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FOREST AND WILDLIFE RESEARCH CENTER

DEPARTMENT of Sustainable Bioproducts

Ninth Annual Evaluation of MSU/RTA Alternative Preservative Study

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This report covers the ninth annual evaluation of the full length crossties exposed as part of the MSU/RTA alternative preservative study. A visual evaluation of the exposed top surface was conducted for all ties at both exposure sites.

General Observations: No unexpected results were found but biological deterioration in the controls indicates the testing is valid. As in the past checks and/or splits were noted to be worse at Site 2 probably due to more direct sunlight exposure. Termite activity was not intensive as expected at this site which again may be due to the sunlight exposure. Ties at Site 1 were more moist/wet due to the increased rain fall, shade and leaf litter as well as the clay soil at this site and these ties showed an increased amount of decay in the controls and more vigorous termite activity (*Reticulitermes flavipes*) due to these conditions. A few photographs documenting the condition of the sites and some of the noted deterioration can be seen below (Figures 1 - 8). The tie number denotes the position of exposure as recorded on the plot-maps. Copies of the inspection forms can be found in the appendix.



Figure 1 - An overall view of exposure Site 2 illustrating the conditions at the time of inspection.



Figure 2 - A general photograph of Site 1 at the time of inspection.

Site 1 - Dorman Lake Test Site



Figure 3 - Tie #323 showing decay damage.



Figure 4 - Tie #6 with heavy decay.



Figure 5 - Tie #212 with decay.

Site 2 – Formosan Termite Research Facility



Figure 6 - Tie #4 with decay and fruiting bodies.



Figure 7 - Tie #131 with decay.



Figure 8 – Tie #165 failed due extensive decay.

APPENDIX:

Plot Map RTA Ties (Dorman - installed 4-08)

Position Row 1 runs North - South (Eastern most row)

April-17

			Decay	Termite	Decay	Termite	Comments
1	wo-2	Cedar	x	x	x	x	Cut 5/10
2	wo-3		x	x	x	x	Cut 5/12
3	wo-4		x	x	x	x	Cut 5/14
4	wo-5		x	x	x	x	Cut 5/16
5	wo-7		8	10			check
6	wo-6		4	10			
7	wo-1		8	10			
8	wo-10		8	10			check
9	wo-8		6	10			
10	wo-9		6	10			
11	wo-21		8	9			live termites/DK top&bottom
12	ro-18	x	x	x	x	Cut 5/10	
13	ro-19	x	x	x	x	Cut 5/12	
14	ro-20	x	x	x	x	Cut 5/16	
15	ro-7	8	10				
16	ro-6	8	10			check	
17	ro-5	8	10			alligator	
18	ro-21	8	10				
19	ro-4	6	10			check	
20	ro-3	8	10			check	
21	ro-2	8	10			check	
22	ro-1	x	x	x	x	Cut 5/14	
23	5	Turada	x	x	x	x	Cut 5/10
24	6		x	x	x	x	Cut 5/16
25	7		10	10			
26	4		9	10			
27	2		x	x	x	x	Cut 5/14
28	9		10	10			
29	8		9.5	10			edge
30	10	10	10				
31	1	10	10				
32	3	x	x	x	x	Cut 5/12	
33	SROBC-7	Seaman	x	x	x	x	Cut 5/10
34	SROBC-7		x	x	x	x	Cut 5/12
35	SROBC-7		10	10			
36	SROBC-7		10	10			
37	SROBC-7		10	10			check
38	SROBC-7		10	10			check
39	SROBC-7		x	x	x	x	Cut 5/14
40	SROBC-5		x	x	x	x	Cut 5/10
41	SROBC-7		x	x	x	x	Cut 5/16
42	SWOCEF		x	x	x	x	Cut 5/10
43	SWOCEF		x	x	x	x	Cut 5/12
44	SWOCEF		10	10			
45	SWOCEF		10	10			

