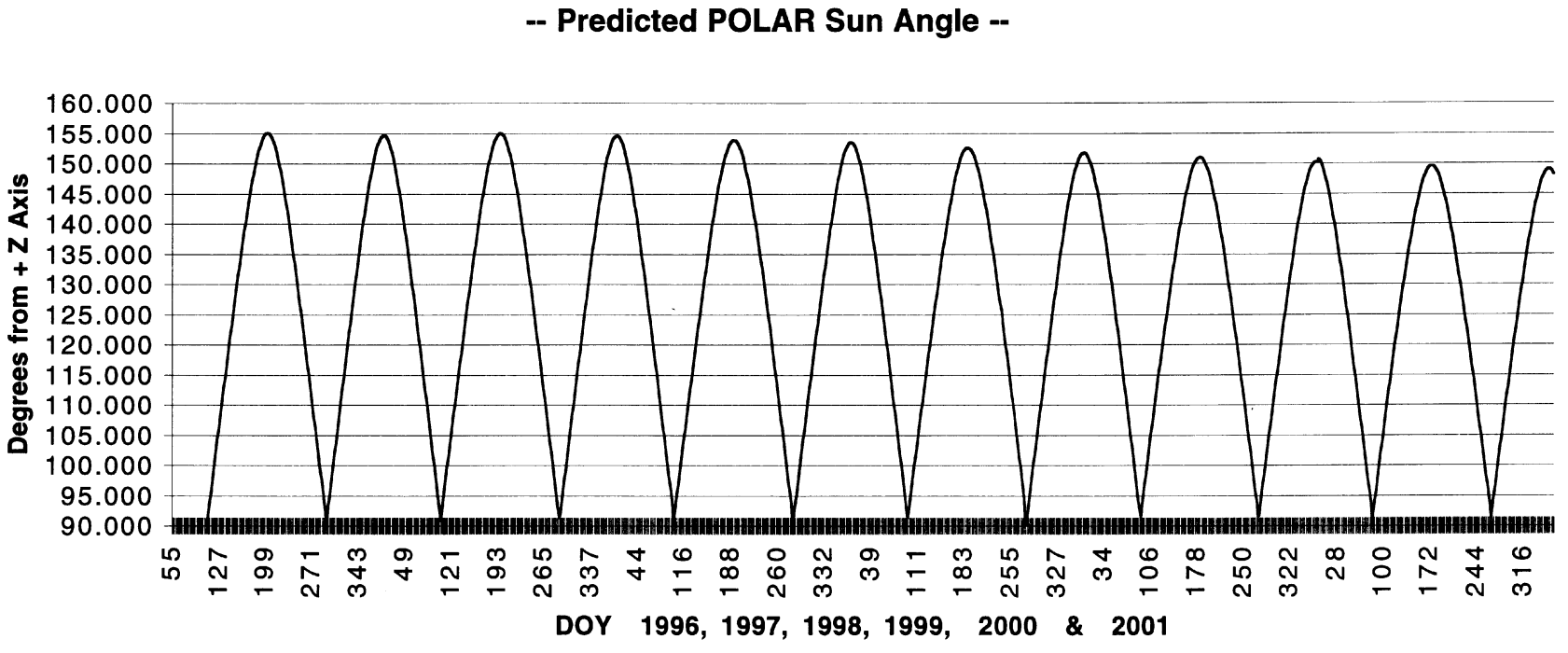
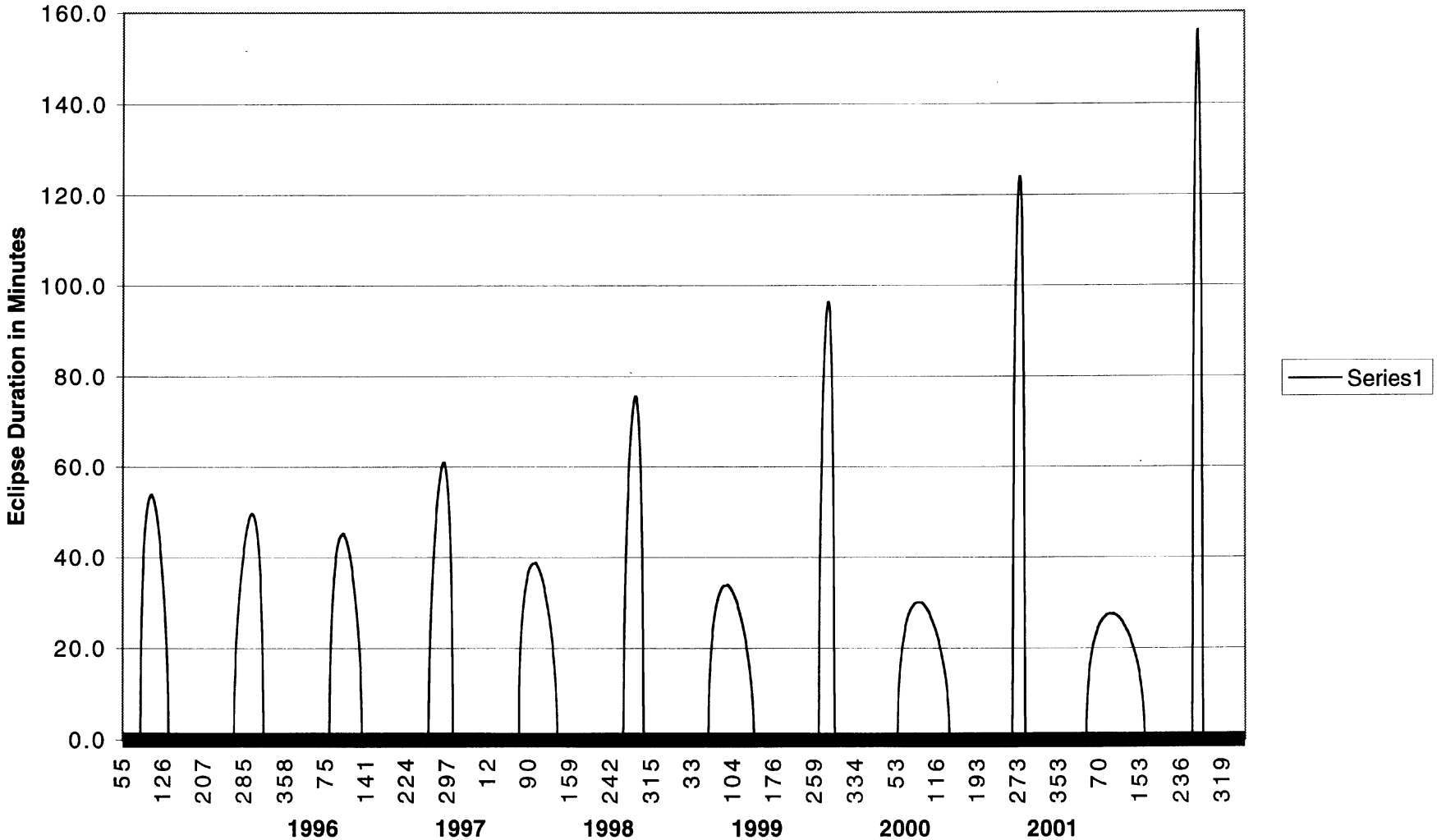

