

Fermilab

TS-SSC 91-004

1/14/91

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From: Jim Strait

Subject: DC0304 Collar Keying Strain Gauge Data

Attached are graphs and tables summarizing the strain gauge data from the collar keying of DC0304. These data are for the second attempt with the replacement inner coils and were taken on 12/22/90. (A turn-to-turn short[1] occurred in one of the inner coils on an earlier keying attempt and both inner coils were replaced before the keying on 12/22.) Figure 1 shows the average of the four inner and outer coil gauge readings at each of the two collar packs. The peak average stress in the press was 19 and 18 kpsi in the inner coils and 23 and 20 kpsi in the outer coils. The individual inner coil gage peak values range from 15 to 20 kpsi and outer coil gages range from 15 to 24 kpsi. The "spring-back" losses are 4.6 kpsi and 12.3 kpsi averaged over the eight inner and eight outer coil gauges respectively. The final average prestresses are 13.7 and 9.2 kpsi in the inner and outer coils. The final inner coil prestresses vary from 11.3 to 15.9 kpsi and the outer coil prestresses vary from 4.5 to 14.1 kpsi.

The two gauge packs were placed at the locations where the average size of the four inner coil quadrants was largest ("LE") and smallest ("RE"). The final prestresses at the two gauge pack locations are surprisingly similar (13.1 and 14.3 kpsi in the inner coil and 9.6 and 8.8 kpsi in the outer coil) despite the 4.4 mil difference in the average inner coil size[2].

Figure 2 shows the coil stress, averaged over all inner and outer coil gauges in each of the gauge packs, as a function of press hydraulic system pressure before the side cylinders were energized. The dotted line has a slope of 2.22 coil psi per hydraulic system psi, the relation expected if the coil press load is fully balanced by the coil stress at the pole.

References

- [1] J. Strait, DC0304 Turn-to-Turn Short, TS-SSC 90-104, 12/17/90.
- [2] W. Koska, TS-SSC note to be published.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1				CORRECTED AVERAGING FORMULAS 11-20-90									
2													
3											BNL C3	BNL C2	BNL C1
4				GAGENO.	TYPE	COIL	Quadrant	Gage Factor	R0 (Ohms)	FNAL A0	FNAL A1	FNAL A2	FNAL A3
5				1067	Active	Inner	1	2.02	350.302	-143.3	5.2E+00	3.46E-03	0.00000
6				1066	Active	Inner	2	2.02	350.407	11.2	1.9E+00	3.98E-03	0.00000
7				329	Comp.	Inner	1&2	2.02	350.329				
8				1062	Active	Inner	3	2.02	350.19	-60.1	3.0E+00	3.95E-03	0.00000
9				1063	Active	Inner	4	2.02	350.717	-102.8	4.6E+00	3.49E-03	0.00000
10				328	Comp.	Inner	3&4	2.02	349.964				
11				1068	Active	Outer	1	2.02	350.542	24.7	2.4E+00	4.49E-03	0.00000
12				1069	Active	Outer	2	2.02	350.55	1.6	3.2E+00	3.94E-03	0.00000
13				327	Comp.	Outer	1	2.02	350.18				
14				326	Comp.	Outer	2	2.02	350.721				
15				1070	Active	Outer	3	2.02	350.313	98.0	2.4E+00	4.89E-03	0.00000
16				1071	Active	Outer	4	2.02	350.141	109.5	1.3E+00	4.06E-03	0.00000
17				322	Comp.	Outer	3	2.02	350.055				
18				323	Comp.	Outer	4	2.02	350.239				
19													
20													
21													
22				Seq #	Date	Press	P(Vert)	P(Horiz)	LE Inner	LE Outer	All	Inner	Outer
23				1	12/22/90	SSC 17M	3	-1	-33	101	34		
24				2	12/22/90	SSC 17M	1002	-1	2043	883	1463		
25				3	12/22/90	SSC 17M	1996	-1	4529	2125	3327	2.50	1.25
26				4	12/22/90	SSC 17M	2989	-1	6917	3910	5413	2.40	1.80
27				5	12/22/90	SSC 17M	4002	-1	8965	6058	7511	2.02	2.12
28				6	12/22/90	SSC 17M	5001	-1	11399	8906	10153	2.44	2.85
29				7	12/22/90	SSC 17M	5991	-1	13329	12256	12792	1.95	3.38
30				8	12/22/90	SSC 17M	7000	-1	15544	15050	15297	2.19	2.77
31				9	12/22/90	SSC 17M	7998	-1	16826	18815	17821	1.29	3.77
32				10	12/22/90	SSC 17M	8494	-1	17866	20609	19237	2.10	3.62
33				11	12/22/90	SSC 17M	8490	25	17857	21567	19712	2.26	-239.47
34				12	12/22/90	SSC 17M	8491	1549	18732	22288	20510	874.90	721.30
35				13	12/22/90	SSC 17M	8497	2077	18655	22754	20705		
36				14	12/22/90	SSC 17M	9	2	13106	9555	11331		
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	A	B	C	D	E	F	G	H	I	J	K	L	M
1				CORRECTED AVERAGING FORMULAS 11-20-90									
2													
3											BNL C3	BNL C2	BNL C1
4				GAGE NO.	TYPE	COIL	Quadrant	Gage Fac	R0 (Ohms)	FNAL A0	FNAL A1	FNAL A2	FNAL A3
5				1061	Active	Inner	1	2.02	350.164	-145.8	3.87E+00	3.98E-03	0.00000
6				1060	Active	Inner	2	2.02	350.289	-92.8	1.65E+00	5.58E-03	0.00000
7				330	Comp.	Inner	1&2	2.02	350.056				
8				1065	Active	Inner	3	2.02	350.41	104.8	2.52E+00	3.49E-03	0.00000
9				1064	Active	Inner	4	2.02	350.171	-40.3	3.11E+00	4.30E-03	0.00000
10				324	Comp.	Inner	3&4	2.02	350.276				
11				1072	Active	Outer	1	2.02	350.497	10.7	1.92E+00	4.09E-03	0.00000
12				1073	Active	Outer	2	2.02	350.3	2.6	2.38E+00	2.65E-03	0.00000
13				320	Comp.	Outer	1	2.02	350.197				
14				325	Comp.	Outer	2	2.02	350.187				
15				1074	Active	Outer	3	2.02	350.516	-68.6	4.26E+00	3.49E-03	0.00000
16				1075	Active	Outer	4	2.02	350.705	-102.5	2.60E+00	3.97E-03	0.00000
17				321	Comp.	Outer	3	2.02	350.236				
18				331	Comp.	Outer	4	2.02	350.155				
19													
20													
21						Hydraulic Pressure		Average Coil Stress		d(Stress)/dPv			
22			Seq #	Date	Press	Vertical	Horizontal	RE Inner	RE Outer	All	Inner	Outer	All
23			1	12/22/90	SSC 17M	3	-1	-29	341	156			
24			2	12/22/90	SSC 17M	1002	-1	1689	832	1260			
25			3	12/22/90	SSC 17M	1996	-1	3856	2182	3019	2.18	1.36	1.77
26			4	12/22/90	SSC 17M	2989	-1	5954	3220	4587	2.11	1.05	1.58
27			5	12/22/90	SSC 17M	4002	-1	8164	4881	6522	2.18	1.64	1.91
28			6	12/22/90	SSC 17M	5001	-1	10301	6515	8408	2.14	1.64	1.89
29			7	12/22/90	SSC 17M	5991	-1	12275	9153	10714	1.99	2.66	2.33
30			8	12/22/90	SSC 17M	7000	-1	14023	11740	12881	1.73	2.56	2.15
31			9	12/22/90	SSC 17M	7998	-1	15442	14978	15210	1.42	3.25	2.33
32			10	12/22/90	SSC 17M	8494	-1	16668	16489	16579	2.47	3.05	2.76
33			11	12/22/90	SSC 17M	8490	25	16467	17258	16862	50.39	-192.31	-70.96
34			12	12/22/90	SSC 17M	8491	1549	17734	19742	18738	1267.00	2483.89	1875.45
35			13	12/22/90	SSC 17M	8497	2077	17848	20154	19001			
36			14	12/22/90	SSC 17M	9	2	14252	8767	11510			
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DC0304 Collaring History (12/22/90)