46	SWOCEF		10	10			check
47	SWOCEF		10	10			
48	SWOCEF		10	10			check
49	SWOCEF		10	10			
50	SWOCEF		x	x	x	x	Cut 5/14
51	SROC-7		x	x	x	x	Cut 5/10
52	SWOC-5		x	x	x	x	Cut 5/10
53	SROBC-5		7	9			
54	SWOBCREF		x	x	x	x	Cut 5/10
55	SWOBCREF		x	x	x	x	Cut 5/14
56	SWOBCREF		x	x	x	x	Cut 5/16
57	SWOBCREF		10	10			check
58	SWOBCREF		10	10			check
59	SWOBCREF		10	10			check
60	SWOBCREF		10	10			
61	SWOBCREF		x	x	x	x	Cut 5/12
62	SROC5		x	x	x	x	Cut 5/10
63	SROC5		x	x	x	x	Cut 5/12
64	SROC5		x	x	x	x	Cut 5/16
65	SROC5		10	10			
66	SROC5		10	10			
67	SROC5		10	10			
68	SROC5		10	10			
69	SROC5		10	10			
70	SROC5		x	x	x	x	Cut 5/14
71	SROBC5		x	x	x	x	Cut 5/12
72	SROBC5		x	x	x	x	Cut 5/16
73	SROBC5		10	10			
74	SROBC5		10	10			check
75	SWOBCREF		10	10			check
76	SWOCREF		x	x	x	x	Cut 5/16
77	SROC5		10	10			check
78	SROBC5		10	10			check
79	SROBC5		10	10			check
80	SROBC5		10	10			check
81	SROBC5		10	10			check
82	SWOBCREF		10	10			check
83	SROBC5		10	10			check
84	SROBC5		x	x	x	x	Cut 5/14
85	wo-136	Lonza	x	x	x	x	Cut 5/10
86	wo-130		x	x	x	x	Cut 5/12
87	wo-129		x	x	x	x	Cut 5/14
88	wo-121		10	10			
89	wo-127		9.5	10			
90	wo-124		10	10			
91	wo-128		x	x	x	x	Cut 5/16
92	wo-122		10	10			
93	wo-123		10	10			
94	wo-125		9.5	10			

95	ro-105	x	x	x	x	Cut 5/10
96	ro-104	x	x	x	x	Cut 5/12
97	ro-103	x	x	x	x	Cut 5/14
98	ro-102	x	x	x	x	Cut 5/16
99	ro-110	10	10			
100	ro-107	9.5	10			
101	ro-106	10	10			
102	ro-109	10	10			
103	ro-101	10	10			
104	ro-108	10	10			check
105	wo-135	x	x	x	x	Cut 5/10
106	wo-134	x	x	x	x	Cut 5/12
107	wo-138	10	10			
108	wo-139	10	10			
109	wo-137	10	10			
110	wo-132	10	10			
111	wo-136	9	10			
112	wo-140	x	x	x	x	Cut 5/16
113	wo-133	x	x	x	x	Cut 5/14
114	wo-131					
115	ro-182	0	0	0	0	FAILED
116	wo-181					
117	ro-114	x	x	x	x	Cut 5/10
118	ro-120	10	10			
119	ro-117	x	x	x	x	Cut 5/12
120	ro-112	10	10			
121	ro-113	10	10			
122	ro-115	10	10			check
123	ro-119	10	10			
124	ro-116	10	10			
125	ro-111	x	x	x	x	Cut 5/16
126	ro-118	x	x	x	x	Cut 5/14
127	P3RO7-39	KMG	x	x	x	Cut 5/16
128	P3RO7-36		10	10		
129	P3RO7-37		10	10		
130	P3RO7-38		10	10		
131	P3RO7-23		10	10		
132	P3RO7-40		10	10		
133	P3RO7-26		10	10		
134	P3RO7-42		x	x	x	Cut 5/14
135	P3RO7-35		x	x	x	Cut 5/12
136	P3RO7-41		x	x	x	Cut 5/10
137	P3WO7-5		x	x	x	Cut 5/10
138	P3WO7-4		x	x	x	Cut 5/12
139	P3WO7-6		x	x	x	Cut 5/14
140	P3WO7-7		10	10		check
141	P3WO7-11		10	10		check
142	P3WO7-17		10	10		check
143	P3WO7-20		x	x	x	Cut 5/16