-- Predicted POLAR Sun Angle --
Degrees from + Z Axis
160.000
155.000
150.000
145.000
140.000
135.000
130.000
125.000
120.000
115.000
110.000
105.000
100.000
95.000
90.000
55
127
199
271
343
49
121
193
265
337
44
116
188
260
332
39
111
183
255
327
34
106
178
250
322
28
100
172
244
316
DOY 1996, 1997, 1998, 1999, 2000 & 2001

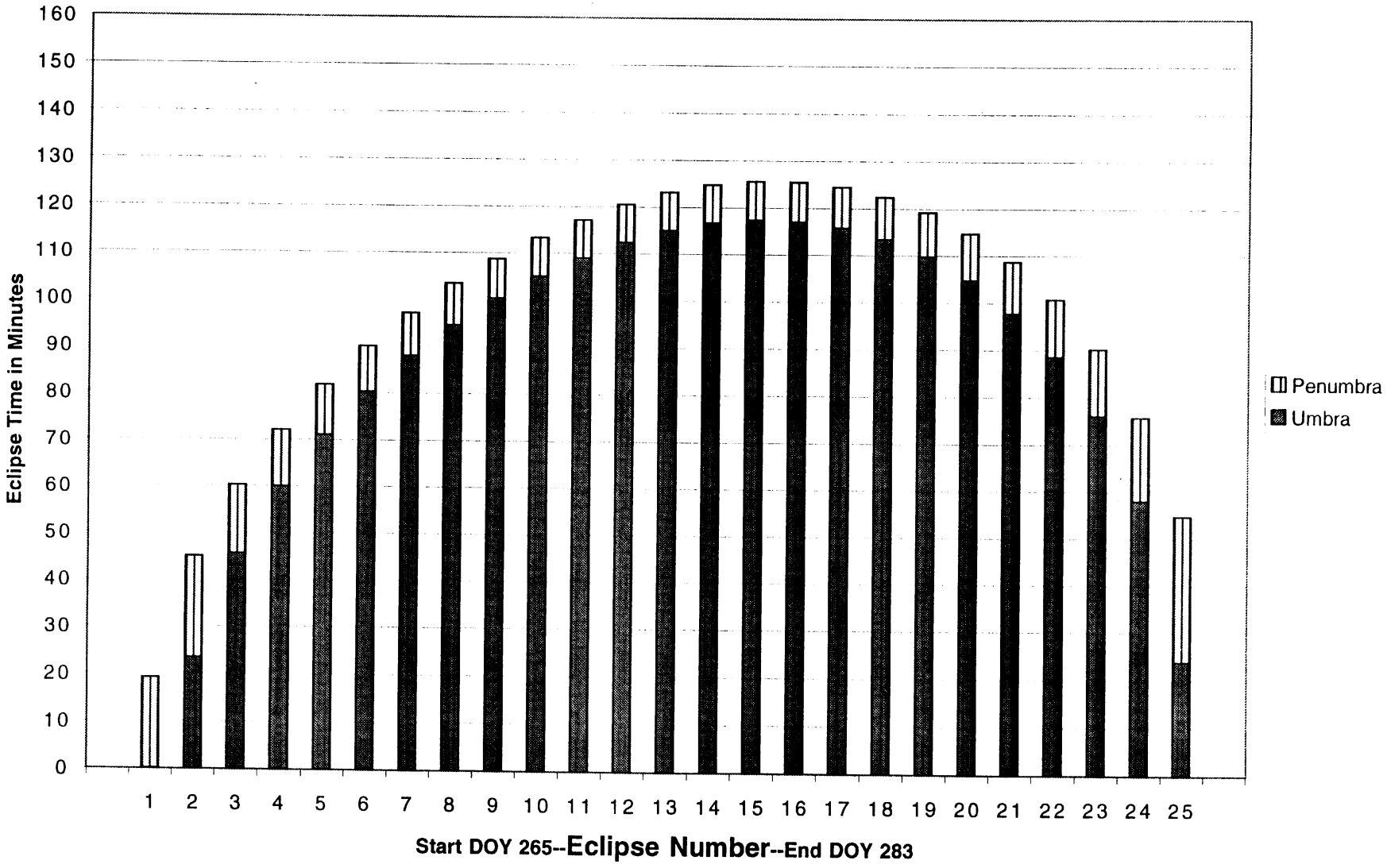
--- POLAR Eclipse Duration Since Launch ---



