

Vitrinite reflectance (whole rock) analyses for Cook Inlet well cuttings from the following:

Shell Oil Company Kustatan Ridge No. 1 (2,020'-5,770'),  
Shell Oil Company Middle River State No. 1 (1,465'-4,920'),  
Superior Oil Three Mile Creek State No. 1 (850'-12,665'), and  
Texas International Pet. Corp. Pretty Creek State No. 1 (1,250'-6,420').



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# Vitrinite Reflectance Analyses

*For 60 well cuttings samples*

For Dan Seamount, UNOCAL PETROLEUM LTD.

*Analyses carried out by R.M. Bustin 09/21/97*

## Results of Vitrinite Reflectance Analyses

The vitrinite reflectance analyses of the 60 provided samples are summarized in Table 1. Because of the mineral matter content of some cuttings, the samples were hand picked for coal prior to crushing and preparation of pellets for reflectance. No difficulties were encountered in any of the analyses however in many samples there is clear evidence of exposure to high temperatures for short duration. This evidence includes high reflectance rims around many particles and local evidence of vespication. Because of the lower reflectance (maturity) of the samples exposure to high temperatures for even a short time would account for the oxidation rims. The high reflecting oxidation rims are restricted to the particle edges thus the temperature must have existed for a relatively short time and thus natural processes (i.e. burial, hydrothermal fluids) can be ruled out with fair confidence. It is thus suspected that the cuttings samples were dried (likely at the well site?) over an open flame or on a hot plate. Because the high reflectance rims are restricted to the rims of particles it was possible in most samples to obtain good reflectance data. Samples in which high temperature rims are particularly pronounced are marked in Table 1 as "heat affected".

Normally with cuttings samples the highest reflecting vitrinite are the indigenous population in a sample since the cavings would normally be derived from higher stratigraphic intervals which would be less mature. In the cuttings samples which are heat affected this assumption can not be made and thus care must be exercised in the rigorous interpretation of the reflectance values. In the analyses samples there is a general increase in reflectance with depth (as anticipated) with few anomalies. Such results lend credence to the determined values and also provide a means by which the anomalous values can be identified.

Histograms for all samples are provided in appendix i.

Sample #	Well Name	Depth	Mean	Std. Error	Mode	Std. Dev.	Min.	Max.	Sum	Count
U18	<i>Superior</i> 3-Mile	Creek State 850-865	0.18	0.01	0.17	0.05	0.10	0.29	8.17	45
U19	<i>21</i> 3-Mile	1150-1180	0.21	0.01	0.19	0.05	0.12	0.30	9.73	46
U20	<i>JR</i> 3-Mile	1980-1990	0.37	0.01	0.31	0.08	0.21	0.53	17.68	48
*U21	3-Mile	2220-2230	0.58	0.02	0.50	0.13	0.35	1.00	27.64	48
*U22	3-Mile	2570-2580	0.32	0.01	0.29	0.10	0.21	0.64	15.59	48
*U23	3-Mile	3125-3135	0.41	0.01	0.36	0.09	0.22	0.59	21.72	53
U24	3-Mile	3490-3500	0.29	0.01	0.23	0.05	0.21	0.38	14.42	50
U25	3-Mile	4085-4100	0.28	0.00	0.27	0.02	0.23	0.35	12.93	46
*U26	3-Mile	4690-4700	0.29	0.01	0.27	0.04	0.21	0.38	14.10	48
*U27	3-Mile	5305-5320	0.27	0.01	0.23	0.04	0.21	0.36	12.92	48
U28	3-Mile	6200-6215	0.41	0.01	0.41	0.08	0.30	0.64	19.59	48
U29	3-Mile	6900-6910	0.36	0.01	0.29	0.05	0.27	0.50	19.59	54
U30	3-Mile	7390-7405	0.34	0.00	0.33	0.03	0.27	0.42	16.44	49
U49	3-Mile	7800-7810	0.38	0.01	0.34	0.06	0.21	0.46	18.88	50
*U36	3-Mile	8550-8610	0.34	0.01	0.34	0.05	0.23	0.49	16.36	48
U50	3-Mile	8555-8580	0.38	0.01	0.30	0.06	0.28	0.49	18.15	48
U51	3-Mile	8920-35; 8940-55	0.39	0.01	0.38	0.04	0.29	0.45	17.17	44
U52	3-Mile	9565-9620	0.38	0.01	0.39	0.04	0.31	0.46	17.23	45
*U53	3-Mile	10030-10050	0.40	0.01	0.39	0.05	0.30	0.50	22.40	56
U54	3-Mile	10675-10685	0.45	0.01	0.44	0.06	0.35	0.55	22.83	51
*U56	3-Mile	11155-11165	0.39	0.01	0.32	0.07	0.27	0.53	17.35	45
*U55	3-Mile	11580-11590	0.40	0.01	0.27	0.08	0.27	0.55	21.75	55
U57	3-Mile	12160-12170	0.36	0.00	0.36	0.03	0.32	0.44	17.76	49
U58	3-Mile	12160-12180	0.44	0.01	0.46	0.07	0.29	0.56	20.41	46
U59	3-Mile	12320-12330	0.52	0.01	0.52	0.05	0.42	0.61	23.20	45
*U60	3-Mile	12650-12665	0.52	0.01	0.48	0.05	0.44	0.60	25.10	48
U13	<i>shell o:</i> Middle R. St.#1	1465-1480	0.19	0.00	0.21	0.03	0.12	0.26	8.96	48
U14	<i>JR</i> Middle R. St.#1	1935-1950	0.23	0.01	0.25	0.04	0.15	0.32	10.78	46
U15	Middle R. St.#1	2560-2590	0.24	0.00	0.27	0.02	0.20	0.28	11.37	47
U16	Middle R. St.#1	2970-2990	0.25	0.01	0.21	0.04	0.21	0.32	11.57	46
U17	Middle R. St.#1	3565-3575	0.32	0.00	0.29	0.03	0.25	0.40	16.76	52
U7	Middle R. St.#1	3660-3670	0.30	0.00	0.29	0.02	0.26	0.33	12.76	43
U8	Middle R. St.#1	4080-4090	0.38	0.01	0.37	0.04	0.31	0.45	17.97	47
U9	Middle R. St.#1	4630-4650	0.38	0.01	0.37	0.05	0.28	0.53	19.49	51
U10	Middle R. St.#1	4790-4800	0.31	0.01	0.29	0.05	0.17	0.37	14.90	48
U11	Middle R. St.#1	4820-4830	0.39	0.00	0.37	0.03	0.34	0.45	18.73	48
U12	Middle R. St.#1	4910-4920	0.37	0.01	0.38	0.03	0.29	0.42	17.23	47
U1	<i>Texas</i> Pretty Creek #1	State 1250-1260	0.24	0.01	0.23	0.04	0.19	0.36	15.60	64
U2	<i>Intern.</i> Pretty Creek #1	2410-2420	0.37	0.01	0.36	0.04	0.26	0.43	19.36	53
*U3	<i>Per. Be.</i> Pretty Creek #1	3170-3190	0.38	0.00	0.40	0.03	0.32	0.42	18.85	50
U4	<i>JR</i> Pretty Creek #1	3190-3200	0.32	0.00	0.35	0.03	0.22	0.37	16.72	52
*U5	Pretty Creek #1	4110-20; 4135-45	0.35	0.01	0.30	0.06	0.26	0.48	16.58	48
*U6	Pretty Creek #1	4930-4940	0.44	0.02	0.37	0.14	0.30	0.74	21.34	48
*U43	Pretty Creek #1	4930-4950	0.39	0.01	0.39	0.04	0.30	0.48	19.32	50
U40	Pretty Creek #1	5500-5530	0.41	0.00	0.40	0.04	0.34	0.48	21.88	53
U38	Pretty Creek #1	5780-5790	0.42	0.01	0.42	0.06	0.34	0.57	20.81	49

*Kustatan Ridge No. 1  
JR*

Sample #	Well Name	Depth	Mean	Std. Error	Mode	Std. Dev.	Min.	Max.	Sum	Count
U39	Pretty Creek #1	6085-6120	0.46	0.01	0.40	0.05	0.37	0.53	21.44	47
*U41	Pretty Creek #1	6310-6320	0.48	0.01	0.46	0.07	0.34	0.71	25.97	54
*U42	Pretty Creek #1	6400-6420	0.35	0.00	0.31	0.03	0.30	0.43	17.24	49
U37 <i>shell 0.1</i>	<del>Teustatan R.#1</del>	2020-2030	0.24	0.00	0.22	0.04	0.17	0.32	14.50	60
*U35	Teustatan R.#1	3040-3060	0.33	0.01	0.28	0.05	0.22	0.45	16.79	51
U34	Teustatan R.#1	3360-3370	0.27	0.00	0.24	0.03	0.21	0.34	13.75	51
U33	Teustatan R.#1	3690-3710	0.26	0.00	0.24	0.03	0.21	0.32	12.16	47
U32	Teustatan R.#1	3890-3990	0.28	0.01	0.25	0.04	0.22	0.34	12.96	47
*U31	Teustatan R.#1	4200-4220	0.30	0.01	0.29	0.04	0.21	0.40	15.17	51
*U44	Teustatan R.#1	4590-4600	0.38	0.01	0.38	0.05	0.28	0.47	23.37	62
U45	Teustatan R.#1	4665-4680	0.38	0.01	0.39	0.04	0.27	0.44	19.19	51
U46	Teustatan R.#1	5120-5135	0.31	0.00	0.34	0.03	0.23	0.36	15.42	49
U47	Teustatan R.#1	5550-5560	0.37	0.01	0.38	0.04	0.24	0.43	18.28	50
*U48	Teustatan R.#1	5730-45; 5760-70	0.42	0.02	0.34	0.11	0.27	0.70	18.75	45

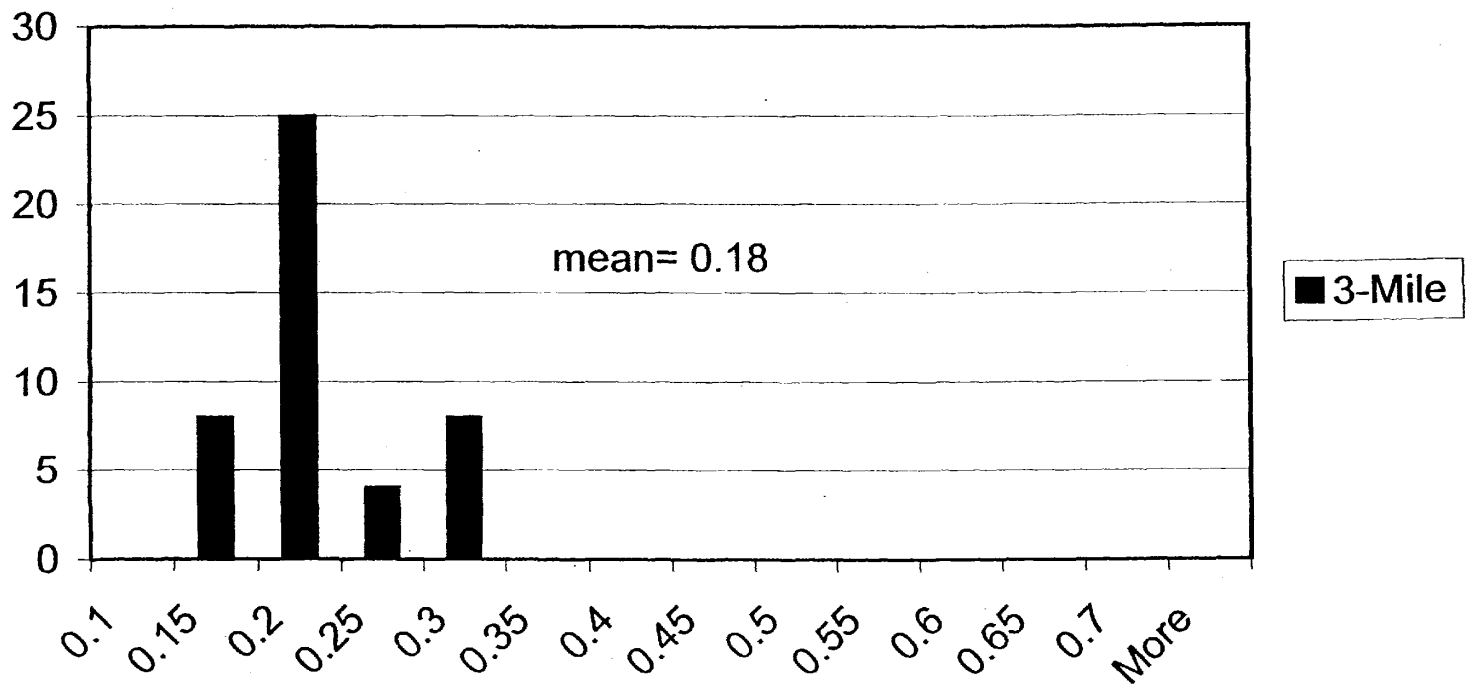
\*= Heat affected

*shell*

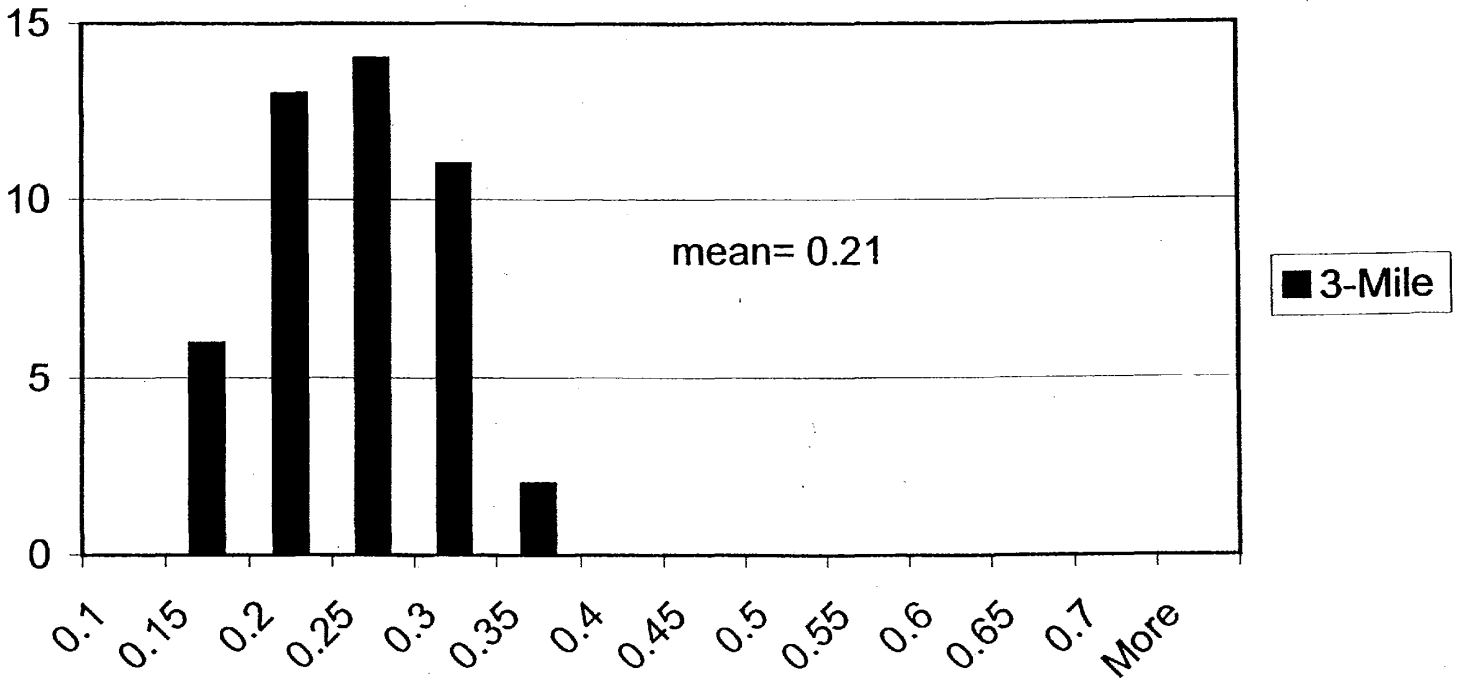
# APPENDIX 1

Histograms of vitrinite reflectance determinations for the 60 provided samples.

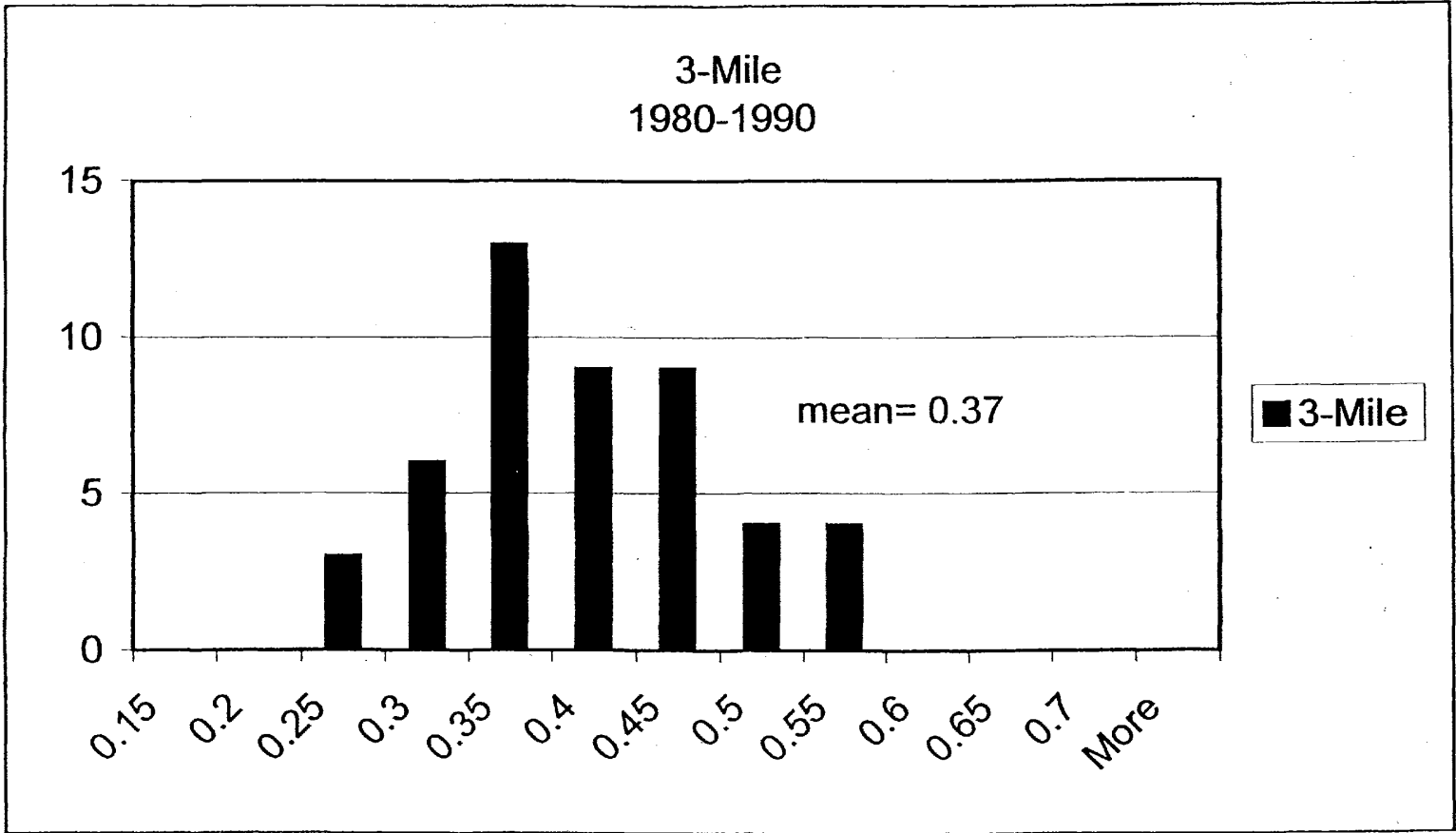
3-Mile  
850-865



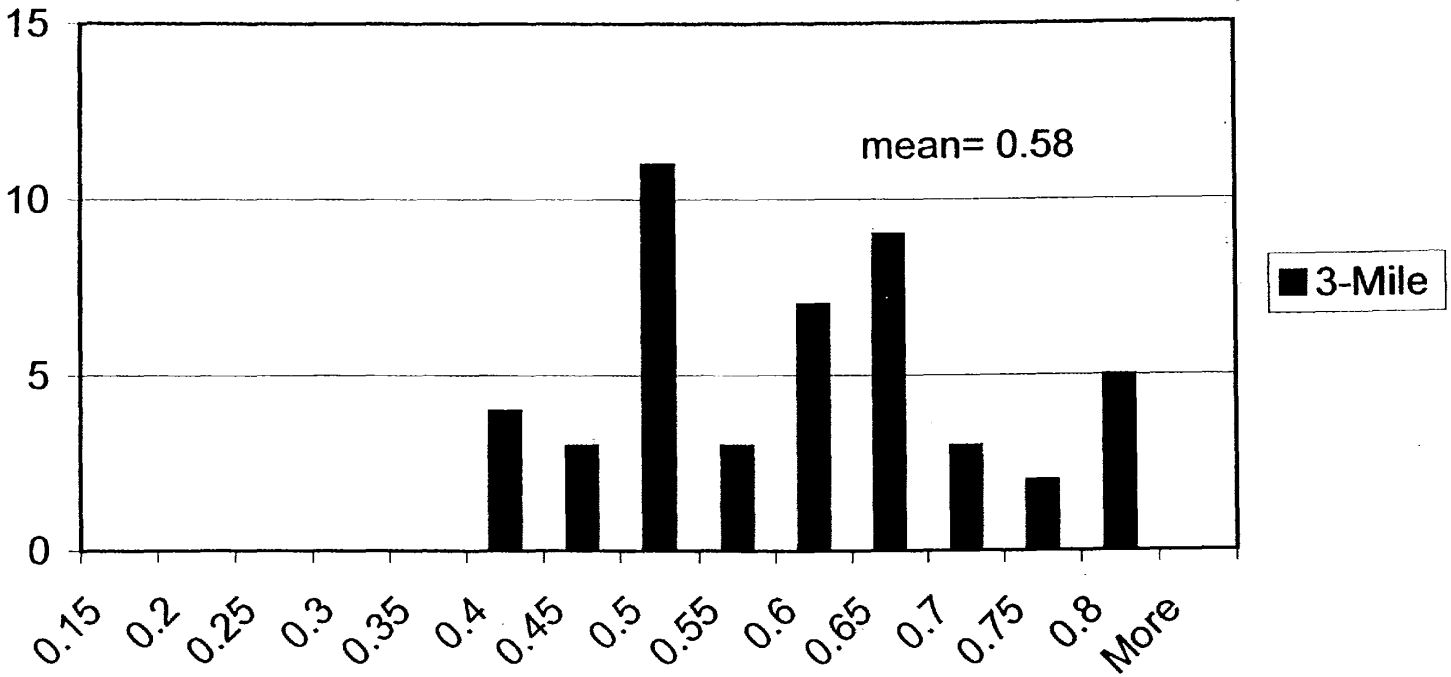
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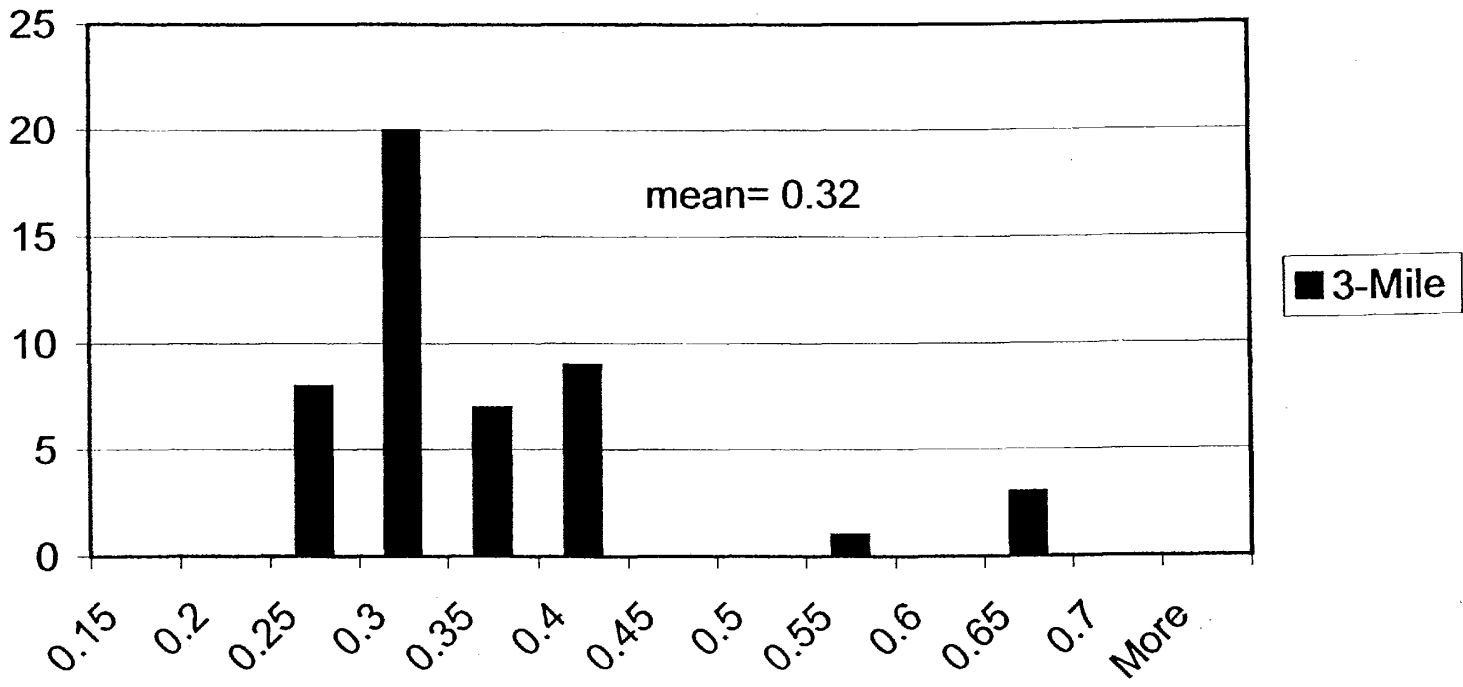