144	P3WO7-2		10	10			
145	P3WO7-8		10	10			
146	P3WO7-3		10	10			
147	Woctrl-21		8	9			live termites/check
148	Roctrl-43		x	x	x	x	Cut 5/16
149	WO122	Nisus	x	x	x	x	Cut 5/14
150	WO14						
151	WO128		x	x	x	x	Cut 5/16
152	WO61		10	10			check
153	WO5		10	10			check
154	WO1		10	10			check
155	WO71		10	10			check
156	WO98		10	10			
157	WO139		x	x	x	x	Cut 5/14
158	WO135		10	10			check
159	WO144		10	10			check
160	WO126		10	10			check
161	WO131		x	x	x	x	Cut 5/16
162	WO138		10	10			split
163	WO130		10	10			check
164	WO125		x	x	x	x	Cut 5/12
165	WO29		x	x	x	x	Cut 5/12
166	WO52		x	x	x	x	Cut 5/10
167	WO137		10	10			
168	WO134		x	x	x	x	Cut 5/10
169	WO44ctrl		x	x	x	x	Cut 5/14
170	WO94ctrl		x	x	x	x	Cut 5/12
171	RO6ctrl		x	x	x	x	Cut 5/12

172	RO-51ctrl	x	x	x	x	Cut 5/14
173	RO21	x	x	x	x	Cut 5/14
174	RO22	10	10			
175	RO15	10	10			check
176	RO62	10	10			check
177	RO46	10	10			
178	RO2	10	10			
179	RO24	x	x	x	x	Cut 5/12
180	RO20	x	x	x	x	Cut 5/10
181	RO37	x	x	x	x	Cut 5/10
182	RO31	10	10			
183	RO59	x	x	x	x	Cut 5/14
184	RO89	10	10			
185	RO13	x	x	x	x	Cut 5/16
186	RO58	10	10			check
187	RO57	10	10			
188	RO12	x	x	x	x	Cut 5/16
189	RO56	10	10			check
190	RO25	10	10			
191	RO43	10	10			check
192	RO10	x	x	x	x	Cut 5/12
193	RO54	x	x	x	x	Cut 5/10
194	RO38	x	x	x	x	Cut 5/12
195	RO45	x	x	x	x	Cut 5/14
196	RO16	9.5	10			
197	RO72	x	x	x	x	Cut 5/16
198	RO77	9.5	9.5			
199	RO40	9.5	10			
200	RO55	9	10			check
201	RO18	9.5	10			
202	RO3	9	10			
203	WO49	x	x	x	x	Cut 5/10
204	WO121	x	x	x	x	Cut 5/12
205	WO68	x	x	x	x	Cut 5/14
206	WO11	8	10			
207	WO65	9	10			
208	WO92	x	x	x	x	Cut 5/16
209	WO60	8	10			
210	WO47	9.5	10			
211	WO90	9.5	10			
212	WO69	8	9			
213	MRO8	Merichem	x	x	x	Cut 5/10
214	MRO8		x	x	x	Cut 5/14
215	MROB8		x	x	x	Cut 5/10
216	MROB8		10	10		check
217	MROB8		10	10		check
218	MROB8		10	10		
219	MROB8		10	10		check
220	MROB8		10	10		check

221	MROB8	x	x	x	x	Cut 5/16
222	MROB8	x	x	x	x	Cut 5/14
223	MROB8	x	x	x	x	Cut 5/12
224	MWO8ctrl	x	x	x	x	Cut 5/16
225	MWO8ctrl	4	8			
226	MRO8ctrl	0	0	0	0	FAILED
227	MRO8	x	x	x	x	Cut 5/12
228	MRO8	x	x	x	x	Cut 5/16
229	MRO8	10	10			check
230	MRO8	10	10			check
231	MRO8	10	10			check
232	MRO8	10	10			
233	MRO8	10	10			
234	MRO8	10	10			
235	MWOB8	x	x	x	x	Cut 5/10
236	MWOB8	x	x	x	x	Cut 5/14
237	MWOB8	x	x	x	x	Cut 5/16
238	MWOB8	10	10			check
239	MWOB8	10	10			check
240	MWOB8	10	10			check
241	MWOB8	10	10			check
242	MWOB8	10	10			check
243	MWOB8	10	10			check
244	MWOB8	x	x	x	x	Cut 5/12

Row 2 runs North - South (West row)

April-17

		Decay	Termite	Decay	Termite	Comments
245	6	x	x	x	x	Cut 5/10
246	14	x	x	x	x	Cut 5/14
247	79	10	10			
248	73	x	x	x	x	Cut 5/12
249	75	x	x	x	x	Cut 5/14
250	?	10	10			
251	80	10	10			check
252	?	10	10			
253	62	x	x	x	x	Cut 5/16
254	82	10	10			
255	68	10	10			check
256	74	10	10			
257	37	x	x	x	x	Cut 5/10
258	26	x	x	x	x	Cut 5/14
259	53	x	x	x	x	Cut 5/10
260	59	x	x	x	x	Cut 5/14
261	52	10	10			
262	48	x	x	x	x	Cut 5/16
263	45	10	10			
264	67	x	x	x	x	Cut 5/10
265	51?	10	10			