Any Questions:
Call Larry Nichols (301) 286-0725

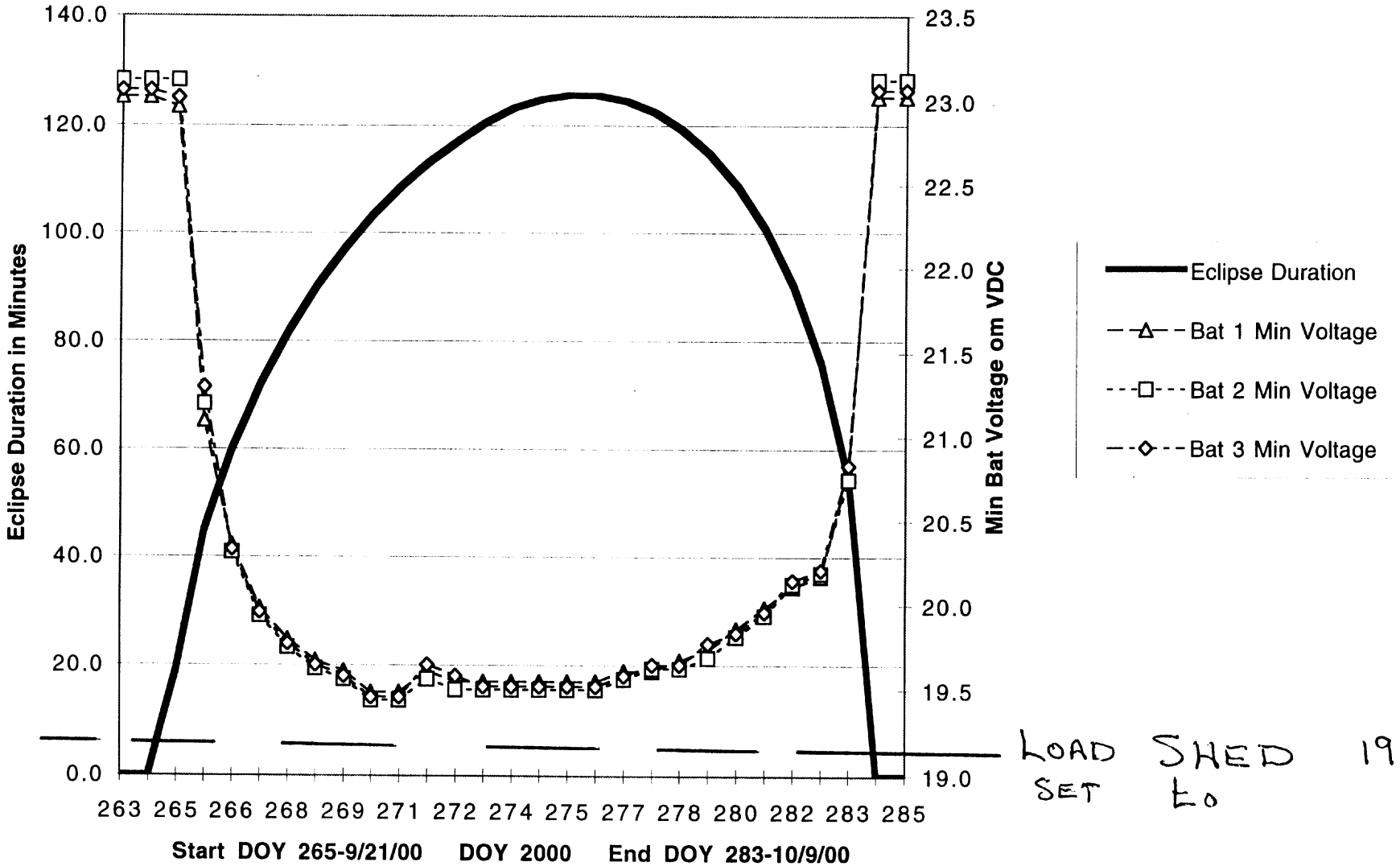
GRAPH # 1

Penumbra & Umbra Eclipse Times --- Fall 2000



2

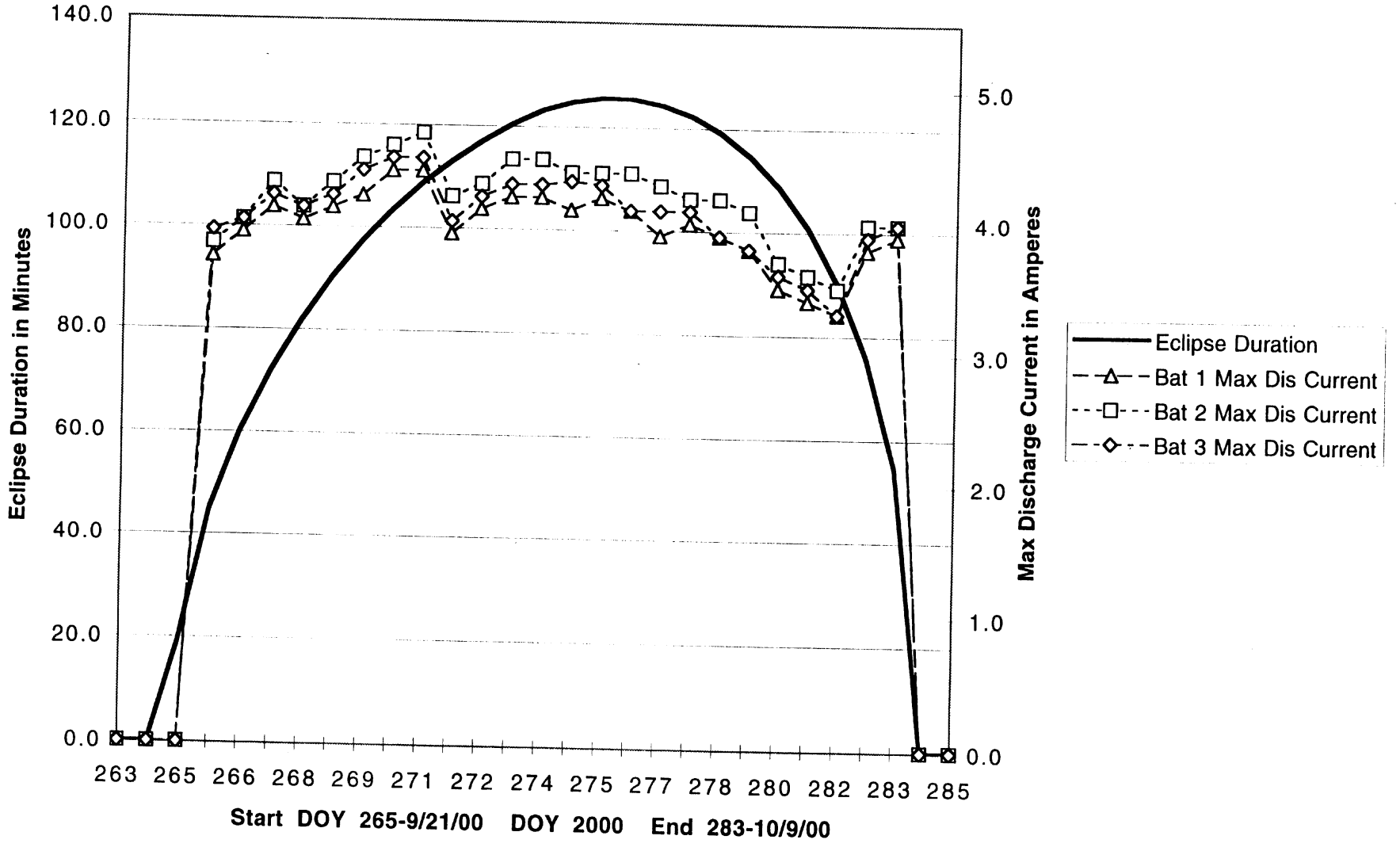
---POLAR Min Bat V & Eclipse Duration: Fall 2000---



