

APPENDIX K: HOT and industrial hygiene measurement results by work area

Table K-1: Use of basic required PPE

	n Pre/Post	Pre # (%)	Pre-Post change
Hard hat	674/497	558 (83)	-4%
Safety glasses	654/497	513 (78)	1%
High visibility clothing	674/497	142 (21)	13%
Work boots	583/496	582 (99.8)	0.2%

Table K-2: Use of basic required PPE by work area

	Hard hat		Safety glasses		High visibility clothing		Work boots	
	Pre #(%)	Pre-Post change	Pre # (%)	Pre-Post change	Pre # (%)	Pre-Post change	Pre # (%)	Pre-Post change
Burn	26 (87)	3%	27 (96)	4%	0 (0)	10%	28 (100)	0%
Maintenance	28 (82)	-10%	22 (65)	26%	0 (0)	14%	34 (100)	0%
NF Warehouse	145 (95)	5%	129 (85)	5%	11 (7)	0%	139 (100)	0%
NF Baler	125 (92)	-2%	112 (84)	-11%	36 (27)	9%	128 (99)	1%
Shear	82 (69)	-8%	83 (74)	0%	24 (20)	15%	96 (100)	0%
Shredder Inlet	50 (58)	5%	61 (73)	7%	45 (52)	-2%	68 (100)	0%
Shredder Outlet	80 (86)	-2%	67 (76)	10%	4 (4)	34%	66 (100)	0%
Yard	22 (96)	4%	12 (52)	-44%	22 (96)	4%	23 (100)	0%

Table K-3: Hazard presence and hazard-specific PPE and control use

	Hazard presence			PPE/control use*		
	n Pre/Post	Pre # (%)	Pre-Post Change	n Pre/Post	Pre # (%)	Pre, Post Change
Falls	677/499	120 (18)	-7%	119/54	100 (84)	-3%
Noise	677/499	478 (71)	-4%	331/293	196 (59)	14%
Eye Hazards	677/500	198 (29)	1%	193/150	109 (56)	39%
Dust/fume	677/500	190 (28)	-4%	185/119	66 (36)	16%
Struck by objects	677/501	157 (23)	-14%	153/46	16 (10)	35%
Traffic/vehicles	677/501	239 (35)	-6%	230/145	16 (7)	3%
Hazardous energy	677/501	31 (5)	2%	9/33	0	76%
Machines	677/501	125 (19)	-1%	66/89	29 (44)	42%
Working surfaces	555/501	205 (37)	-18%	NA	NA	NA
Lacerations/abrasions	677/501	258 (38)	3%	251/203	222 (88)	6%
Repetitive motion	677/501	440 (65)	6%	NA	NA	NA
Lifting	677/501	153 (23)	0%	NA	NA	NA
Awkward postures	676/501	456 (68)	-1%	NA	NA	NA
Vibration	677/500	297 (44)	2%	82/181	21 (26)	-7%

*other than basic required PPE

Table K-4: Fall hazards by work area

	Hazard presence		PPE/control use	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	120 (18)	-7%	100 (84)	-3%
Burn	5 (17)	-5%	0	0%
Maintenance	1 (3)	-3%	0	0%
NF Warehouse	10 (7)	-5%	7 (70)	-70%
NF Baler	25 (18)	-0%	20 (80)	-8%
Shear	33 (28)	-17%	29 (88)	-13%
Shredder Inlet	6 (7)	-6%	6 (100)	0%
Shredder Outlet	40 (42)	-19%	38 (95)	1%
Yard	0	0%	NA	NA

Table K-5: Noise hazards by work area

	Hazard presence		PPE/control use	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	478 (71)	-4%	196 (59)	14%
Burn	25 (83)	17%	9 (90)	10%
Maintenance	26 (77)	5%	9 (39)	44%
NF Warehouse	83 (55)	-11%	19 (29)	-29%
NF Baler	111 (82)	-12%	75 (86)	-3%
Shear	84 (71)	-11%	21 (42)	35%
Shredder Inlet	52 (60)	8%	31 (86)	-10%
Shredder Outlet	84 (88)	-2%	29 (63)	6%
Yard	13 (57)	-40%	3 (23)	-23%

Table K-6: Eye hazards by work area

	Hazard presence		PPE/control use*	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	198 (29)	1%	109 (56)	39%
Burn	25 (83)	17%	23 (92)	8%
Maintenance	7 (21)	29%	2 (33)	67%
NF Warehouse	22 (15)	-9%	12 (57)	43%
NF Baler	46 (34)	-3%	28 (61)	39%
Shear	37 (31)	-7%	19 (51)	45%
Shredder Inlet	12 (14)	3%	7 (58)	27%
Shredder Outlet	49 (51)	-5%	18 (39)	52%
Yard	0	0%	NA	NA