266	?		10	10			
267	88		10	10			
268	46		x	x	x	x	Cut 5/12
269	12		x	x	x	x	Cut 5/16
270	20		x	x	x	x	Cut 5/12
271	31		x	x	x	x	Cut 5/12
272	17		10	10			check
273	4		10	10			
274	10?		10	10			
275	16		10	10			
276	5		10	10			
277	27		10	10			
278	36		10	10			
279	24		x	x	x	x	Cut 5/16
280	?		10	10			
281	22		10	10			
282	39		10	10			
283	25		10	10			
284	?		10	10			
285	WO30	Enviro	x	x	x	x	Cut 5/10
286	RO6		x	x	x	x	Cut 5/10
287	RO7		9.5	10			
288	RO8		9	10			
289	RO9		7	9			
290	RO1		x	x	x	x	Cut 5/14
291	RO2		10	10			
292	RO3		9	10			check
293	RO4		9	10			
294	RO5		9	10			
295	RO10		x	x	x	x	Cut 5/12
296	6	BioP					
297	1						
298	7						
299	8						
300	9						
301	10						
302	2						
303	3						
304	4						
305	5						
306	12						control?
307	9469						
308	9459						
309	9460						
310	9471						
311	9472						
312	9470						
313	9464						
314	11						control?

315	9468							
316	9466							
317	9467							
318	roctrl	Enviro	0	0	0	0		FAILED
319	roctrl		0	0	0	0		FAILED
320	woctrl		7	10				
321	woctrl		4	8				fruiting body
322	WO22		x	x	x	x		Cut 5/14
323	WO23		8	10				
324	WO24		9	10				
325	W025		9	10				
326	WO27		9	9				
327	WO28		9	10				
328	WO29		9	10				
329	WO21		8	10				
330	WO26		x	x	x	x		Cut 5/12
331	MWO8	Meri	x	x	x	x		Cut 5/12
332	MWO8		x	x	x	x		Cut 5/16
333	MWO8		10	10				check
334	MWO8		10	10				
335	MWO8		9	10				
336	MWO8		10	10				
337	MWO8		10	10				
338	MWO8		10	10				
339	MWO8		10	10				check
340	MWO8		x	x	x	x		Cut 5/14
341	MWO8		x	x	x	x		Cut 5/10/heart rot

Plot Map RTA Ties (McNeill)

Position Row 1 runs East - West (Northern most row)

March-17

			Decay	Termite	Decay	Termite	Comments
Turada	1	1	x	x	x	x	cut 4/10_____
	2	2	x	x	x	x	cut 3/16_____
	3	3		10			_____
	4	4		9.5			large check/FB_____
	5	5		9.5			FB_____
	6	6		10			_____
	7	7		10			_____
	8	8	x		x	x	cut 4/14_____
	9	9			8	10	Dk on top/FB_____
	10	10	x		x	x	cut 5/12_____
Envirosafe	11	11RO	x		x	x	cut 5/12_____
	12	15RO	x		x	x	cut 3/16_____
	13	14RO		9			large check_____
	14	13RO		10			large check_____
	15	12RO		9			large check_____
	16	20RO		10			_____
	17	19RO		8			large check/FB in check_____
	18	18RO		9.5			large check_____
	19	17RO	x		x	x	cut 4/14_____
	20	16RO	x		x	x	large check/cut 4/10_____
	21	35WO	x		x	x	cut 4/10_____
	22	34WO	x		x	x	cut 4/14_____
	23	33WO	x		x	x	cut 3/16_____
	24	32WO		9.5			large check_____
	25	31WO		9.5			large check/FB_____
	26	40WO		9.5			large check_____
	27	39WO		10			large check/FB in check_____
	28	38WO		9.5			_____
	29	37WO		9.5			large check_____
	30	36WO	x		x	x	cut 5/12_____
Seaman	31	SROC5	x		x	x	cut 4/10_____
	32	SROC5	x		x	x	cut 4/14_____
	33	SROC5	x		x	x	cut 3/16_____
	34	SROC5		10			pic 09/large check_____
	35	SROC5		10			large check_____
	36	SROC5		10			_____
	37	SROC5		10			_____
	38	SROC5		10			_____
	39	SROC5		10			large check_____
	40	SROC5	x		x	x	cut 5/12_____
	41	SROBC5	x		x	x	split/cut 4/10_____
	42	SROBC5	x		x	x	cut 4/14_____
	43	SROBC5	x		x	x	cut 3/16_____
	44	SROBC5		10			check_____
	45	SROBC5		10			large check_____
	46	SROBC5		10			_____
	47	SROBC5		10			_____
	48	SROBC5		10			check_____