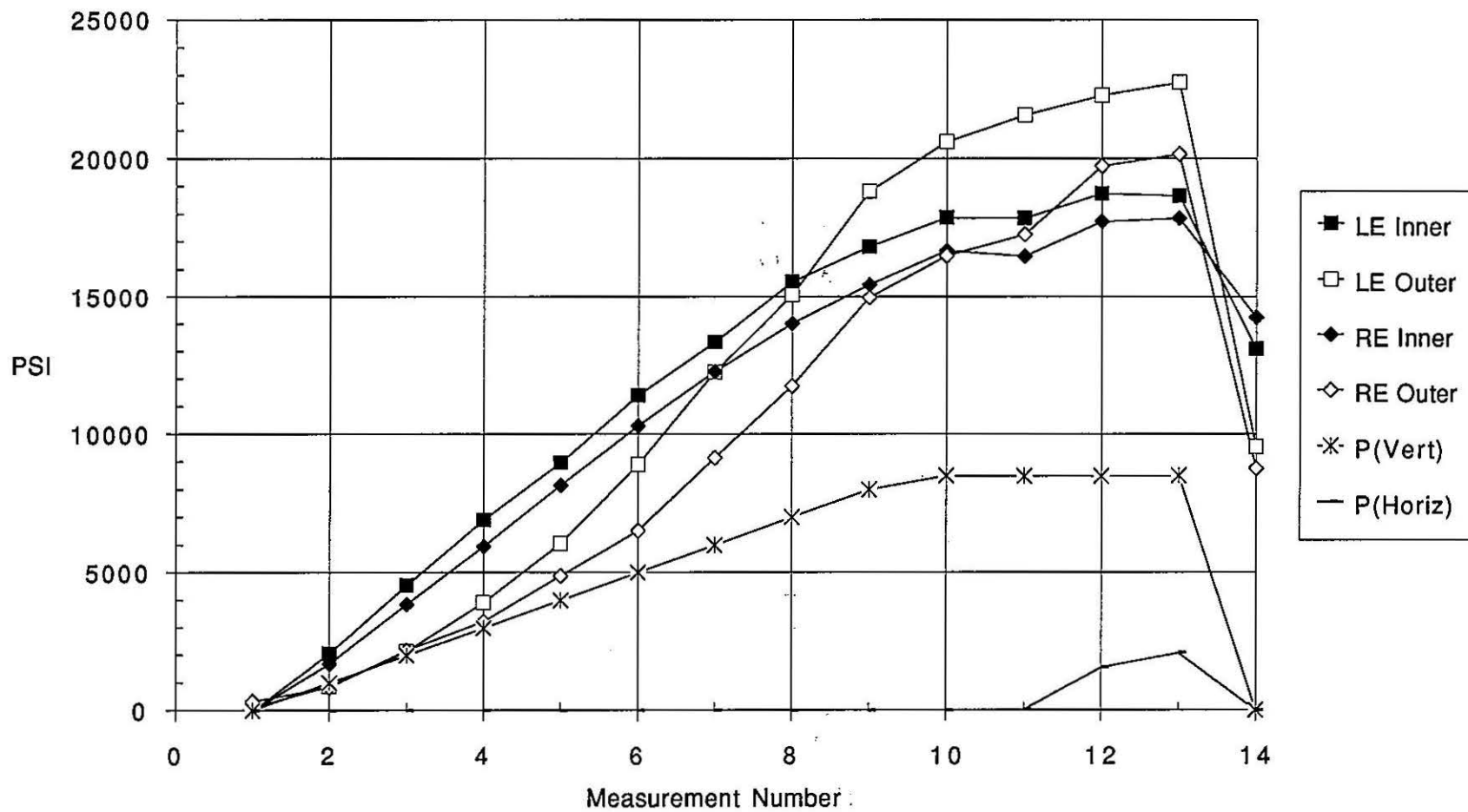


Figure 1

DC0304 Collaring (12/22/90)