*other than safety glasses

Table K-7: Dust/fume hazards by work area

	Hazard presence		PPE/control use	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	190 (28)	-4%	66 (36)	16%
Burn	25 (83)	17%	22 (88)	12%
Maintenance	4 (12)	29%	0	89%
NF Warehouse	15 (10)	-9%	13 (87)	-87%
NF Baler	36 (27)	-12%	13 (37)	36%
Shear	46 (39)	-15%	13 (29)	17%
Shredder Inlet	14 (16)	15%	0	85%
Shredder Outlet	50 (52)	-26%	5 (11)	5%
Yard	0	0%	NA	NA

Table K-8: Struck by hazards by work area

	Hazard presence		PPE/control use*	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	157 (23)	-14%	16 (10)	35%
Burn	10 (33)	-18%	0	0%
Maintenance	8 (24)	-24%	0	0%
NF Warehouse	16 (11)	-11%	2 (13)	NA
NF Baler	37 (27)	-13%	1 (3)	33%
Shear	28 (24)	-11%	10 (37)	63%
Shredder Inlet	30 (35)	-19%	0	8%
Shredder Outlet	28 (29)	-26%	3 (11)	23%
Yard	0	0%	NA	NA

*other than hard hat

Table K-9: Traffic/vehicle hazards by work area

	Hazard presence		PPE/control use*	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	239 (35)	-6%	16 (7)	3%
Burn	3 (10)	-5%	0	100%
Maintenance	5 (15)	-11%	0	0%
NF Warehouse	54 (36)	-14%	5 (9)	-9%
NF Baler	72 (53)	-20%	4 (6)	-6%
Shear	34 (29)	-1%	5 (15)	2%
Shredder Inlet	43 (49)	-1%	0	11%
Shredder Outlet	9 (9)	10%	1 (17)	0%
Yard	19 (83)	0%	1 (6)	4%

*other than high visibility vest/jacket

Table K-10: Machinery hazards by work area

	Hazard presence		PPE/control use	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	125 (19)	-1%	29 (44)	42%
Burn	5 (17)	-17%	0	0%
Maintenance	6 (18)	-9%	1 (20)	-20%
NF Warehouse	8 (5)	-2%	6 (100)	0%
NF Baler	34 (25)	-1%	9 (45)	23%
Shear	20 (17)	-2%	4 (50)	50%
Shredder Inlet	1 (1)	-1%	0	0%
Shredder Outlet	51 (53)	-7%	9 (35)	59%
Yard	0	0%	NA	NA

Table K-11: Hazardous energy by work area

	Hazard presence		PPE/control use	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	31 (5)	2%	9/33	0%
Burn	0	0%	0	0%
Maintenance	20 (59)	-18%	0	44%
NF Warehouse	0	0%	0	0%
NF Baler	1 (0.7)	4%	0	100%
Shear	7 (6)	6.2%	0	92%
Shredder Inlet	1 (1)	-1%	0	0%
Shredder Outlet	2 (2)	3%	0	60%
Yard	0	0%	NA	NA

Table K-12: Working surface hazards by work area

	Hazard presence		PPE/control use	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	205 (37)	-18%	NA	NA
Burn	24 (83)	7%	NA	NA
Maintenance	19 (59)	-55%	NA	NA
NF Warehouse	38 (29)	-20%	NA	NA
NF Baler	41 (35)	-11%	NA	NA
Shear	25 (29)	-18%	NA	NA
Shredder Inlet	32 (44)	-29%	NA	NA
Shredder Outlet	22 (32)	-6%	NA	NA
Yard	5 (22)	-22%	NA	NA

Table K-13: Laceration/abrasion hazards by work area

	Hazard presence		PPE/control use	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	258 (38)	3%	222 (88)	6%
Burn	20 (67)	33%	20 (100)	0%
Maintenance	18 (53)	-3%	11 (65)	26%
NF Warehouse	74 (49)	9%	57 (78)	2%
NF Baler	53 (39)	0%	48 (94)	3%
Shear	28 (24)	2%	27 (100)	-4%
Shredder Inlet	10 (12)	-5%	6 (67)	33%
Shredder Outlet	55 (57)	7%	53 (98)	2%
Yard	0	0%	NA	NA

Table K-14: Ergonomic risks by work area

	Repetition		Lifting		Awkward Postures		Vibration	
	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change	Pre # (%)	Pre-Post Change
Overall	440 (65)	6%	153 (23)	0%	456 (68)	-1%	297 (44)	2%
Burn	14 (48)	-13%	8 (27)	-22%	23 (78)	-13%	5 (17)	-17%
Maintenance	6 (18)	23%	4 (12)	-2.7%	15 (44)	20%	6 (18)	-14%
NF Warehouse	104 (68)	9%	50 (33)	11%	99 (65)	-4%	49 (32)	9%
NF Baler	96 (71)	-4%	36 (27)	-7%	104 (76)	-8%	55 (40)	-2%
Shear	85 (71)	5%	22 (18)	-4%	85 (72)	0%	63 (53)	5%
Shredder Inlet	48 (55)	12%	3 (3.4)	-2%	52 (60)	5%	48 (55)	8%
Shredder Outlet	84 (88)	5%	29 (30)	17%	75 (78)	-1%	69 (72)	-15%
Yard	3 (13)	-13%	1 (4)	-4%	3 (13)	-13%	2 (9)	-9%