LOAD SHED 19.14 VDC
SET TO

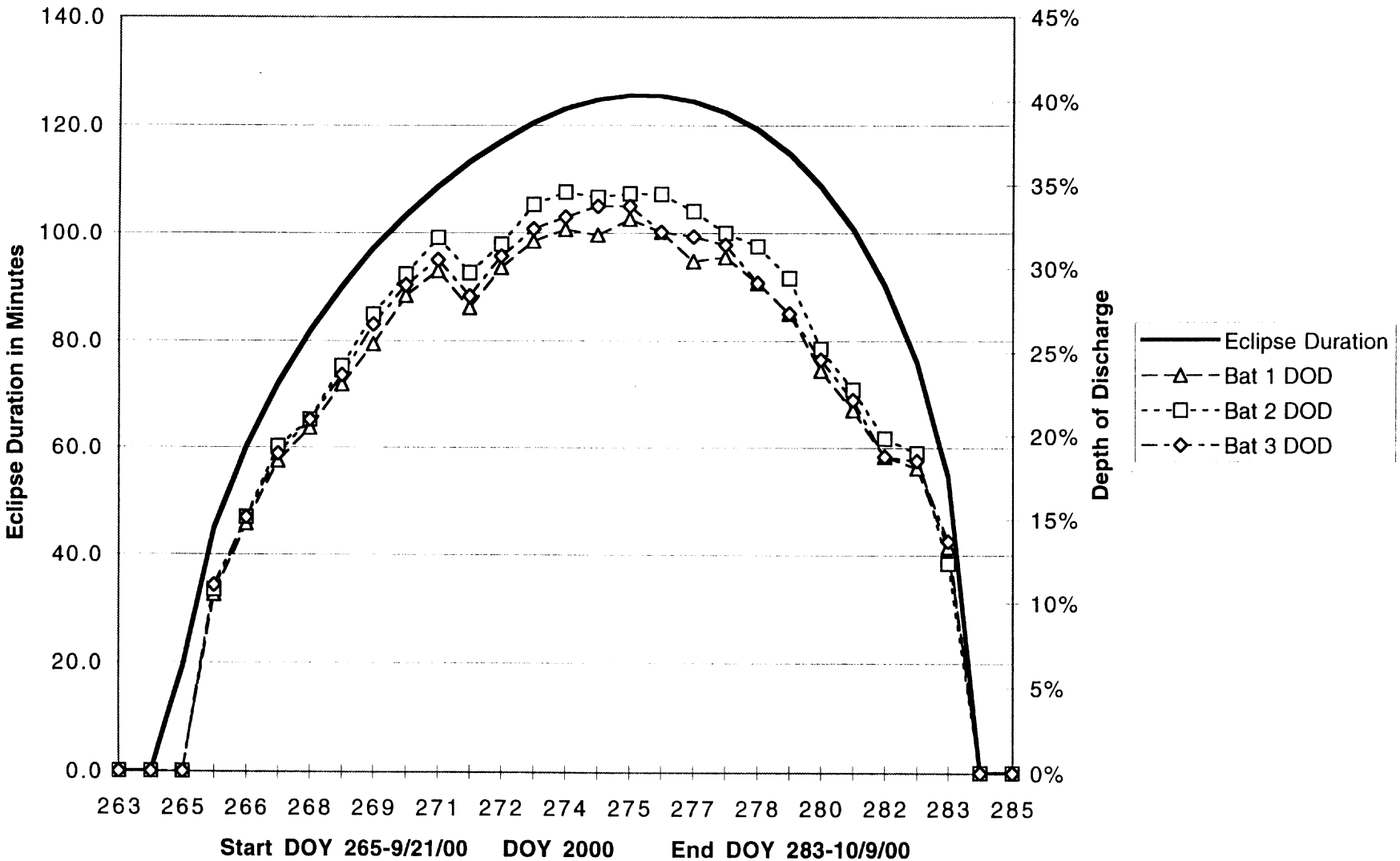
3

---POLAR Max Dis I & Eclipse Duration: Fall 2000---



4

----POLAR Depth of Discharge: Fall 2000---



 Data for Graphs # 2 + 3

2000 Fall	Eclipse		Minimum	Battery	Voltage	Maximum	Discharge	Current
DOY	Eclipse #	Eclipse Time	BAT 1 VDC	Bat 2 VDC	Bat 3 VDC	Bat 1 Amps	Bat 2 Amps	Bat 3 Amps
263	0	0.00	23.025	23.122	23.064	0.000	0.000	0.000
264	0	0.00	23.025	23.122	23.064	0.000	0.000	0.000
265	1	19.13	22.968	23.125	23.021	0.000	0.000	0.000
266	2	44.95	21.10	21.20	21.30	3.70	3.80	3.90
266	3	60.27	20.356	20.312	20.333	3.886	3.982	3.982
267	4	72.05	19.982	19.938	19.958	4.079	4.271	4.175
268	5	81.77	19.796	19.750	19.771	3.982	4.079	4.079
269	6	90.03	19.671	19.625	19.646	4.079	4.271	4.175
269	7	97.17	19.609	19.562	19.583	4.175	4.464	4.368
270	8	103.37	19.485	19.438	19.458	4.368	4.560	4.464
271	9	108.72	19.485	19.438	19.458	4.368	4.657	4.464
272	10	113.27	19.609	19.562	19.646	3.886	4.175	3.982
272	11	117.10	19.547	19.500	19.583	4.079	4.271	4.175
273	12	120.53	19.547	19.500	19.521	4.175	4.464	4.271
274	13	123.22	19.547	19.500	19.521	4.175	4.464	4.271
275	14	124.82	19.547	19.500	19.521	4.079	4.368	4.300
275	15	125.58	19.547	19.500	19.521	4.175	4.368	4.271
276	16	125.50	19.547	19.500	19.521	4.079	4.368	4.079
277	17	124.47	19.609	19.562	19.583	3.886	4.271	4.079
278	18	122.43	19.609	19.625	19.646	3.982	4.175	4.079
278	19	119.25	19.671	19.625	19.646	3.886	4.175	3.886
279	20	114.77	19.734	19.688	19.771	3.790	4.079	3.790
280	21	108.70	19.858	19.812	19.833	3.501	3.693	3.597
281	22	100.72	19.982	19.938	19.958	3.404	3.597	3.501
282	23	90.17	20.107	20.125	20.146	3.308	3.501	3.308
282	24	75.85	20.169	20.188	20.208	3.790	3.982	3.886
283	25	54.73	20.791	20.750	20.833	3.886	3.982	3.982
284	0	0.00	23.025	23.122	23.064	0.000	0.000	0.000
285	0	0.00	23.025	23.122	23.064	0.000	0.000	0.000