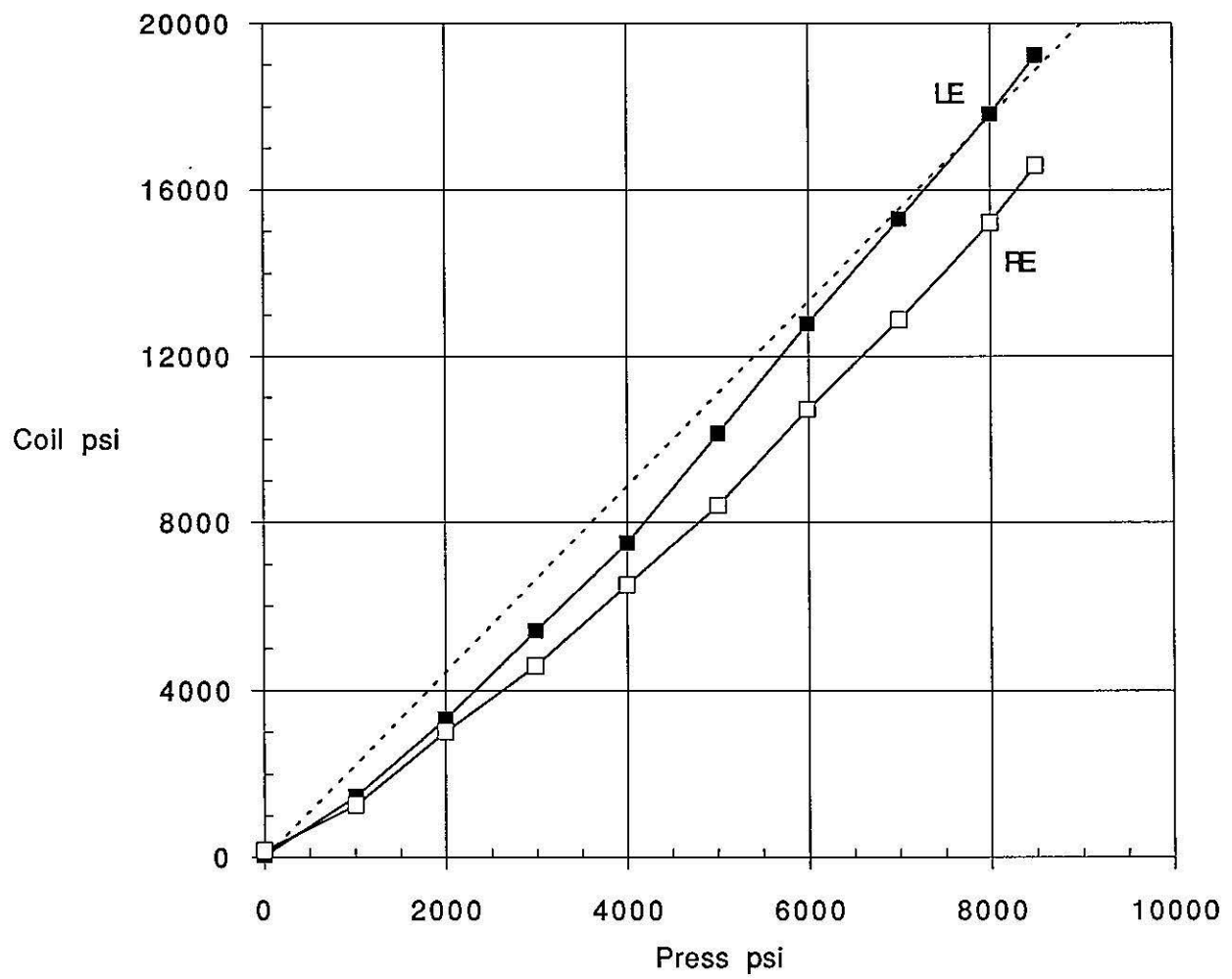


Figure 2

	A	B	C	D	E	F	G	H	I	J	K	L	M
61	Name	Donna Kubik		Date:	11:42:13	Time:	12/22/90						
62	Press:	SSC 17M Collaring	Vertical Pressure			3	Comments:	Data taken using HP/360 RMBasic and HPIB					
63			Horizontal Pressure			-1							
64	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
65	1067	Active	Inner	1	2.52583	884.839	350.316	0.014	1067	35	17	-52	
66	1066	Active	Inner	2	2.52573	884.993	350.391	-0.016	1066	-52	-26	-35	
67	329	Comp.	Inner	1&2	2.52589	884.899	350.331	0.002	329	-41	-20		Avg Stress
68	1062	Active	Inner	3	2.52589	884.57	350.201	0.011	1062	-14	-7	-81	Inner
69	1063	Active	Inner	4	2.52587	885.962	350.755	0.038	1063	61	30	37	-33
70	328	Comp.	Inner	3&4	2.52586	884.001	349.980	0.016	328	41	20		Outer
71	1068	Active	Outer	1	2.5259	885.564	350.593	0.051	1068	26	13	57	101
72	1069	Active	Outer	2	2.52577	885.564	350.611	0.061	1069	124	62	214	Total
73	327	Comp.	Outer	1	2.52581	884.594	350.222	0.042	327	69	34		34
74	326	Comp.	Outer	2	2.52585	885.912	350.739	0.018	326	-69	-34		
75	1070	Active	Outer	3	2.5258	884.912	350.349	0.036	1070	-93	-46	0	
76	1071	Active	Outer	4	2.52563	884.342	350.147	0.006	1071	33	16	132	
77	322	Comp.	Outer	3	2.52534	884.183	350.124	0.069	322	212	105		
78	323	Comp.	Outer	4	2.52557	884.538	350.234	-0.005	323	-211	-105		
79													
80													
81	Name:	Donna Kubik		Date:	11:50:46	Time:	12/22/90						
82	Press:	SSC 17M Collaring	Vertical Pressure			1002	Comments:	Data taken using HP/360 RMBasic and HPIB					
83			Horizontal Pressure			-1							
84	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
85	1067	Active	Inner	1	2.52534	885.389	350.602	0.300	1067	827	410	2528	
86	1068	Active	Inner	2	2.52528	885.763	350.759	0.352	1066	977	483	1781	
87	329	Comp.	Inner	1&2	2.52526	884.698	350.339	0.010	329	-25	-12		Avg Stress
88	1062	Active	Inner	3	2.52535	885.159	350.510	0.320	1062	860	426	1871	Inner
89	1063	Active	Inner	4	2.5255	886.436	350.994	0.277	1063	737	365	1992	2043