Table K-15: Industrial hygiene measurements

	Pre-Intervention				Post-Intervention							
	n	GM	GSD	% over PEL	n	GM	GSD	% over PEL	Post PPE use (total)	Post PPE use (over PEL)	Change in mean	Change in % over PEL
Noise (dBA)*	59	81.9	8.4	19%	53	80.8	9.8	17%	77%	89%	-1.1	-2%
Tot. particulates (mg/m ³)	63	0.38	3.6	2%	62	0.32	3.9	5%	77%	100%	-0.1	3%
Carbon monoxide (ppm)	17	2.1	1.9	0%								

*arithmetic mean reported

Table K-16: Noise by work area (PEL-TWA 90 dBA)

	Pre-Intervention			Post –Intervention						
	n	Mean (SD)	% over	n	Mean (SD)	% over	PPE	PPE use (over PEL)	Change in mean	Change in % over PEL
			PEL			PEL	use (total)			
Burn	2	90.3 (1.2)	50%	1	91 (0)	100%	100%	100%	0.7	50%
Crane	3	68.0 (9.4)	0	3	66.9 (0.71)	0	100%	100%	-1.1	0%
Maintenance	4	87.3 (6.3)	50%	5	81.6 (8.8)	20%	80%	100%	-5.7	-30%
NF1	6	81.6 (4.2)	0	5	82.2 (3.1)	0	60%	100%	0.6	0%
NF2	13	83.4 (8.1)	23%	13	84.5 (8.3)	23%	92%	100%	1.1	0%
Night	4	81.4 (8.7)	25%	4	83.0 (4.7)	0	100%	100%	1.6	-25%
Shear	4	79.8 (13.4)	25%	2	78.0 (23.5)	50%	50%	100%	-1.8	25%
Shredder	12	82.3 (10.2)	25%	12	78.0 (11.2)	8%	67%	100%	-4.3	-17%
Yard	11	81.3 (3.8)	0	8	81.5 (10.9)	25%	63%	50%	0.2	25%
Total	59	81.9 (8.4)	19%	53	80.8 (9.8)	17%	77%	89%	-1.1	-2%

Table K-17: Total particulates by work area (PEL-TWA 10 mg/m3)

	Pre-Intervention				Post-Intervention						Change in GM	Change in % over PEL
	n	GM	GSD	% over PEL	n	GM	GSD	% over PEL	PPE use (total)	PPE use (over PEL)		
Burn	4	3.45	4.69	1 (25%)	4	7.85	2.23	2 (50%)	100%	100%	4.40	25%
Crane	4	0.09	1.70	0	3	0.06	1.87	0	33%		-0.03	0%
Maintenance	7	0.92	2.68	0	5	1.52	4.14	1 (17%)	60%	100%	0.60	17%
NF1	8	0.24	1.59	0	5	0.22	1.67	0	0%		-0.02	0%
NF2	7	0.26	1.57	0	8	0.19	2.12	0	63%		-0.07	0%
Night	4	0.52	3.73	0	4	0.33	2.31	0	25%		-0.19	0%
Shear	6	0.31	8.92	0	4	0.28	2.52	0	50%		-0.03	0%
Shredder	13	0.35	2.13	0	14	0.24	2.06	0	43%		-0.11	0%
Yard	10	0.29	2.96	0	9	0.18	2.19	0	56%		-0.11	0%
Total	63	0.38	3.57	1 (2%)	56	0.32	3.86	3 (5%)	77%	100%	-0.06	3%

Table K-19: Lead by work area (PEL 0.05 mg/m3)

	Pre-Intervention				Post-Intervention			
	n	GM	GSD	% over PEL	n	GM	GSD	% over PEL
Burn	4	0.0065	20.9	2 (50%)	4	0.0195	4.6	1 (25%)
Crane	4	0.0001	2.9	0%	3	0.0001	1.9	0%
Maintenance	7	0.0005	2.2	0%	6	0.0007	3.0	0%
NF1	8	0.0012	2.4	0%	6	0.0005	4.0	0%
NF2	7	0.0004	1.9	0%	8	0.0005	6.4	0%
Night	4	0.0007	4.6	0%	4	0.0007	3.2	0%
Shear	6	0.0006	11.6	1 (17%)	4	0.0002	8.4	0%
Shredder	13	0.0006	3.1	0%	15	0.0003	3.7	0%
Yard	10	0.0003	3.7	0%	12	0.0002	2.9	0%
Total	63	0.0006	4.9	3 (5%)	62	0.0004	5.8	1 (2%)