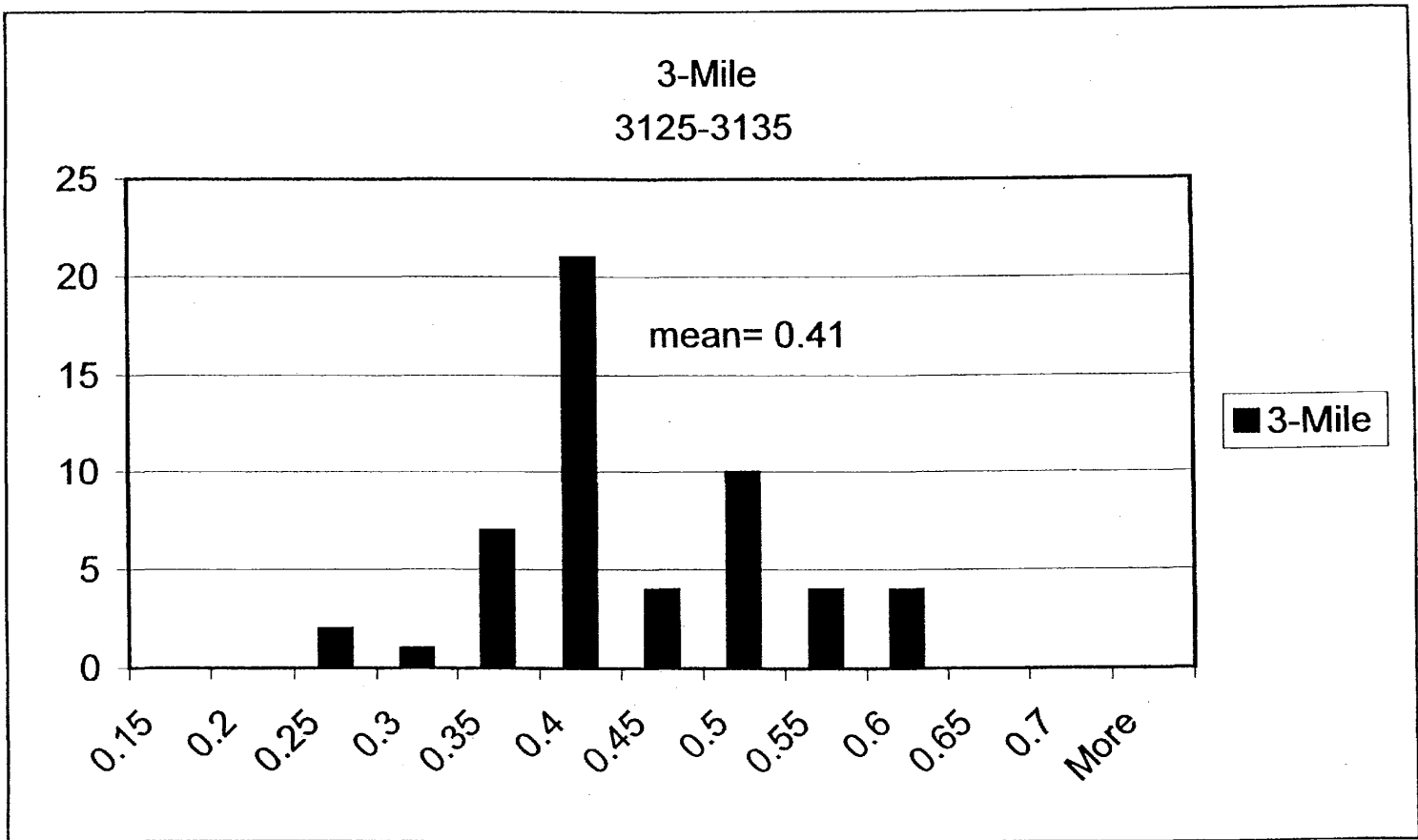


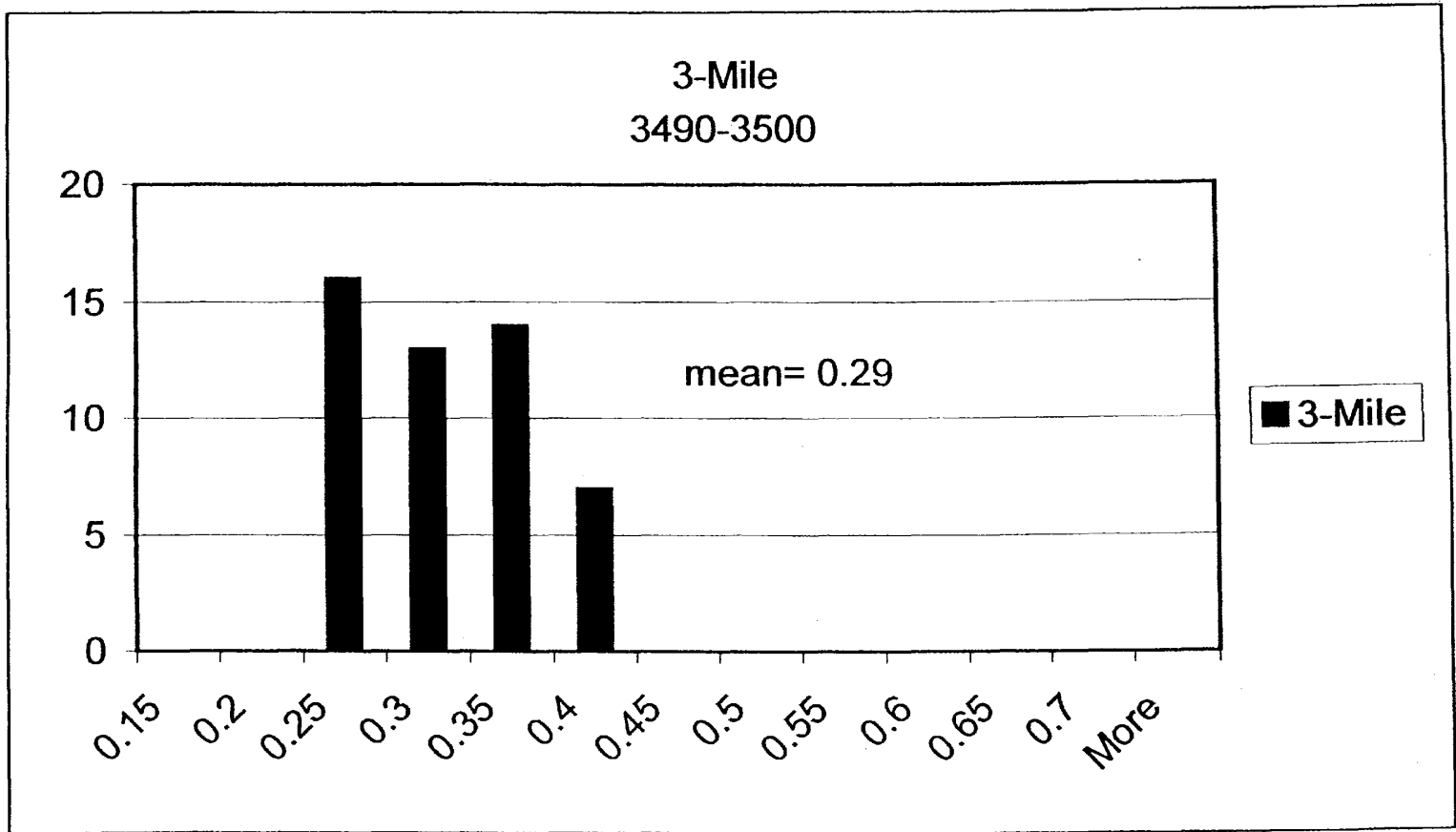
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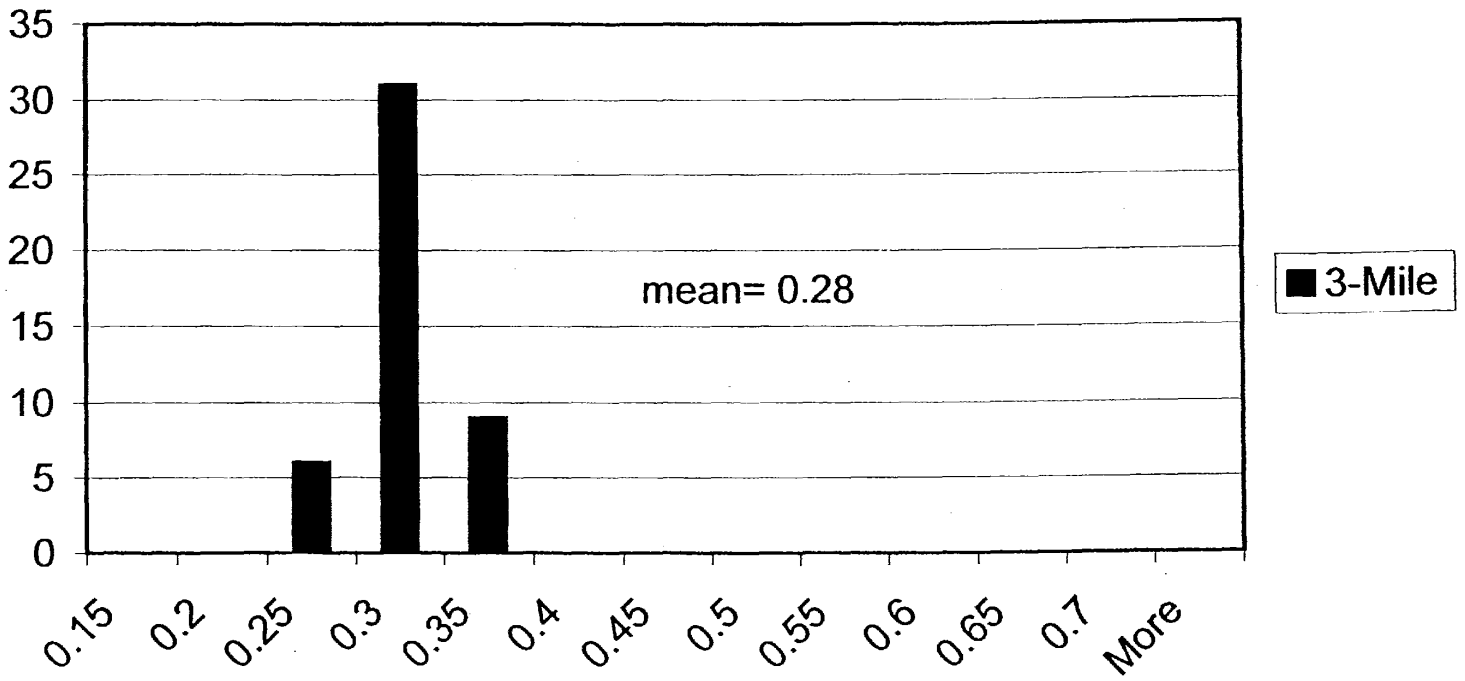
3-Mile  
2570-2580