90	328	Comp.	Inner	3&4	2.52537	883.834	349.983	0.019	328	25	12		Outer
91	1068	Active	Outer	1	2.52542	886.016	350.839	0.297	1068	774	383	1568	883
92	1069	Active	Outer	2	2.52535	885.945	350.821	0.271	1069	711	352	1589	Total
93	327	Comp.	Outer	1	2.52528	884.368	350.206	0.026	327	12	6		1463
94	326	Comp.	Outer	2	2.52523	885.705	350.743	0.022	326	-12	-6		
95	1070	Active	Outer	3	2.5255	884.836	350.361	0.048	1070	-855	-423	45	
96	1071	Active	Outer	4	2.52531	884.506	350.257	0.116	1071	250	124	332	
97	322	Comp.	Outer	3	2.52545	884.067	350.402	0.347	322	911	451		
98	323	Comp.	Outer	4	2.52535	884.546	350.267	0.028	323	-910	-451		
99													
100													
101	Name:	Donna Kubik		Date:	12:02:24	Time:	12/22/90						
102	Press:	SSC 17M Collaring	Vertical Pressure			1996	Comments:	Data taken using HP/360 RMBasic and HPIB					
103			Horizontal Pressure			-1							
104	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
105	1067	Active	Inner	1	2.52599	886.173	350.823	0.521	1067	1547	766	5537	
106	1066	Active	Inner	2	2.52578	886.547	350.999	0.592	1066	1751	867	4204	
107	329	Comp.	Inner	1&2	2.52614	884.926	350.308	-0.021	329	-131	-65		Avg Stress
108	1062	Active	Inner	3	2.526	885.919	350.720	0.530	1062	1443	714	3817	Inner
109	1063	Active	Inner	4	2.52589	887.189	351.238	0.521	1063	1415	701	4557	4529
110	328	Comp.	Inner	3&4	2.52599	884.067	349.989	0.025	328	131	65		Outer
111	1068	Active	Outer	1	2.52607	886.56	350.964	0.422	1068	1140	565	2677	2125
112	1069	Active	Outer	2	2.52599	886.705	351.033	0.483	1069	1326	657	3595	Total
113	327	Comp.	Outer	1	2.52599	884.607	350.202	0.022	327	13	7		3327
114	326	Comp.	Outer	2	2.52604	885.978	350.739	0.018	326	-13	-7		
115	1070	Active	Outer	3	2.52592	885.433	350.539	0.226	1070	589	292	1179	
116	1071	Active	Outer	4	2.52592	885.112	350.412	0.271	1071	713	353	1051	
117	322	Comp.	Outer	3	2.5259	884.251	350.074	0.019	322	-4	-2		
118	323	Comp.	Outer	4	2.52596	884.742	350.260	0.021	323	4	2		
119													
120													