LOAD SHED SET to 19.14 VDC

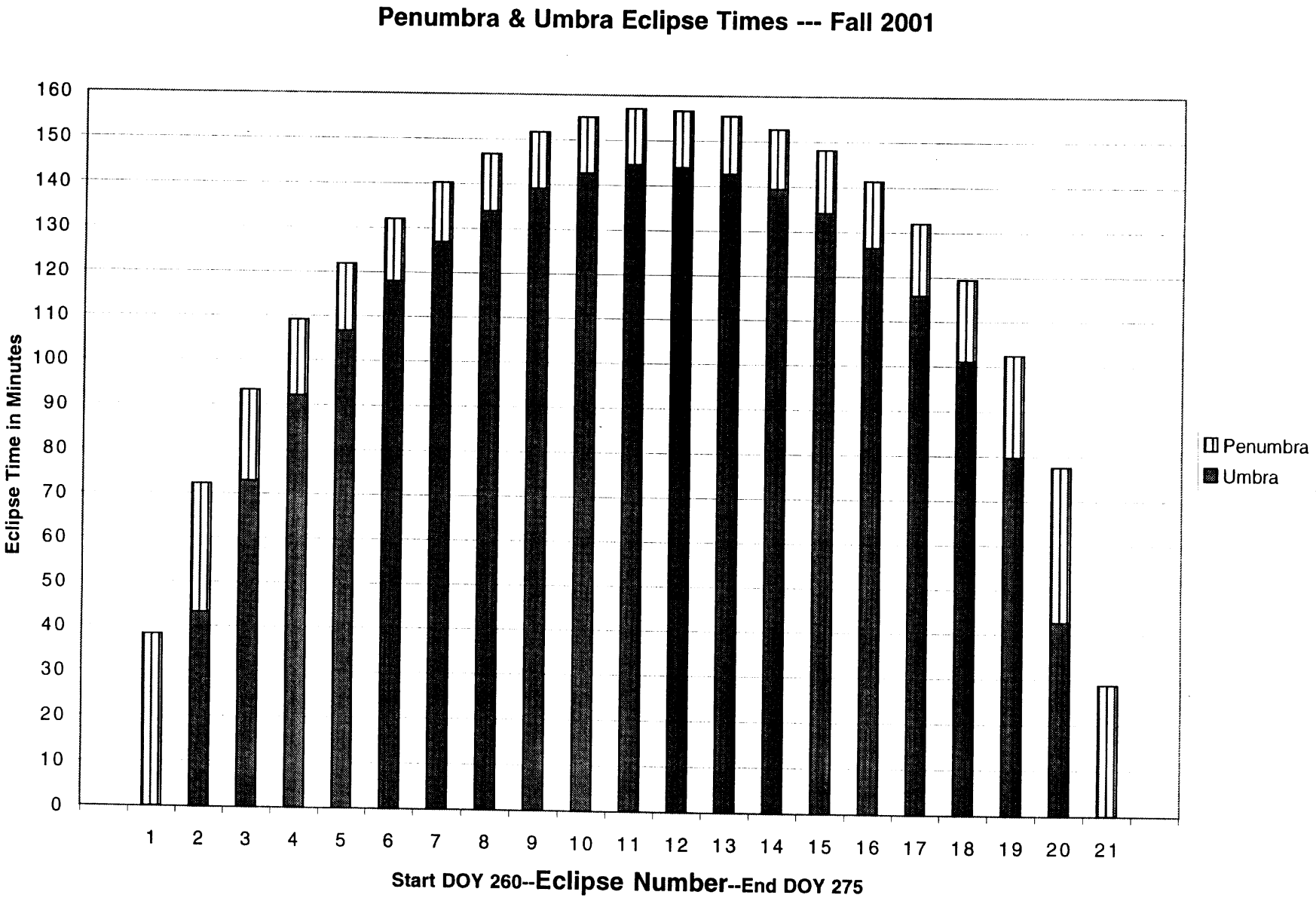
 Data for graph # 4

2000 Fall	Eclipse		Depth	of	Discharge			
Day of Year 2000	Eclipse Number	Eclipse Time Minutes	Battery 1 DOD %	Battery 1 DOD Ampere Hours	Battery 2 DOD %	Battery 2 DOD Ampere Hours	Battery 3 DOD DOD %	Battery 3 DOD Ampere Hours
263	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
264	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
265	1	19.13	0.00	0.00	0.00	0.00	0.00	0.00
266	2	44.95	10.46	2.77	10.74	2.92	11.03	2.93
266	3	60.27	14.73	3.90	15.09	4.00	15.09	4.02
267	4	72.05	18.48	4.90	19.36	5.01	18.92	5.03
268	5	81.77	20.48	5.43	20.97	5.56	20.97	5.58
269	6	90.03	23.09	6.12	24.19	6.26	23.64	6.29
269	7	97.17	25.51	6.76	27.28	7.07	26.69	7.10
270	8	103.37	28.39	7.52	29.65	7.69	29.02	7.72
271	9	108.72	29.86	7.91	31.84	8.09	30.52	8.12
272	10	113.27	27.68	7.34	29.74	7.52	28.37	7.55
272	11	117.10	30.04	7.96	31.46	8.15	30.75	8.18
273	12	120.53	31.65	8.39	33.84	8.58	32.38	8.61
274	13	123.22	32.35	8.57	34.59	8.77	33.10	8.80
275	14	124.82	32.02	8.48	34.29	8.95	33.76	8.98
275	15	125.58	32.98	8.74	34.50	8.94	33.74	8.97
276	16	125.50	32.19	8.53	34.47	8.53	32.19	8.56
277	17	124.47	30.42	8.06	33.44	8.46	31.93	8.49
278	18	122.43	30.66	8.13	32.15	8.32	31.41	8.35
278	19	119.25	29.14	7.72	31.31	7.72	29.14	7.75
279	20	114.77	27.35	7.25	29.44	7.25	27.35	7.28
280	21	108.70	23.93	6.34	25.25	6.52	24.59	6.54
281	22	100.72	21.56	5.71	22.78	5.88	22.17	5.90
282	23	90.17	18.76	4.97	19.85	4.97	18.76	4.99
282	24	75.85	18.08	4.79	19.00	4.91	18.54	4.93
283	25	54.73	13.38	3.54	12.38	3.63	13.71	3.65
284	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00
285	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00

DOD in %

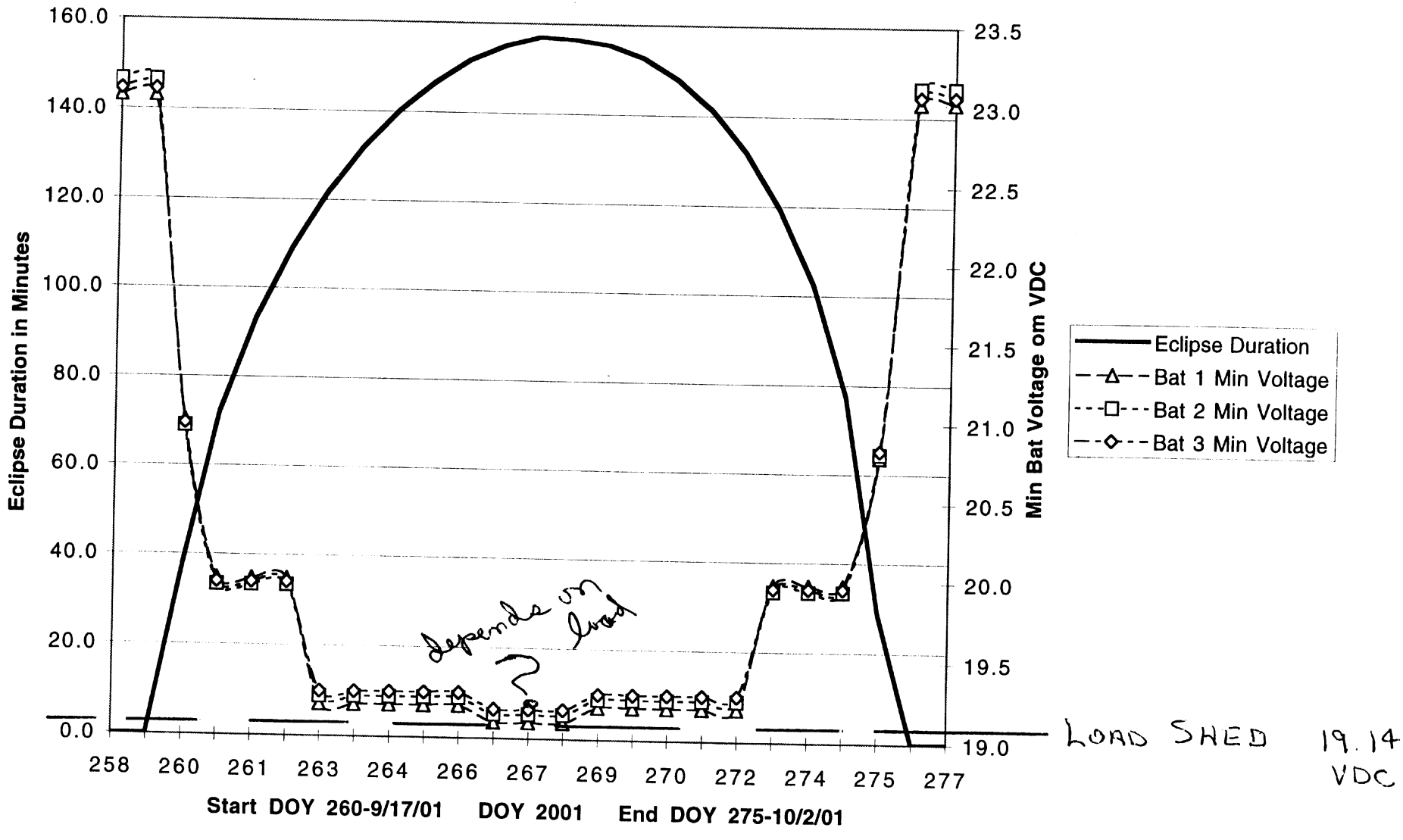
Max. Depth of Discharge ≈ 9 ampere hours. Battery capacity at launch > 26.5 ampere hours

Graph # 5


Penumbra & Umbra Eclipse Times --- Fall 2001
Eclipse Time in Minutes
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21
Start DOY 260--Eclipse Number--End DOY 275
Penumbra
Umbra

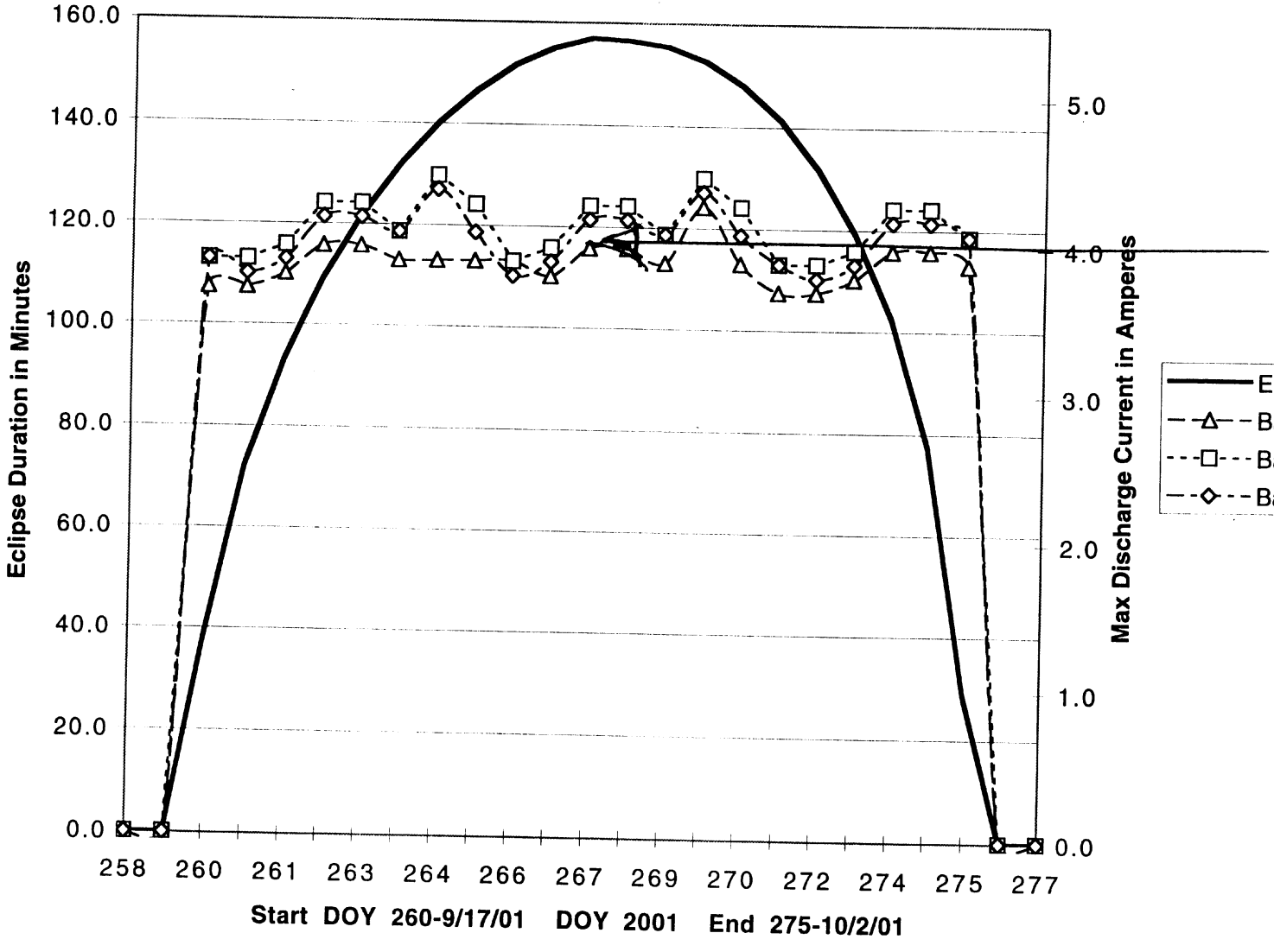
Graph # 6

---Est. POLAR Min Bat V & Eclipse Duration: Fall 2001---



Graph # 7

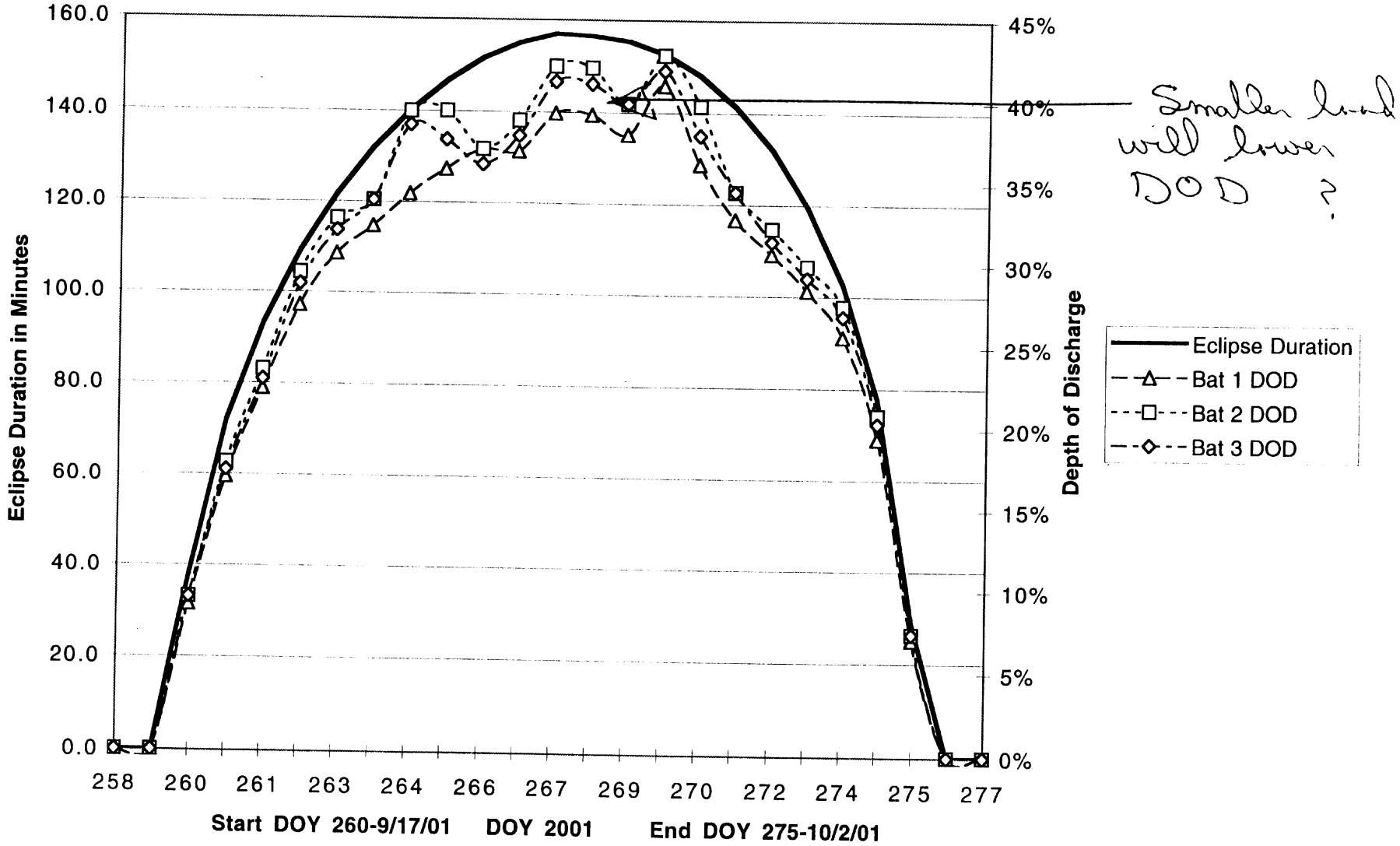
---Est. POLAR Max Dis I & Eclipse Duration: Fall 2001---



MUST LOWER LOAD to avoid load shed if set to 19.14 VDC

Graph # 8

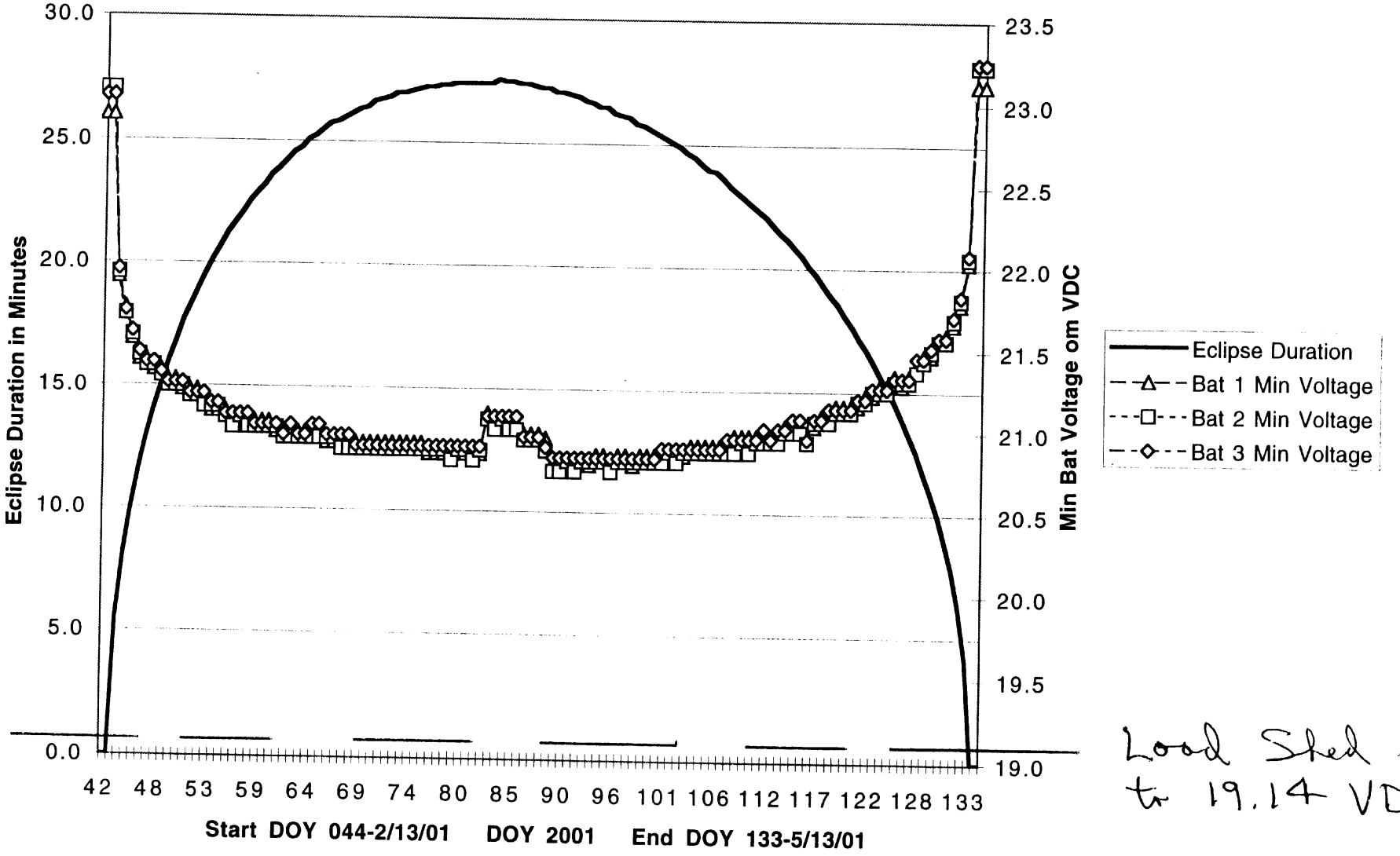
----Est. POLAR Depth of Discharge: Fall 2001---



Smaller load will lower DOD ?