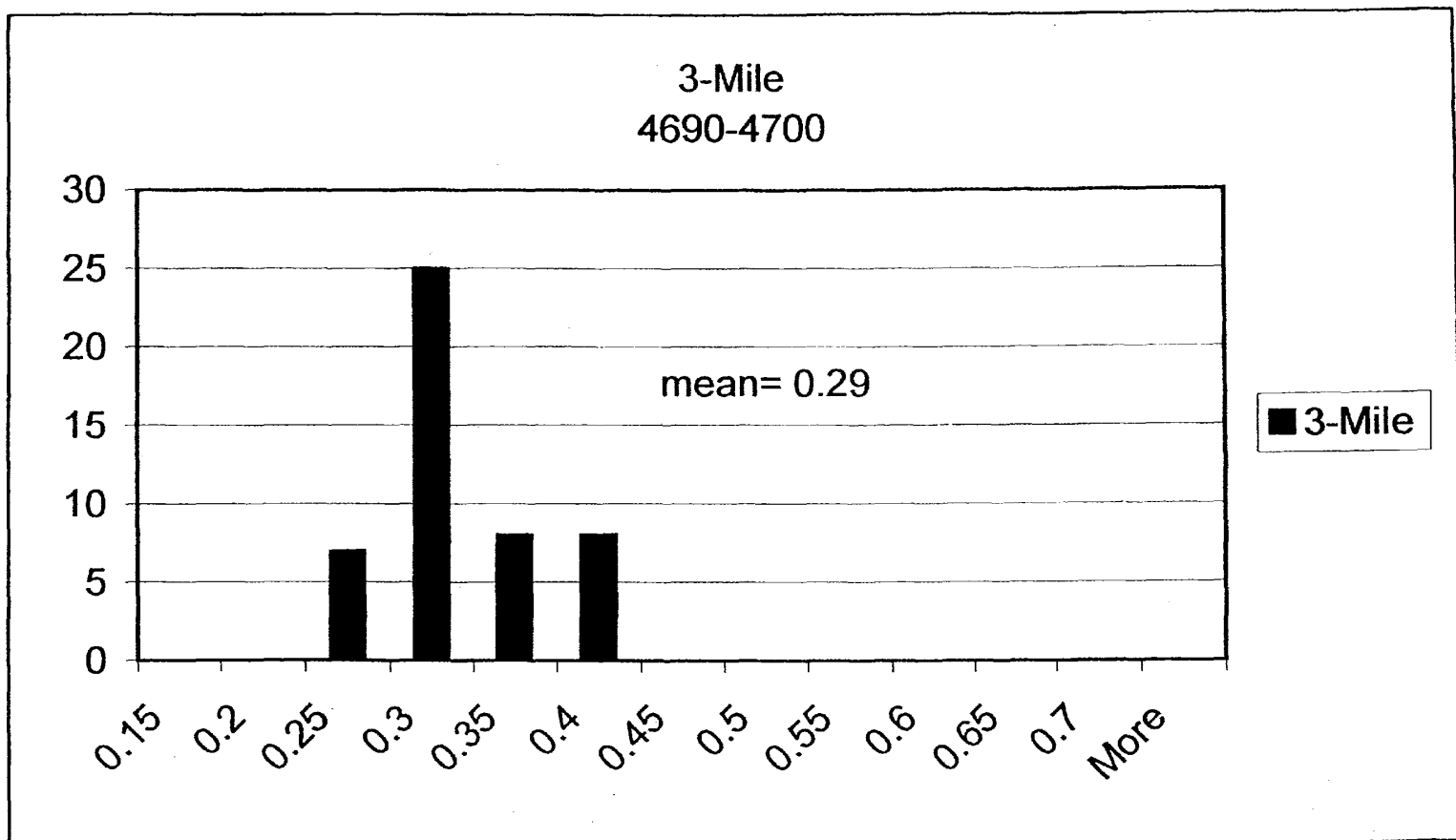


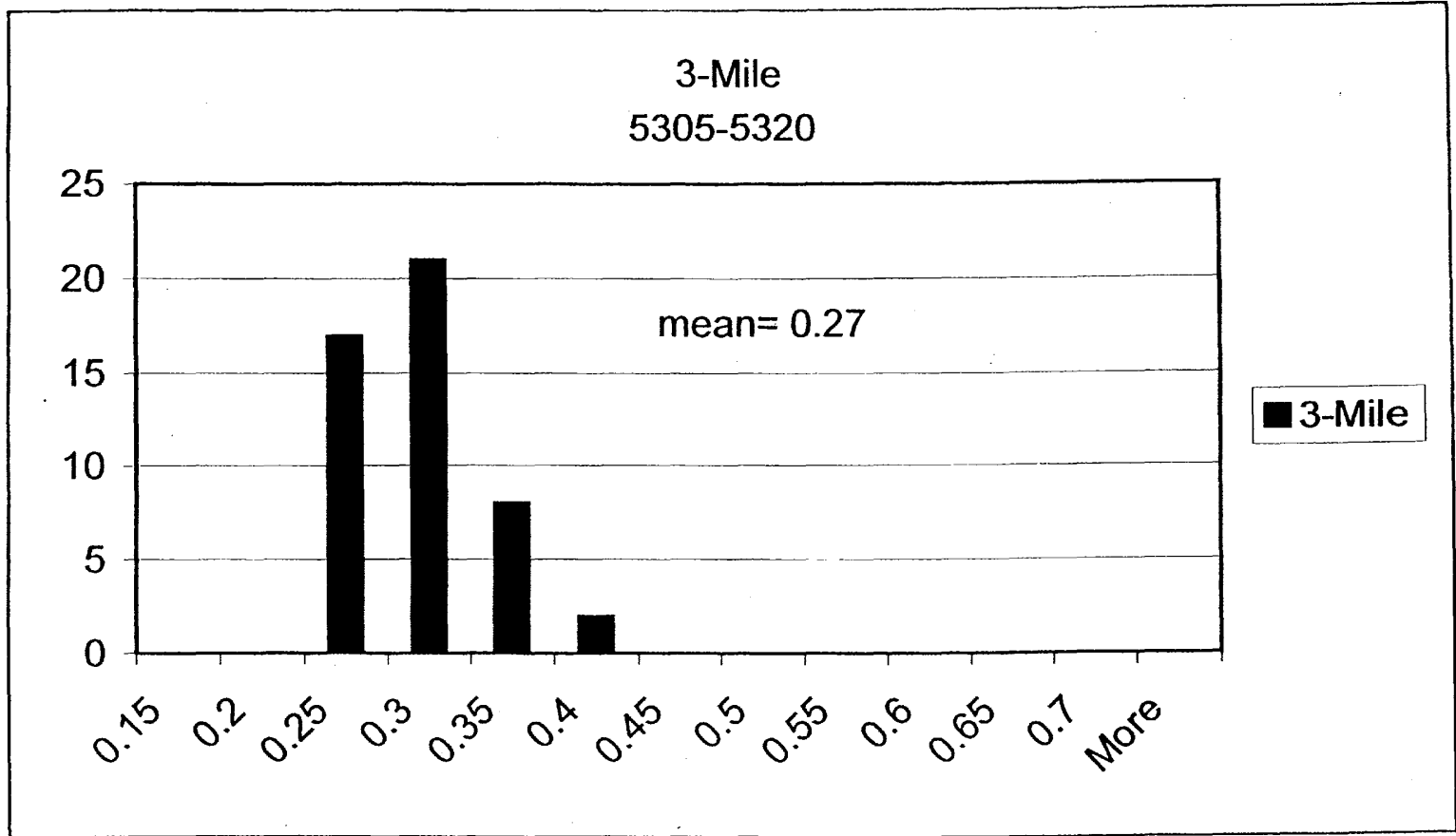




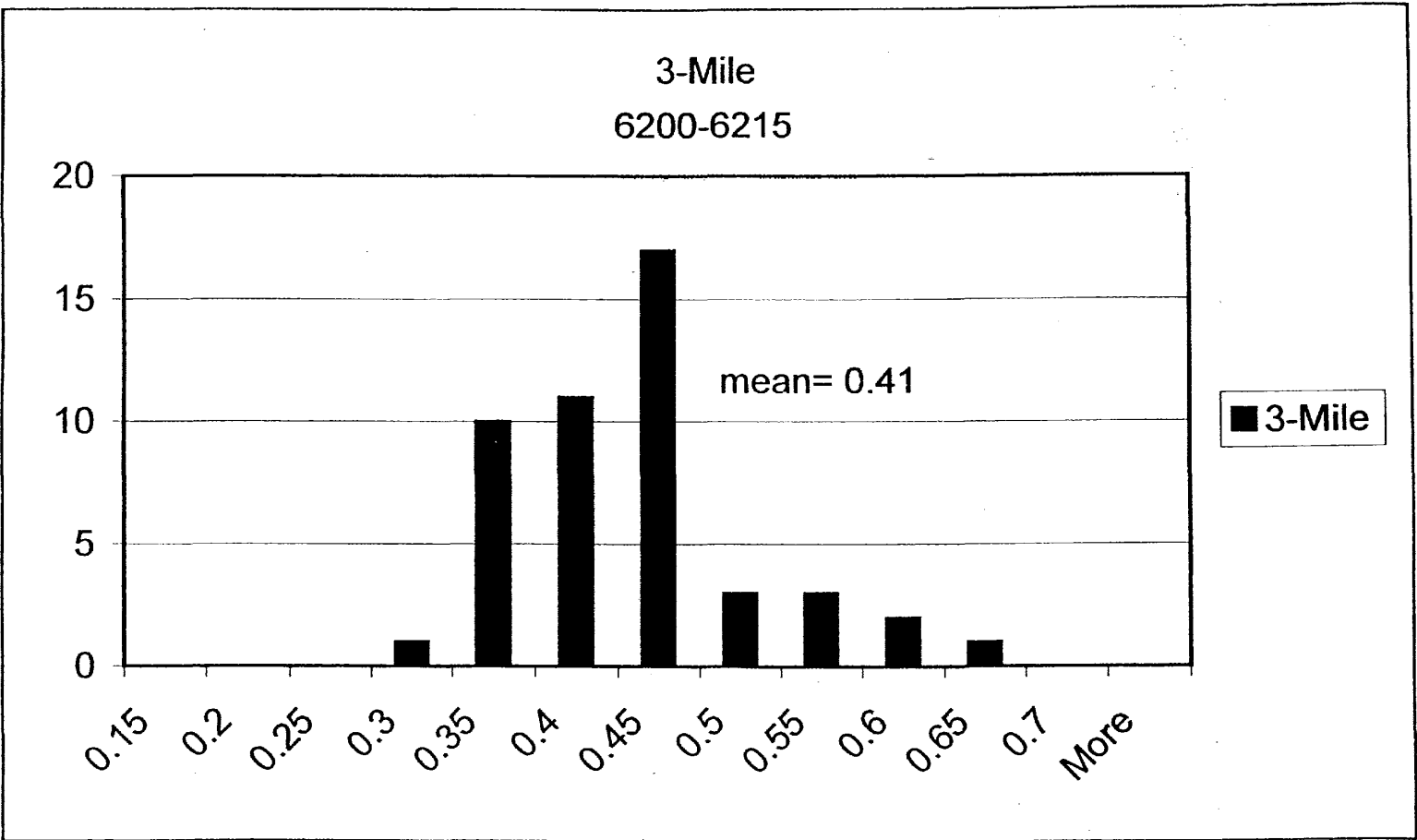
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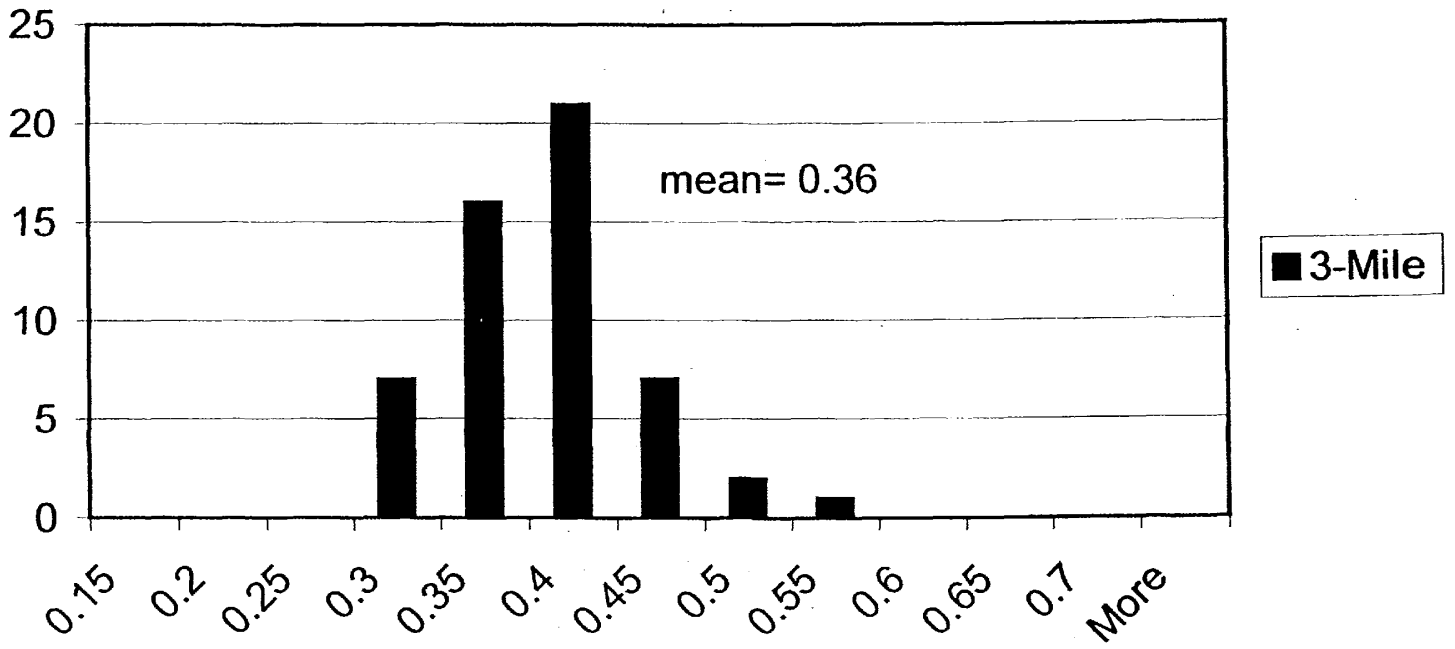




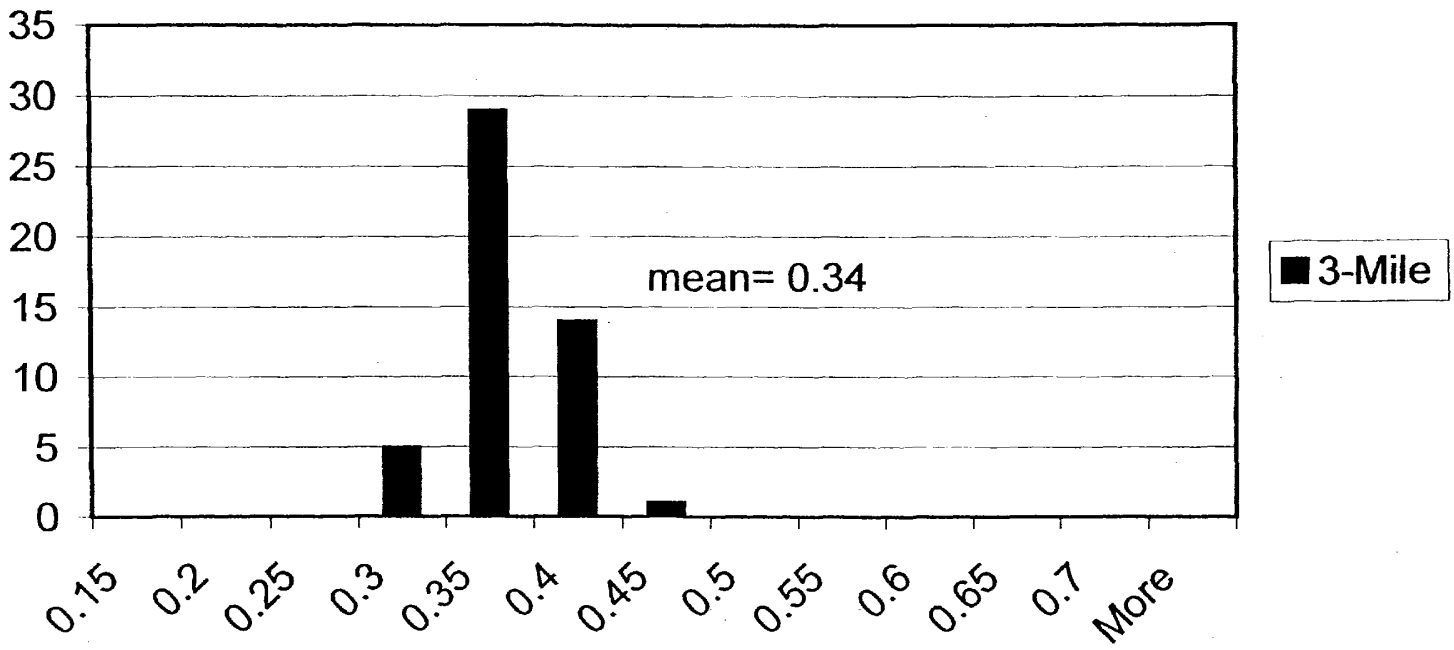




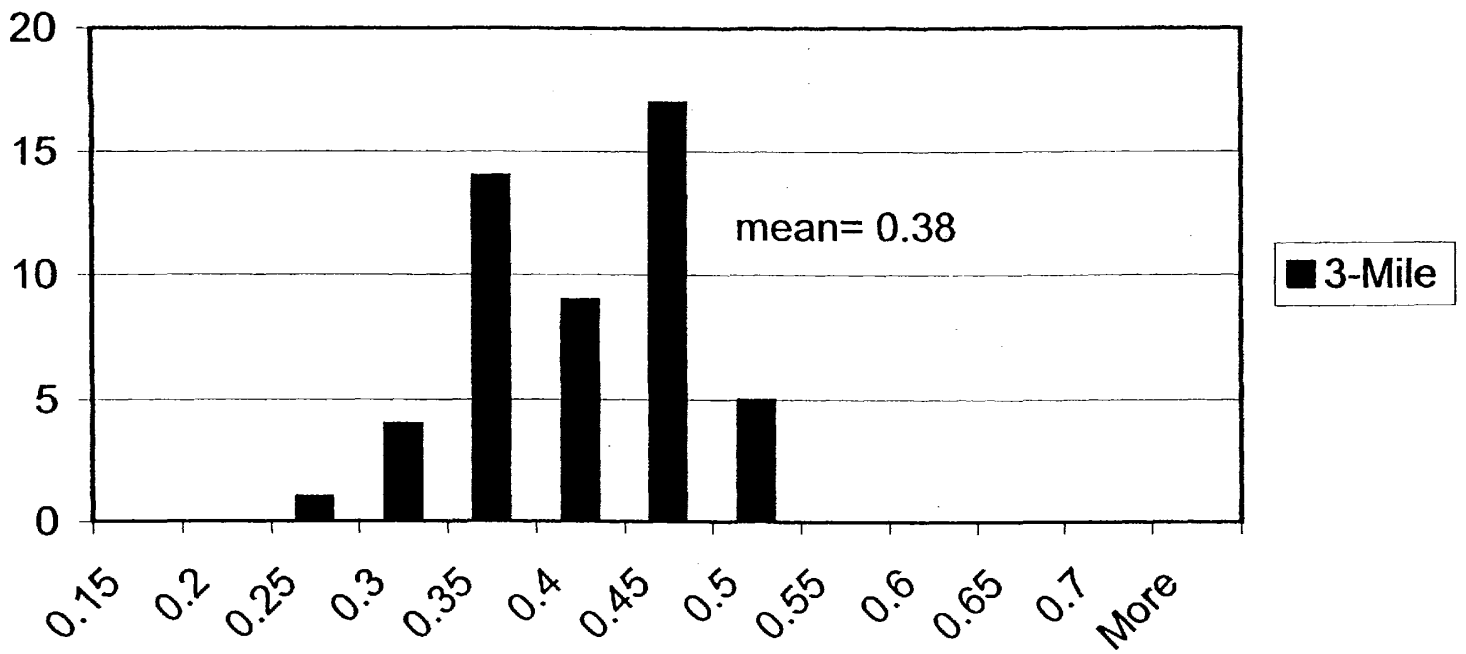
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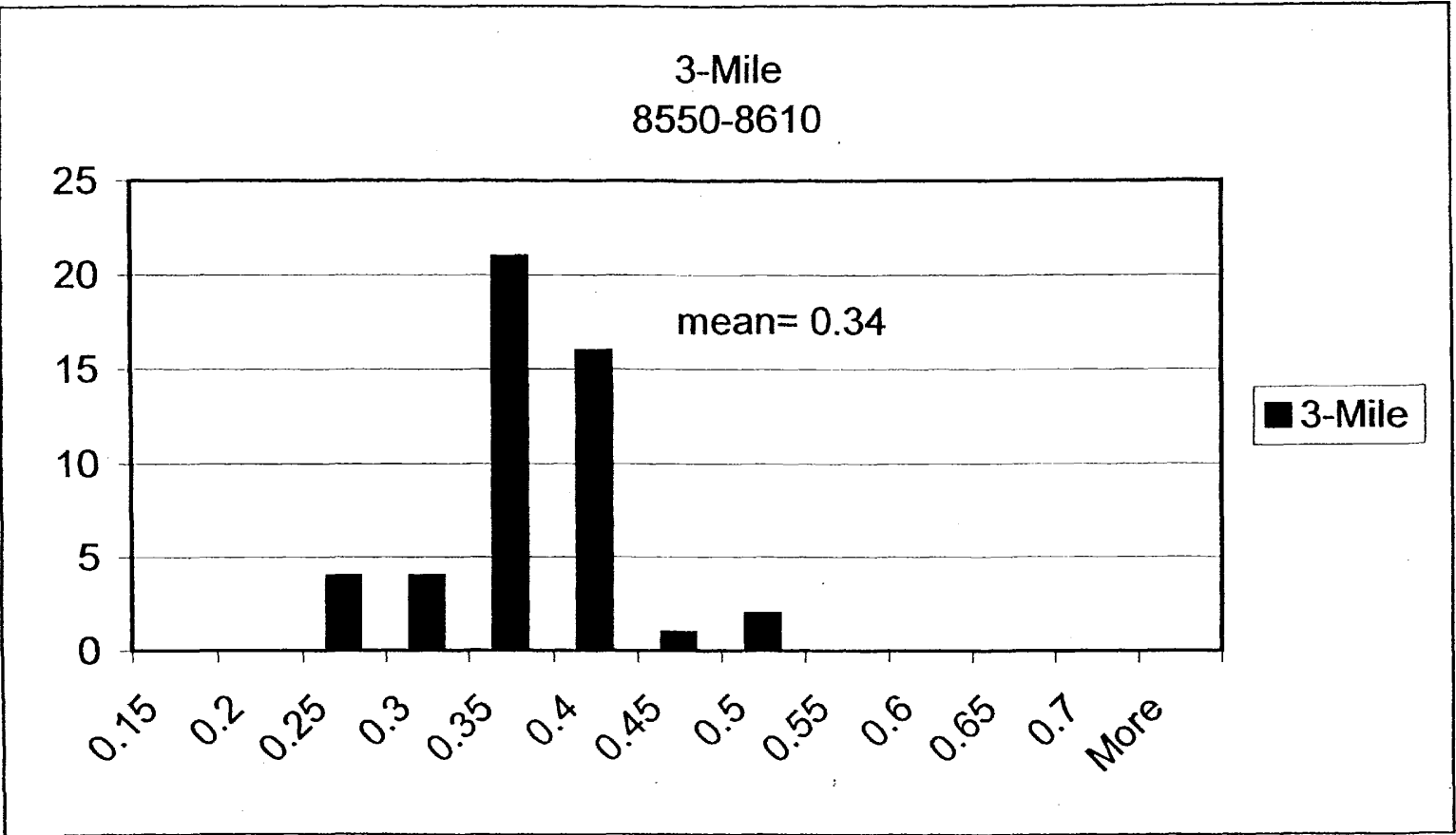


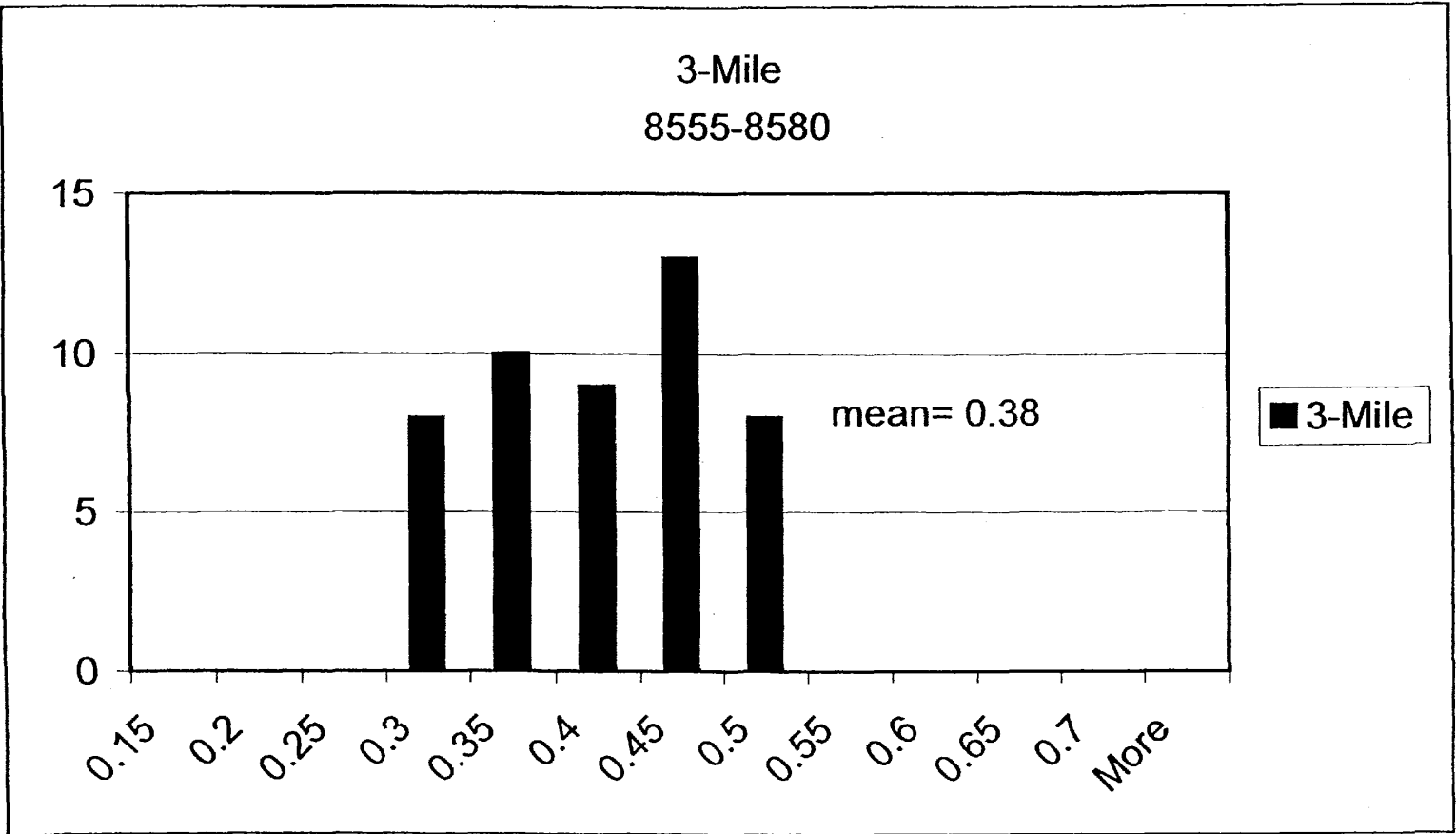
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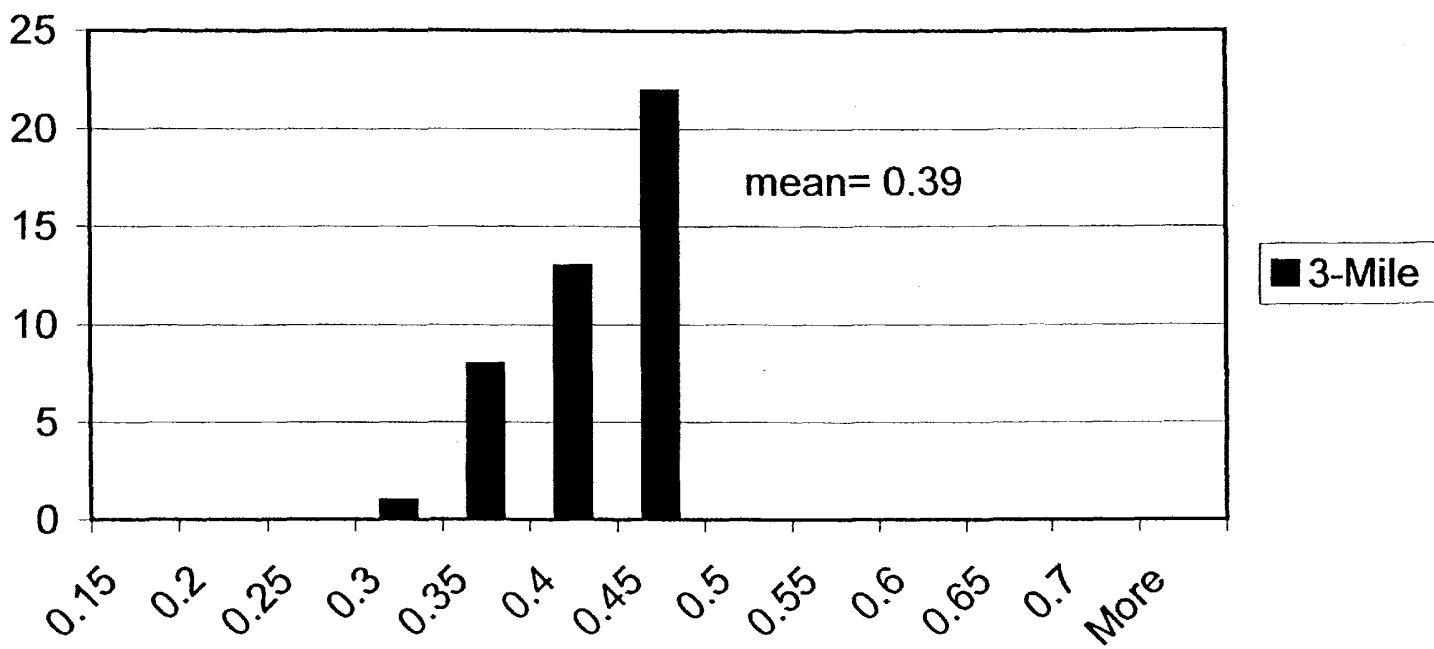
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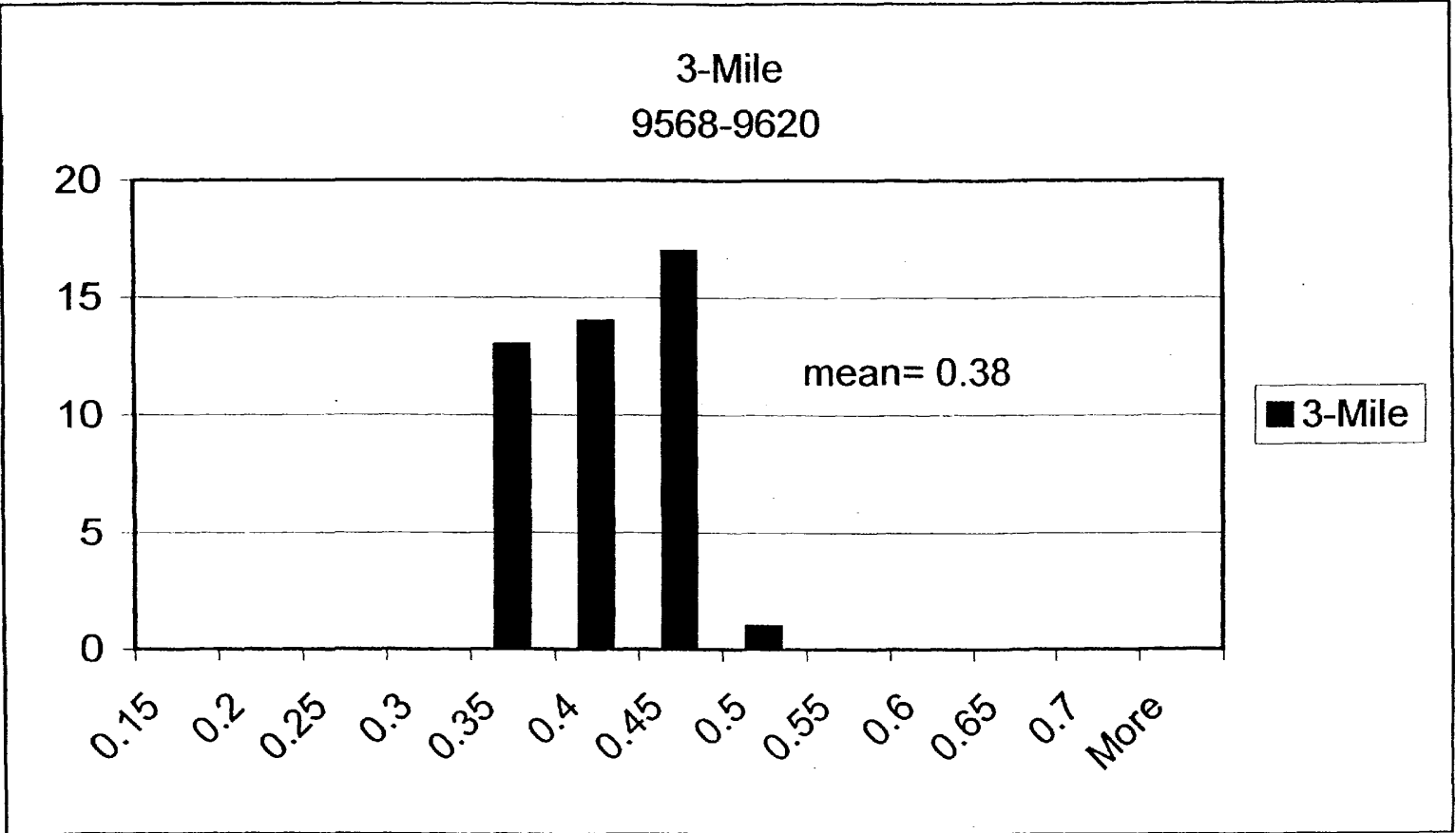




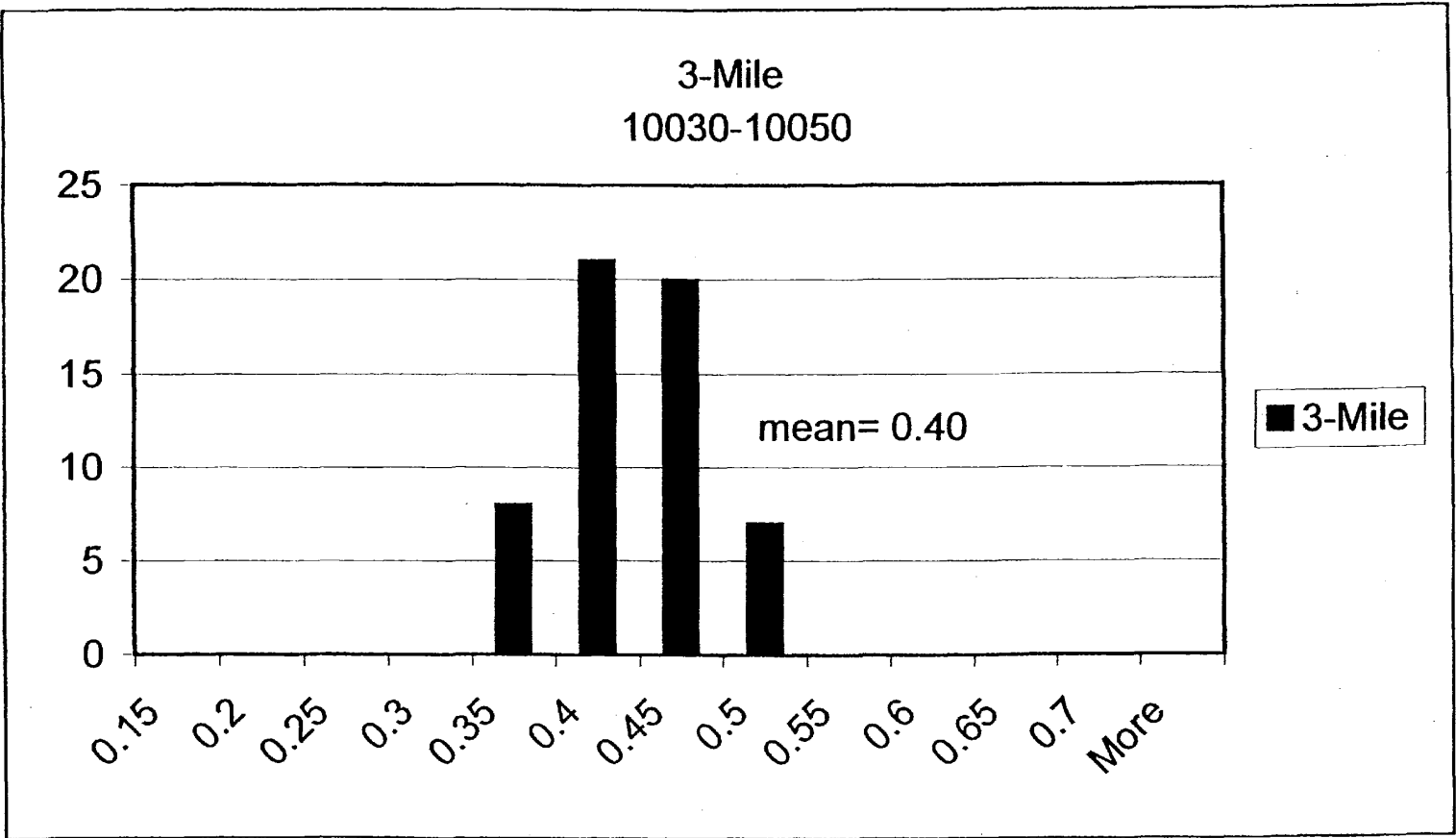


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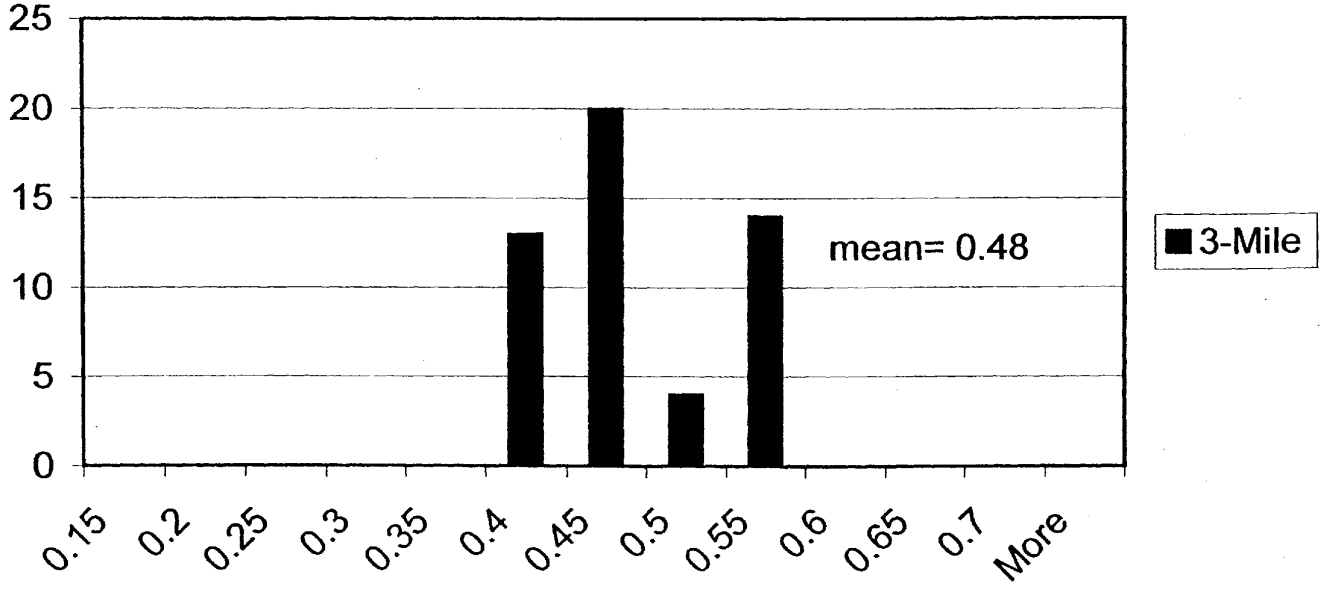


