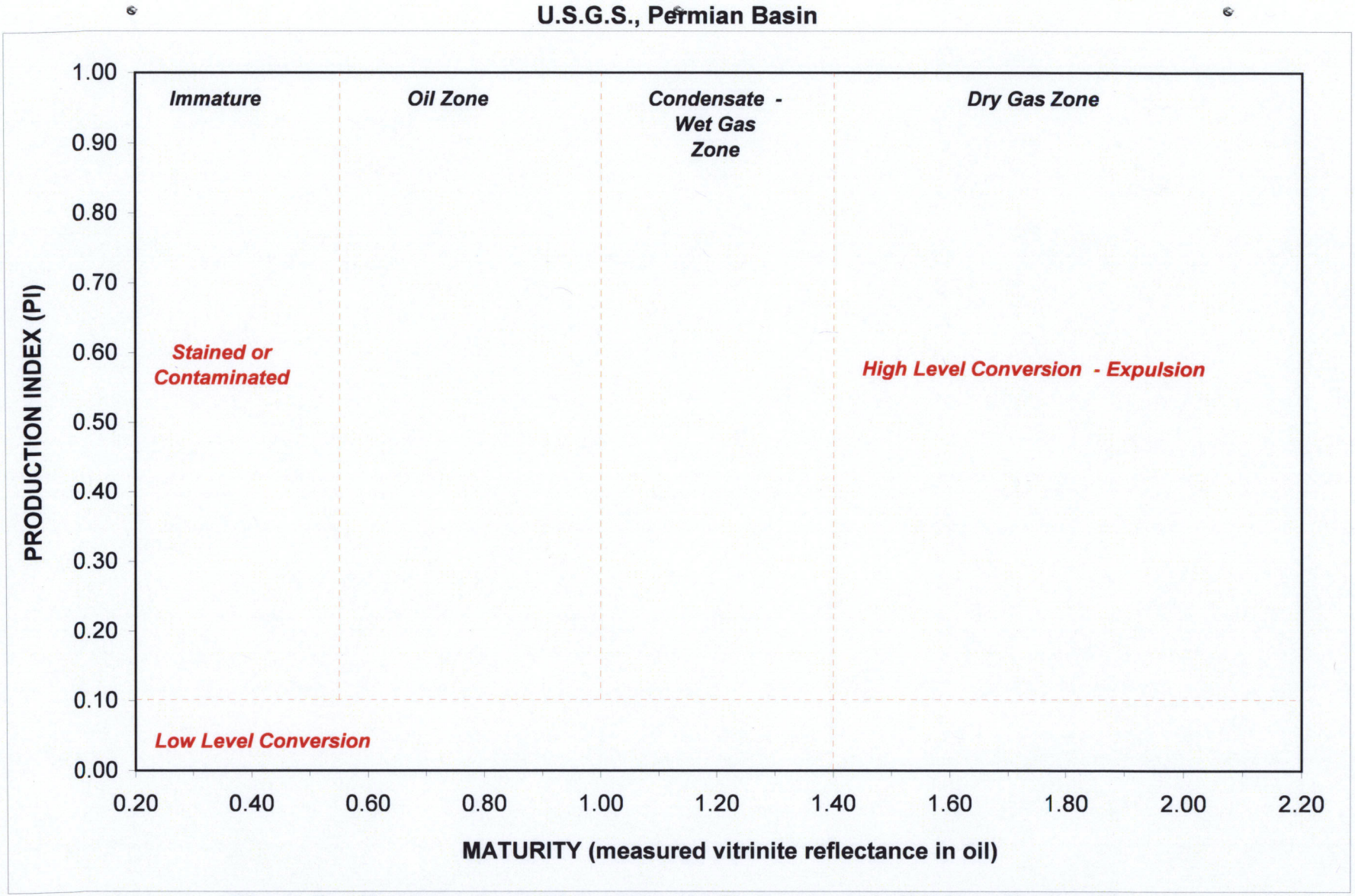

Figure 5c. Kerogen conversion and maturity (measured vitrinite reflectance).

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