49	SROBC5		10		10			check
50	SROBC5	x		x		x	x	cut 5/12
51	SWOCREF	x		x		x	x	cut 4/10
52	SWOCREF	x		x		x	x	cut 4/14
53	SWOCREF		10		10			
54	SWOCREF		10		10			large check
55	SWOCREF		10		10			check
56	SWOCREF		10		10			check
57	SWOCREF		10		10			check
58	SWOCREF		10		10			check
59	SWOCREF	x		x		x	x	cut 3/16
60	SWOCREF	x		x		x	x	cut 5/12
61	SWOBCREF	x		x		x	x	cut 4/10
62	SWOBCREF	x		x		x	x	cut 4/14
63	SWOBCREF		10		10			large check
64	SWOBCREF		10		10			check/loose plate
65	SWOBCREF		10		10			large check
66	SWOBCREF		10		10			
67	SWOBCREF		10		10			large check
68	SWOBCREF		10		10			large check
69	SWOBCREF	x		x		x	x	cut 3/16
70	SWOBCREF	x		x		x	x	cut 5/12
71	SROBC7	x		x		x	x	cut 4/10
72	SROBC7	x		x		x	x	cut 4/14
73	SROBC7		10		10			check
74	SROBC7		10		10			
75	SROBC7		10		10			large check
76	SROBC7		10		10			check
77	SROBC7		10		10			large check
78	SROBC7		10		10			check
79	SROBC7	x		x		x	x	cut 3/16
80	SROBC7	x		x		x	x	cut 5/12
81	ctrlSROC7	x		x		x	x	cut 4/10
82	ctrlSWOC5	x		x		x	x	cut 4/10
83	ctrlSWOC5		6		9			pic 09/active DK/FB
84	209	x		x		x	x	cut 4/10
85	206	x		x		x	x	cut 3/16
86	204		10		10			large check
87	201	x		x		x	x	cut 4/14
88	208		9.5		10			large check
89	203		9.5		10			
90	205		6		10			large check/FB on side
91	207		9.5		10			
92	210		6		10			large check/DK top
93	202	x		x		x	x	cut 5/12
94	240	x		x		x	x	cut 4/10
95	237	x		x		x	x	cut 5/12
96	243	x		x		x	x	cut 4/14
97	238		10		10			large check
98	245		10		10			large check
99	239		10		10			large check
100	247	x		x		x	x	cut 3/16

Lonza

Nisus

101	241		10	10			check
102	233		10	10			large check
103	242		10	10			large check
104	203	x		x	x	x	cut 4/10
105	227	x		x	x	x	cut 5/12
106	207	x		x	x	x	cut 4/14
107	200		10	10			large check
108	229		10	10			check
109	206		10	10			split
110	216		10	10			split
111	220	x		x	x	x	cut 3/16
112	212		10	10			large check
113	222		10	10			
114	217	x		x	x	x	cut 4/10
115	264	x		x	x	x	cut 3/16
116	287		10	10			large check
117	253		10	10			large check
118	283		10	10			large check
119	219	x		x	x	x	cut 5/12
120	276		10	10			large check
121	292		10	10			
122	269		10	10			large check
123	289	x		x	x	x	cut 4/14
124	225	x		x	x	x	cut 4/10
125	204	x		x	x	x	cut 5/12
126	234	x		x	x	x	cut 4/14
127	215		8	10			large check/Dk around plate
128	231		8	10			large check/Dk around plate
129	213		8	10			Dk around plate
130	205		7	10			large check/Dk around plate
131	208		7	10			large check/Dk around plate/FB
132	210		7	10			split/Dk around plate/FB
133	226		7	10			Dk around plate/FB
134	305	x		x	x	x	cut 4/10
135	201	x		x	x	x	cut
136	313	x		x	x	x	cut 4/14
137	294		10	10			
138	308	x		x	x	x	cut 3/16
139	301		10	10			
140	291		10	10			large check
141	309		10	10			large check
142	296		10	10			
143	314		10	10			
Lonza	144	236	x		x	x	cut 5/12
	145	232	x		x	x	cut 4/14
	146	238		10	10		IS
	147	234		10	10		IS
	148	231		9.5	10		large check/IS
	149	233		10	10		large check/IS
	150	235		10	10		large check/IS
	151	239		9	10		IS
	152	240	x		x	x	cut 3/16