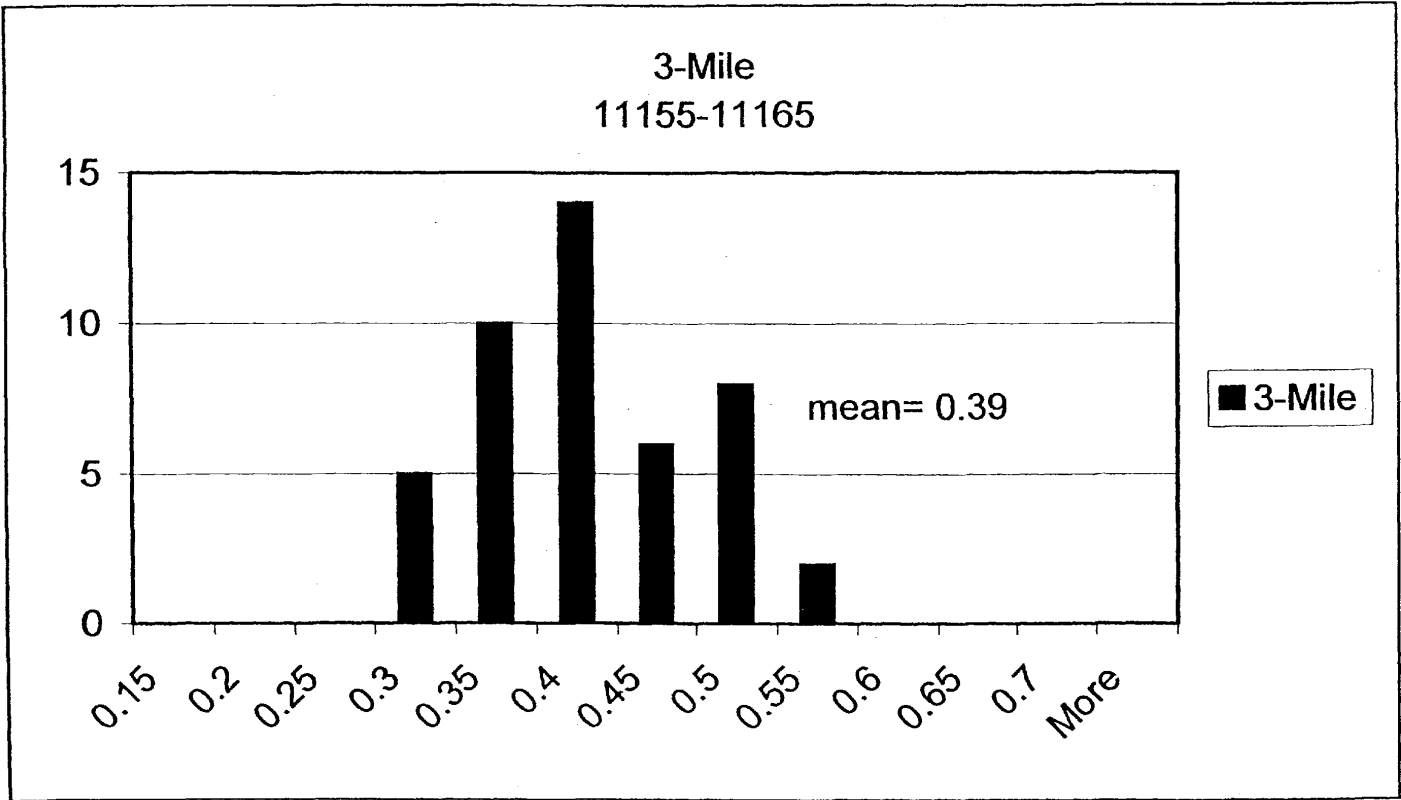


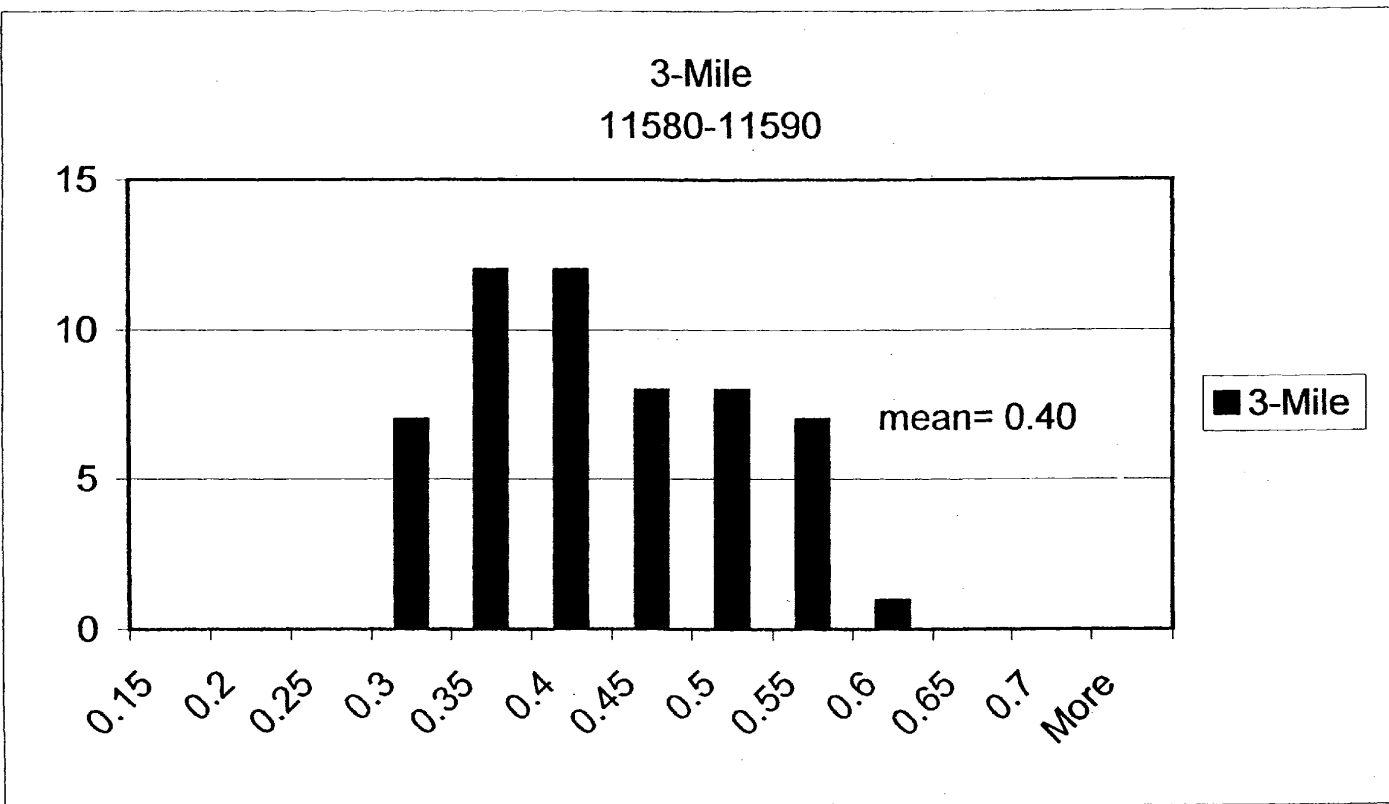


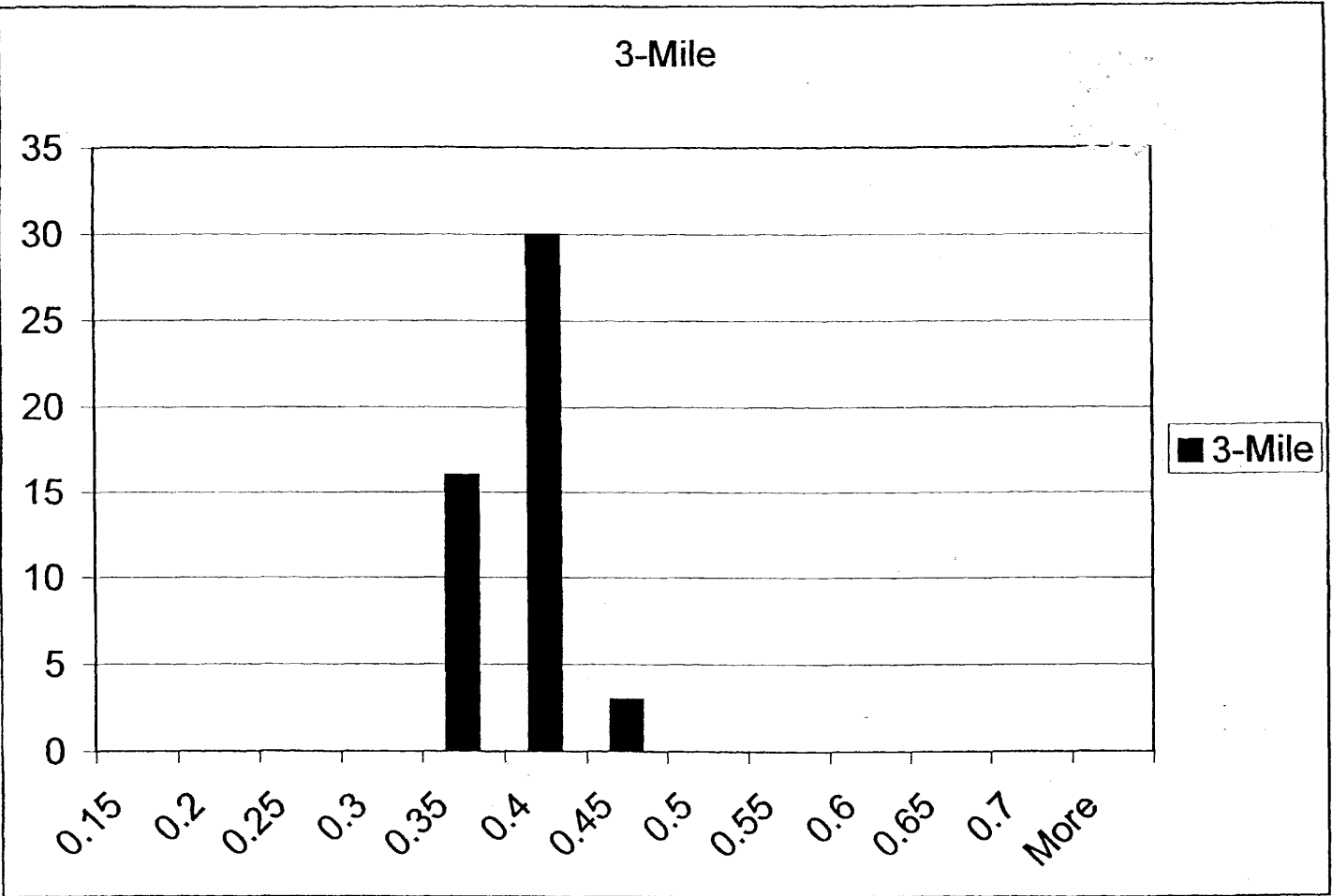


3-Mile  
10675-10685

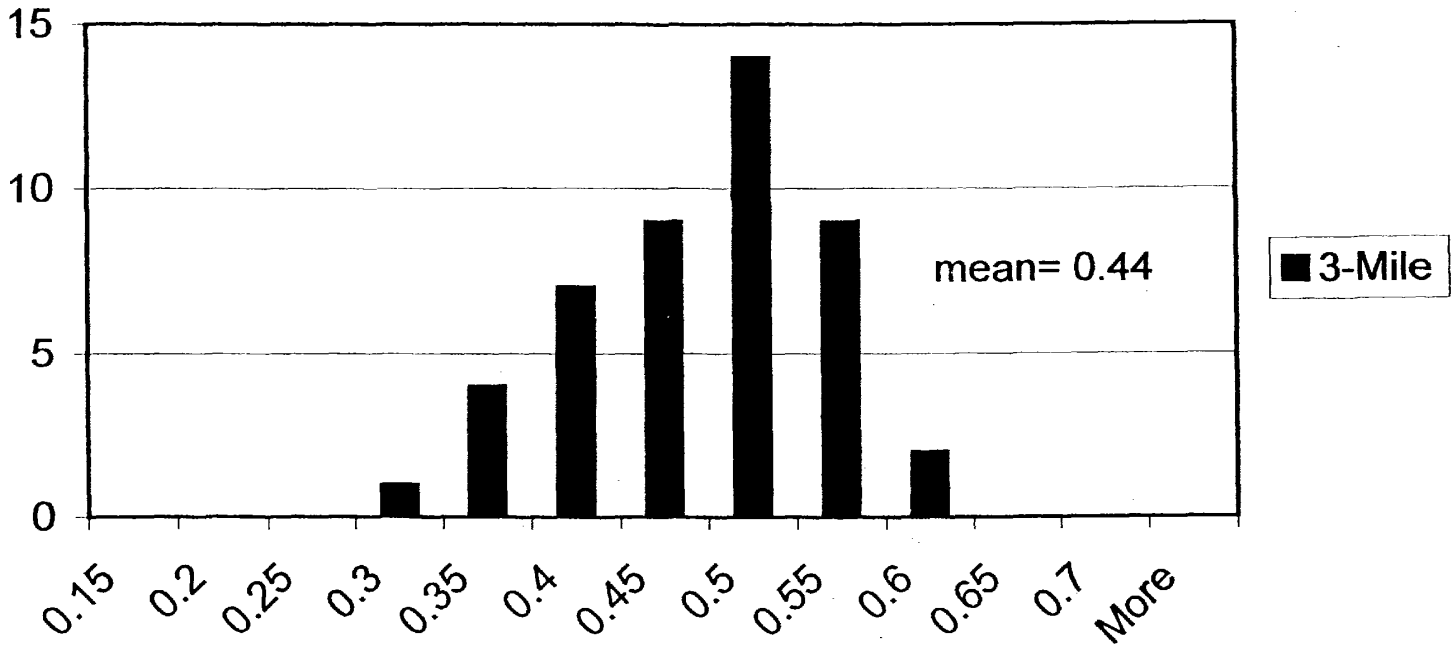




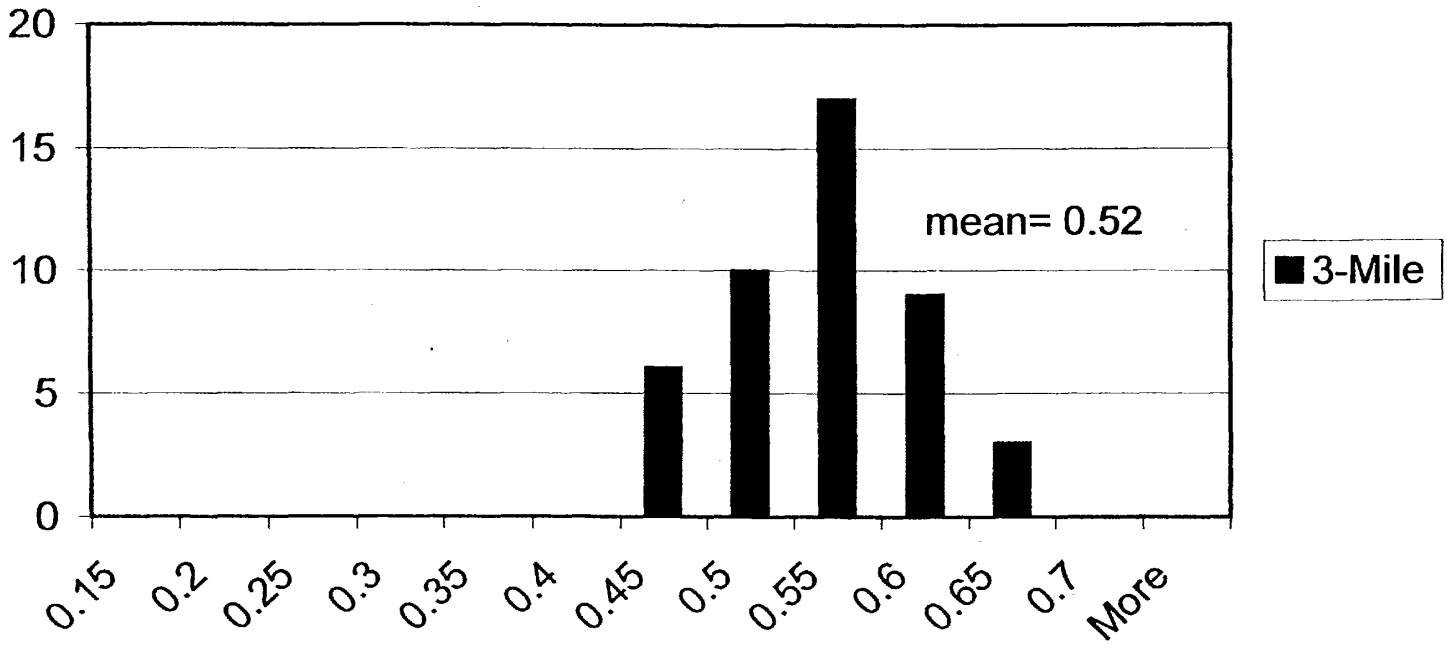


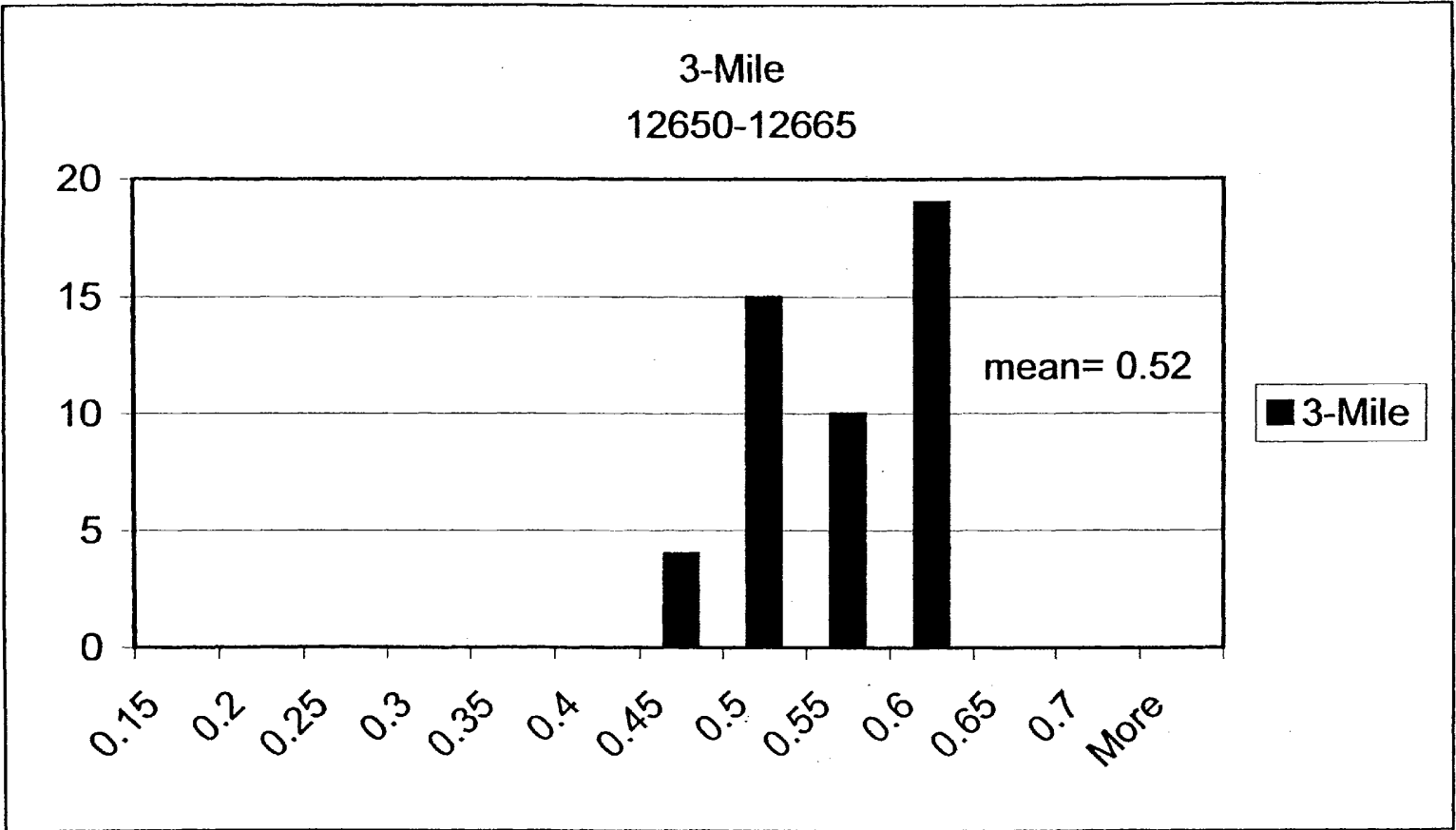


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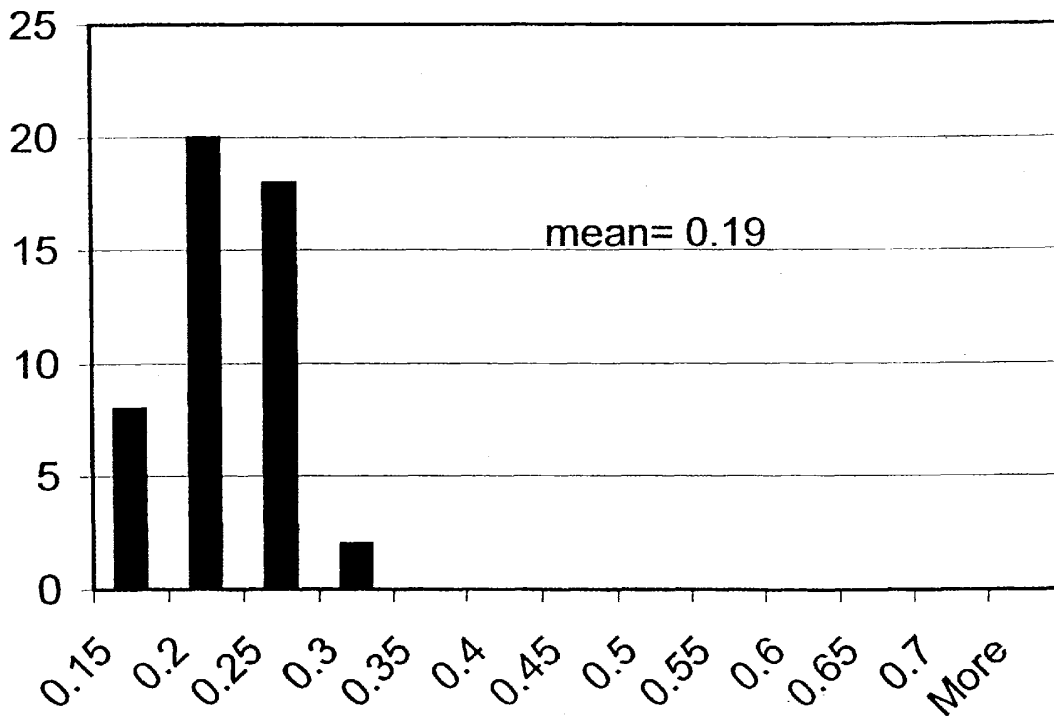
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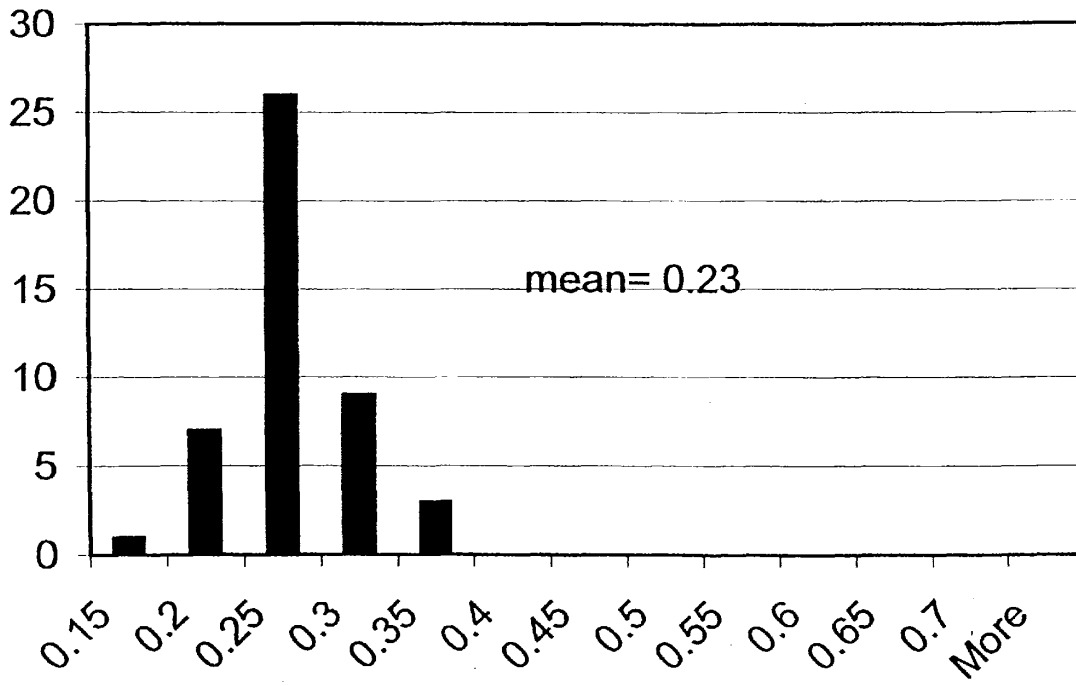


Middle R. St.#1  
1465-1480



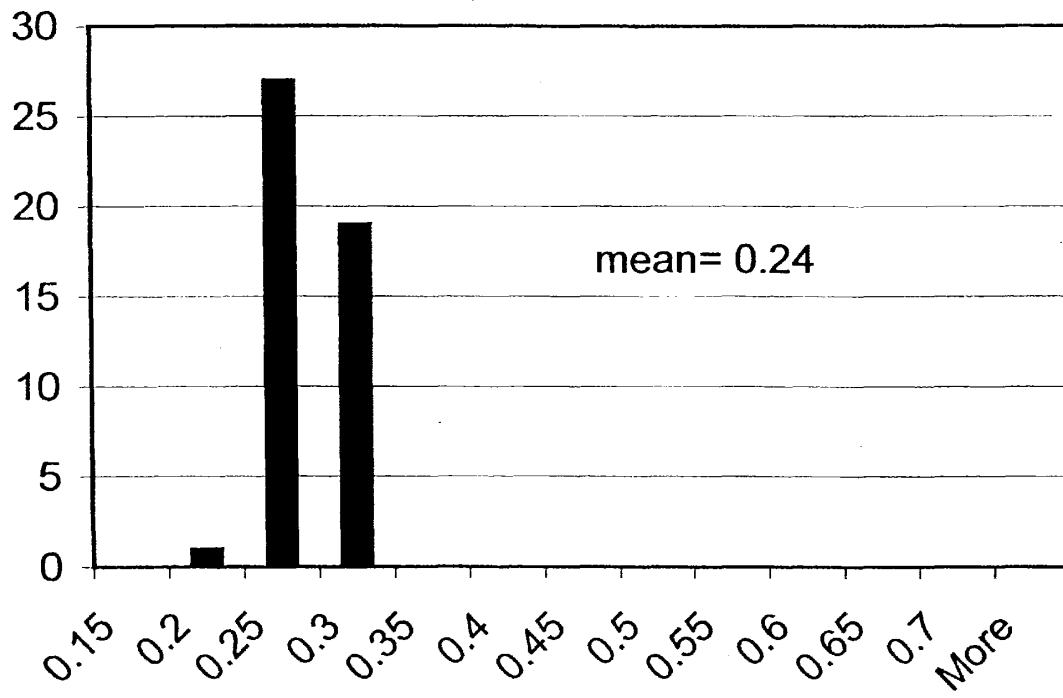
■ Middle R. St.#1

### Middle R. St.#1 1935-1950



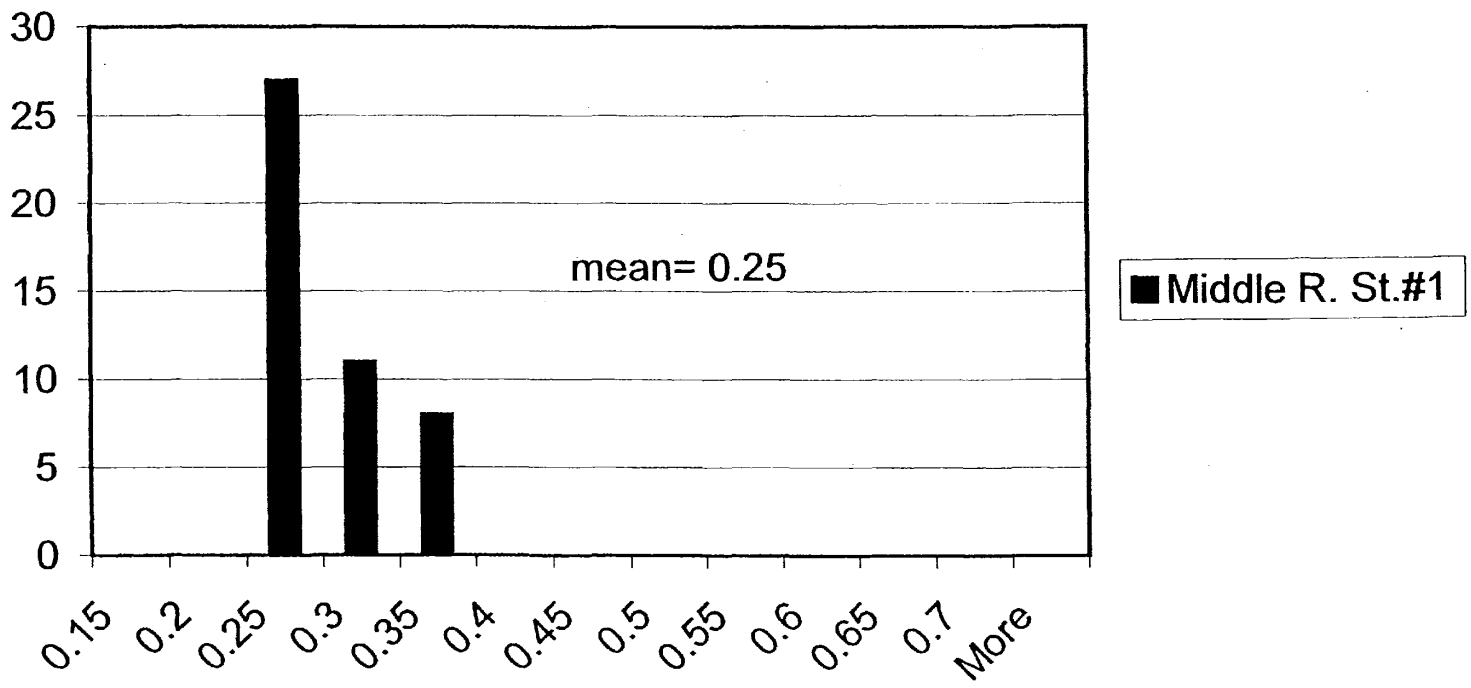
■ Middle R. St.#1

Middle R. St.#1  
2560-2590

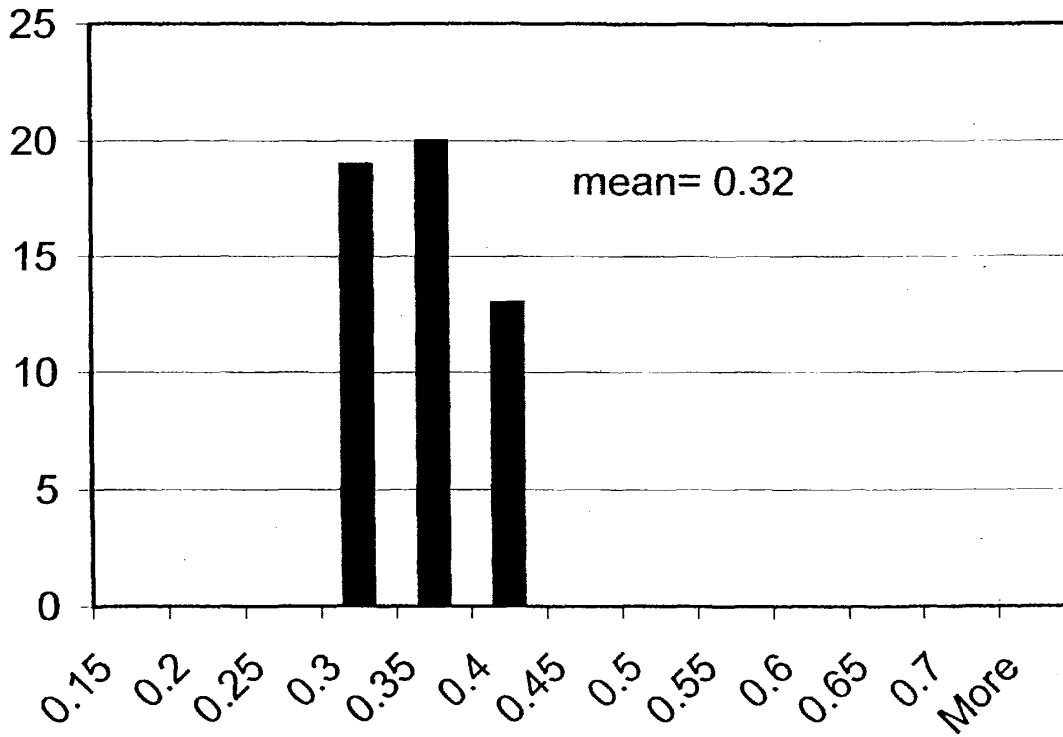


■ Middle R. St.#1

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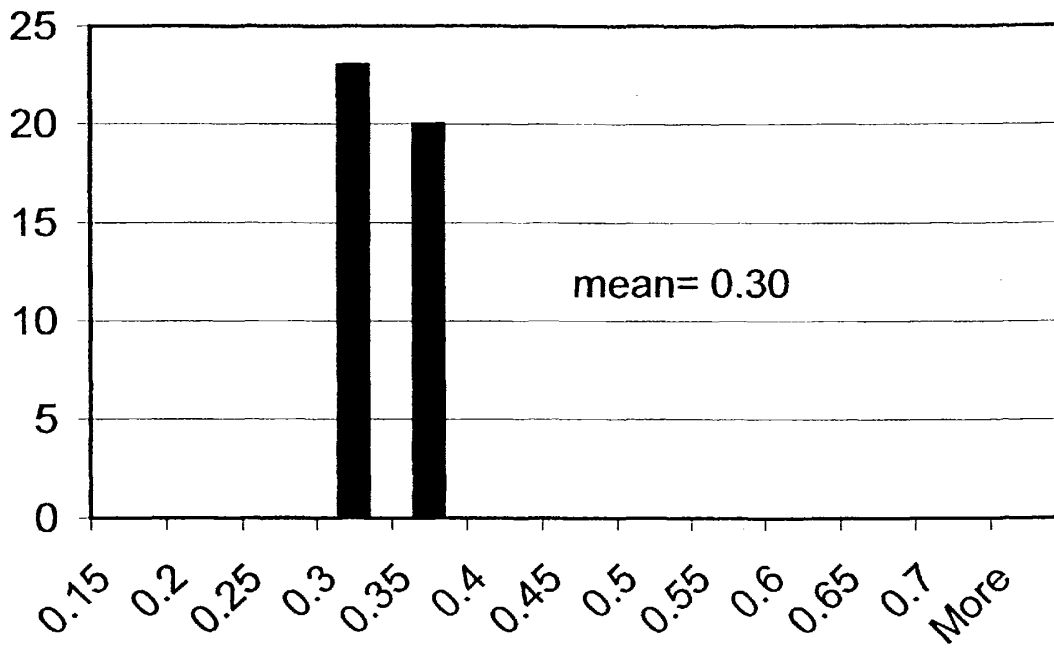


Middle R. St.#1  
3565-3575



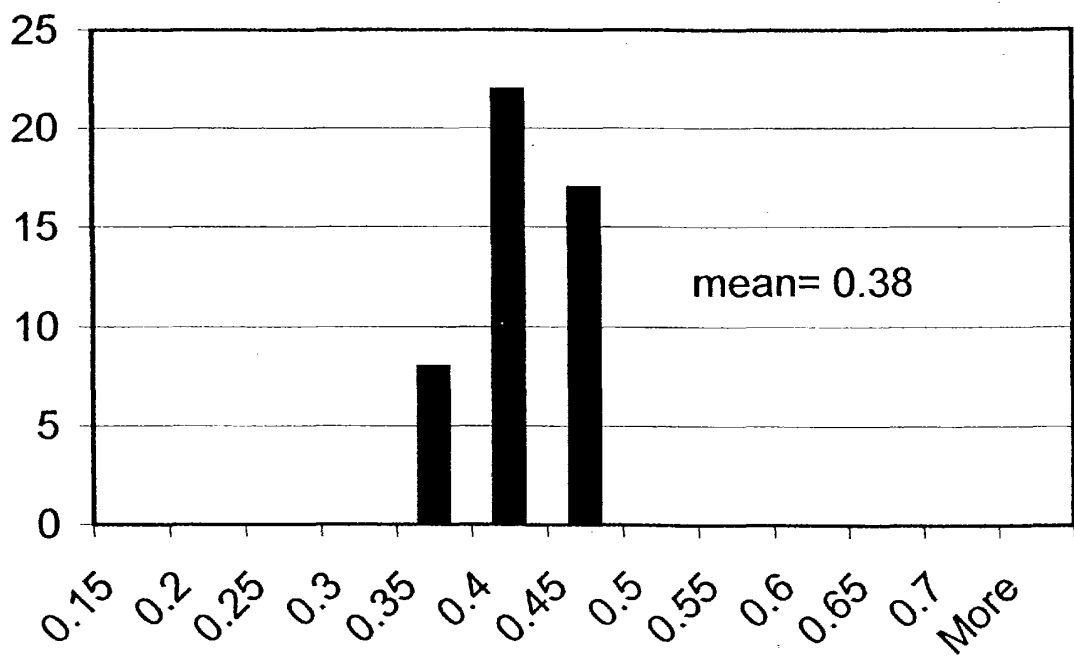
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Middle R. St.#1  
3660-3670



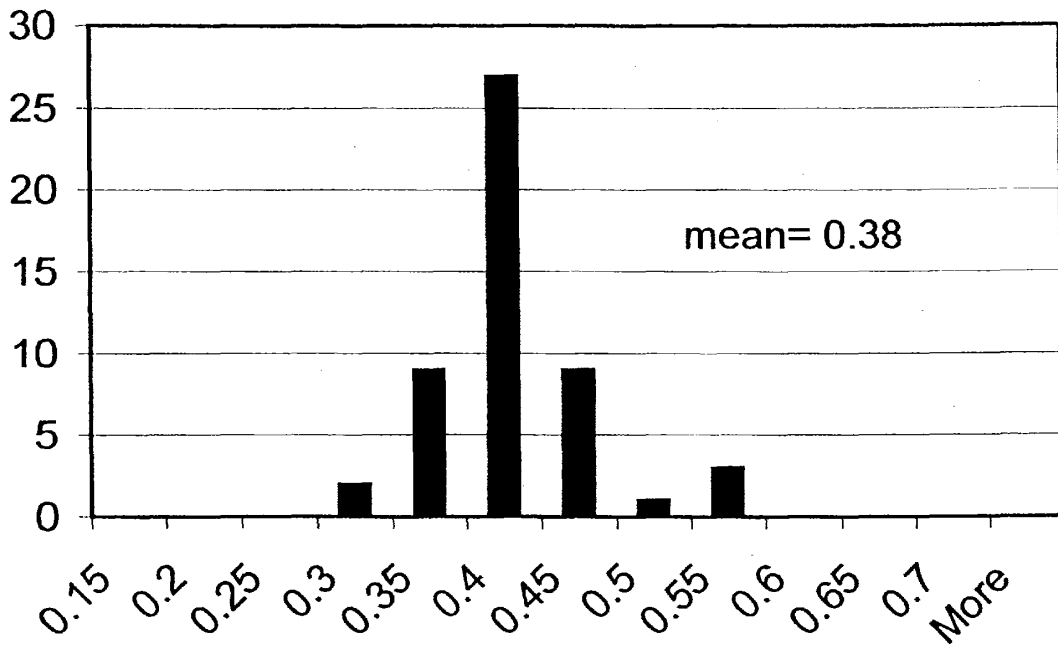
■ Middle R. St.#1

### Middle R. St.#1 4080-4090



■ Middle R. St.#1

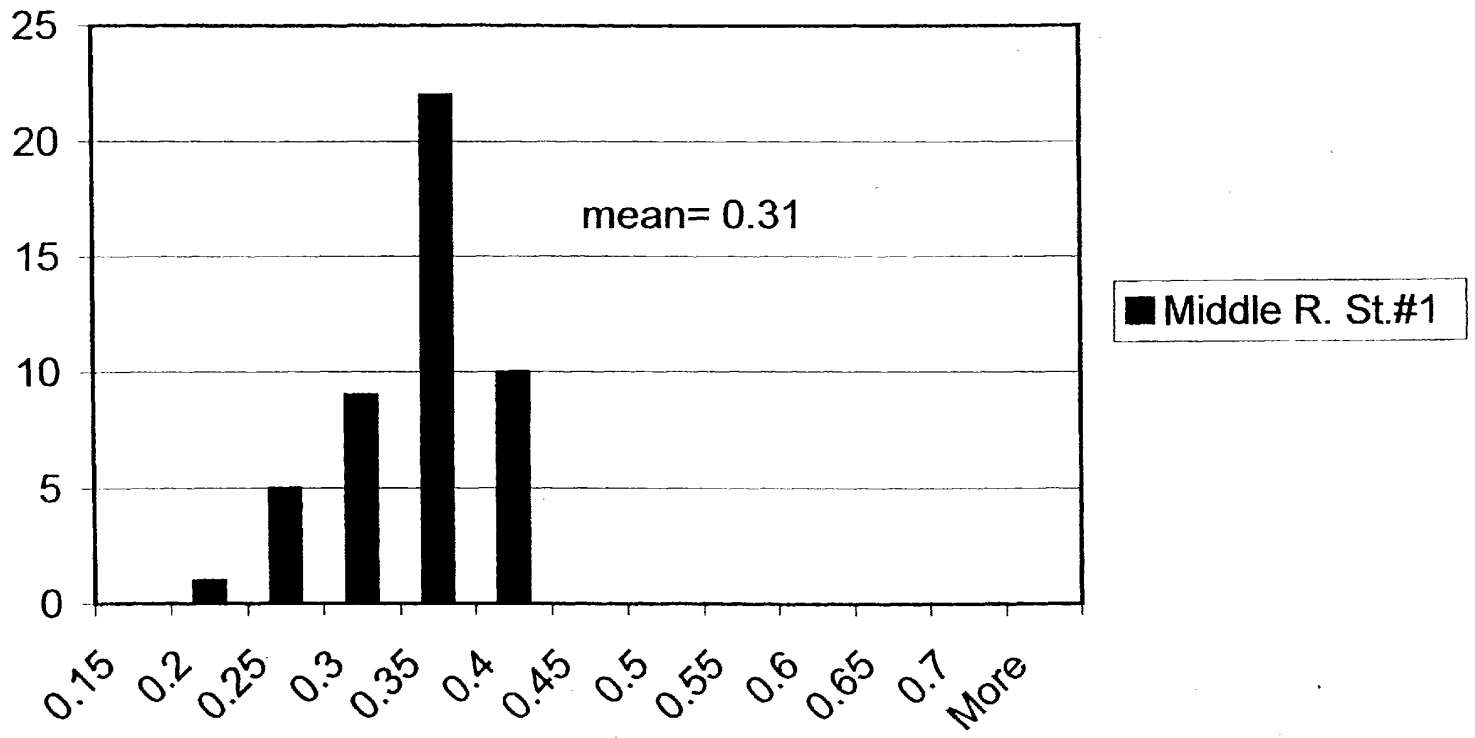
Middle R. St.#1  
4630-4650

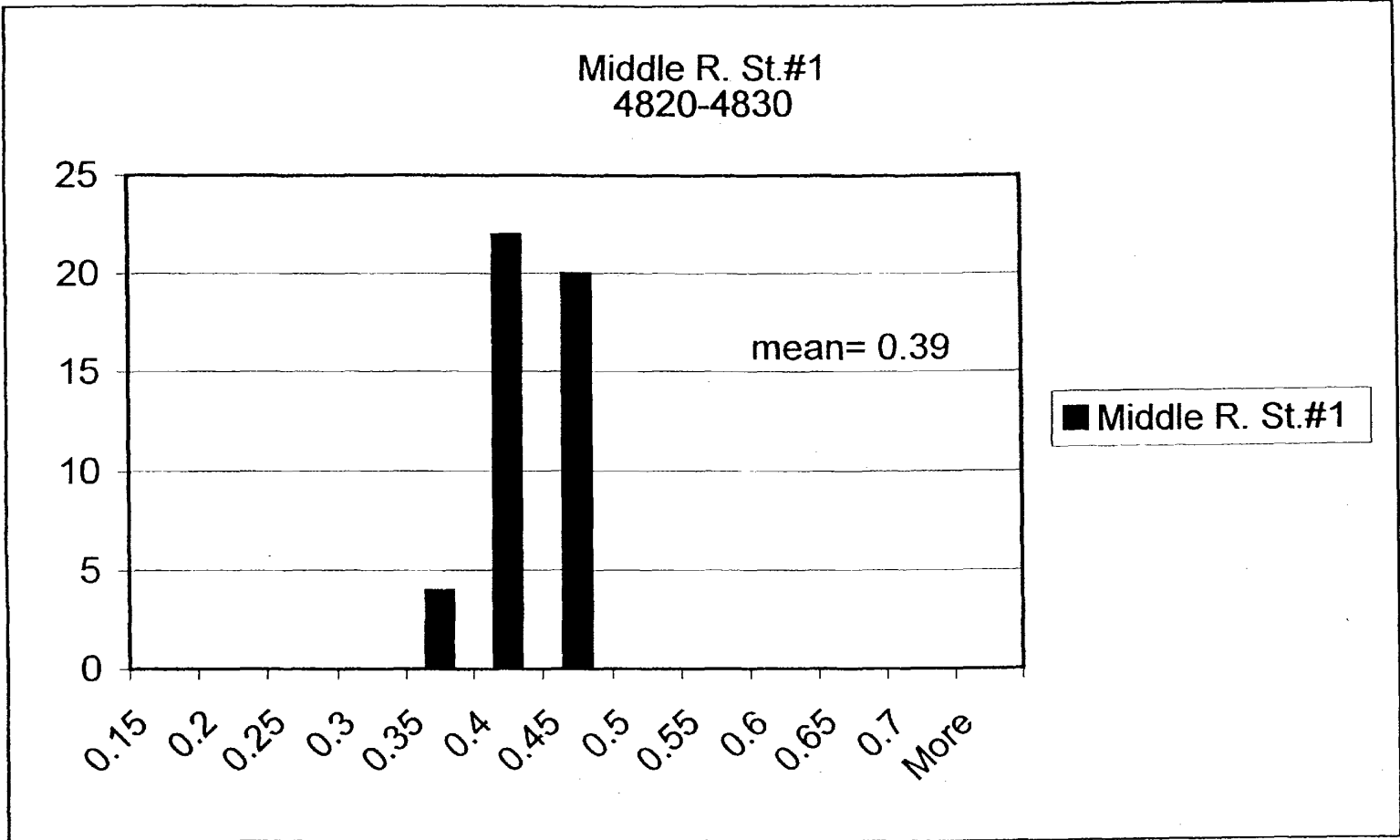


■ Middle R. St.#1

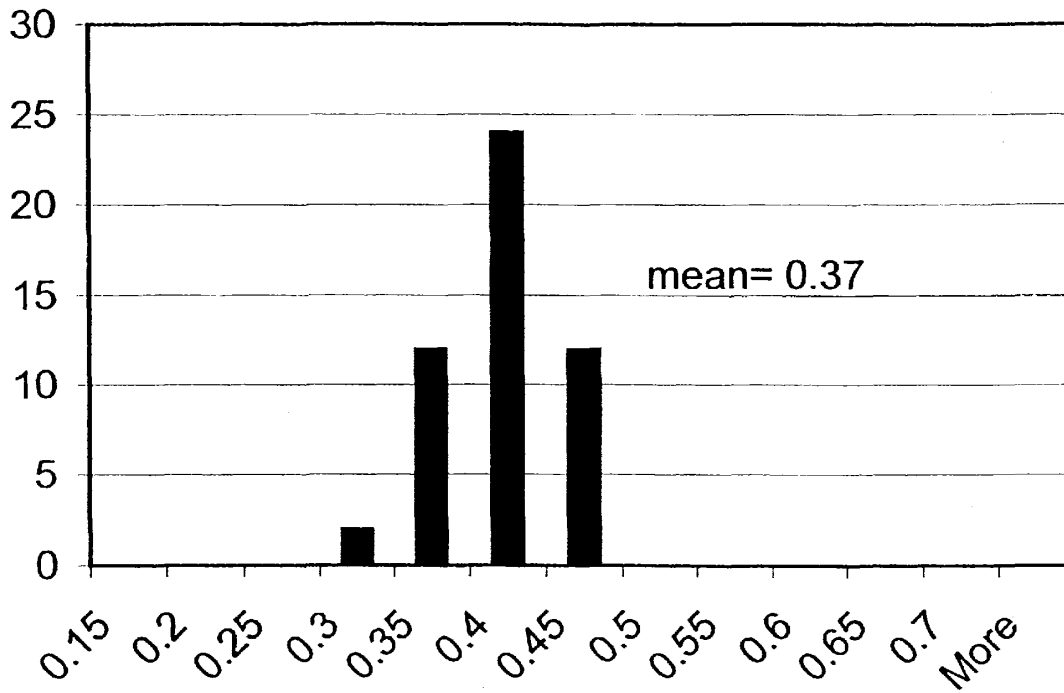


Middle R. St.#1  
4790-4800



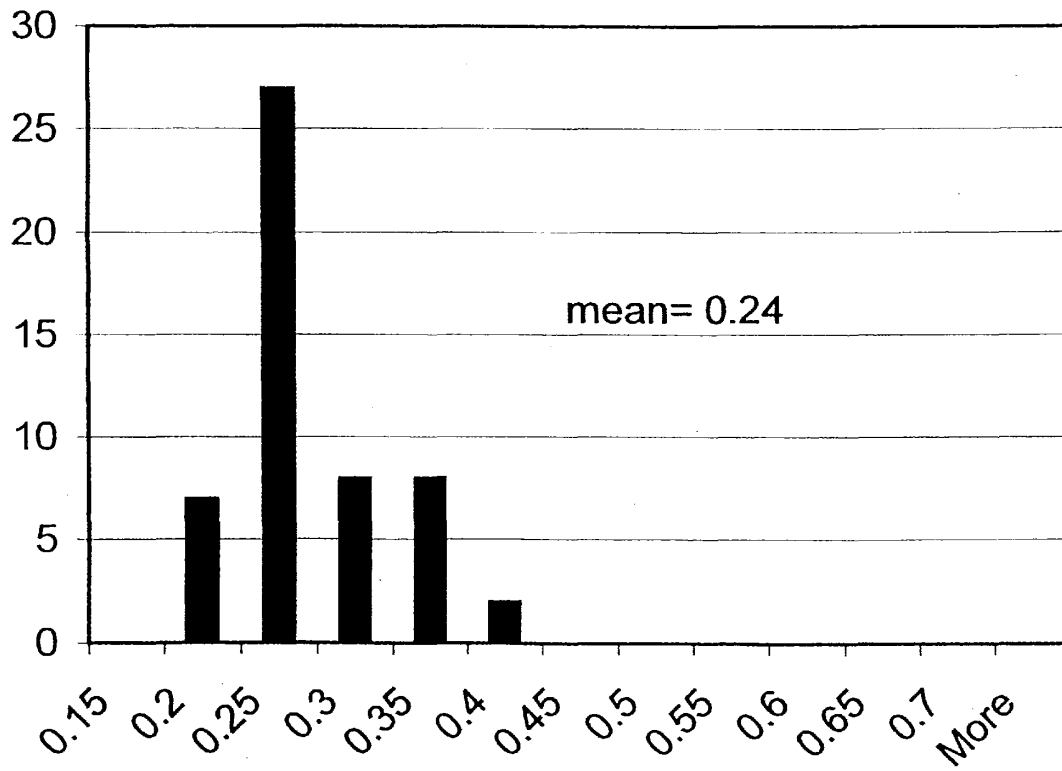


Middle R. St.#1  
4910-4920



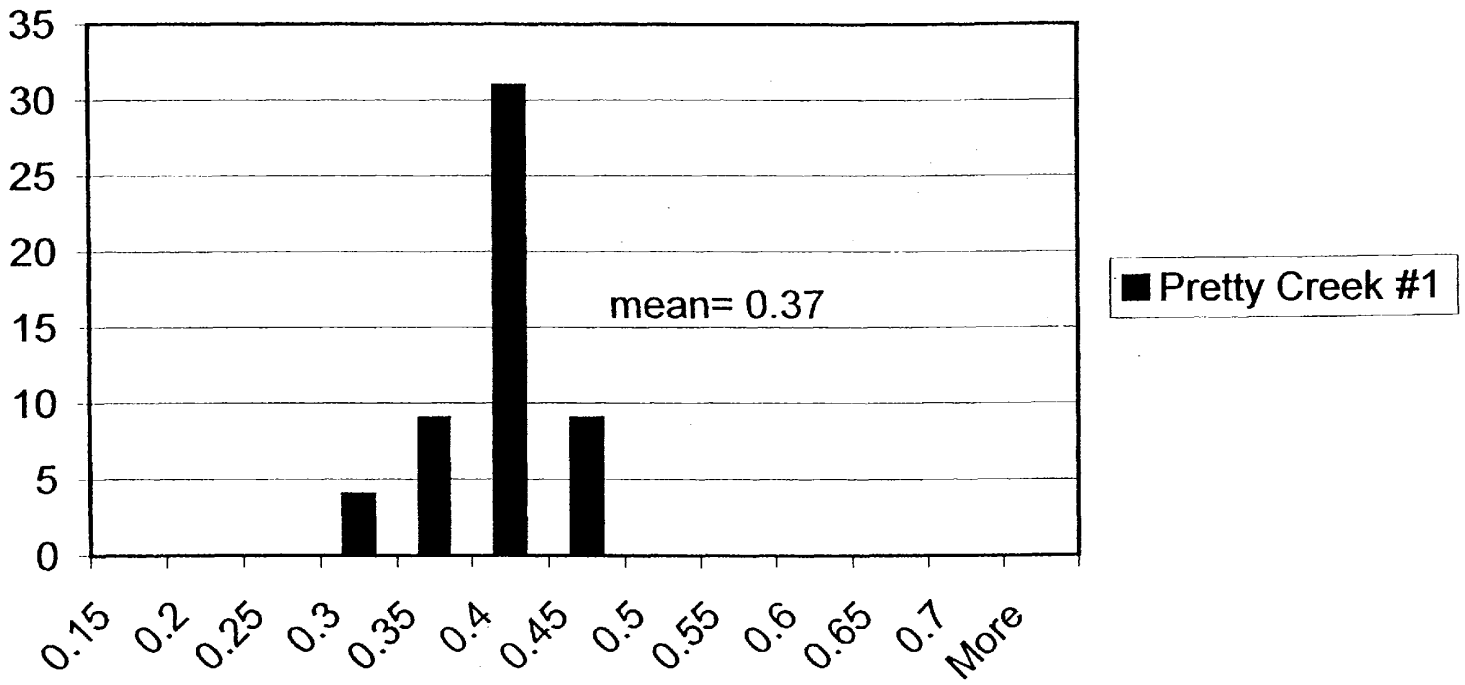
■ Middle R. St.#1

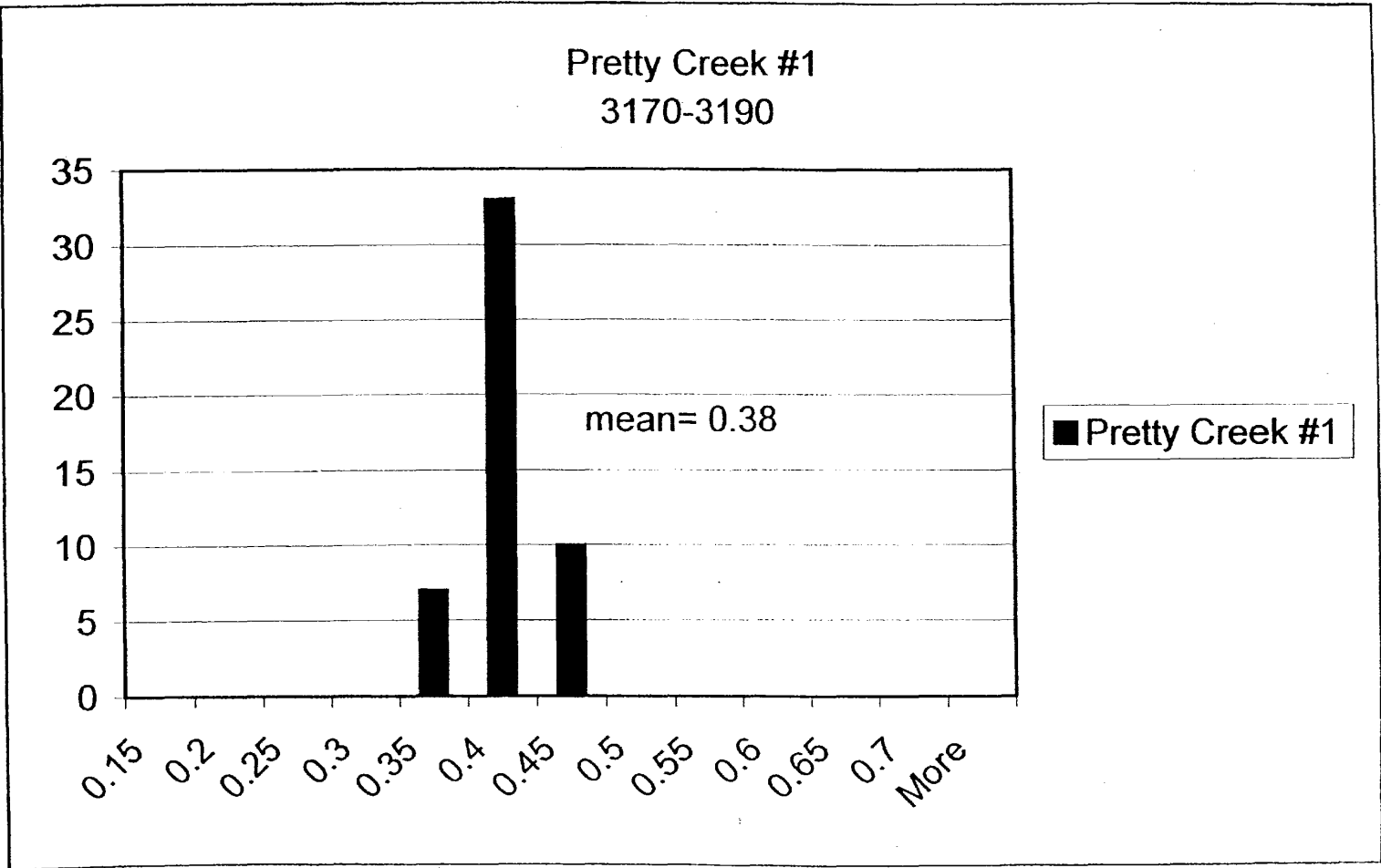
Pretty Creek #1  
1250-1260



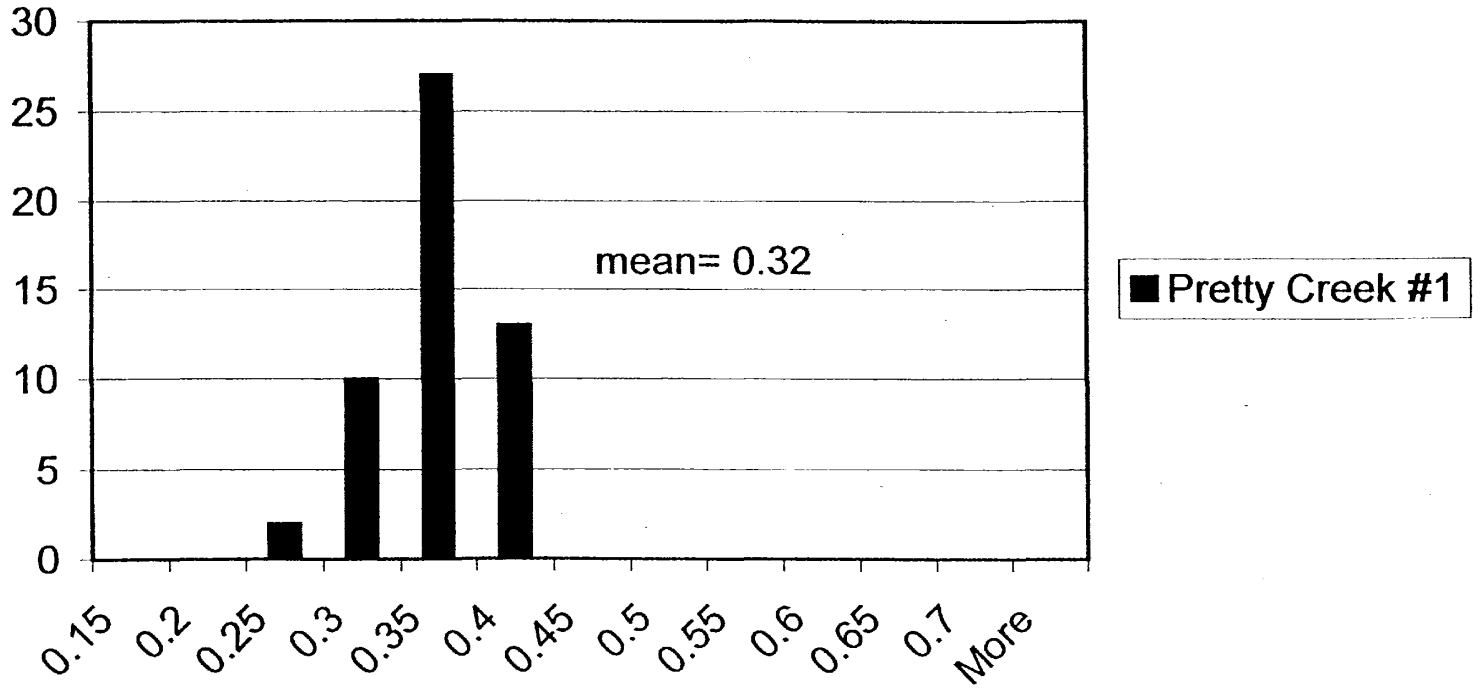
■ Pretty Creek #1

### Pretty Creek #1 2410-2420

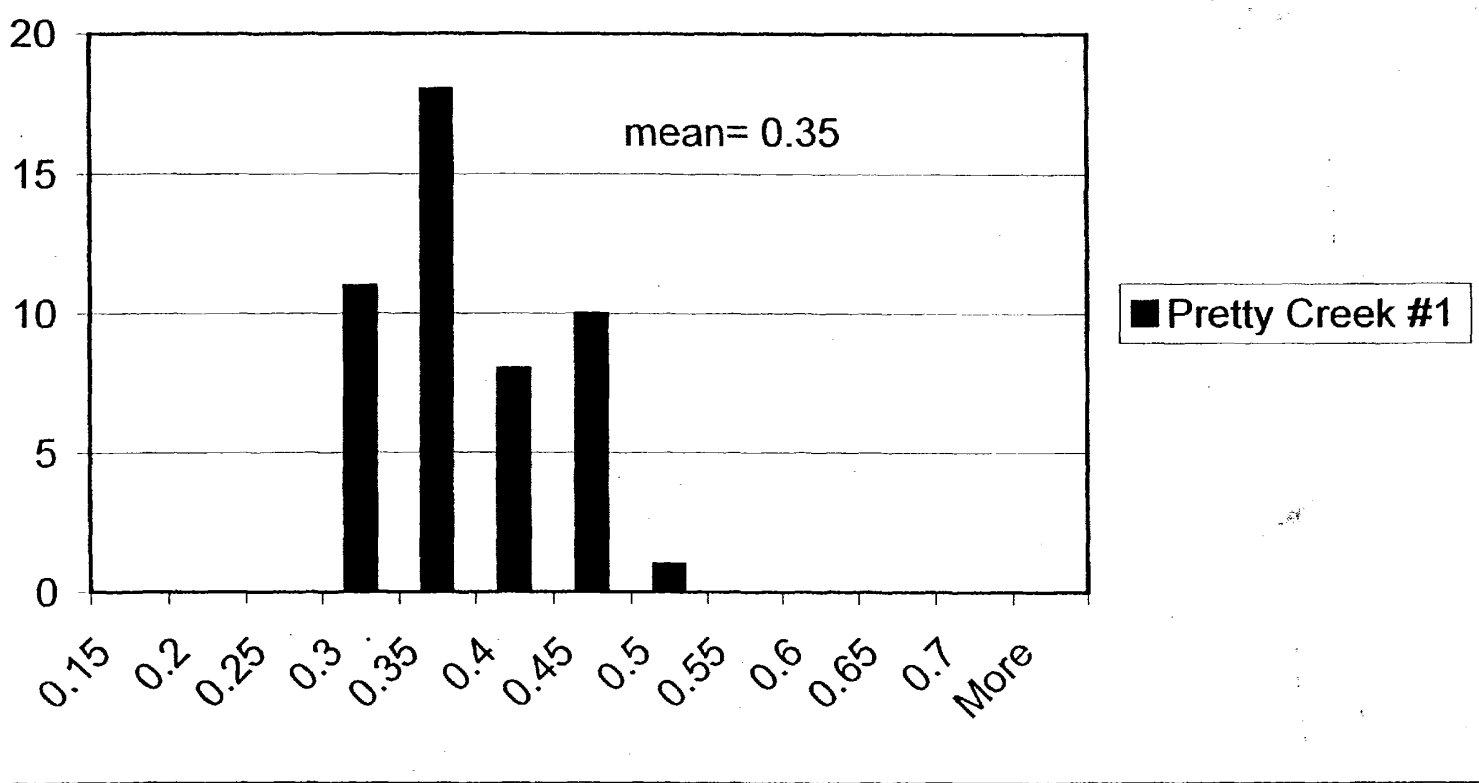




### Pretty Creek #1 3190-3200

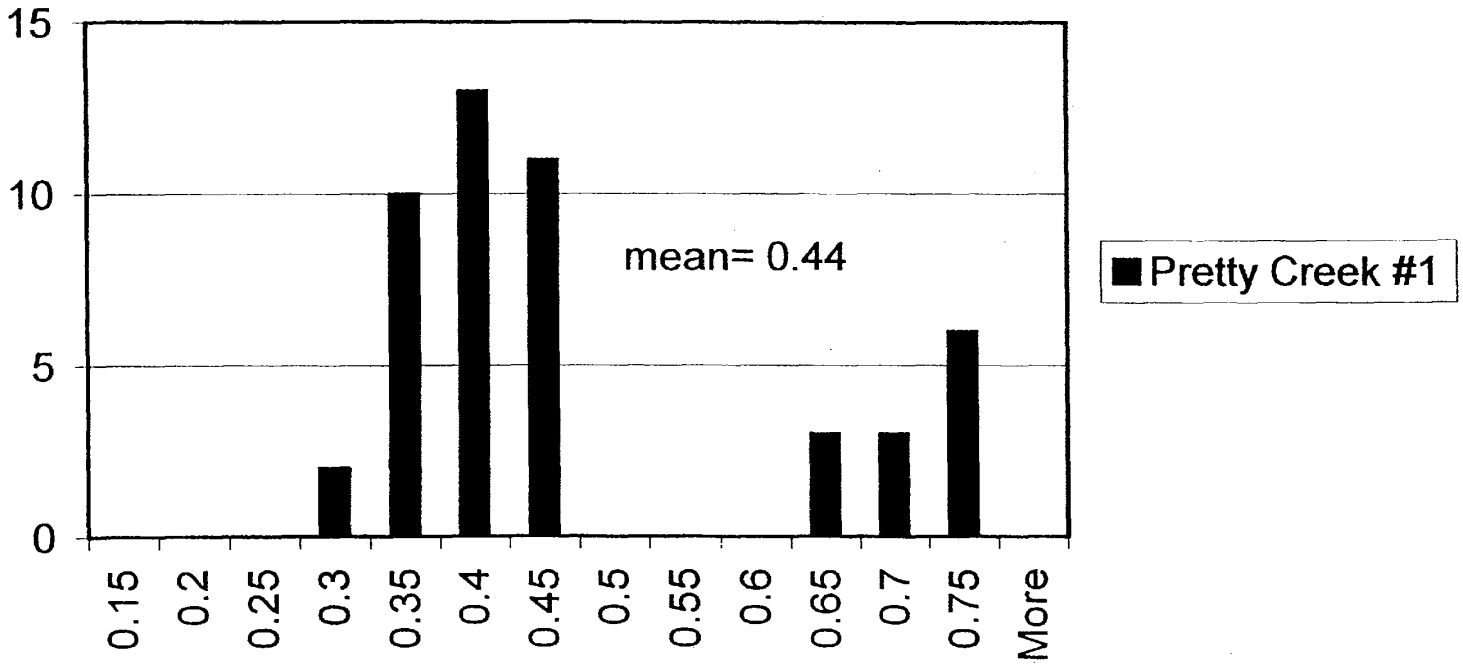


### Pretty Creek #1 4110-20; 4135-45

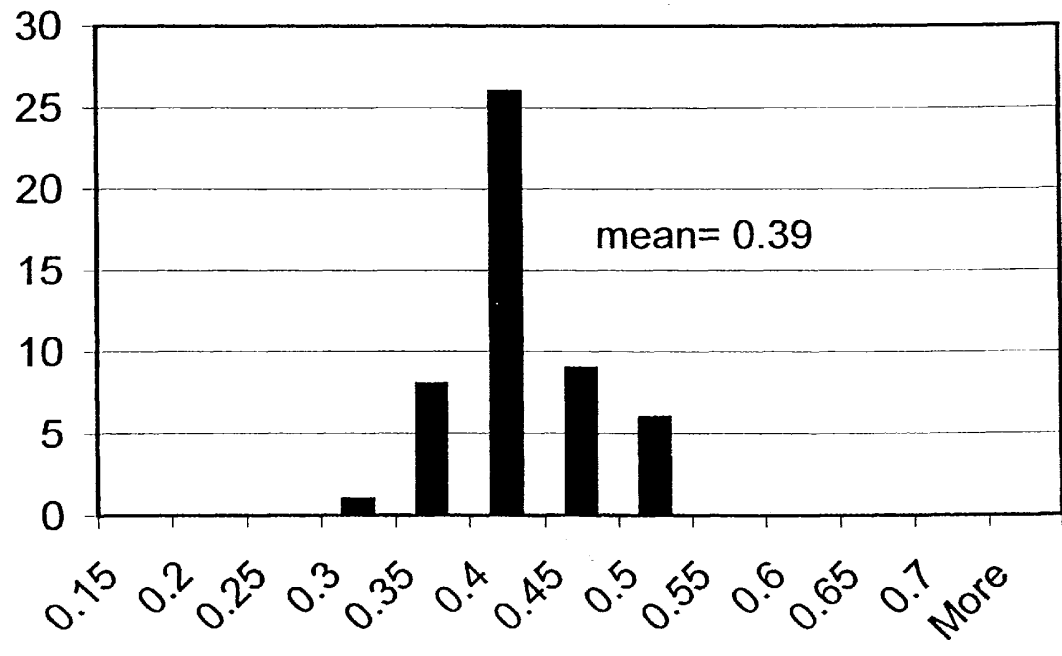




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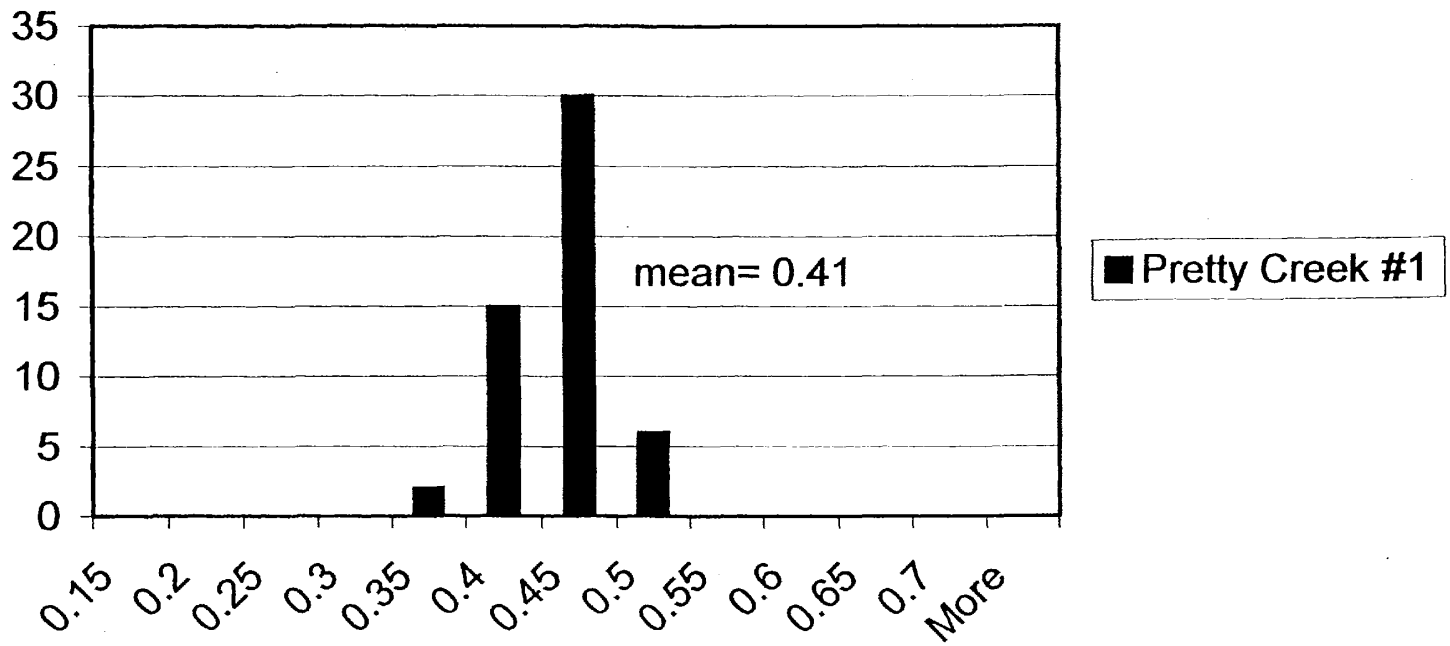


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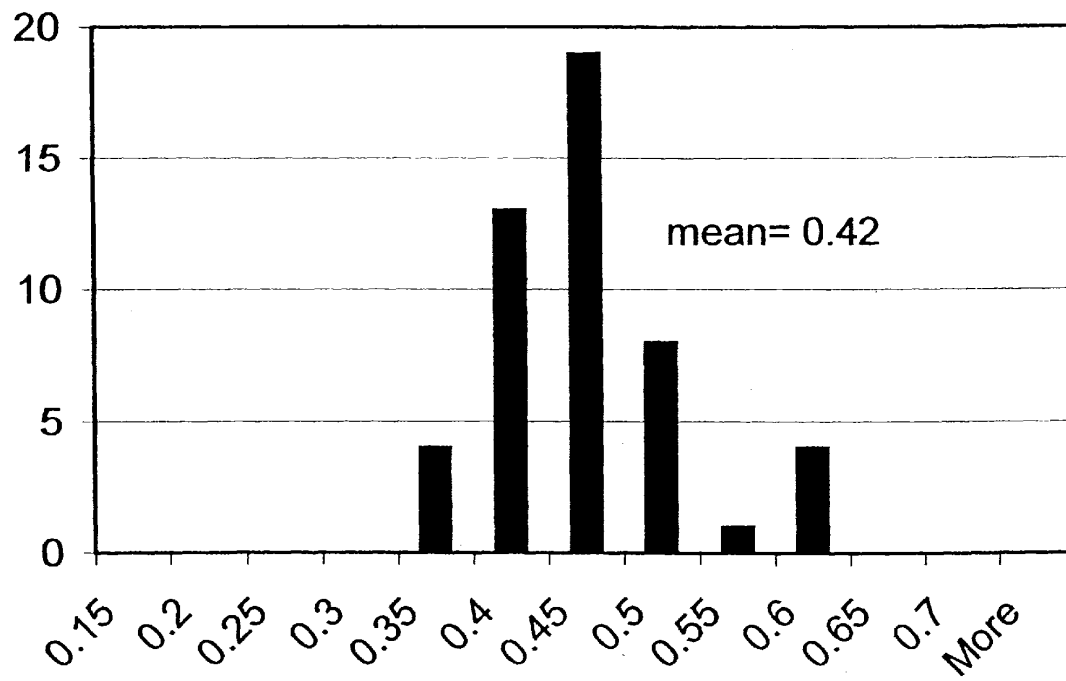


■ Pretty Creek #1

### Pretty Creek #1 5500-5530

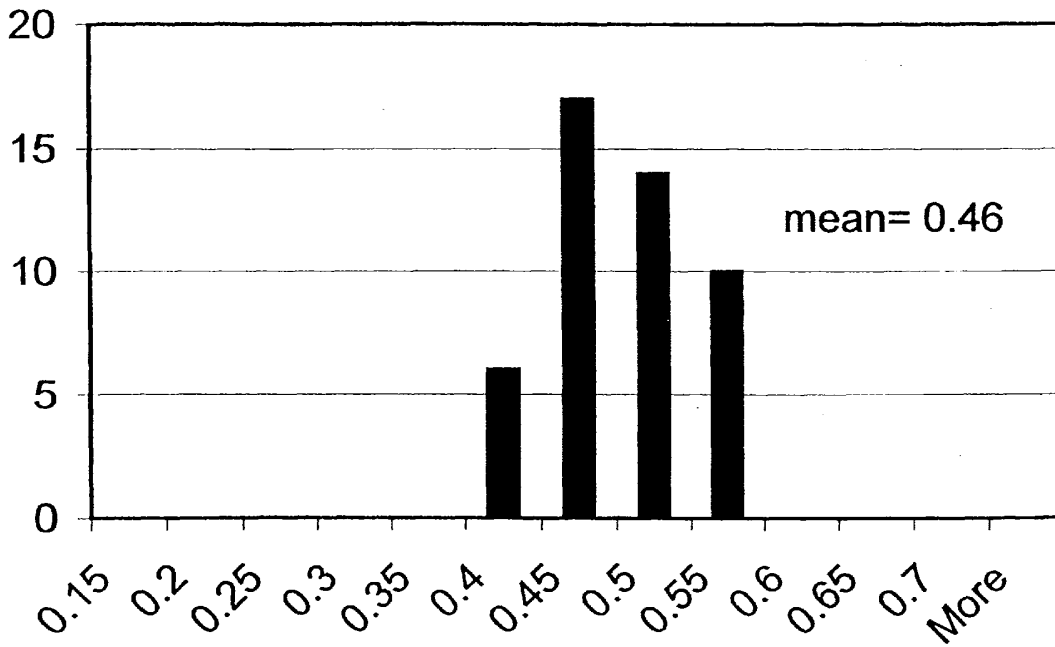


### Pretty Creek #1 5780-5790



■ Pretty Creek #1

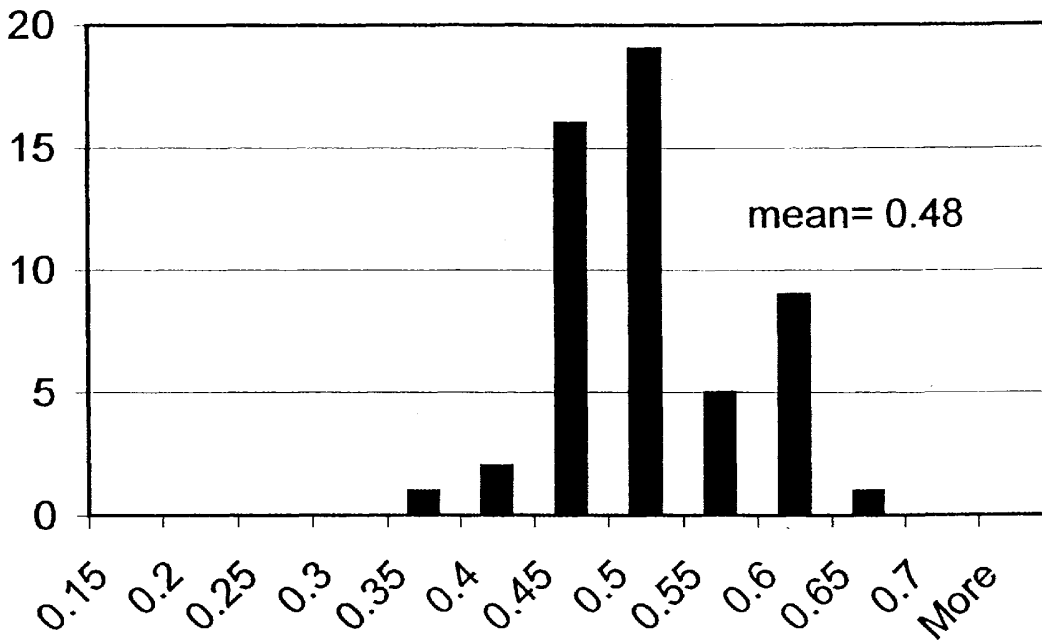
### Pretty Creek #1 6085-6120



■ Pretty Creek #1

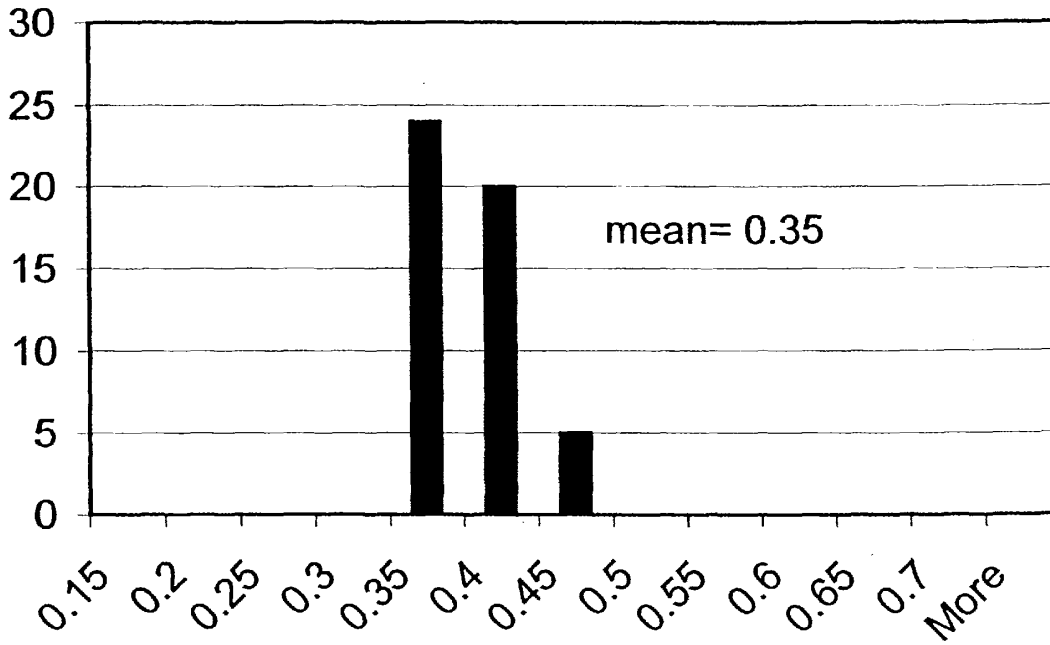
mean= 0.46

### Pretty Creek #1 6310-6320



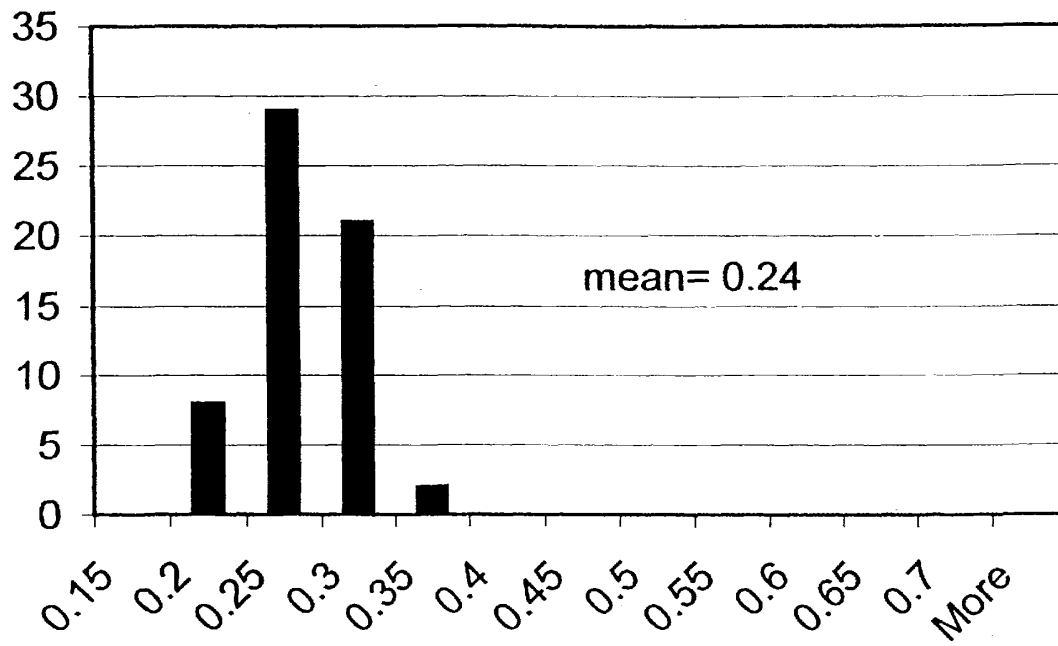
■ Pretty Creek #1

### Pretty Creek #1 6400-6420



■ Pretty Creek #1

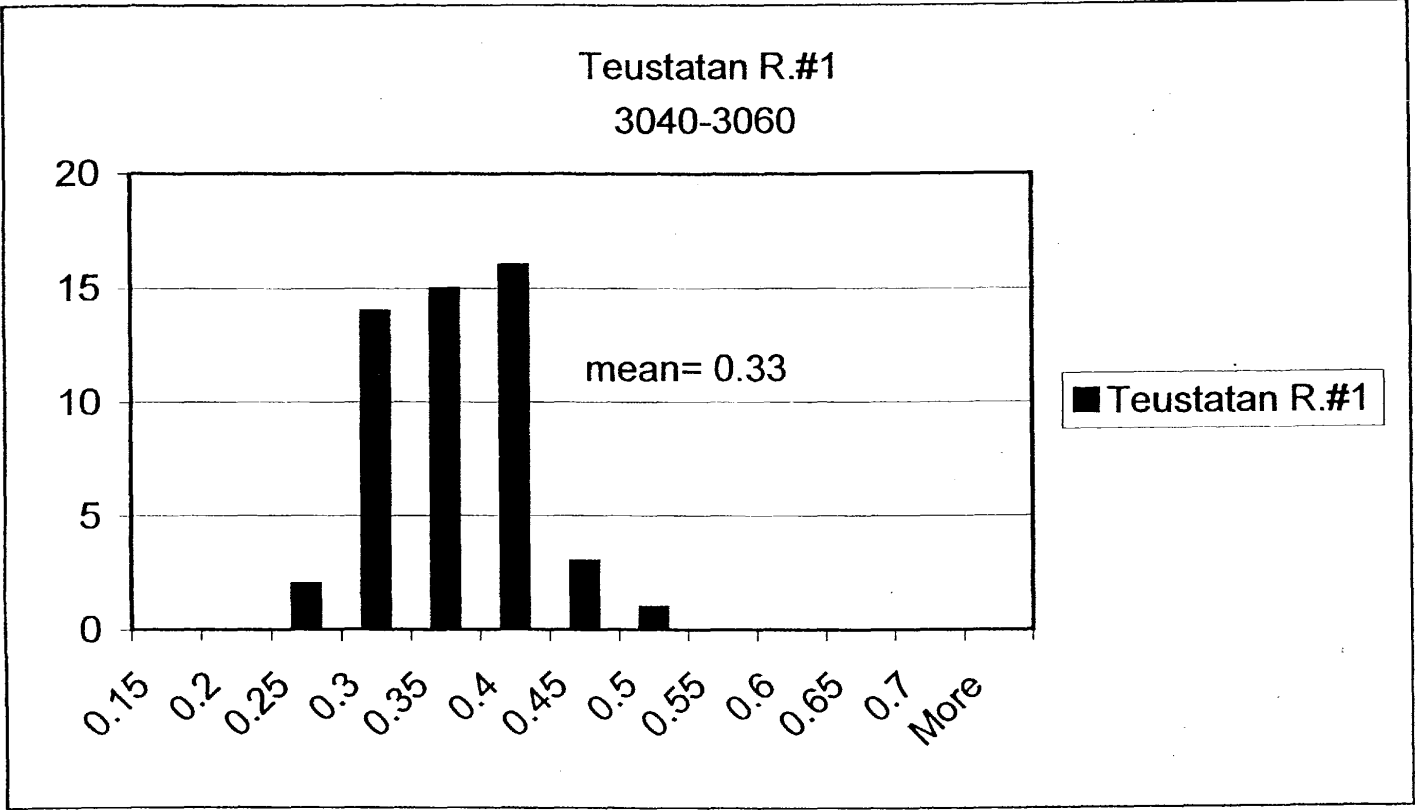
### Teustatan R.#1 2020-2030



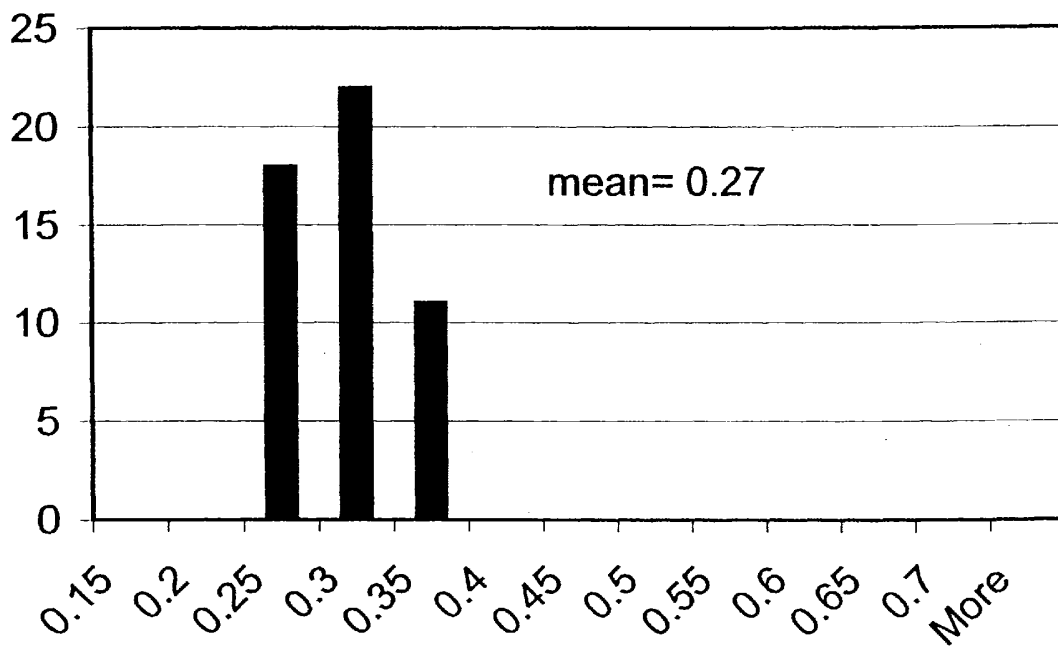
■ Teustatan R.#1

mean= 0.24



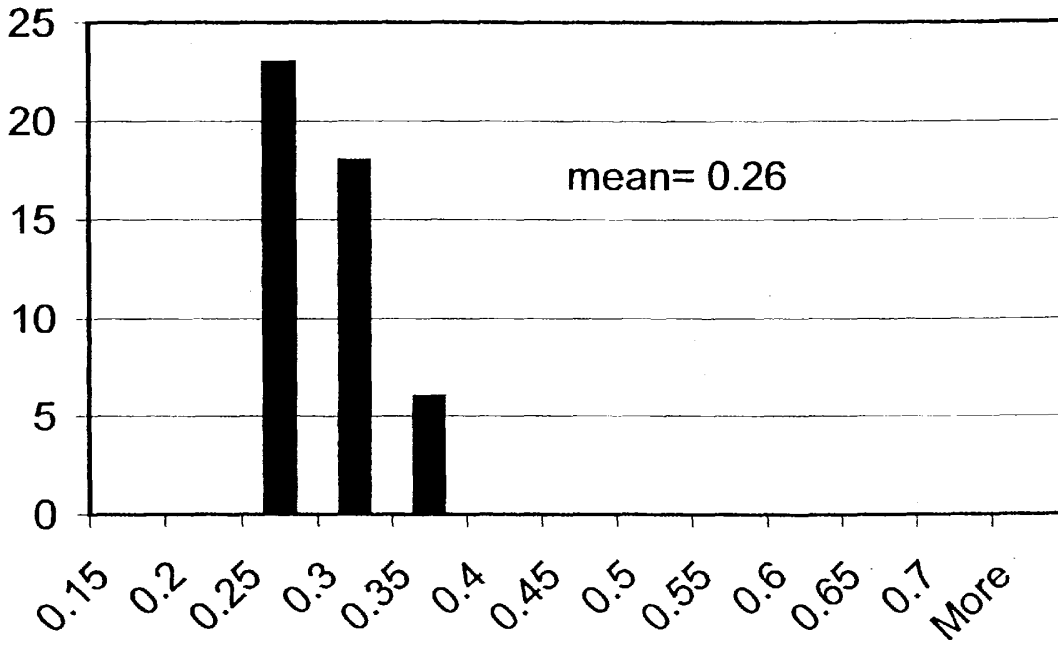


Teustatan R.#1  
3360-3370



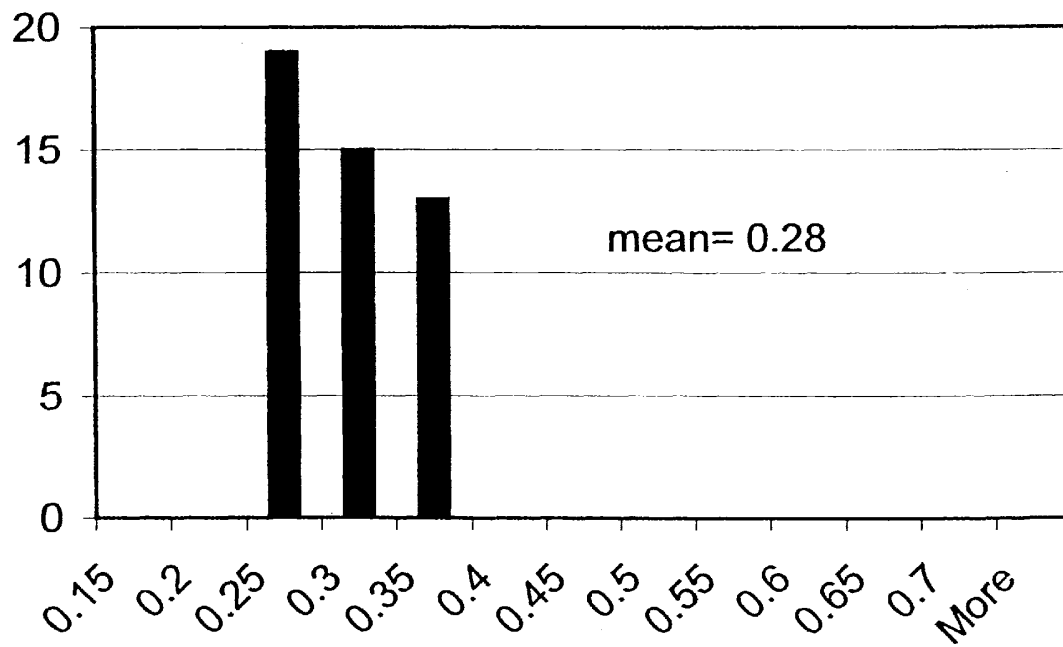
■ Teustatan R.#1

Teustatan R.#1  
3690-3710



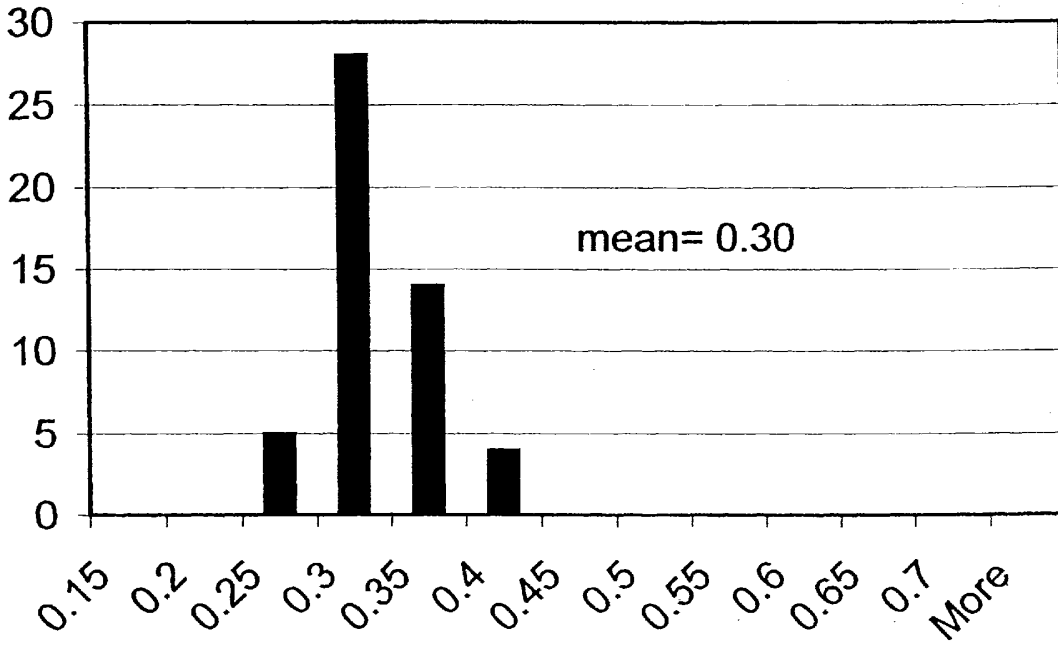
■ Teustatan R.#1

### Teustatan R.#1 3890-3990



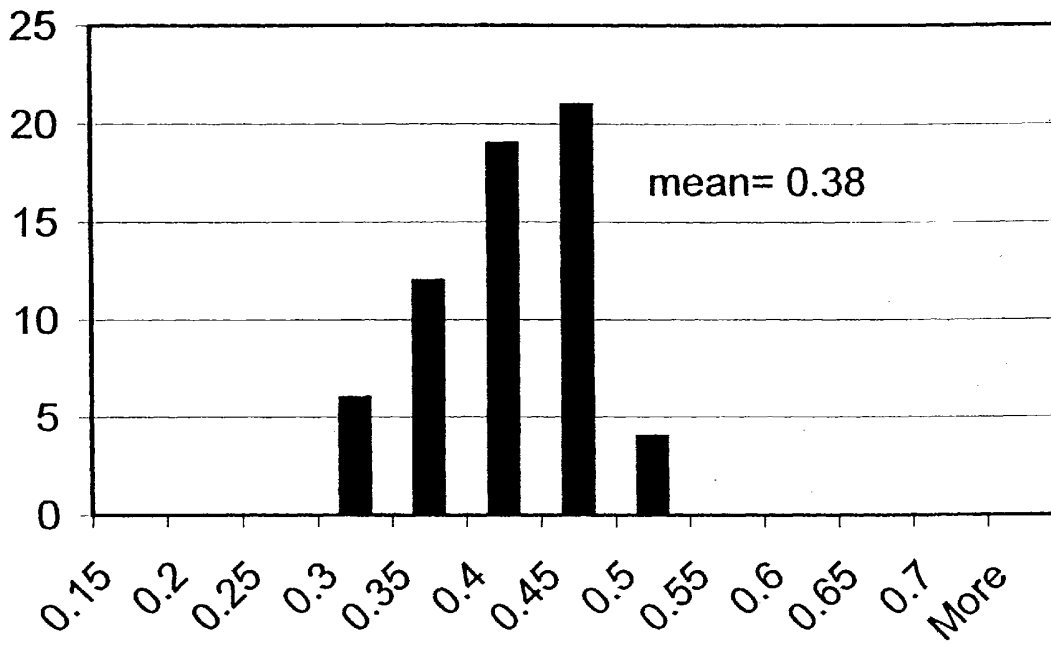
■ Teustatan R.#1

### Teustatan R.#1 4200-4220



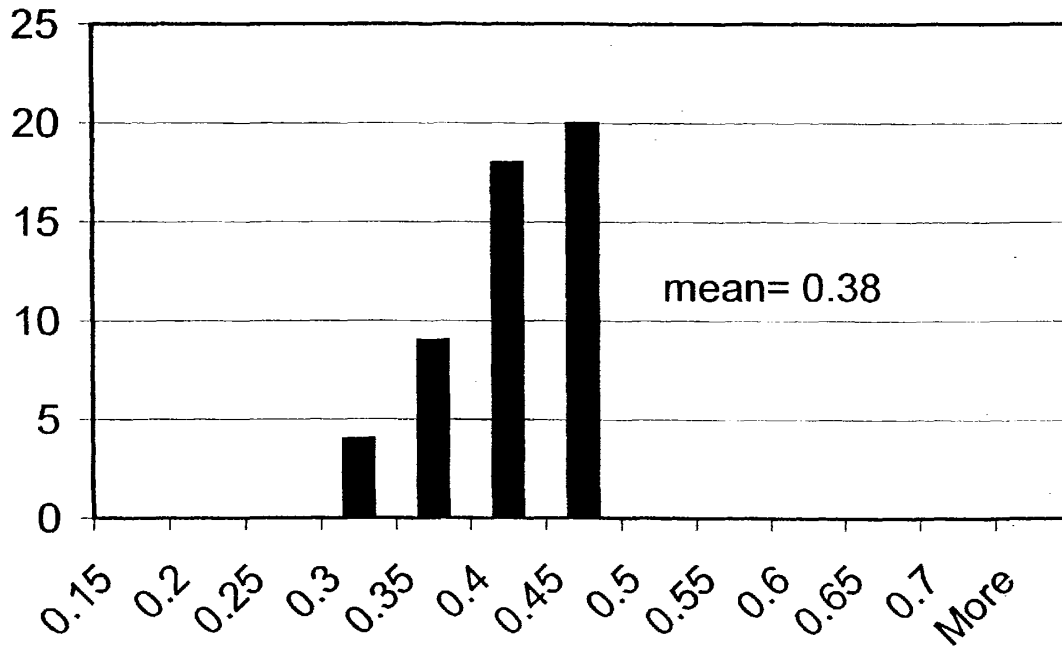
■ Teustatan R.#1

### Teustatan R.#1 4590-4600



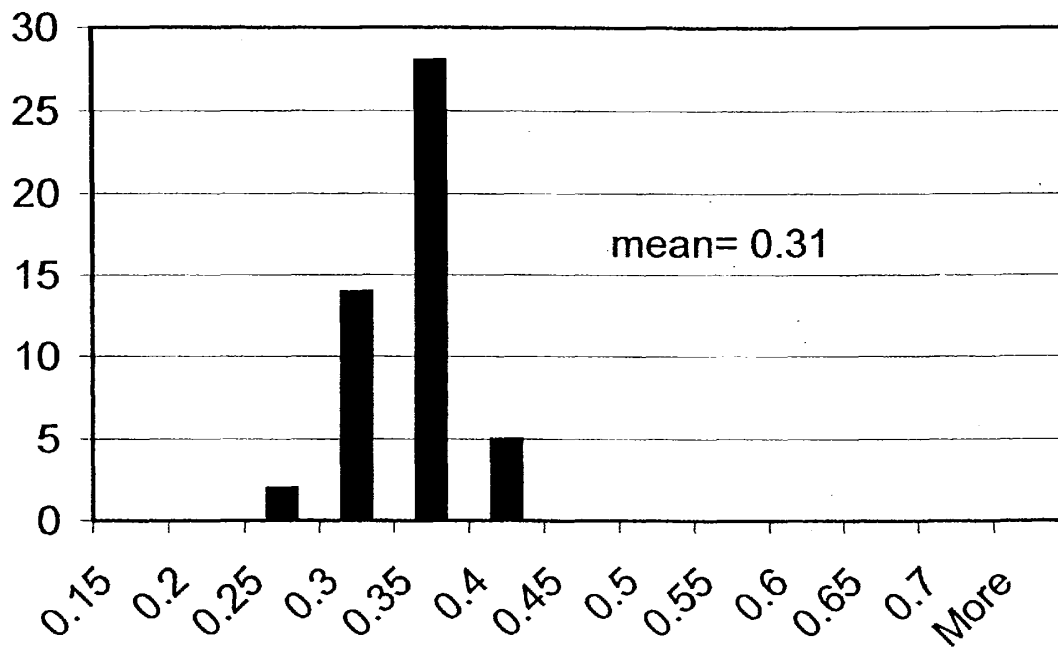
■ Teustatan R.#1

Teustatan R.#1  
4665-4680



■ Teustatan R.#1

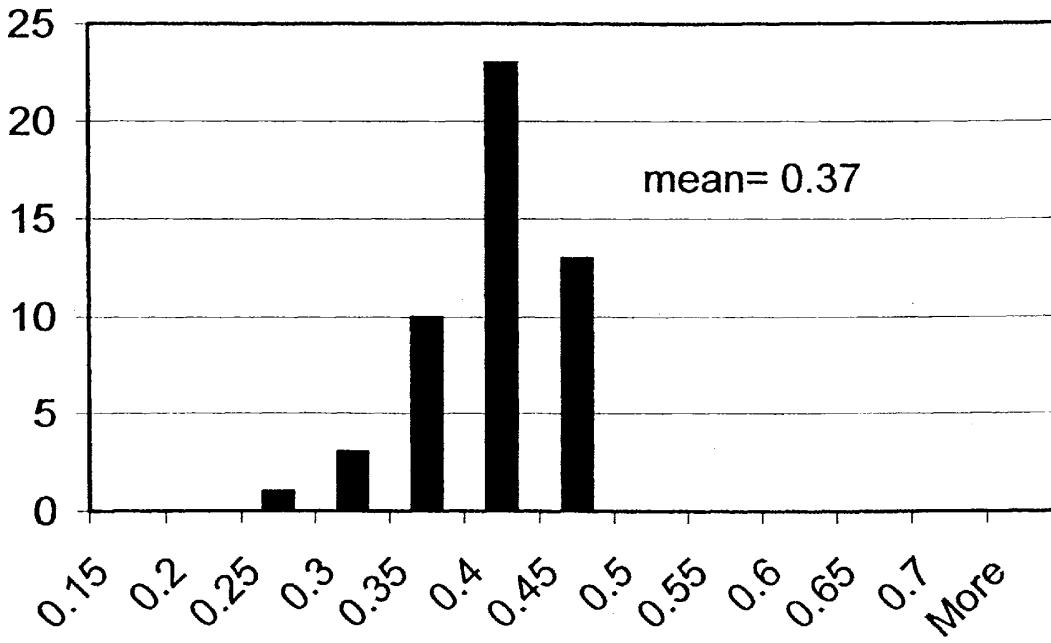
Teustatan R.#1  
5120-5135



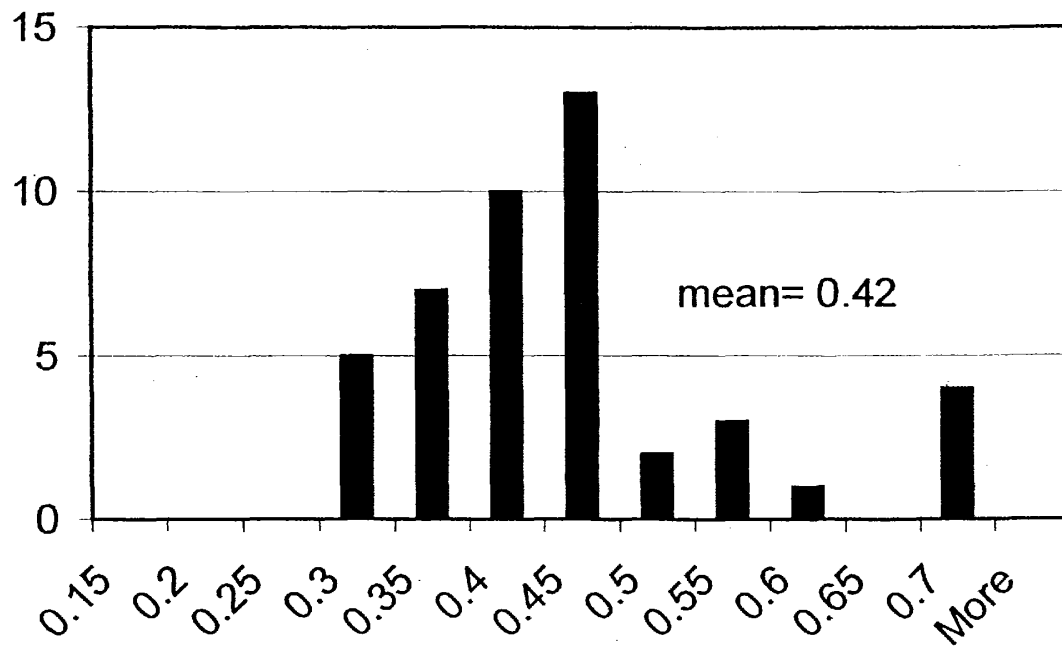
■ Teustatan R.#1



### Teustatan R.#1 5550-5560



### Teustatan R.#1 5730-45; 5760-70



■ Teustatan R.#1