	A	B	C	D	E	F	G	H	I	J	K	L	M
121	Name:	Donna Kubik		Date:	12/04/38	Time:	12/22/90						
122	Press:	SSC 17M Collaring	Vertical Pressure		2989	Comments:	Data taken using HP/360 RMBasic and HPIB						
123			Horizontal Pressure		- 1								
124	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
125	1067	Active	Inner	1	2.52565	886.531	351.011	0.709	1067	2042	1011	7864	
126	1066	Active	Inner	2	2.52573	886.953	351.167	0.760	1066	2187	1082	5872	
127	329	Comp.	Inner	1&2	2.52574	884.824	350.323	-0.006	329	-40	-20		Avg Stres
128	1062	Active	Inner	3	2.52568	886.396	350.964	0.774	1062	2187	1083	6852	Inner
129	1063	Active	Inner	4	2.52568	887.624	351.423	0.706	1063	1988	984	7079	6917
130	328	Comp.	Inner	3&4	2.52587	883.983	349.972	0.008	328	40	20		Outer
131	1068	Active	Outer	1	2.52589	886.933	351.138	0.596	1068	1644	814	4521	3910
132	1069	Active	Outer	2	2.52581	887.034	351.188	0.638	1069	1771	877	5335	Total
133	327	Comp.	Outer	1	2.52587	884.556	350.199	0.019	327	7	4		5413
134	326	Comp.	Outer	2	2.52584	885.907	350.738	0.017	326	-7	-4		
135	1070	Active	Outer	3	2.52586	886.004	350.774	0.461	1070	1317	652	3454	
136	1071	Active	Outer	4	2.52597	885.587	350.593	0.452	1071	1245	616	2328	
137	322	Comp.	Outer	3	2.52607	884.262	350.055	0.000	322	-48	-24		
138	323	Comp.	Outer	4	2.52607	884.769	350.255	0.016	323	48	24		
139													
140													
141	Name:	Donna Kubik		Date:	12/15/24	Time:	12/22/90						
142	Press:	SSC 17M Collaring	Vertical Pressure		4002	Comments:	Data taken using HP/360 RMBasic and HPIB						
143			Horizontal Pressure		- 1								
144	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
145	1067	Active	Inner	1	2.52624	887.181	351.186	0.884	1067	2511	1243	10183	
146	1066	Active	Inner	2	2.5262	887.607	351.361	0.954	1066	2708	1341	8085	
147	329	Comp.	Inner	1&2	2.5264	885.085	350.334	0.005	329	-93	-46		Avg Stres
148	1062	Active	Inner	3	2.52635	887.041	351.116	0.926	1062	2537	1256	8435	Inner
149	1063	Active	Inner	4	2.52638	888.29	351.606	0.889	1063	2427	1201	9156	8965
150	328	Comp.	Inner	3&4	2.52643	884.253	350.002	0.038	328	93	46		Outer
151	1068	Active	Outer	1	2.52652	887.627	351.324	0.782	1068	2167	1073	6751	6058
152	1069	Active	Outer	2	2.52633	887.753	351.401	0.851	1069	2407	1192	8135	Total
153	327	Comp.	Outer	1	2.5264	884.751	350.203	0.023	327	45	22		7511
154	326	Comp.	Outer	2	2.52664	886.163	350.728	0.007	326	-45	-22		
155	1070	Active	Outer	3	2.52639	886.684	350.968	0.655	1070	1821	902	5512	
156	1071	Active	Outer	4	2.52655	886.237	350.770	0.629	1071	1721	852	3836	
157	322	Comp.	Outer	3	2.52658	884.485	350.072	0.017	322	-25	-13		
158	323	Comp.	Outer	4	2.52642	884.916	350.265	0.026	323	25	13		
159													
160													
161	Name:	Donna Kubik		Date:	12/17/38	Time:	12/22/90						
162	Press:	SSC 17M Collaring	Vertical Pressure		5001	Comments:	Data taken using HP/360 RMBasic and HPIB						
163			Horizontal Pressure		- 1								
164	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
165	1067	Active	Inner	1	2.52654	887.678	351.342	1.040	1067	2958	1465	12446	
166	1066	Active	Inner	2	2.52657	888.164	351.530	1.123	1066	3195	1581	10305	
167	329	Comp.	Inner	1&2	2.52639	885.077	350.332	0.003	329	-23	-11		Avg Stres
168	1062	Active	Inner	3	2.52629	887.489	351.301	1.111	1062	3141	1555	11312	Inner
169	1063	Active	Inner	4	2.52672	888.771	351.748	1.031	1063	2908	1440	11534	11399
170	328	Comp.	Inner	3&4	2.52652	884.22	349.975	0.011	328	23	11		Outer
171	1068	Active	Outer	1	2.52653	888.206	351.552	1.010	1068	2836	1404	9936	8906
172	1069	Active	Outer	2	2.52653	888.309	351.593	1.043	1069	2854	1413	10252	Total
173	327	Comp.	Outer	1	2.52675	884.857	350.195	0.015	327	-77	-38		10153
174	326	Comp.	Outer	2	2.52675	886.29	350.763	0.042	326	76	38		
175	1070	Active	Outer	3	2.52693	887.442	351.194	0.881	1070	2453	1214	8489	
176	1071	Active	Outer	4	2.52682	886.98	351.026	0.885	1071	2503	1239	6947	
177	322	Comp.	Outer	3	2.52686	884.594	350.077	0.022	322	39	19		
178	323	Comp.	Outer	4	2.52696	885.061	350.247	0.008	323	-39	-19		
179													
180													

	A	B	C	D	E	F	G	H	I	J	K	L	M
181	Name:	Donna Kubik		Date:	12:26:44	Time:	12/22/90						
182	Press:	SSC 17M Collaring		Vertical Pressure		5991	Comments:	Data taken using HP/360 RMBasic and HPIB					
183				Horizontal Pressure		- 1							
184	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
185	1067	Active	Inner	1	2.52754	888.403	351.489	1.187	1067	3356	1661	14455	
186	1066	Active	Inner	2	2.52747	888.868	351.683	1.276	1066	3608	1786	12268	
187	329	Comp.	Inner	1&2	2.52777	885.554	350.340	0.011	329	20	10		Avg Stres
188	1062	Active	Inner	3	2.52774	888.252	351.402	1.212	1062	3449	1707	12819	Inner
189	1063	Active	Inner	4	2.52778	889.522	351.898	1.181	1063	3355	1661	13775	13329
190	328	Comp.	Inner	3&4	2.52778	884.642	349.968	0.004	328	-20	-10		Outer
191	1068	Active	Outer	1	2.52772	889.192	351.776	1.234	1068	3519	1742	13383	12256
192	1069	Active	Outer	2	2.52774	889.225	351.787	1.237	1069	3525	1745	13549	Total
193	327	Comp.	Outer	1	2.52789	885.218	350.180	0.000	327	-3	-2		12792
194	326	Comp.	Outer	2	2.52787	886.582	350.723	0.002	326	3	2		
195	1070	Active	Outer	3	2.52784	888.356	351.428	1.115	1070	3171	1570	12218	
196	1071	Active	Outer	4	2.52782	887.863	351.237	1.096	1071	3123	1546	9872	
197	322	Comp.	Outer	3	2.52792	884.922	350.059	0.004	322	6	3		
198	323	Comp.	Outer	4	2.52801	885.415	350.241	0.002	323	-6	-3		
199													
200													
201	Name:	Donna Kubik		Date:	12:28:56	Time:	12/22/90						
202	Press:	SSC 17M Collaring		Vertical Pressure		7000	Comments:	Data taken using HP/360 RMBasic and HPIB					
203				Horizontal Pressure		- 1							
204	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
205	1067	Active	Inner	1	2.52788	888.976	351.668	1.366	1067	3903	1932	17144	
206	1066	Active	Inner	2	2.52789	889.338	351.810	1.403	1066	4007	1984	14191	
207	329	Comp.	Inner	1&2	2.52793	885.604	350.328	-0.001	329	-56	-28		Avg Stres
208	1062	Active	Inner	3	2.52789	888.752	351.579	1.389	1062	3912	1937	15086	Inner
209	1063	Active	Inner	4	2.52794	889.963	352.051	1.334	1063	3752	1857	15753	15544
210	328	Comp.	Inner	3&4	2.52795	884.74	349.983	0.019	328	56	28		Outer
211	1068	Active	Outer	1	2.528	889.865	352.004	1.462	1068	4098	2029	16317	15050
212	1069	Active	Outer	2	2.52806	889.866	351.995	1.445	1069	4029	1995	16024	Total
213	327	Comp.	Outer	1	2.52795	885.301	350.205	0.025	327	-22	-11		15297
214	326	Comp.	Outer	2	2.52793	886.681	350.754	0.033	326	21	11		
215	1070	Active	Outer	3	2.52799	888.947	351.642	1.329	1070	3743	1853	15282	
216	1071	Active	Outer	4	2.52791	888.425	351.446	1.305	1071	3646	1805	12575	
217	322	Comp.	Outer	3	2.52797	884.972	350.073	0.018	322	-31	-15		
218	323	Comp.	Outer	4	2.52801	885.479	350.268	0.029	323	31	15		
219													
220													
221	Name:	Donna Kubik		Date:	12:36:44	Time:	12/22/90						
222	Press:	SSC 17M Collaring		Vertical Pressure		7998	Comments:	Data taken using HP/360 RMBasic and HPIB					
223				Horizontal Pressure		- 1							
224	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
225	1067	Active	Inner	1	2.52766	889.139	351.764	1.462	1067	4050	2005	17845	
226	1066	Active	Inner	2	2.52795	889.694	351.943	1.536	1066	4262	2110	15422	
227	329	Comp.	Inner	1&2	2.52775	885.651	350.372	0.043	329	44	22		Avg Stres
228	1062	Active	Inner	3	2.52779	888.983	351.684	1.494	1062	4188	2074	16422	Inner
229	1063	Active	Inner	4	2.52777	890.264	352.194	1.477	1063	4133	2046	17616	16826
230	328	Comp.	Inner	3&4	2.52779	884.703	349.991	0.027	328	-44	-22		Outer
231	1068	Active	Outer	1	2.52777	890.393	352.245	1.703	1068	4776	2364	19598	18815
232	1069	Active	Outer	2	2.52772	890.378	352.246	1.696	1069	4753	2353	19424	Total
233	327	Comp.	Outer	1	2.52763	885.198	350.209	0.029	327	-1	0		17821
234	326	Comp.	Outer	2	2.52767	886.58	350.750	0.029	326	1	0		
235	1070	Active	Outer	3	2.52758	889.485	351.911	1.598	1070	4579	2267	19628	
236	1071	Active	Outer	4	2.52778	888.977	351.683	1.542	1071	4377	2167	16611	
237	322	Comp.	Outer	3	2.5277	884.821	350.049	-0.006	322	-45	-22		
238	323	Comp.	Outer	4	2.52773	885.334	350.249	0.010	323	45	22		
239													
240													

	A	B	C	D	E	F	G	H	I	J	K	L	M
241	Name:	Donna Kubik		Date:	12:38:41	Time:	12/22/90						
242	Press:	SSC 17M Collaring		Vertical Pressure	8494	Comments:	Data taken using HP/360 RMBasic and HPIB						
243				Horizontal Pressure	- 1								
244	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
245	1067	Active	Inner	1	2.52797	889.422	351.832	1.530	1067	4304	2131	19014	
246	1066	Active	Inner	2	2.52753	889.787	352.038	1.631	1066	4592	2273	17000	
247	329	Comp.	Inner	1&2	2.52749	885.511	350.351	0.022	329	-24	-12		Avg Stress
248	1062	Active	Inner	3	2.52759	889.054	351.739	1.549	1062	4336	2147	17126	Inner
249	1063	Active	Inner	4	2.52764	890.36	352.250	1.533	1063	4282	2120	18326	17866
250	328	Comp.	Inner	3&4	2.52758	884.641	349.995	0.031	328	24	12		Outer
251	1068	Active	Outer	1	2.52767	890.684	352.374	1.832	1068	5189	2569	21438	20609
252	1069	Active	Outer	2	2.52769	890.682	352.370	1.820	1069	5131	2540	21062	Total
253	327	Comp.	Outer	1	2.52765	885.164	350.192	0.012	327	-26	-13		19237
254	326	Comp.	Outer	2	2.5275	886.5	350.743	0.022	326	26	13		
255	1070	Active	Outer	3	2.52774	889.819	352.021	1.708	1070	4819	2386	20799	
256	1071	Active	Outer	4	2.52769	889.326	351.833	1.692	1071	4818	2385	19136	
257	322	Comp.	Outer	3	2.52763	884.861	350.075	0.020	322	41	20		
258	323	Comp.	Outer	4	2.52768	885.306	350.244	0.005	323	-41	-20		
259													
260													
261	Name:	Donna Kubik		Date:	13:16:24	Time:	12/22/90						
262	Press:	SSC 17M Collaring		Vertical Pressure	8490	Comments:	Data taken using HP/360 RMBasic and HPIB						
263				Horizontal Pressure	25								
264	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
265	1067	Active	Inner	1	2.52921	889.801	351.810	1.508	1067	4297	2127	18982	
266	1066	Active	Inner	2	2.52915	890.243	351.993	1.586	1066	4516	2236	16640	
267	329	Comp.	Inner	1&2	2.52906	886.011	350.332	0.003	329	11	5		Avg Stress
268	1062	Active	Inner	3	2.52913	889.533	351.715	1.525	1062	4356	2157	17221	Inner
269	1063	Active	Inner	4	2.52911	890.847	352.237	1.520	1063	4337	2147	18586	17857
270	328	Comp.	Inner	3&4	2.52915	885.11	349.963	-0.001	328	-11	-5		Outer
271	1068	Active	Outer	1	2.52921	891.431	352.454	1.912	1068	5428	2687	22422	21567
272	1069	Active	Outer	2	2.52925	891.432	352.449	1.899	1069	5399	2673	22144	Total
273	327	Comp.	Outer	1	2.52935	885.752	350.189	0.009	327	8	4		19712
274	326	Comp.	Outer	2	2.52934	887.108	350.727	0.006	326	-8	-4		
275	1070	Active	Outer	3	2.52934	890.564	352.093	1.780	1070	5012	2481	21705	
276	1071	Active	Outer	4	2.52925	890.05	351.903	1.762	1071	4966	2459	19996	
277	322	Comp.	Outer	3	2.52924	885.433	350.079	0.024	322	3	1		
278	323	Comp.	Outer	4	2.52913	885.86	350.262	0.023	323	-3	-1		
279													
280													
281	Name:	Donna Kubik		Date:	13:20:25	Time:	12/22/90						
282	Press:	SSC 17M Collaring		Vertical Pressure	8491	Comments:	Data taken using HP/360 RMBasic and HPIB						
283				Horizontal Pressure	1549								
284	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
285	1067	Active	Inner	1	2.52885	889.837	351.874	1.572	1067	4485	2220	19819	
286	1066	Active	Inner	2	2.52869	890.248	352.059	1.652	1066	4713	2333	17572	
287	329	Comp.	Inner	1&2	2.52884	885.928	350.330	0.001	329	-41	-20		Avg Stress
288	1062	Active	Inner	3	2.52891	889.699	351.811	1.621	1062	4587	2271	18297	Inner
289	1063	Active	Inner	4	2.52878	890.896	352.302	1.585	1063	4478	2217	19240	18732
290	328	Comp.	Inner	3&4	2.52878	885.019	349.979	0.015	328	41	20		Outer
291	1068	Active	Outer	1	2.52896	891.531	352.528	1.986	1068	5613	2779	23143	22288
292	1069	Active	Outer	2	2.52899	891.506	352.515	1.965	1069	5506	2726	22555	Total
293	327	Comp.	Outer	1	2.52892	885.623	350.199	0.019	327	-47	-23		20510
294	326	Comp.	Outer	2	2.52888	887.019	350.756	0.035	326	47	23		
295	1070	Active	Outer	3	2.52882	890.5	352.141	1.828	1070	5173	2561	22429	
296	1071	Active	Outer	4	2.52868	890.082	351.995	1.854	1071	5144	2547	21024	
297	322	Comp.	Outer	3	2.52885	885.278	350.071	0.016	322	-106	-53		
298	323	Comp.	Outer	4	2.52884	885.833	350.292	0.053	323	106	52		
299													
300													

	A	B	C	D	E	F	G	H	I	J	K	L	M
301	Name:	Donna Kubik		Date:	13:28:35	Time:	12/22/90						
302	Press:	SSC 17M Collaring		Vertical Pressure		8497	Comments:	Data taken using HP/360 RMBasic and HPIB					
303				Horizontal Pressure		2077							
304	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
305	1067	Active	Inner	1	2.52903	889.896	351.872	1.570	1067	4446	2201	19648	
306	1066	Active	Inner	2	2.52897	890.379	352.072	1.665	1066	4716	2335	17589	
307	329	Comp.	Inner	1&2	2.52904	886.028	350.342	0.013	329	-24	-12		Avg Stress
308	1062	Active	Inner	3	2.52901	889.707	351.800	1.610	1062	4538	2246	18068	Inner
309	1063	Active	Inner	4	2.529	891.001	352.314	1.597	1063	4494	2225	19315	18655
310	328	Comp.	Inner	3&4	2.52911	885.149	349.985	0.021	328	24	12		Outer
311	1068	Active	Outer	1	2.52926	891.684	352.548	2.006	1068	5678	2811	23382	22754
312	1069	Active	Outer	2	2.52913	891.657	352.555	2.005	1069	5664	2804	23140	Total
313	327	Comp.	Outer	1	2.52935	885.767	350.195	0.015	327	-12	-6		20705
314	326	Comp.	Outer	2	2.52915	887.075	350.741	0.020	326	12	6		
315	1070	Active	Outer	3	2.52912	890.692	352.175	1.862	1070	5232	2590	22688	
316	1071	Active	Outer	4	2.52919	890.257	351.993	1.852	1071	5279	2613	21806	
317	322	Comp.	Outer	3	2.52908	885.389	350.084	0.029	322	73	36		
318	323	Comp.	Outer	4	2.52944	885.917	350.242	0.003	323	-73	-36		
319													
320													
321	Name:	Donna Kubik		Date:	13:39:09	Time:	12/22/90						
322	Press:	SSC 17M Collaring		Vertical Pressure		9	Comments:	Data taken using HP/360 RMBasic and HPIB					
323				Horizontal Pressure		2							
324	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
325	1067	Active	Inner	1	2.52922	888.913	351.457	1.155	1067	3255	1611	13944	
326	1066	Active	Inner	2	2.52937	889.4	351.629	1.222	1066	3443	1705	11480	
327	329	Comp.	Inner	1&2	2.52933	886.136	350.344	0.015	329	-10	-5		Avg Stress
328	1062	Active	Inner	3	2.52917	888.796	351.419	1.229	1062	3456	1711	12854	Inner
329	1063	Active	Inner	4	2.52932	890.163	351.938	1.221	1063	3430	1698	14147	13106
330	328	Comp.	Inner	3&4	2.52918	885.17	349.982	0.018	328	10	5		Outer
331	1068	Active	Outer	1	2.52921	889.426	351.661	1.119	1068	3120	1544	11353	9555
332	1069	Active	Outer	2	2.52937	889.242	351.567	1.017	1069	2910	1440	10524	Total
333	327	Comp.	Outer	1	2.5293	885.776	350.206	0.026	327	82	40		11331
334	326	Comp.	Outer	2	2.52943	887.118	350.718	-0.003	326	-81	-40		
335	1070	Active	Outer	3	2.52934	888.428	351.249	0.936	1070	2606	1290	9260	
336	1071	Active	Outer	4	2.52943	887.897	351.027	0.886	1071	2534	1254	7084	
337	322	Comp.	Outer	3	2.52944	885.5	350.078	0.023	322	69	34		
338	323	Comp.	Outer	4	2.52944	885.907	350.238	-0.001	323	-69	-34		
339													
340													

	A	B	C	D	E	F	G	H	I	J	K	L	M
301	Name:	Donna Kubik		Date:	13:28:36	Time:	12/22/90						
302	Press:	SSC 17M Collaring P	Vertical	Pressure		8497	Comments:	Data taken using HP/360 RMBasic and HP1B					
303			Horizontal	Pressure		2077			1E6*(dR-dRc)				
304	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
305	1061	Active	Inner	1	2.52901	889.778	351.829	1.665	1061	4715	2334	19298	
306	1060	Active	Inner	2	2.52897	889.925	351.892	1.603	1060	4537	2246	18225	
307	330	Comp.	Inner	1&2	2.52901	885.331	350.070	0.014	330	14	7		Avg Stress
308	1065	Active	Inner	3	2.52888	889.794	351.853	1.443	1065	4092	2026	14632	Inner
309	1064	Active	Inner	4	2.52923	889.747	351.786	1.615	1064	4566	2270	19237	17848
310	324	Comp.	Inner	3&4	2.52917	885.932	350.285	0.009	324	-14	-7		Outer
311	1072	Active	Outer	1	2.52906	890.88	352.257	1.760	1072	4971	2461	20238	20154
312	1073	Active	Outer	2	2.52913	890.969	352.283	1.983	1073	5565	2755	21485	Total
313	320	Comp.	Outer	1	2.52919	885.759	350.215	0.018	320	-44	-22		19001
314	325	Comp.	Outer	2	2.52907	885.73	350.220	0.033	325	44	22		
315	1074	Active	Outer	3	2.52909	891.678	352.568	2.052	1074	5765	2854	23767	
316	1075	Active	Outer	4	2.52915	890.511	352.099	1.394	1075	4043	2002	15125	
317	321	Comp.	Outer	3	2.52921	885.9	350.267	0.031	321	157	78		
318	331	Comp.	Outer	4	2.52933	885.598	350.131	-0.024	331	-157	-78		
319													
320													
321	Name:	Donna Kubik		Date:	13:39:11	Time:	12/22/90						
322	Press:	SSC 17M Collaring P	Vertical	Pressure		9	Comments:	Data taken using HP/360 RMBasic and HP1B					
323			Horizontal	Pressure		2			1E6*(dR-dRc)				
324	GAGE NO.	TYPE	COIL	Quadrant	I (mA)	V (mV)	R (Ohms)	dR= R-R0	GAGE NO.	R0	μE	COIL Psi	
325	1061	Active	Inner	1	2.52901	889.195	351.598	1.434	1061	3981	1971	16154	
326	1060	Active	Inner	2	2.52937	889.269	351.577	1.288	1060	3561	1763	13641	
327	330	Comp.	Inner	1&2	2.52917	885.455	350.097	0.041	330	77	38		Avg Stress
328	1065	Active	Inner	3	2.52932	889.319	351.605	1.195	1065	3371	1669	11292	Inner
329	1064	Active	Inner	4	2.52922	889.157	351.553	1.382	1064	3909	1935	15921	14252
330	324	Comp.	Inner	3&4	2.52928	885.98	350.290	0.014	324	-77	-38		Outer
331	1072	Active	Outer	1	2.52955	888.702	351.329	0.832	1072	2277	1127	6490	8767
332	1073	Active	Outer	2	2.52942	889.034	351.477	1.177	1073	3330	1648	10018	Total
333	320	Comp.	Outer	1	2.52925	885.82	350.230	0.033	320	64	32		11510
334	325	Comp.	Outer	2	2.52936	885.776	350.198	0.011	325	-64	-32		
335	1074	Active	Outer	3	2.52936	889.745	351.766	1.250	1074	3501	1733	14050	
336	1075	Active	Outer	4	2.52933	888.626	351.328	0.623	1075	1714	848	4511	
337	321	Comp.	Outer	3	2.52957	886.004	350.259	0.023	321	3	1		
338	331	Comp.	Outer	4	2.52939	885.733	350.177	0.022	331	-3	-1		
339													
340													