Nisus	153	237	x	x	x	x	cut 4/10	_____
	154	272	x	x	x	x	cut 4/10	_____
	155	223	x	x	x	x	cut 4/14	_____
	156	256	x	x	x	x	cut 5/12	_____
	157	297		9.5	10			_____
	158	295		8	10		split	_____
	159	267		10	10		split	_____
	160	299		10	10		check	_____
	161	261		10	10			_____
	162	214		10	10			_____
Lonza	163	275		10	10			_____
	164	281		7	10		fruiting body	_____
Nisus	165	282		0	10	0	0	Failed
	166	315	x	x	x	x	cut 3/16	_____
	167	316	x	x	x	x	cut 4/14	_____
	168	249	x	x	x	x	cut 3/16	_____
	169	248	x	x	x	x	cut 4/14	_____

Row 2 runs East - West (middle row)

March-17

			Decay	Termite	Decay	Termite	Comments	
Lonza	170	220	x	x	x	x	cut 4/10_____	
	171	218	x	x	x	x	cut 4/14_____	
	172	214		9.5	10		large check_____	
	173	219		10	10		_____	
	174	212		10	10		_____	
	175	217		9	10		large check_____	
	176	216		10	10		large check_____	
	177	211		10	10		_____	
	178	213	x	x	x	x	cut 3/16_____	
	179	215	x	x	x	x	cut 5/12_____	
	180	224	x	x	x	x	cut 4/10_____	
	181	228	x	x	x	x	cut 3/16_____	
	182	221		9.5	10		large check/FB_____	
	183	222		10	10		_____	
	184	230		10	10		large check_____	
	185	225		10	10		large check_____	
	186	226		10	10		large check_____	
	187	229		10	10		large check_____	
	Cedarcide	188	223	x	x	x	x	cut 4/14_____
		189	227	x	x	x	x	cut 5/12_____
190		19W	x	x	x	x	cut 4/10_____	
191		20W	x	x	x	x	cut 4/14_____	
192		15W	x	x	x	x	cut 3/16_____	
193		16W		8	10		large check_____	
194		18W		9	10		split/FB_____	
195		17W		6	10		shake/FB_____	
196		10R	x	x	x	x	cut 4/10_____	
197		9R		7	10		large check/FB_____	
198		8R	x	x	x	x	cut 5/12_____	
199		11W	x	x	x	x	cut 5/12_____	
200		12W		4	10		split_____	
201		13W		8	10		split/FB_____	
202		14W		8	10		split/FB_____	
203		11R	x	x	x	x	cut 4/14_____	
204		12R	x	x	x	x	cut 3/16_____	
205		13R		8	10		split/FB_____	
206		14R		8	10		_____	
207		15R		8	10		split/FB_____	
208	16R		6	10		alligator/FB_____		
Merichem	209	17R		0	0	0	0 Failed	
	210	22R		0	0	0	0 Failed	
	211	22W		9.5	10		split_____	
	212	MWOB8	x	x	x	x	cut 4/10_____	
	213	MWOB8	x	x	x	x	cut 4/14_____	
	214	MWOB8		10	10		large check/iron sickness_____	
	215	MWOB8		10	10		iron sickness_____	
	216	MWOB8		10	10		large check/iron sickness_____	
	217	MWOB8	x	x	x	x	cut 3/16_____	