Graph #9

---POLAR Min Bat V & Eclipse Duration: Spring 2001---

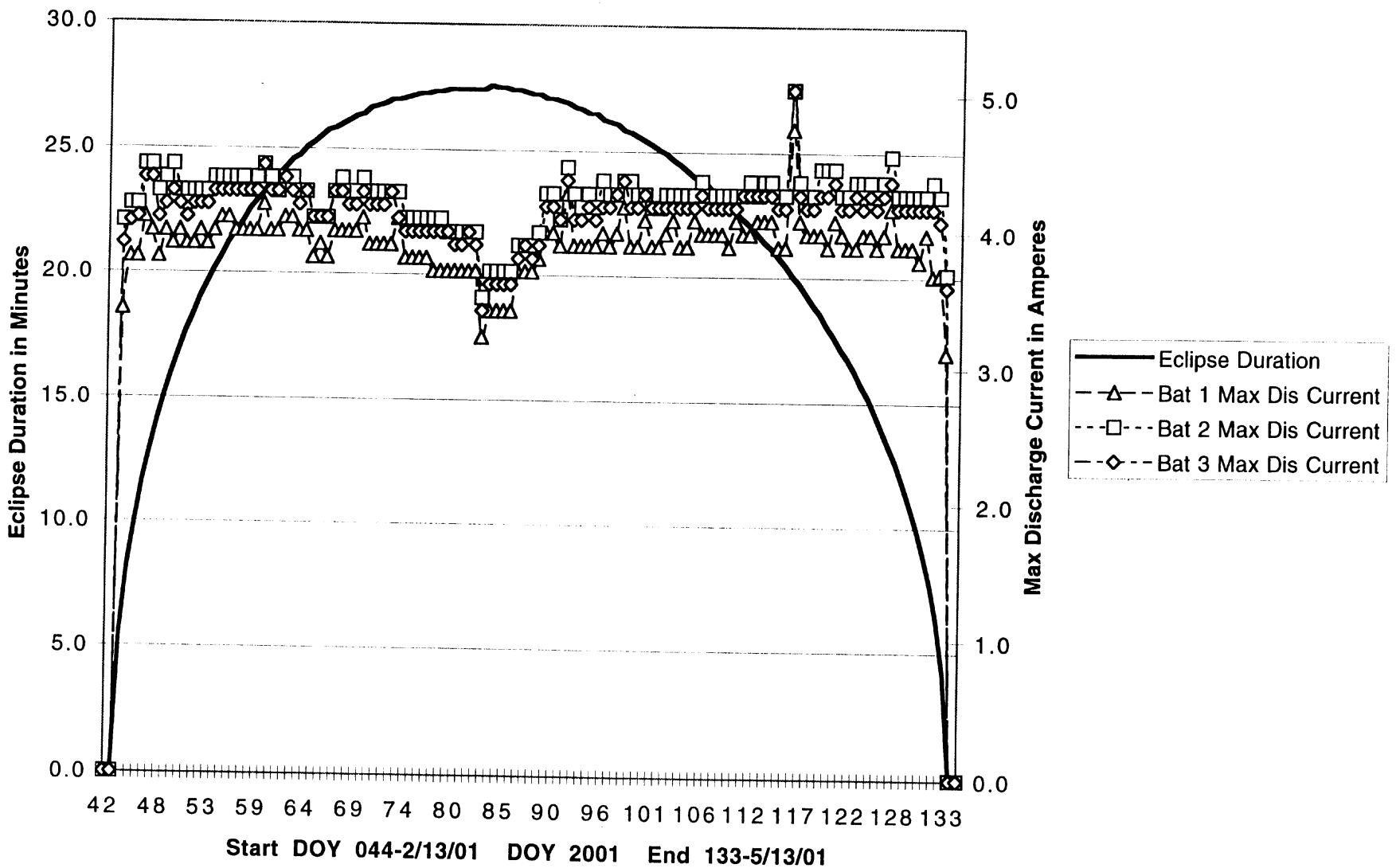


Load Shed set to 19.14 VDC

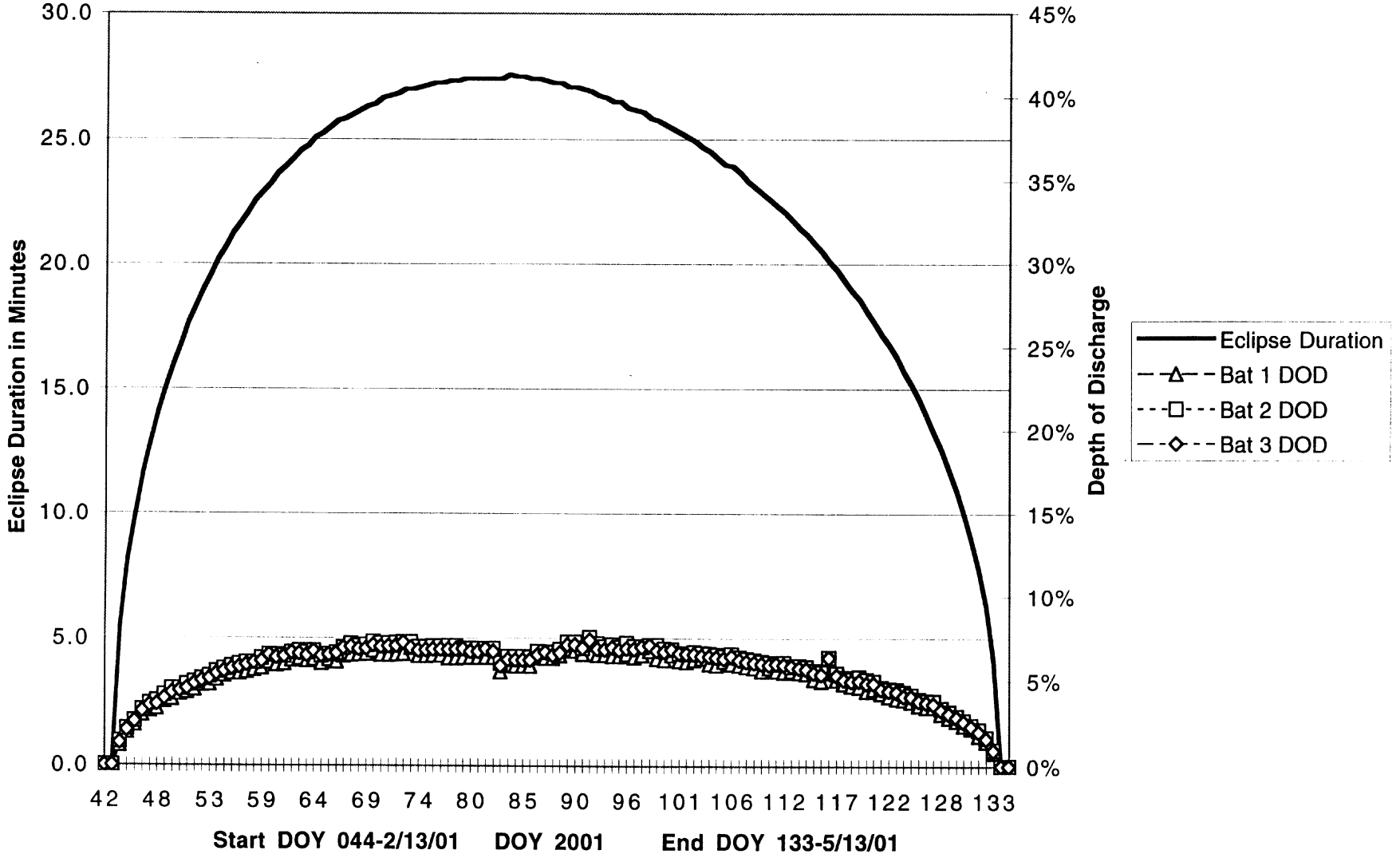
5/14/01

Graph # 10

---POLAR Max Dis I & Eclipse Duration: Spring 2001---



5/14/01

Graph # 11

----POLAR Depth of Discharge: SPRING 2001---