	218	MWOB8	x		x	x	x	cut 5/12
	219	MRO8	x		x	x	x	cut 5/12
	220	MRO8	x		x	x	x	cut 4/10
	221	MRO8	x		x	x	x	cut 4/14
	222	MRO8		10		10		pic 09
	223	MRO8	x		x	x	x	cut 3/16
	224	MRO8		10		10		
	225	MRO8		10		10		large check
	226	MRO8		10		10		split
	227	MWOB8		10		10		
	228	MWOB8		10		10		large check
	229	MRO8		10		10		
	230	MRO8		10		10		large check
	231	MRO8		9.5		10		iron sickness
	232	MWO8	x		x	x	x	cut 4/10
	233	MWO8	x		x	x	x	cut 4/14
	234	MWO8		10		10		large check/iron sickness
	235	MWO8		10		10		
	236	MWO8		10		10		
	237	MWO8		10		10		
	238	MWO8		10		10		large check
	239	MWO8		9.5		10		large check
	240	MWO8	x		x	x	x	cut 3/16
	241	MROB8	x		x	x	x	cut 4/10
	242	MROB8	x		x	x	x	cut 4/14
	243	MROB8	x		x	x	x	cut 5/12
	244	MWO8	x		x	x	x	cut 5/12
	245	MROB8	x		x	x	x	cut 3/16
	246	MROB8		10		10		iron sickness
	247	MROB8		10		10		large check/iron sickness
	248	MROB8		10		10		large check/iron sickness
	249	MROB8		10		10		large check/iron sickness
	250	MROB8		10		9		spike kill/iron sickness
	251	MROB8		10		9		pic 09/DK/iron sickness
	252	MROCONT		6		10		
BioPres	253	MWOCONT		8		10		pic 09/DK top side/FB
	254	MWOCONT		8		10		FB
	255	75						
	256	67						
	257	68						DK top side
	258	69						DK top side
	259	71						
	260	74						DK top side
	261	82						
	262	77						
	263	93						
	264	?						DK top side
	265	66						
	266	65						
	267	73						
KMG	270	1	x		x	x	x	cut 5/12
	271	14	x		x	x	x	cut 4/14

	272	12	x		x	x	x	cut 3/16
	273	16		10	10			
	274	15		10	10			large check
	275	18		10	10			check
	276	19		10	10			check
	277	10	x		x	x	x	cut 4/10
	278	30	x		x	x	x	cut 4/10
	279	33	x		x	x	x	cut 4/14
	280	34	x		x	x	x	
	281	24	x		x	x	x	cut 3/16
	282	27		10	10			large check
	283	28		10	10			
	284	29		10	10			large check
	285	32		10	10			large check
	286	13		10	10			large check
	287	31	x		x	x	x	cut 5/12
	288	9		10	10			large check
	289	25		10	10			
	290	22(Woctrl)		7	10			
	291	44(Roctrl)		7	10			large check
Koppers	292	11	x		x	x	x	cut 5/12
	293	?		10	10			
	294	?		10	10			
	295	?		10	10			
	296	19	x		x	x	x	cut 4/10
	297	15	x		x	x	x	cut 4/14
	298	?		10	10			
	299	?		10	10			large check
	300	47	x		x	x	x	cut 4/10
	301	44	x		x	x	x	cut 4/14
	302	41	x		x	x	x	cut 3/16
	303	55		10	10			large check
	304	60		10	10			
	305	43	x		x	x	x	cut 5/12
	306	51		10	10			
	307	?		10	10			
	308	76	x		x	x	x	cut 3/16
	309	65		10	10			check
	310	61	x		x	x	x	cut 4/10
	311	70	x		x	x	x	cut 4/14
	312	72		10	10			
	313	71		10	10			
	314	64		10	10			
	315	2?		10	10			large check
	316	?		10	10			
	317	34	x		x	x	x	cut 4/10
	318	38	x		x	x	x	cut 5/12
	319	?		10	10			
	320	29	x		x	x	x	cut 4/14
	321	?		10	10			
	322	21?		10	10			
	323	31	x		x	x	x	cut 3/16

	324	35	10	10			
	325	23	10	10			large check
	326	66	x	x	x	x	cut 5/12
	327	67	10	10			
	328	42	10	10			check
	329	49	10	10			
	330	7	10	10			check
	331	8	x	x	x	x	cut 3/16
	332	WO	x	x	x	x	cut 5/12
	333	RO	x	x	x	x	FST Alate wings found/cut 5/12
	334	RO		0	0	0	0 Failed
Enviro	335	ctrl	0	9		0	0 Failed
	336	ctrl	7	10			large check/FB
	337	ctrl	7	10			FB

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Applicable Standards:

None: