5.7 Reporting

a. Cliffs will report on the outcomes of the decommissioning and rehabilitation works to the Department of Environment and Conservation, Department of Industry and Resources and the Koolyanobbing Community Reference Group as part of annual reporting on the Mt Jackson J1 Deposit proposal.

5.8 Care and Maintenance Phase[1]

a. In the unlikely event that mine operations cease prematurely and temporarily, Cliffs will liaise with the Department of Mines and Petroleum, Department of Environment and Conservation and the Shire of Yilgarn regarding a care and maintenance phase and any obligations Cliffs may have during this period to meet Government legislation and community expectations.

5.9 Future Management

a. Following implementation of the decommissioning and rehabilitation management actions above, and demonstration that Cliffs has achieved the decommissioning and rehabilitation performance indicators, no further obligations or requirements in relation to decommissioning or rehabilitation will apply to Cliffs, other than any ongoing requirement(s) relating to management of the fauna exclusion fence (if installed) identified above.

6. Review of Management Actions

Cliffs will review and update the management actions contained in this Plan from time to time for currency with legislation, standards, guidelines and/or operational requirements. Any changes to this Plan that results in a significant change to environmental outcome will be referred to the relevant regulatory authorities prior to implementation of such changes.

[1] A care and maintenance phase is considered highly unlikely due to consistent long-term international demand for iron ore and the high quality of the Mt Jackson J1 Deposit ore. Despite this, Cliffs has included scope for a care and maintenance phase as part of this plan in acknowledgement of standard EPA requirements for this phase to be considered in decommissioning plans and in recognition of Government concerns arising from recent premature closure of other mines in Western Australia during the period of 2008/2009.

7. References

The following references have been cited or used in preparation of this plan:

Australian and New Zealand Minerals and Energy Council and the Australian Minerals Industry (2000) *Strategic Framework for Mine Closure*. Commonwealth of Australia, Canberra.

Cliffs Asia Pacific Iron Ore Pty Ltd (2003a) *Koolyanobbing Expansion Project – Northern Tenements Mining Environmental Management Plan.* Prepared for Cliffs Asia Pacific Iron Ore Pty Ltd (formerly as Portman Iron Ore Limited) by Ecologia Environmental Consultants.

Cliffs Asia Pacific Iron Ore Pty Ltd (2006) *Environmental Operating Procedure EOP14 Topsoil Management*.

Cliffs Asia Pacific Iron Ore Pty Ltd (2009a) *Environmental Impact Assessment (Public Environmental Review) – Koolyanobbing Iron Ore Project Mt Jackson J1 Deposit*. Prepared for Cliffs Asia Pacific Iron Ore Pty Ltd by Globe Environments Australia Pty Ltd, Perth, Western Australia. April 2009.

Cliffs Asia Pacific Iron Ore Pty Ltd (2009b) *Koolyanobbing Iron Ore Project – Land Clearing Management Plan*. Prepared for Cliffs Asia Pacific Iron Ore Pty Ltd (formerly as Portman Iron Ore Limited) by Ecologia Environmental Consultants (2003) and updated by Greg Barrett and Associates (2009).

Cliffs Asia Pacific Iron Ore Pty Ltd (2009c) *Koolyanobbing Iron Ore Project – Waste Management Plan*. Prepared for Cliffs Asia Pacific Iron Ore Pty Ltd (formerly as Portman Iron Ore Limited) by Ecologia Environmental Consultants (2003) and updated by Greg Barrett and Associates (2009).

Cliffs Asia Pacific Iron Ore Pty Ltd (2009d) *Koolyanobbing Iron Ore Project – Weed Management Plan*. Prepared for Cliffs Asia Pacific Iron Ore Pty Ltd (formerly as Portman Iron Ore Limited) by Ecologia Environmental Consultants (2003) and updated by Greg Barrett and Associates (2009).

Department of Industry, Tourism and Resources (2006) Mine Closure and Completion: Leading Practice Sustainable Development Program for the Mining Industry.

Department of Mines and Petroleum (1997) *Safety Bund Walls Around Abandoned Open Pit Mines.* Produced by the former Department of Industry and Resources. Guideline ZMA048HA, December 1997.

Department of Water (2003) *Hydrogeological Record Series Report No. 9: Mine Void Water Resource Issues in Western Australia.* Produced under the former department name of Water and Rivers Commission.

DumpSolver Pty Ltd (2009) *Mt Jackson J1 Deposit Abandonment Bunding Requirements*. Unpublished report to Cliffs Asia Pacific Iron Ore Pty Ltd, February 2009.

Environmental Protection Authority (2004) *Guide to EIA Environmental Principles, Factors and Objectives*. Version 2, 1 November 2004.

Environmental Protection Authority (2006) Guidance for the Assessment of Environmental Factors – Rehabilitation of terrestrial ecosystems. Guidance Statement No. 6, June 2006.

Government of Western Australia (1967) *Mt Jackson Pastoral Lease*. As amended (2006).

Oakville Capital Limited (2008) Email correspondence from Oakville Capital Limited to Cliffs Asia Pacific Iron Ore Pty Ltd (formerly as Portman Iron Ore Limited) of containing October 2008 10-year Government Bonds by the Reserve Bank of Australia and 2009 Consumer Price Index forecasts by Australia and New Zealand Banking Corporation Limited, Commonwealth Bank of Australia and Deutsche Bank. Unpublished report to Cliffs Asia Pacific Iron Ore Pty Ltd (formerly as Portman Iron Ore Limited).

Western Botanical (2009) Flora and Vegetation Survey of the western Mt Jackson Range, Shire of Yilgarn, Western Australia. Report prepared for Cliffs Asia Pacific Iron Ore Pty Ltd (formerly as Portman Iron Ore Limited). April 2009.

Legislation cited in this Plan can be accessed from the State Law Publisher at http://www.slp.wa.gov.au.

8. Appendix 1

Table 1. Mt Jackson J1 Deposit J1 West Pit Exclusion Fence - Installation, Maintenance & Replacement Calculations

Notes:
1 The capital to be invested is dependent on the year the fund is established. Capital values should be reviewed for currency at the time the fund is established.
2 Fence installation cost, annual inspection & maintenance cost and periodic replacement timeframe is based on Cliffs' estimates and advice from DEC (October 2008).
3 CPI based on 3.36% being averaged 2009 CPI forecasts by the Australian and New Zealand Banking Corporation, Commonwealth Bank of Australia and the Deutsche Bank as at October 2008 (supplied by Oakville Capital Limited, 2008).
4 Interest rate is based the 10-year Government Bonds projection of the Reserve Bank of Australia as at October 2008 (supplied by Oakville Capital Limited, 2008).
5 Maintenance and fence installation figures that are greyed are not funds invested or paid for that year, but are shown for calculation purposes.

Event	Year	Capital at Year Start	Interest @ 5.18%	Capital plus Interest	Maintenance @ 3.36%CPI	Capital Carried Over	Fence Installation @ 3.36%CPI
	2008	$ -	$ -	$ -	$ 10,000.00	$ -	$ 75,000.00
	2009	$ -	$ -	$ -	$ 10,336.00	$ -	$ 77,520.00
	2010	$ 650,000	$ 33,670.00	$ 683,670.00	$ 10,683.29	$ 683,670.00	$ 80,124.67
	2011	$ 683,670	$ 35,414.11	$ 719,084.11	$ 11,042.25	$ 719,084.11	$ 82,816.86
	2012	$ 719,084	$ 37,248.56	$ 756,332.66	$ 11,413.27	$ 756,332.66	$ 85,599.51
	2013	$ 756,333	$ 39,178.03	$ 795,510.69	$ 11,796.75	$ 795,510.69	$ 88,475.65
	2014	$ 795,511	$ 41,207.45	$ 836,718.15	$ 12,193.12	$ 836,718.15	$ 91,448.43
	2015	$ 836,718	$ 43,342.00	$ 880,060.15	$ 12,602.81	$ 880,060.15	$ 94,521.10
	2016	$ 880,060	$ 45,587.12	$ 925,647.26	$ 13,026.27	$ 925,647.26	$ 97,697.01
	2017	$ 925,647	$ 47,948.53	$ 973,595.79	$ 13,463.95	$ 973,595.79	$ 100,979.63
	2018	$ 973,596	$ 50,432.26	$ 1,024,028.05	$ 13,916.34	$ 1,024,028.05	$ 104,372.54
	2019	$ 1,024,028	$ 53,044.65	$ 1,077,072.71	$ 14,383.93	$ 1,077,072.71	$ 107,879.46
	2020	$ 1,077,073	$ 55,792.37	$ 1,132,865.07	$ 14,867.23	$ 1,132,865.07	$ 111,504.21
Fund Established & Installation Year	1	**$ 1,017,614**	**$ 52,712.42**	**$ 1,070,326.74**	$ 15,366.77	**$ 1,070,326.74**	**$ 115,250.75**
	2	$ 1,070,327	$ 55,442.93	$ 1,125,769.67	$ 15,883.09	$ 1,109,886.58	$ 119,123.18
	3	$ 1,109,887	$ 57,492.12	$ 1,167,378.70	$ 16,416.76	$ 1,150,961.94	$ 123,125.72
	4	$ 1,150,962	$ 59,619.83	$ 1,210,581.77	$ 16,968.37	$ 1,193,613.40	$ 127,262.74
	5	$ 1,193,613	$ 61,829.17	$ 1,255,442.58	$ 17,538.50	$ 1,237,904.08	$ 131,538.77
	6	$ 1,237,904	$ 64,123.43	$ 1,302,027.51	$ 18,127.80	$ 1,283,899.71	$ 135,958.47
	7	$ 1,283,900	$ 66,506.00	$ 1,350,405.71	$ 18,736.89	$ 1,331,668.82	$ 140,526.68
	8	$ 1,331,669	$ 68,980.45	$ 1,400,649.27	$ 19,366.45	$ 1,381,282.82	$ 145,248.37
	9	$ 1,381,283	$ 71,550.45	$ 1,452,833.27	$ 20,017.16	$ 1,432,816.11	$ 150,128.72
	10	$ 1,432,816	$ 74,219.87	$ 1,507,035.98	$ 20,689.74	$ 1,486,346.24	$ 155,173.04
	11	$ 1,486,346	$ 76,992.74	$ 1,563,338.98	$ 21,384.91	$ 1,541,954.06	$ 160,386.86
	12	$ 1,541,954	$ 79,873.22	$ 1,621,827.28	$ 22,103.45	$ 1,599,723.84	$ 165,775.86
	13	$ 1,599,724	$ 82,865.69	$ 1,682,589.53	$ 22,846.12	$ 1,659,743.41	$ 171,345.92
	14	$ 1,659,743	$ 85,974.71	$ 1,745,718.12	$ 23,613.75	$ 1,722,104.36	$ 177,103.15

Event	Year	Capital at Year Start	Interest @ 5.18%	Capital plus Interest	Maintenance @ 3.36%CPI	Capital Carried Over	Fence Installation @ 3.36%CPI
	15	$ 1,722,104	$ 89,205.01	$ 1,811,309.37	$ 24,407.18	$ 1,786,902.19	$ 183,053.81
	16	$ 1,786,902	$ 92,561.53	$ 1,879,463.73	$ 25,227.26	$ 1,854,236.47	$ 189,204.42
	17	$ 1,854,236	$ 96,049.45	$ 1,950,285.92	$ 26,074.89	$ 1,924,211.03	$ 195,561.69
	18	$ 1,924,211	$ 99,674.13	$ 2,023,885.16	$ 26,951.01	$ 1,996,934.15	$ 202,132.56
	19	$ 1,996,934	$ 103,441.19	$ 2,100,375.34	$ 27,856.56	$ 2,072,518.78	$ 208,924.22
	20	$ 2,072,519	$ 107,356.47	$ 2,179,875.25	$ 28,792.54	$ 2,151,082.71	$ 215,944.07
	21	$ 2,151,083	$ 111,426.08	$ 2,262,508.79	$ 29,759.97	$ 2,232,748.82	$ 223,199.79
	22	$ 2,232,749	$ 115,656.39	$ 2,348,405.21	$ 30,759.91	$ 2,317,645.30	$ 230,699.30
	23	$ 2,317,645	$ 120,054.03	$ 2,437,699.33	$ 31,793.44	$ 2,405,905.89	$ 238,450.80
	24	$ 2,405,906	$ 124,625.93	$ 2,530,531.81	$ 32,861.70	$ 2,497,670.11	$ 246,462.75
	25	$ 2,497,670	$ 129,379.31	$ 2,627,049.43	$ 33,965.85	$ 2,593,083.57	$ 254,743.90
Replacement Year	26	$ 2,329,780	$ 120,682.62	$ 2,450,462.90	$ 35,107.11	$ 2,450,462.90	**$ 263,303.29**
	27	$ 2,450,463	$ 126,933.98	$ 2,577,396.88	$ 36,286.70	$ 2,541,110.18	$ 272,150.28
	28	$ 2,541,110	$ 131,629.51	$ 2,672,739.68	$ 37,505.94	$ 2,635,233.74	$ 281,294.53
	29	$ 2,635,234	$ 136,505.11	$ 2,771,738.85	$ 38,766.14	$ 2,732,972.72	$ 290,746.03
	30	$ 2,732,973	$ 141,567.99	$ 2,874,540.70	$ 40,068.68	$ 2,834,472.02	$ 300,515.09
	31	$ 2,834,472	$ 146,825.65	$ 2,981,297.67	$ 41,414.99	$ 2,939,882.69	$ 310,612.40
	32	$ 2,939,883	$ 152,285.92	$ 3,092,168.61	$ 42,806.53	$ 3,049,362.08	$ 321,048.98
	33	$ 3,049,362	$ 157,956.96	$ 3,207,319.04	$ 44,244.83	$ 3,163,074.21	$ 331,836.22
	34	$ 3,163,074	$ 163,847.24	$ 3,326,921.45	$ 45,731.46	$ 3,281,189.99	$ 342,985.92
	35	$ 3,281,190	$ 169,965.64	$ 3,451,155.63	$ 47,268.03	$ 3,403,887.60	$ 354,510.25
	36	$ 3,403,888	$ 176,321.38	$ 3,580,208.98	$ 48,856.24	$ 3,531,352.74	$ 366,421.79
	37	$ 3,531,353	$ 182,924.07	$ 3,714,276.81	$ 50,497.81	$ 3,663,779.00	$ 378,733.56
	38	$ 3,663,779	$ 189,783.75	$ 3,853,562.76	$ 52,194.53	$ 3,801,368.22	$ 391,459.01
	39	$ 3,801,368	$ 196,910.87	$ 3,998,279.10	$ 53,948.27	$ 3,944,330.82	$ 404,612.04
	40	$ 3,944,331	$ 204,316.34	$ 4,148,647.16	$ 55,760.93	$ 4,092,886.23	$ 418,207.00
	41	$ 4,092,886	$ 212,011.51	$ 4,304,897.73	$ 57,634.50	$ 4,247,263.23	$ 432,258.75
	42	$ 4,247,263	$ 220,008.24	$ 4,467,271.47	$ 59,571.02	$ 4,407,700.45	$ 446,782.65
	43	$ 4,407,700	$ 228,318.88	$ 4,636,019.33	$ 61,572.61	$ 4,574,446.73	$ 461,794.55
	44	$ 4,574,447	$ 236,956.34	$ 4,811,403.07	$ 63,641.45	$ 4,747,761.62	$ 477,310.84
	45	$ 4,747,762	$ 245,934.05	$ 4,993,695.67	$ 65,779.80	$ 4,927,915.87	$ 493,348.49
	46	$ 4,927,916	$ 255,266.04	$ 5,183,181.92	$ 67,990.00	$ 5,115,191.92	$ 509,925.00
	47	$ 5,115,192	$ 264,966.94	$ 5,380,158.86	$ 70,274.46	$ 5,309,884.40	$ 527,058.48
	48	$ 5,309,884	$ 275,052.01	$ 5,584,936.41	$ 72,635.69	$ 5,512,300.72	$ 544,767.64
	49	$ 5,512,301	$ 285,537.18	$ 5,797,837.90	$ 75,076.24	$ 5,722,761.65	$ 563,071.83
	50	$ 5,722,762	$ 296,439.05	$ 6,019,200.71	$ 77,598.81	$ 5,941,601.90	$ 581,991.05
Replacement Year	51	$ 5,340,056	$ 276,614.90	$ 5,616,670.85	$ 80,206.13	$ 5,616,670.85	**$ 601,545.95**
	52	$ 5,616,671	$ 290,943.55	$ 5,907,614.40	$ 82,901.05	$ 5,824,713.35	$ 621,757.89
	53	$ 5,824,713	$ 301,720.15	$ 6,126,433.50	$ 85,686.53	$ 6,040,746.98	$ 642,648.96
	54	$ 6,040,747	$ 312,910.69	$ 6,353,657.67	$ 88,565.59	$ 6,265,092.08	$ 664,241.96

Event	Year	Capital at Year Start	Interest @ 5.18%	Capital plus Interest	Maintenance @ 3.36%CPI	Capital Carried Over	Fence Installation @ 3.36%CPI
	55	$ 6,265,092	$ 324,531.77	$ 6,589,623.85	$ 91,541.40	$ 6,498,082.45	$ 686,560.49
	56	$ 6,498,082	$ 336,600.67	$ 6,834,683.12	$ 94,617.19	$ 6,740,065.93	$ 709,628.92
	57	$ 6,740,066	$ 349,135.42	$ 7,089,201.34	$ 97,796.33	$ 6,991,405.02	$ 733,472.45
	58	$ 6,991,405	$ 362,154.78	$ 7,353,559.80	$ 101,082.28	$ 7,252,477.51	$ 758,117.13
	59	$ 7,252,478	$ 375,678.34	$ 7,628,155.85	$ 104,478.65	$ 7,523,677.20	$ 783,589.86
	60	$ 7,523,677	$ 389,726.48	$ 7,913,403.68	$ 107,989.13	$ 7,805,414.55	$ 809,918.48
	61	$ 7,805,415	$ 404,320.47	$ 8,209,735.02	$ 111,617.57	$ 8,098,117.45	$ 837,131.74
	62	$ 8,098,117	$ 419,482.48	$ 8,517,599.94	$ 115,367.92	$ 8,402,232.02	$ 865,259.37
	63	$ 8,402,232	$ 435,235.62	$ 8,837,467.64	$ 119,244.28	$ 8,718,223.36	$ 894,332.09
	64	$ 8,718,223	$ 451,603.97	$ 9,169,827.33	$ 123,250.89	$ 9,046,576.45	$ 924,381.64
	65	$ 9,046,576	$ 468,612.66	$ 9,515,189.11	$ 127,392.12	$ 9,387,796.99	$ 955,440.87
	66	$ 9,387,797	$ 486,287.88	$ 9,874,084.87	$ 131,672.49	$ 9,742,412.38	$ 987,543.68
	67	$ 9,742,412	$ 504,656.96	$ 10,247,069.35	$ 136,096.69	$ 10,110,972.66	$ 1,020,725.15
	68	$ 10,110,973	$ 523,748.38	$ 10,634,721.04	$ 140,669.54	$ 10,494,051.51	$ 1,055,021.51
	69	$ 10,494,052	$ 543,591.87	$ 11,037,643.38	$ 145,396.03	$ 10,892,247.34	$ 1,090,470.24
	70	$ 10,892,247	$ 564,218.41	$ 11,456,465.76	$ 150,281.34	$ 11,306,184.42	$ 1,127,110.04
	71	$ 11,306,184	$ 585,660.35	$ 11,891,844.77	$ 155,330.79	$ 11,736,513.98	$ 1,164,980.93
	72	$ 11,736,514	$ 607,951.42	$ 12,344,465.40	$ 160,549.91	$ 12,183,915.50	$ 1,204,124.29
	73	$ 12,183,915	$ 631,126.82	$ 12,815,042.32	$ 165,944.38	$ 12,649,097.94	$ 1,244,582.87
	74	$ 12,649,098	$ 655,223.27	$ 13,304,321.21	$ 171,520.11	$ 13,132,801.10	$ 1,286,400.85
	75	$ 13,132,801	$ 680,279.10	$ 13,813,080.20	$ 177,283.19	$ 13,635,797.01	$ 1,329,623.92
Replacement Year	76	$ 12,261,498	$ 635,145.58	$ 12,896,643.30	$ 183,239.90	$ 12,896,643.30	**$ 1,374,299.29**
	77	$ 12,896,643	$ 668,046.12	$ 13,564,689.43	$ 189,396.77	$ 13,375,292.66	$ 1,420,475.74
	78	$ 13,375,293	$ 692,840.16	$ 14,068,132.82	$ 195,760.50	$ 13,872,372.32	$ 1,468,203.73
	79	$ 13,872,372	$ 718,588.89	$ 14,590,961.21	$ 202,338.05	$ 14,388,623.16	$ 1,517,535.37
	80	$ 14,388,623	$ 745,330.68	$ 15,133,953.84	$ 209,136.61	$ 14,924,817.23	$ 1,568,524.56
	81	$ 14,924,817	$ 773,105.53	$ 15,697,922.76	$ 216,163.60	$ 15,481,759.17	$ 1,621,226.99
	82	$ 15,481,759	$ 801,955.12	$ 16,283,714.29	$ 223,426.69	$ 16,060,287.60	$ 1,675,700.21
	83	$ 16,060,288	$ 831,922.90	$ 16,892,210.49	$ 230,933.83	$ 16,661,276.66	$ 1,732,003.74
	84	$ 16,661,277	$ 863,054.13	$ 17,524,330.79	$ 238,693.21	$ 17,285,637.58	$ 1,790,199.06
	85	$ 17,285,638	$ 895,396.03	$ 18,181,033.61	$ 246,713.30	$ 17,934,320.31	$ 1,850,349.75
	86	$ 17,934,320	$ 928,997.79	$ 18,863,318.10	$ 255,002.87	$ 18,608,315.23	$ 1,912,521.50
	87	$ 18,608,315	$ 963,910.73	$ 19,572,225.96	$ 263,570.96	$ 19,308,655.00	$ 1,976,782.23
	88	$ 19,308,655	$ 1,000,188.33	$ 20,308,843.33	$ 272,426.95	$ 20,036,416.38	$ 2,043,202.11
	89	$ 20,036,416	$ 1,037,886.37	$ 21,074,302.75	$ 281,580.49	$ 20,792,722.26	$ 2,111,853.70
	90	$ 20,792,722	$ 1,077,063.01	$ 21,869,785.27	$ 291,041.60	$ 21,578,743.67	$ 2,182,811.99
	91	$ 21,578,744	$ 1,117,778.92	$ 22,696,522.59	$ 300,820.60	$ 22,395,702.00	$ 2,256,154.47
	92	$ 22,395,702	$ 1,160,097.36	$ 23,555,799.36	$ 310,928.17	$ 23,244,871.19	$ 2,331,961.26
	93	$ 23,244,871	$ 1,204,084.33	$ 24,448,955.52	$ 321,375.35	$ 24,127,580.17	$ 2,410,315.16
	94	$ 24,127,580	$ 1,249,808.65	$ 25,377,388.82	$ 332,173.57	$ 25,045,215.25	$ 2,491,301.75

Event	Year	Capital at Year Start	Interest @ 5.18%	Capital plus Interest	Maintenance @ 3.36%CPI	Capital Carried Over	Fence Installation @ 3.36%CPI
	95	$ 25,045,215	$ 1,297,342.15	$ 26,342,557.40	$ 343,334.60	$ 25,999,222.81	$ 2,575,009.48
	96	$ 25,999,223	$ 1,346,759.74	$ 27,345,982.55	$ 354,870.64	$ 26,991,111.91	$ 2,661,529.80
	97	$ 26,991,112	$ 1,398,139.60	$ 28,389,251.50	$ 366,794.29	$ 28,022,457.21	$ 2,750,957.20
	98	$ 28,022,457	$ 1,451,563.28	$ 29,474,020.49	$ 379,118.58	$ 29,094,901.91	$ 2,843,389.37
	99	$ 29,094,902	$ 1,507,115.92	$ 30,602,017.83	$ 391,856.97	$ 30,210,160.86	$ 2,938,927.25
	100	$ 30,210,161	$ 1,564,886.33	$ 31,775,047.19	$ 405,023.36	$ 31,370,023.83	$ 3,037,675.21
Replacement Year	101	$ 28,332,349	$ 1,467,615.66	$ 29,799,964.29	$ 418,632.15	$ 29,799,964.29	$ 3,139,741.09

APPENDIX 6

Weed Management Plan (Cliffs 2009d)

CLIFFS

KOOLYANOBBING IRON ORE PROJECT

WEED MANAGEMENT PLAN

April 2009

Document History				
Rev No.	**Author**	**Status**	**Date**	**Distribution**
P	ecologia	DEC approved	Oct 2003	
A	G Barrett	New draft for internal review	Aug 2008	P West; G Cockerton
B	G Barrett	Revised draft after internal comments	Sep 2008	P West; M De Souza
C	G Barrett	Revised Figure 1	Oct 2008	P West; M De Souza
D	G Barrett	Internal review plus change to Cliffs	Feb 2009	P West; M De Souza; S Hawkins
E	G Barrett	Approved Draft – Public Release	Apr 2009	Public Release

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF APPENDICES

1.0 BACKGROUND AND OBJECTIVE

The Koolyanobbing Iron Ore Project consists of three mine sites: Koolyanobbing, Mt Jackson and Windarling. The Koolyanobbing mine site is located 425 kilometres east of Perth, Western Australia, and approximately 50 kilometres north-east of the town of Southern Cross (Figure 1). Mt. Jackson and Windarling are located 80 and 100 kilometres north of Koolyanobbing respectively. Ore is hauled from these sites by road train to Koolyanobbing for processing. All of the processed ore is transported by rail to the Port of Esperance, 578 kilometres to the south.

This management plan is one of a series of plans that outlines how environmental issues are addressed. While environmental approvals have been issued to Cliffs Asia Pacific Iron Ore Pty Ltd (Cliffs – formerly Portman Iron Ore Ltd), the Koolyanobbing operations are managed by the Koolyanobbing Alliance, formed between Cliffs and BGC (Australia) Pty Ltd in 2007. Therefore, the responsibility to implement this and other management plans is shared between Cliffs and the Koolyanobbing Alliance.

The objective of this plan is to control existing infestations and future outbreaks of significant environmental and noxious weeds within the project area.

2.0 SIGNIFICANT ASPECTS OF THE EXISTING ENVIRONMENT

While a number of weed species have become established within the Koolyanobbing townsite and adjacent mining areas, weed invasion to date has not been significant at Windarling and Mt Jackson due to the relative isolation of the area. These sites, however, adjoin some areas of high conservation value. These areas could be adversely affected should significant weed populations become established locally. Furthermore, the success of rehabilitation works at all three mine sites could be compromised if weed populations are allowed to establish.

The known weed species from the three mining areas are listed in Appendix A. Also included is data for the Mt Manning Range (an example of the weed diversity recorded in a relatively undisturbed area). Cliffs does not operate on Mt Manning Range.

3.0 REGULATORY REQUIREMENTS AND STANDARDS

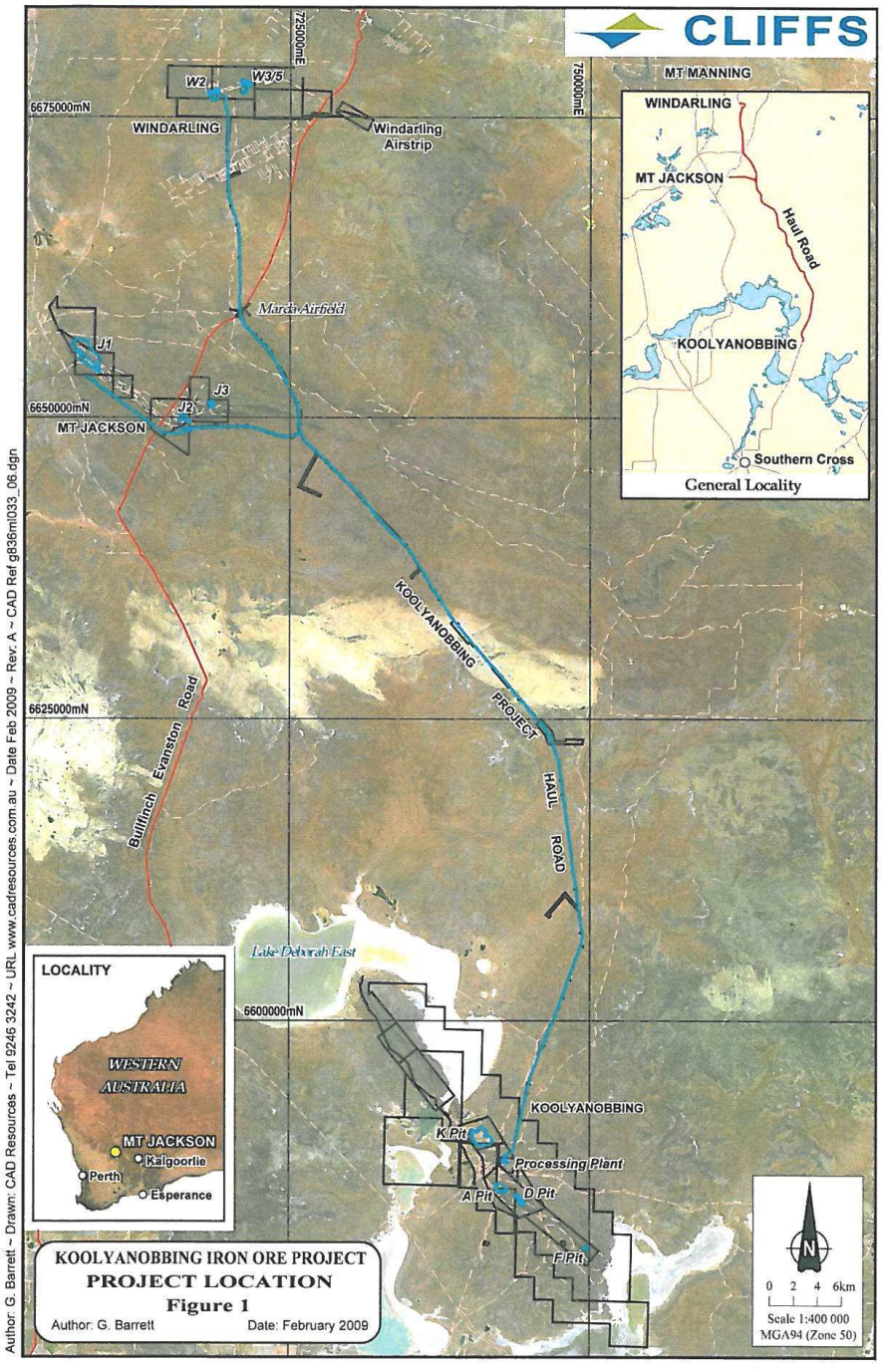
Cliffs has an obligation under Ministerial Statement 627, issued under the *Environmental Protection Act 1986*, to prepare and implement a Weed Management Plan (Condition 10 and Proponent Commitment 11).

Cliffs is also obliged to comply with the following:

- *Agricultural and Related Resources Protection Act 1976*: a State Act that includes provision for the management, control and prevention of certain plants;
- *Wildlife Conservation Act 1950*: a State Act to provide for the conservation and protection of wildlife.
- *Conservation and Land Management Act 1984*: a State Act to make better provision for the use, protection and management of certain public lands and waters and the flora and fauna thereof; and
- *Environmental Protection and Biodiversity Conservation Act 1999:* a Federal Act to manage nationally and internationally important flora, fauna, ecological communities and heritage places.

All commercial operators undertaking weed control must be licensed by the Department of Health.

A 1999 report by the Department of Conservation and Land Management (now Department of Environment and Conservation) – an *Environmental Weed Strategy for Western Australia* – was used as an important reference document in the formulation of this plan.


CLIFFS
725000mE
750000mE
6675000mN
6650000mN
6625000mN
6600000mN
W2
W3/5
WINDARLING
Windarling Airstrip
Marda Airfield
J1
J2
J3
MT JACKSON
KOOLYANOBBING PROJECT
HAUL ROAD
Bullfinch Evanston Road
Lake Deborah East
KOOLYANOBBING
K Pit
Processing Plant
A Pit
D Pit
F Pit
MT MANNING
WINDARLING
MT JACKSON
Haul Road
KOOLYANOBBING
Southern Cross
General Locality
LOCALITY
WESTERN AUSTRALIA
MT JACKSON
Kalgoorlie
Perth
Esperance
KOOLYANOBBING IRON ORE PROJECT
PROJECT LOCATION
Figure 1
Author: G. Barrett
Date: February 2009
N
0 2 4 6km
Scale 1:400 000
MGA94 (Zone 50)
Author: G. Barrett ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Date Feb 2009 ~ Rev: A ~ CAD Ref g836ml033_06.dgn

4.0 CONSULTATION

This draft plan will be reviewed by representatives from the Department of Environment and Conservation and Cliffs' Community Reference Group prior to finalisation.

5.0 POTENTIAL IMPACTS

Environmental weeds are "plants that establish themselves in natural ecosystems and proceed to modify natural processes, usually adversely, resulting in the decline of the communities they invade" (CALM, 1999). The main aim of this plan is to minimise the impact of environmental weeds. The plan also considers Declared Plants under the *Agricultural and Related Resources Protection Act 1976* but only one – Saffron Thistle – is known to occur in the Koolyanobbing area. It is also listed as an environmental weed.

Appendix A includes a risk ranking of each weed taxon known to occur in the Koolyanobbing Iron Ore Project area. The management actions determined for this plan are guided by these risk rankings together with the conservation value of locally-occurring native vegetation.

6.0 DEFINITIONS

Weed Risk Area means an area in which weed populations are established and in which vehicle movement could result in the inadvertent collection of weed seeds which can be dislodged elsewhere. Vehicles moving from a Weed Risk Area to another area should be subject to cleaning and inspection.

7.0 MANAGEMENT ACTIONS

Cliffs and the Koolyanobbing Alliance will undertake the following management actions:

Management Actions	Timing	Responsibility
Survey and assessment		
1. Undertake a comprehensive assessment of the status of weeds and weed populations across the project area. The assessment should consider the distribution and abundance of individual weed species and the risk posed by them.	June 2009	Alliance Environmental Superintendent
2. Using data from 1, integrate the data into the site GIS database.	June 2009	Alliance Environmental Superintendent
3. Using data from 2, develop a risk-based approach to weed management. Establish and implement a procedure for the identification of Weed Risk Areas where hygiene requirements are warranted.	Ongoing	Alliance Environmental Superintendent
4. Update computer-based weed distribution and abundance records through opportunistic observations and targeted survey. Use incident reporting system to report new populations or significant population increases of high risk environmental weeds or Declared Plants.	Ongoing	Alliance Environmental Superintendent
Control and eradication of existing weed populations		
5. Undertake annual weed control and eradication campaigns in areas of high risk (e.g. known populations of significant environmental weeds) or potential high impact on significant native vegetation (e.g. vegetation supporting DRF at Windarling). Control will be largely by chemical means. Record weed control campaigns in GIS database.	Ongoing	Alliance Environmental Superintendent
6. Assess success of weed control efforts and modify methods accordingly.	Ongoing	Alliance Environmental Superintendent
Weed hygiene		
7. Prepare and implement a procedure to complement the existing Weed Hygiene Certificate (ENVF07). The procedure should provide guidance on vehicle and equipment inspection requirements and on the establishment and maintenance of Weed Risk Areas.	August 2009	Cliffs Manager Environmental Services
8. Ensure all major earthmoving and exploration contracts include clauses requiring adherence to Cliffs' weed hygiene procedures.	August 2009	Cliffs Manager Environmental Services
9. Provide and maintain washdown facilities.	Ongoing	General Manager Operations
Education and training		
10. Maintain a component on weed management in the site environmental induction. Component should include information on significant weed species, the approach to weed hygiene, and areas of significant native vegetation warranting special protection from weeds.	Ongoing	Alliance Environmental Superintendent
11. Provide specialised training on weed management to relevant personnel. Training requirements could include weed identification, weed control methods (if inhouse resources used for weed control) or updates on developments of alternative control methodologies.	Ongoing	Alliance Environmental Superintendent
Rehabilitation		
12. Develop and implement a standard contract clause whereby suppliers of native plant seed must certify that all seed supplied is weed free.	June 2009 for development of clause, ongoing for certification.	Cliffs Manager Environmental Services

8.0 MONITORING

Monitoring of weed populations will be undertaken through opportunistic observations made during site inspections and through targeted survey of known weed populations. The latter should focus on higher risk populations and should attempt to assess changes in distribution and abundance.

9.0 PERFORMANCE INDICATORS

- Establishment of weed data within GIS database.
- No persistent new introductions or spread of weeds as a consequence of Cliffs' operations.

10.0 RECORDS AND REPORTING

Weed distribution, abundance and control records will be maintained within the site GIS database. A summary of significant changes in weed distribution and abundance, and the control measures used, will be presented within the Annual Environmental Report to the Department of Mines and Petroleum.

11.0 REVIEW

The plan will be reviewed in 2012. An earlier review will be triggered if there are material changes to the project or reporting indicates that the aims of the plan are not being met.

12.0 REFERENCES

Reports:

- Department of Conservation and Land Management (1999). Environmental Weed Strategy for Western Australia, 3 May 1999.
- Gibson, N. (2004). Flora and vegetation of the Eastern Goldfields Ranges: Part 6. Mt Manning Range. *Journal of the Royal Society of Western Australia* 87, 35-47.
- Mattiske Pty Ltd (2001). Review of Flora on Portman Iron Ore Proposed Expansion Areas – Koolyanobbing. Report for Cliffs Natural Resources Pty Ltd (formerly as Portman Iron Ore Ltd.)
- Western Botanical (2003) *Assessment of Weed Infestations - Southern Cross to Koolyanobbing and Bullfinch - Evanston Rd.* Consultants report to Cliffs Natural Resources Pty Ltd (formerly as Portman Iron Ore Ltd.). Reference WB360.
- Western Botanical (2009) *Flora and Vegetation Survey of the Western Jackson Range, Western Australia.* Report to Cliffs Natural Resources Pty Ltd (formerly as Portman Iron Ore Ltd.). Reference WB359.

Related documents:

- ENVF07 Weed Hygiene Certificate.
- EOP16 Weed Management.

APPENDIX A

List of weed species known to occur in the Koolyanobbing Iron Ore Project area with risk ranking.

Risk ranking follows Department of Conservation and Land Management (1999):

- High (H) – priority weed for control and/or research.
- Moderate (Mo) – control and/or research if resources available, otherwise monitoring.
- Mild (Mi): monitoring, control where appropriate.
- Low (L): low level monitoring.
- TBA: to be advised.

An asterisk indicates a Declared Weed under the *Agricultural and Related Resources Protection Act 1976*.

Species	Common Name	Koolyanobbing	Windarling	Mt Jackson	Trans Corridor	Evanston Road	Southern Cross – Koolyanobbing Road	Mt Manning Range	Risk ranking
Acetosa vesicaria	Ruby Dock	✓							**H**
Aira caryophyllea	Silver Hairgrass		✓	✓	✓				**Mo**
Brassica tournefortii	Wild Turnip	✓				✓	✓		**H**
Bromus diandrus	Great Brome	✓	✓	✓					**H**
Bromus madritensis	Brome Grass			✓					**L**
Bromus rubens	Red Brome		✓	✓					**Mo**
Carrichtera annua	Wards Weed	✓		✓	✓	✓	✓		**H**
*Carthamus lanatus**	Saffron Thistle	✓			✓	✓			**L**
Centaurea melitensis	Maltese Cockspur	✓		✓	✓	✓	✓		**Mo**
Citrullus lanatus	Afghan Melon					✓	✓		**L**

Species	Common Name	Koolyanobbing	Windarling	Mt Jackson	Trans Corridor	Evanston Road	Southern Cross – Koolyanobbing Road	Mt Manning Range	Risk ranking
Echium plantaginaeum	Patterson's Curse	✓				✓	✓		**TBA**
Eragrostis curvula	African Love Grass	✓				✓	✓		**H**
Erodium botrys	Big Herons Bill	✓		✓					**L**
Hypochaeris glabra	Flat Weed		✓	✓	✓			✓	**Mo**
Hyptis suaveolens	Mint Weed	✓	✓	✓	✓	✓	✓		**Mo**
Medicago sp.	Medic			✓					**TBA**
Osteospermum calendulaceum	Stinking Roger	✓	✓	✓					**Mi**
Pentaschistis airoides	False Hairgrass	✓	✓	✓	✓			✓	**Mo**
Rostraria pumila	Roughtail			✓					**Mo**
Sonchus asper	Prickly Sowthistle			✓					**Mo**
Sonchus oleraceus	Sowthistle		✓		✓			✓	**Mo**
Vulpia myuros var. myuros	Rats-tail Fescue		✓	✓	✓			✓	**Mo**

Data sources:
Windarling, Mt Jackson, Transport Corridor – Mattiske (2001), Western Botanical (pers. comm.).
Koolyanobbing, Evanston Road, Southern Cross – Koolyanobbing Road - Western Botanical (pers. comm.).
Mt Manning Range – Gibson (2004).
Mt Jackson – Western Botanical (2009).
Risk ranking – CALM (1999).

APPENDIX 7

Bush Fire Management Plan (Cliffs 2009e)

CLIFFS

KOOLYANOBBING IRON ORE PROJECT

BUSH FIRE MANAGEMENT PLAN

April 2009

Document History				
Rev No.	**Author**	**Status**	**Date**	**Distribution**
P	ecologia	DEC approved	Oct 2003	
A	G Barrett	New draft for internal review	Dec 2008	P West
B	G Barrett	Approved Draft – Public Release	Apr 2009	Public Release

TABLE OF CONTENTS

LIST OF FIGURES

1.0 BACKGROUND AND OBJECTIVES

The Koolyanobbing Iron Ore Project consists of three mine sites, Koolyanobbing, Mt Jackson and Windarling. The Koolyanobbing mine site is located 425 kilometres east of Perth, Western Australia, and approximately 50 kilometres north-east of the town of Southern Cross and includes the ore processing facilities for the project (Figure 1). Mt. Jackson and Windarling are located 80 and 100 kilometres north of Koolyanobbing respectively. Ore is hauled from these sites by road train to Koolyanobbing for processing. All of the processed ore is transported by rail to the Port of Esperance, 578 kilometres to the south.

This management plan is one of a series of plans that outlines how environmental issues are addressed. While environmental approvals have been issued to Cliffs Asia Pacific Iron Ore Pty Ltd (Cliffs – formerly Portman Iron Ore Ltd), the Koolyanobbing operations are managed by the Koolyanobbing Alliance, formed between Cliffs and BGC in 2007. Therefore, the responsibility to implement this and other management plans is shared between Cliffs and the Koolyanobbing Alliance.

The Koolyanobbing operations are set in an area where mineral exploration and mining, pastoral activities and reservation of land for conservation purposes are the major land uses. The presence of the operations could potentially change the naturally-occurring fire frequency of the area. The operations may also present an opportunity to help control any fires that occur in land reserved for conservation and where the impact of fire could be a reduction in the conservation values of those areas. Therefore, the objectives of this plan are to:

- Identify what actions are necessary to ensure fires arising directly from Cliffs' activities can be prevented; and
- Outline how Cliffs could assist in a broader fire prevention and/or management across the region, particularly in land reserved for conservation.

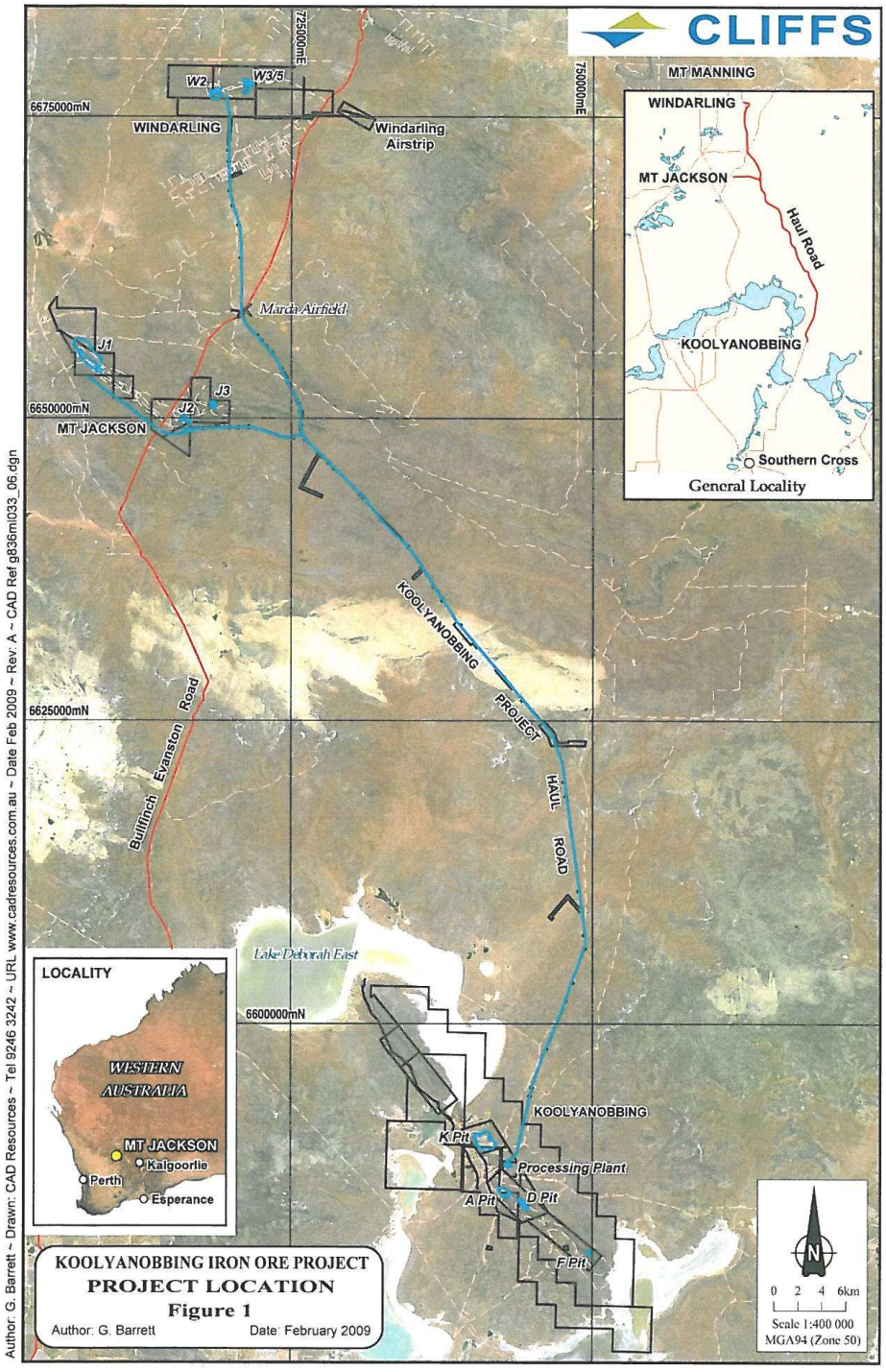
This plan does not cover workplace fire safety management but will refer to, and draw upon, strategies already in place for that purpose.

2.0 SIGNIFICANT ASPECTS OF THE EXISTING ENVIRONMENT

The climate of the Goldfields region is defined as semi-arid Mediterranean. It is characterized by hot, dry summers and mild wet winters. The mean average rainfall at Southern Cross, 54km south-west of Koolyanobbing is 292mm. Most rainfall occurs in winter, and is generally associated with frontal activity from May through to August. At Mt Jackson, an annual average rainfall of 232mm has been calculated (ecologia, 2002).

Temperature data from Southern Cross show that mean monthly maximum temperatures are highest in January (34.6°C), with December through March recording average temperatures above 30°C. The lowest mean minimum temperatures of below 5°C are recorded in the winter months of July and August.

Both Windarling and Mt Jackson are outcropping BIF (banded ironstone formation) deposits of sufficient relief to form ranges. The Koolyanobbing deposits also comprise BIF but the relief is much more subdued. The Department of Environment and Conservation (2007) had the following to say about BIF ranges in the Midwest and Yilgarn regions:


CLIFFS
725000mE
750000mE
6675000mN
6650000mN
6625000mN
6600000mN
W2
W3/5
WINDARLING
Windarling Airstrip
MT MANNING
Marda Airfield
J1
J2
J3
MT JACKSON
KOOLYANOBBING
PROJECT
HAUL
ROAD
Bullfinch
Evanston
Road
Lake Deborah East
KOOLYANOBBING
K Pit
Processing Plant
A Pit
D Pit
F Pit
Haul Road
Southern Cross
General Locality
LOCALITY
WESTERN AUSTRALIA
MT JACKSON
Kalgoorlie
Perth
Esperance
KOOLYANOBBING IRON ORE PROJECT
PROJECT LOCATION
Figure 1
Author: G. Barrett
Date: February 2009
N
0 2 4 6km
Scale 1:400 000
MGA94 (Zone 50)
Author: G. Barrett ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Date Feb 2009 ~ Rev: A ~ CAD Ref g836mi033_06.dgn

> *"Although forming a very small proportion of each bioregion, the BIF ranges are of very significant biodiversity value. This is a consequence of their unique geology, soils and relative isolation. The ranges are important due to the presence of endemic plant species, rare and restricted plant species and highly restricted and distinct plant communities. Based on survey information to date, every range is distinctly different from the other sampled ranges from an ecological perspective. The ranges are also very distinct features in the regional landscape and in many cases possess outstanding landscape values. Examples of the BIF landscapes need to be retained, both partially and in their entirety, for protection of their unique landscape and geodiversity values and for their tourism potential."*

While Koolyanobbing does not feature BIF ranges considered within the above report, both Windarling and Mt Jackson are ranges that have biodiversity and landscape values like those referred to above. Some of the ranges in the Yilgarn with the most significant values – such as the Helena and Aurora Ranges, and the Mt Manning Range, east of Windarling – are already in conservation reserves or are proposed for reservation. The BIF ranges at Windarling and Mt Jackson, however, contain two and one species respectively of DRF (Declared Rare Flora) not known from any other locations. Mt Jackson also features a population of malleefowl, a species of conservation significance under both State and Federal legislation (see Cliffs' Malleefowl Conservation Plan).

Due to the limited human activity and over much of the Eastern Goldfields region, the major source of ignition of wildfires is lightning strikes associated with thunderstorm activity (CALM, 2003). These are largely random in nature, both spatially and temporally and are, therefore, difficult to predict. Similarly, the likely impact of fires on biodiversity values is not well understood.

3.0 REGULATORY REQUIREMENTS AND STANDARDS

Cliffs has an obligation under Ministerial Statement 627, issued under the *Environmental Protection Act 1986*, to prepare and implement a Bush Fire Management Plan (Condition 11). In particular, the plan is required to address bush fire prevention, bush fire detection, fire brigade and infrastructure, and training of personnel for fighting fires in adjacent land.

Cliffs is also obliged to comply with the following:

- Other provisions of the *Environmental Protection Act 1986*, where relevant;
- *Wildlife Conservation Act 1950*: a State act providing for the conservation and protection of wildlife.
- *Bushfires Act 1954*: a State act to make better provision for diminishing the dangers resulting from bush fires, and for the prevention, control and extinguishment of bush fires.
- *Mines Safety and Inspection Act 1994:* a State act to promote and improve the safety and health of persons at mines.
- Other acts, regulations, guidelines and codes of practice that may apply.

Cliffs has a MOU (Memorandum of Understanding) dated September 2003 with the Department of Conservation and Land Management (now DEC - Department of Environment and Conservation). The MOU covers a range of issues over which Cliffs and the DEC co-operate but these issues do not include any information on to what extent Cliffs can offer assistance in the event of bush fires occurring within the region. A draft MOU with FESA (Fire and Emergency Services Authority) was also developed but never finalised.

4.0 CONSULTATION

This draft plan will be reviewed by the DEC and the CRG (Community Reference Group).

5.0 POTENTIAL IMPACTS

As bush fires occur on an erratic basis, the likely impact they have on local biodiversity values is difficult to predict. While many plant species may have strategies that enable them to be resilient in the presence of fire, in the absence of information to the contrary, it must be assumed that a change in the fire frequency arising from the activities of Cliffs' operations could have adverse impacts on local biodiversity values. Therefore, it is contingent upon Cliffs to take steps to ensure no bush fires are started as a consequence of their activities. No bush fires have occurred at any of the Koolyanobbing Alliance operations to date.

Similarly, large wildfires originating from lightning strikes may require control to ensure a mosaic of burnt and unburnt areas remains. Responsibility for the control of such fires lies with the DEC (Department of Environment and Conservation) and with FESA (Fire and Emergency Services Authority). In some circumstances, however, Cliffs may be able to assist.

6.0 MANAGEMENT ACTIONS

Cliffs and the Koolyanobbing Alliance will undertake the following actions:

Management Actions	Timing	Responsibilities
Bush fire prevention		
1. Hot work permits shall be issued for any activities where there is a risk of fire.	At all times	Site Supervisor
2. Site safety inspections shall include assessment of potential fire risks.	At all times	Site Supervisor
3. Erect and maintain "No Fires" signage at various points throughout the mine tenements aimed at mine personnel and visitors to the area.	At all times	Alliance Environmental Superintendent
4. Restrict access and discourage camping within the mine tenements.	At all times	Site Supervisor
Planning for bush fire management		
5. Where the requirement is not met by existing access or haul roads, the Koolyanobbing Alliance will establish fire breaks to provide access to areas with significant biodiversity values. This shall be carried out in conjunction with management action 7.	After management actions 6, 7 and 8 have been completed.	General Manager Operations
6. Cliffs will review the MOU with the DEC with a view to including an agreed position as to the nature of any assistance the Koolyanobbing Alliance will provide for bush fire management, including definition of the geographical area over which any commitment might apply.	June 2009	Cliffs Manager Environmental Services
7. Cliffs will discuss with FESA the nature of any assistance the Koolyanobbing Alliance will provide for bush fire management and, if required, develop an MOU.	June 2009	Cliffs Manager Environmental Services
8. In conjunction with the DEC, the Koolyanobbing Alliance will conduct a Wildfire Threat Analysis to assist with identifying those areas within the Cliffs tenements requiring special protection from fire.	June 2009	Manager – Environmental Services (Cliffs)
Bush fire detection		
9. The Koolyanobbing Alliance will report to the DEC, Kalgoorlie, any fires in or near conservation reserves or that are otherwise likely to threaten biodiversity values. All emergency situations will be managed in accordance with the Emergency Response Plan.	As they occur.	General Manager Operations
Fire brigade and infrastructure		
10. All light vehicles will carry a fire extinguisher for extinguishment of vehicle or small fires.	At all times.	General Manager Operations
11. The Koolyanobbing Alliance will have on standby a dedicated emergency vehicle with fire fighting capability.	At all times.	General Manager Operations
Training of personnel for fighting fires in adjacent land		
12. Information on the potential impacts of bush fires on biodiversity will be included in the environmental induction delivered to all personnel.	At all times.	Alliance Environmental Superintendent
13. The Koolyanobbing Alliance will provide training for the emergency response team in fighting bush fires.	One training exercise at least every two years.	General Manager Operations

7.0 MONITORING

No environmental monitoring is applicable to this plan. In the event of a bush fire within the mine tenements, monitoring of vegetation recovery may be appropriate.

8.0 PERFORMANCE INDICATORS

- No. of bush fires originating from the operations of the Koolyanobbing Alliance.
- Formalisation of bush fire response arrangements with the DEC.
- No. of emergency training exercises conducted.

9.0 RECORDS AND REPORTING

All fires are reported as incidents and investigated.

Developments in bush fire management will be discussed in the Annual Environmental Report provided to the statutory authorities.

10.0 REVIEW

Unless there are material changes to the project, or reporting indicates that the aims of the plan are not being met, the plan will be revised in 2012.

11.0 REFERENCES

Reports:

- Department of Conservation and Land Management (2003). Wildfire in the Coolgardie Region of Western Australia.
- Ecologia (2002). Koolyanobbing Iron Ore Expansion Project - Public Environmental Review.
- Department of Environment and Conservation (2007). Banded Ironstone Formation Ranges of the Midwest and Goldfields. Interim Status Report - Biodiversity Values and Conservation Requirement. September 2007.

Procedures / Management Plans:

- Hot Work Permit.
- Koolyanobbing Alliance - Emergency Response Plan (16 April 2008).
- Monthly Hazard Inspection - Mining.
- Monthly Hazard Inspection - Workshop.

12.0 GLOSSARY

Bush fire means any fire occurring in native vegetation.

Wildfire means a bush fire that affects an extensive area and for which control is difficult.

APPENDIX 8

Dust Management Plan (Cliffs 2009f)

CLIFFS

KOOLYANOBBING IRON ORE PROJECT

DUST MANAGEMENT PLAN

April 2009

Document History				
Rev No.	**Author**	**Status**	**Date**	**Distribution**
D	ecologia	DEC approved	Oct 2003	
A	G Barrett	New draft for internal review	Dec 2008	P West
B	G Barrett	Draft for internal review	Feb 2009	P West
C	G Barrett	Approved Draft – Public Release	Apr 2009	Public Release

TABLE OF CONTENTS

LIST OF FIGURES

1.0 BACKGROUND AND OBJECTIVES

The Koolyanobbing Iron Ore Project consists of three mine sites, Koolyanobbing, Mt Jackson and Windarling. The Koolyanobbing mine site is located 425 kilometres east of Perth, Western Australia, and approximately 50 kilometres north-east of the town of Southern Cross and includes the ore processing facilities for the project (Figure 1). Mt. Jackson and Windarling are located 80 and 100 kilometres north of Koolyanobbing respectively. Ore is hauled from these sites by road train to Koolyanobbing for processing. All of the processed ore is transported by rail to the Port of Esperance, 578 kilometres to the south.

This management plan is one of a series of plans that outlines how environmental issues are addressed. While environmental approvals have been issued to Cliffs Asia Pacific Iron Ore Pty Ltd (Cliffs – formerly Portman Iron Ore Ltd), the Koolyanobbing operations are managed by the Koolyanobbing Alliance, formed between Cliffs and BGC (Australia) Pty Ltd in 2007. Therefore, it is the responsibility of the Koolyanobbing Alliance to implement this and other management plans.

The Koolyanobbing operations are set in an area where mineral exploration and mining, pastoral activities and reservation of land for conservation purposes are the major land uses. Dust generation is inherent in mining and mineral processing activities and must be controlled so that other land uses or local biodiversity values are not compromised.

The objectives of this plan are to:

- Minimise dust emissions across the project; and
- Ensure dust emissions do not cause a significant decline in environmental values of the area, especially to flora of conservation significance.

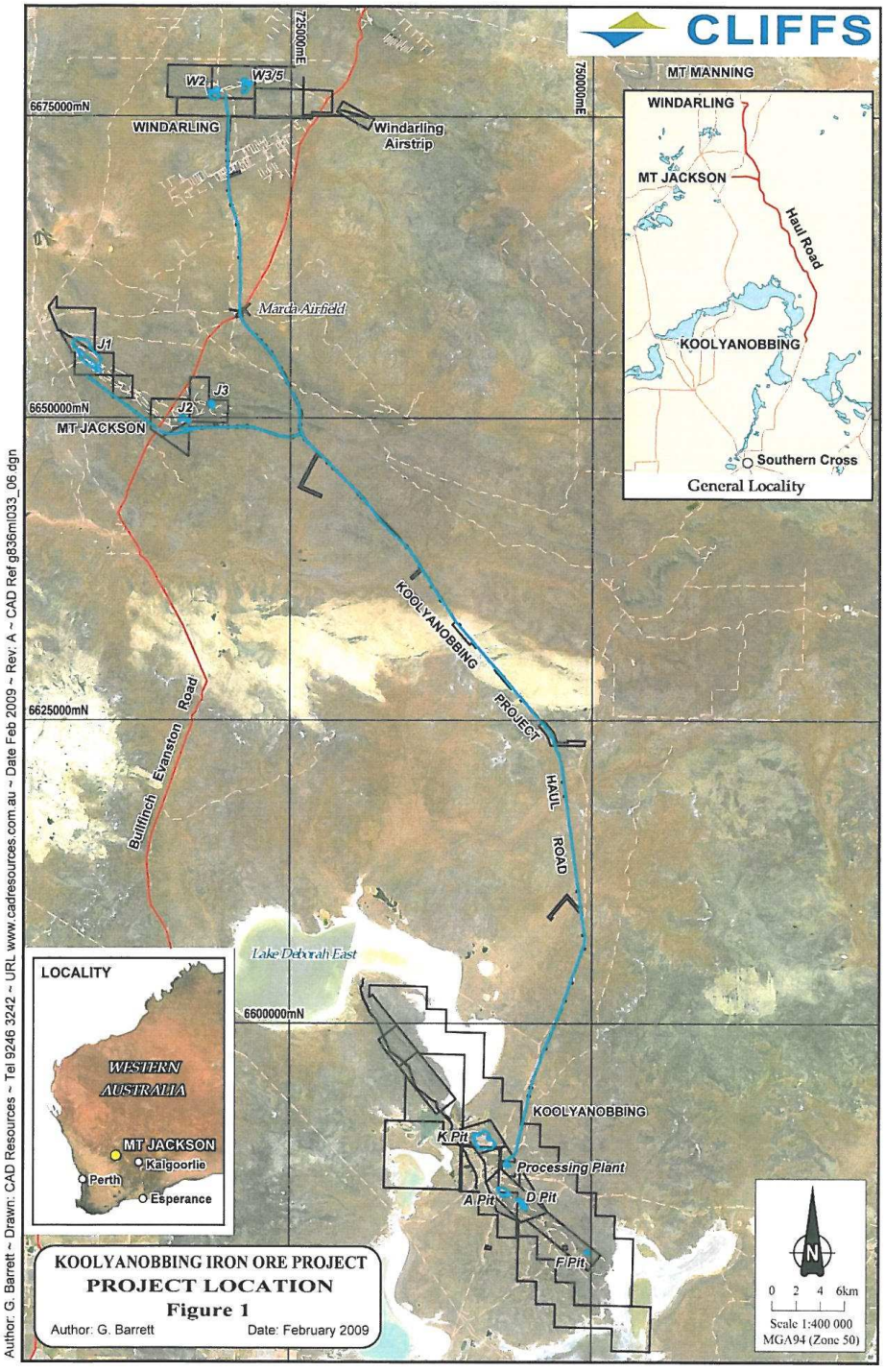
This plan covers the environmental impacts associated with dust generation across all mining and processing areas at Koolyanobbing, Windarling, Mt Jackson and the transport corridor connecting Windarling and Mt Jackson with Koolyanobbing. It does not cover environmental impacts associated with the rail operations nor the loading, unloading and storage of ore at the Port of Esperance. Dust management at the Port of Esperance is covered within Esperance Port Authority documentation. Similarly, occupational health aspects of dust management are beyond the scope of this plan.

2.0 SIGNIFICANT ASPECTS OF THE EXISTING ENVIRONMENT

The climate of the Goldfields region is defined as semi-arid Mediterranean. It is characterized by hot, dry summers and mild wet winters. The mean average rainfall at Southern Cross, 54km south-west of Koolyanobbing is 292mm. Most rainfall occurs in winter, and is generally associated with frontal activity from May through to August. At Mt Jackson, an annual average rainfall of 232mm has been calculated (ecologia, 2002).

Temperature data from Southern Cross show that mean monthly maximum temperatures are highest in January (34.6°C), with December through March recording average temperatures above 30°C. The lowest mean minimum temperatures of below 5°C are recorded in the winter months of July and August.

Much of the Koolyanobbing, Windarling and Mt Jackson area contains native vegetation in good condition although some disturbance has occurred through mining and pastoral activities. The major landforms are sandplains and valleys interspersed by banded ironstone formation (BIF) ranges. The latter are known for their significant biodiversity and landscape values (Department of Environment and Conservation, 2007). Both Windarling and Mt Jackson are BIF ranges and contain two and one species respectively of Declared Rare Flora (DRF) not known from other locations. At Windarling, both DRF – *Tetratheca paynterae* subsp. *paynterae* and *Ricinocarpos brevis* – occur close to the W3/5 open pit and the former is known only from this area.


CLIFFS
725000mE
750000mE
6675000mN
6650000mN
6625000mN
6600000mN
W2
W3/5
WINDARLING
Windarling Airstrip
MT MANNING
Marda Airfield
J1
J2
J3
MT JACKSON
KOOLYANOBBING
PROJECT
HAUL ROAD
Haul Road
Southern Cross
General Locality
Evanston Road
Bullfinch
Lake Deborah East
LOCALITY
WESTERN AUSTRALIA
MT JACKSON
Kalgoorlie
Perth
Esperance
K Pit
Processing Plant
A Pit
D Pit
F Pit
KOOLYANOBBING IRON ORE PROJECT
PROJECT LOCATION
Figure 1
Author: G. Barrett
Date: February 2009
N
0 2 4 6km
Scale 1:400 000
MGA94 (Zone 50)
Author: G. Barrett ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Date Feb 2009 ~ Rev: A ~ CAD Ref g836mi033_06.dgn

At Windarling, there is an existing program of vegetation condition monitoring, dust deposition monitoring (using an array of ten dust deposition gauges) and air quality monitoring (using an Osiris monitor for measurement of Total Suspended Particulates (TSP) and PM_{10} (Particulate Matter less than 10 µm)). The Osiris monitor can operate on a real time basis but the supporting infrastructure to allow data to be continuously received is not in place. Consequently, the data is downloaded and reviewed on a monthly basis.

Groundwater in the region is generally of poorer quality with a salinity equivalent to sea water, although some pockets of sub-potable water do exist. The Koolyanobbing operations extract groundwater for domestic use (after treatment) and for operational uses, including dust control.

3.0 REGULATORY REQUIREMENTS AND STANDARDS

Cliffs has an obligation under Ministerial Statement 627, issued under the *Environmental Protection Act 1986*, to prepare and implement a Dust Management Plan (Condition 15). This condition requires Cliffs to:

- undertake baseline and ongoing monitoring;
- detail management measures to minimise dust;
- demonstrate best practice and detail methods for all dust sources;
- monitor size and composition of particulates;
- monitor effects of dust and saline water on fringing vegetation; and,
- provide for continuous improvement in dust management.

Other legal obligations or relevant standards and guidelines include:

- Other provisions of the *Environmental Protection Act 1986*, including Works Approvals and Operating Licences issued under Part V of the Act;
- Provisions of the *Wildlife Conservation Act 1950*: a State act providing for the conservation and protection of wildlife (including flora).
- *National Environment Protection (Ambient Air Quality) Measure*: note, however, that this is a measure aimed at the protection of human health, an issue not covered within this plan, but it provides a useful benchmark for air quality.
- *Mines Safety and Inspection Act 1994:* a State act to promote and improve the safety and health of persons at mines.
- Various Australian standards on methods of sampling and analysis of ambient air.
- Other acts, regulations, guidelines and codes of practice that may apply.

4.0 CONSULTATION

This draft plan will be reviewed by representatives from the Department of Environment and Conservation and Cliffs' Community Reference Group prior to finalisation.

5.0 POTENTIAL ENVIRONMENTAL IMPACTS

Dust can be generated from a wide range of activities. During mining, dust generation can occur when clearing, blasting, loading and unloading ore and waste rock, vehicle movements on unsealed roads, and wind erosion from cleared areas such as topsoil or product stockpiles, waste rock landforms and open cleared areas such as pits. A desktop study by Holmes Air Sciences (2008) identified the range of sources of dust encountered during mining at Windarling and estimated the relative contribution of each to the overall dust load (Figure 2). In addition to mine sources, dust is also generated by processing (crushing and screening) activities at Koolyanobbing and by traffic along the transport corridor.

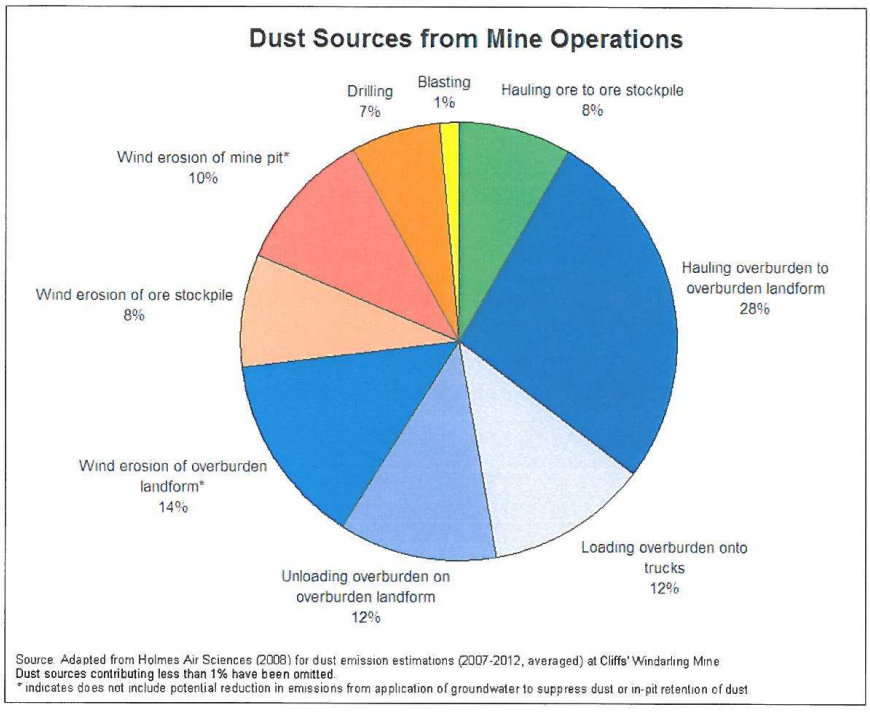


Figure 2: Relative contribution of dust sources at the Windarling mine site.

A significant increase in the airborne dust load can lead to degradation of vegetation close to mining areas. This may be an aesthetic impact where the plants appear unsightly but are able to continue the normal processes of photosynthesis, respiration and growth. In severe cases, however, dust settling on leaves could inhibit photosynthetic activity. Blocking of stomata may also occur, inhibiting gas exchange. Where cryptogams, such as mosses and lichens, are affected, soil stability could also decline and soil moisture losses increase.

Consequently, minimising emissions by controlling dust generation at the sources will help protect vegetation across the Koolyanobbing operations, and in particular high conservation value species at Windarling.

6.0 MANAGEMENT ACTIONS

Cliffs and the Koolyanobbing Alliance will undertake the following management actions:

Management Actions	Timing	Responsibility
General dust minimisation measures		
1. Clear vegetation only when necessary.	At all times	General Manager Operations
2. Avoid clearing or handling of topsoil under windy conditions (> 30 km/h)[1]	During windy conditions.	General Manager Operations
3. Carry out progressive rehabilitation of disturbed areas as they become available.	At all times	General Manager Operations
4. Control dust generation from haul and access roads and other open areas using water trucks and any other methods deemed appropriate. Typical water application under dry conditions will be up to 2L/m^2/day or more if required.	At all times when visible dust occurs.	General Manager Operations
5. Ensure overspray of bore water from water trucks onto adjacent vegetation does not occur.	Whenever management action 4 is occurring.	General Manager Operations
6. Conduct regular house keeping, collecting spillage from around conveyors and loading / unloading areas.	At all times.	General Manager Operations
7. Ensure water sprays on dump hoppers and crushing and screening plant are operational and effective.	At all times.	General Manager Operations
Special measures for protection of rare flora		General Manager Operations
8. Complete a Blast Planning Checklist prior to any blast at the W3/5 open pit to ensure wind conditions are favourable for protection of rare flora. Do not undertake blast unless conditions are favourable (unless safety is compromised).	Prior to any blast at the W3/5 open pit.	General Manager Operations
9. Prevent direct road access to populations of rare flora.	At all times.	General Manager Operations
10. Monitor condition of rare flora populations within 200 m of any operational mine areas (open pits, waste rock dumps and ore stockpiles) on an annual basis. Compare the condition of plants near the pit with control plants further away from the pit. Report any adverse trends potentially attributable to mining to the DEC.	Annually.	General Manager Operations
11. Review all sources of dust at the Windarling operations and estimate the relative contribution of each source based on standard emission estimation techniques supported by field verification.	June 2009	Alliance Environmental Superintendent
12. Implement further appropriate management actions arising from the dust review.	December 2009	General Manager Operations and Alliance Environmental Superintendent

[1] Based on twice the average wind speed in the windiest month (September).

Management Actions	Timing	Responsibility
Air quality and dust deposition monitoring		
13. Maintain existing network of dust deposition gauges and Osiris air quality monitor.	At all times (subject to outcome of management action 14).	Alliance Environmental Superintendent
14. Review effectiveness of air quality and dust deposition monitoring. If warranted, modify monitoring program.	June 2009	Alliance Environmental Superintendent
Other vegetation monitoring		
15. Establish approximately ten permanent photo monitoring points along the transport corridor between Windarling and Koolyanobbing. Check for changes in the condition of roadside vegetation.	By June 2009 and every six months thereafter.	Alliance Environmental Superintendent
Induction and training		
16. Include reference to potential adverse impacts of dust in environmental induction.	At all times.	Alliance Environmental Superintendent
17. Provide targeted training in dust minimisation methods, such as dust suppression techniques in blasting.	As required.	General Manager Operations and Alliance Environmental Superintendent

7.0 MONITORING

The monitoring of dust emissions and vegetation condition is summarised in the following table:

Monitoring Measure	Timing
Dust emissions	
Dust deposition gauges (Windarling)	Bi- monthly
Continuous particle monitor (Windarling)	At all times, data accessed on a monthly basis
Daily inspection (all areas)	At all times
Emission estimates of particulate matter using formulae from National Pollutant Inventory handbook.	Annually
Vegetation condition	
Rare flora assessment	Annually.
Transport corridor photo assessment	Every six months.

The above monitoring regime is at December 2008. Changes may occur to the monitoring program as a result of the reviews outlined in Section 6.

8.0 PERFORMANCE INDICATORS

- Relative condition of DRF.
- Completion of Blast Planning Checklists for all blasts at Windarling.
- Condition of roadside vegetation along transport corridor.
- Compliance with dust control requirements of approvals issued under Part V of the *Environmental Protection Act 1986*.

9.0 RECORDS AND REPORTING

The Koolyanobbing Alliance will maintain records of:

- Dust deposition and continuous particle monitoring.
- Completed Blast Planning Checklists.
- Photo monitoring of vegetation along the transport corridor.
- Condition monitoring of DRF.

Reporting occurs as follows:

- Internal: incident reporting, monthly reports (by exception).
- External: summary provided in Annual Environmental Report provided to the Department of Mines and Petroleum (DMP); compliance reports for the Department of Environment and Conservation (DEC).

10.0 REVIEW

Unless there are material changes to the project, or reporting indicates that the aims of the plan are not being met, the plan will be revised in 2012.

11.0 REFERENCES

Reports:

- Department of Environment and Conservation (2007). Banded Ironstone Formation Ranges of the Midwest and Goldfields. Interim Status Report - Biodiversity Values and Conservation Requirement. September 2007.
- Ecologia (2002). Koolyanobbing Iron Ore Expansion Project - Public Environmental Review.
- Holmes Air Sciences (2008). Letter to Portman Iron Ore Ltd dated 30 April 2008 regarding "Extension of dust emissions inventory for iron ore mining at Windarling, WA to cover projected operations for 2007, 2008, 2009 and 2010 to 2012".

Related documents:

- EOP05 Dust Management
- EOVFO6 W3/5 Blast Planning Checklist

APPENDIX 9

Environmental Operating Procedure
EOP04 Clearing
(Cliffs 2008e)

CLIFFS	EOP04 Clearing	Koolyanobbing Iron Ore Project

Objectives

- Minimise the area of land cleared in implementation of the project.
- Prevent adverse impacts to vegetation outside of approved clearing/disturbance boundaries.

Associated Documentation

1. ENVF04 Site Disturbance Permit
2. EOP05 Dust Control
3. EOP11 Rare and Priority Flora
4. EOP13 Site Disturbance Permit

Management

- Ensure the total area to be cleared has factored in stockpiling of topsoil and vegetation and access tracks.
- The General Manager Operations and Environmental Department shall be informed at least two weeks prior to the scheduled date of clearing utilising ENVF04 Site Disturbance Permit.
- All areas to be cleared must be surveyed by a qualified botanist.
- Personnel responsible for undertaking any clearing works must be inducted by the Environmental Department prior to commencing works.
- A senior Cliffs employee or surveyor shall be present at all times during clearing works to guide operators around the clearing boundaries and ensure over clearing does not occur.
- Declared Rare and Priority Flora shall not be disturbed under any circumstances. The location of these shall be provided prior to works.
- Mature trees and significant flora species shall be avoided where practicable.
- Vegetation shall be progressively cleared to prevent soil erosion, dust generation and weed introduction.
- Areas to be cleared must be clearly delineated on project drawings.
- Delineation of clearing boundaries shall involve:
  - Boundaries of areas approved for clearing shall be identified using survey pegs and/or photo degradable flagging tape.
  - Survey pegs/tape shall be placed on the approved boundary and shall remain in place once clearing has occurred so that over clearing can be identified.
  - Where practicable, survey pegs/tape shall be located at intervals not exceeding 25 metres.
  - Survey pegs/tape shall be positioned so as to be clearly visible from one marker to the next.
  - The colour of the flagging tape must be identified on the SDP.
  - The use of tape should be minimised to limit impacts on stock, which could consume tape.
- Where practicable, clearing operations shall be undertaken from the outer clearing limits inwards.
- Where practicable, vegetation and topsoil may be stripped and stockpiled together.
- All bags, grid pegs and general refuse are to be removed prior to clearing.
- Sites for stockpiling of vegetation are to be clearly defined prior to clearing.
- Vegetation shall be removed, transported and stockpiled in a way that does not damage vegetation or disturb soil outside of the clearing limits.
- Vegetation that has been cleared from areas with known rare or priority flora species shall be stockpiled separately from other stockpiles for use in rehabilitation. These stockpiles shall be appropriately signed.
- Smaller trees can be removed selectively without the use of bladed machinery.
- Trees shall be hand trimmed where only a portion of the tree shall be affected by works.
- Cleared vegetation shall be either stockpiled in an approved location or directly placed on areas to be rehabilitated as directed by the Environmental Department.
- Cleared vegetation shall be stockpiled to avoid any interference to surface drainage flows.
- All vehicles, plant and equipment are restricted to within the clearing limits.
- Burning of vegetation is prohibited.
- Damage caused by any Contractor to vegetation, soil or fauna habitat beyond the scope of works shall be rehabilitated at the Contractor's expense. A penalty clause for unauthorised clearing shall be included in major sub-contracts at $\$100/m^2$.
- The Environmental Department shall maintain a record of Site Disturbance Permits.

Document No:	EOP04	Prepared by:	JC	Revision No:	3
Document Name:	Clearing	Reviewed by:	JC	Revision Date:	Feb 08
Location:	K:\Environmental\EMS\EMP\EOPs\EOP04 Clearing	Authorised by:	RH	Page No:	1 of 2

CLIFFS	EOP04 Clearing	Koolyanobbing Iron Ore Project

Monitoring

The Superintendent/Contract Manager and Environmental Department shall inspect operational areas to ensure:

- Clearing Plans are followed.
- Disturbance to surrounding vegetation and soil has been prevented.
- Clearing limits are pegged/flagged adequately.
- Only authorised clearing is undertaken.
- Vegetation is removed and stockpiled in suitable locations or utilised in rehabilitation.

Reporting

- Clearing plans shall be submitted to the Environmental Department and then to the General Manager Operations for approval prior to the commencement of works.
- The area disturbed shall be determined by the Survey department and provided to the Environmental Department. This shall be recorded in the Land Disturbance and Rehabilitation Register.
- The area disturbed shall be reported to the DoIR in the Annual Environmental Report.
- Clearing beyond clearing limits shall be reported using the Koolyanobbing Alliance Incident Notification and Investigation Report Form (ENVF03). Over clearing shall be reported to government authorities where the area has exceeded approved limits.

Document No:	EOP04	Prepared by:	JC	Revision No:	3
Document Name:	Clearing	Reviewed by:	JC	Revision Date:	Feb 08
Location:	K:\Environmental\EMS\EMP\EOPs\EOP04 Clearing	Authorised by:	RH	Page No:	2 of 2

APPENDIX 10

Environmental Operating Procedure
EOP13 Site Disturbance Permits
(Cliffs 2007a)

CLIFFS	EOP13 Site Disturbance Permits	Koolyanobbing Iron Ore Project

What is a Site Disturbance Permit?

An ENVF04 and Exp01 are Site Disturbance Permits (SDP). The intent to disturb land and sets in motion a series of checks to ensure that appropriate personnel are informed of the intent and that all environmental aspects associated with the works have been thoroughly considered, any potential impacts managed and government approval sought when required. Works are not permitted to proceed without an approved SDP.

When should the SDP form be filled out?

- A SDP shall be completed at the initial planning stage of the exploration and/or operational works, at least one week before the scheduled commencement of the works.

Who fills out a SDP?

- ENVF04 must be completed by the site operational team who initiates, oversees or carries out the intent to clear. This is usually a Cliffs or Alliance Supervisors.
- Exp01 must be completed by the resource development team who initiates, oversees or carries out the intent to clear. This is usually a Cliffs Supervisor.

Where is the SDP submitted?

- Completed SDP forms, and attached documentation, must be submitted to the Environmental Department (ED) for approval. They in turn will seek approval from the General Manager Operations (GMO) if the works are related to operational mining or the Manager Exploration (ME) if the works are related to exploration. Alternatively, forms may be submitted to the GMO or ME prior to submission to the ED.

Process for completing the SDP (Please refer to the form):

1) Note the date and proposed date to commence works.
2) Tick the project area in which the work is to be completed.
3) Write the location and the proposed area of disturbance (ha) and on which tenement(s) the clearing will take place. If the area occurs on more than one tenement, ensure the area is divided accurately. This information will be supplied by the Survey Department.
4) Specify which coloured flagging tape was used to demarcate the area.
5) Only apply for the area that will be cleared immediately. Do not include future proposed clearing as plans and designs change. Submit an additional SDP as required.
6) Write a detailed explanation of the proposed activity, including a time frame for the commencement of works.
7) Include a detailed, clearly annotated and scaled site plan of the proposed works area with tenement boundaries and including environmental constraints eg rare flora, Malleefowl, drainage, contours (numbered).
8) The applicant has the project manager sign the permit. The applicant and the project manager can be the same person.
9) Submit to the ED to complete their section of the form. The ED will review the proposed clearing area against the current Clearing Register which is a running total from the approved NOI. For all exploration clearing a POW must be granted from DoIR before ED sign off.
10) All personnel must await receipt of an SDP approved by the GMO or the GME and ED before commencing works. Only the GMO, GME and Environmental Department have the authority to sign the form.
11) Original SDP's must be returned to the Environmental Department for record keeping.
12) All SDP's will only have a current life of 3 months. Once the 3 months has expired then the SDP must be re-applied for.

Additional Notes

- Please ensure that proactive planning in consultation with the Environmental Department is undertaken and SDP's are submitted well in advance of the proposed date to commence works, as delays may occur due to botanical clearances and if government approval or further planning is required.
- An incident report will be generated for clearing that has commenced without a SDP.

Document No:	EOP13	Prepared by:	DM	Revision No:	5
Document Name:	Site Disturbance Permit	Reviewed by:	DM	Revision Date:	Sep 08
Location:	K:\Environmental\EMS\EMP\EOPs\EOP13 Site Disturbance Permit	Authorised by:	PW	Page No:	1 of 2

CLIFFS	EOP13 Site Disturbance Permits	Koolyanobbing Iron Ore Project

- Clearing without government approval is treated seriously. Fines and even gaol terms may apply to the company or individuals if found guilty.
- Once clearing has been completed, Survey Dept. to confirm area and provide a DXF file to the ED.

Document No:	EOP13	Prepared by:	DM	Revision No:	5
Document Name:	Site Disturbance Permit	Reviewed by:	DM	Revision Date:	Sep 08
Location:	K:\Environmental\EMS\EMP\EOPs\EOP13 Site Disturbance Permit	Authorised by:	PW	Page No:	2 of 2

APPENDIX 11

Environmental Operating Procedure
EOP14 Topsoil Management
(Cliffs 2006)

CLIFFS	EOP14 Topsoil Management	Koolyanobbing Iron Ore Project

Objectives

- Optimise the retention and viability of topsoil resources for future rehabilitation.

Associated Documentation

1. EOP05 Dust Control
2. EOP12 Rehabilitation

Management

- Sites for stockpiling topsoil are to be clearly defined in consultation with the Environmental Department prior to the commencement of stripping operations.
- Where practicable, topsoil with suitable characteristics (i.e. not skeletal, acidic, sodic, alkaline etc.) will be stripped to a minimum depth of 100mm.
- Where topsoil is not mixed with vegetation, stockpiles will be truck dumped no higher than two metres in height and not compacted.
- Where topsoil is stripped from areas containing Rare or Priority flora species, this will be stockpiled separately and clearly signposted.
- Topsoil will not be stripped when wet as this can lead to compaction and loss of soil structure when stockpiling.
- Topsoil will be removed, transported and stockpiled in a way that does not damage vegetation or disturb soil outside of the clearing limits.
- Where practicable, topsoil will be directly placed on rehabilitation. Where this is not possible it will be utilised within one year of stripping to prevent decline in soil structure, seed and nutrient viability.
- Revegetation of topsoil stockpiles will be encouraged after one year to minimise erosion, discourage weeds and maintain nutrient loadings.
- Stockpiled topsoil will be monitored for weed germination and weed control undertaken as necessary.
- Topsoil will be stockpiled to avoid any interference to the flow of surface water. Channels will be cut in topsoil where ponding is evident.

Note: the same principles apply should vegetation and topsoil be stripped and stockpiled together.

Monitoring

- Topsoil will be monitored for the colonisation of weed species and erosion.
- Ponding of water on the upslope side of stockpiles will be monitored.

Reporting

- The area disturbed and volume of topsoil stripped will be recorded by the survey department and reported annually as part of the DoIR AER process.

Document No:	EOP14	Prepared by:	JH	Revision No:	1
Document Name:	Topsoil Management	Reviewed by:	PG	Revision Date:	Apr 06
Location:	K:\Environmental\EMS\EMP\EOPs\EOP14 Topsoil Management	Authorised by:	PG	Page No:	1 of 1

APPENDIX 12

Land Clearing Management Plan (Cliffs 2009c)

CLIFFS

KOOLYANOBBING IRON ORE PROJECT

LAND CLEARING MANAGEMENT PLAN

April 2009

Document History				
Rev No.	**Author**	**Status**	**Date**	**Distribution**
P	ecologia	DEC approved	Oct 2003	
A	G Barrett	New draft for internal review	Sep 2008	D. Martin, P. West
B	G Barrett	Draft following internal comment	Oct 2008	P. West
C	G Barrett	Internal review plus change to Cliffs	Feb 2009	P West, M De Souza, S Hawkins
D	G Barrett	Approved Draft – Public Release	Apr 2009	Public Release

TABLE OF CONTENTS

LIST OF FIGURES

1.0 BACKGROUND AND OBJECTIVE

The Koolyanobbing Iron Ore Project consists of three mine sites: Koolyanobbing, Mt Jackson and Windarling. The Koolyanobbing mine site is located 425 kilometres east of Perth, Western Australia, and approximately 50 kilometres north-east of the town of Southern Cross (Figure 1). Mt. Jackson and Windarling are located 80 and 100 kilometres north of Koolyanobbing, respectively. Ore is hauled from these sites by road train to Koolyanobbing for processing. All of the processed ore is transported by rail to the Port of Esperance, 578 kilometres to the south.

This management plan is one of a series of plans that outlines how environmental issues are addressed. While environmental approvals have been issued to Cliffs Asia Pacific Iron Ore Pty Ltd (Cliffs – formerly Portman Iron Ore Ltd), the Koolyanobbing operations are managed by the Koolyanobbing Alliance, formed between Cliffs and BGC (Australia) Pty Ltd in 2007. Therefore, it is the responsibility of the Koolyanobbing Alliance to implement this and other management plans.

The principal objective of this plan is to put measures in place that will limit land clearing to that absolutely necessary for the project and within areas for which approval to clear has been obtained.

2.0 SIGNIFICANT ASPECTS OF THE EXISTING ENVIRONMENT

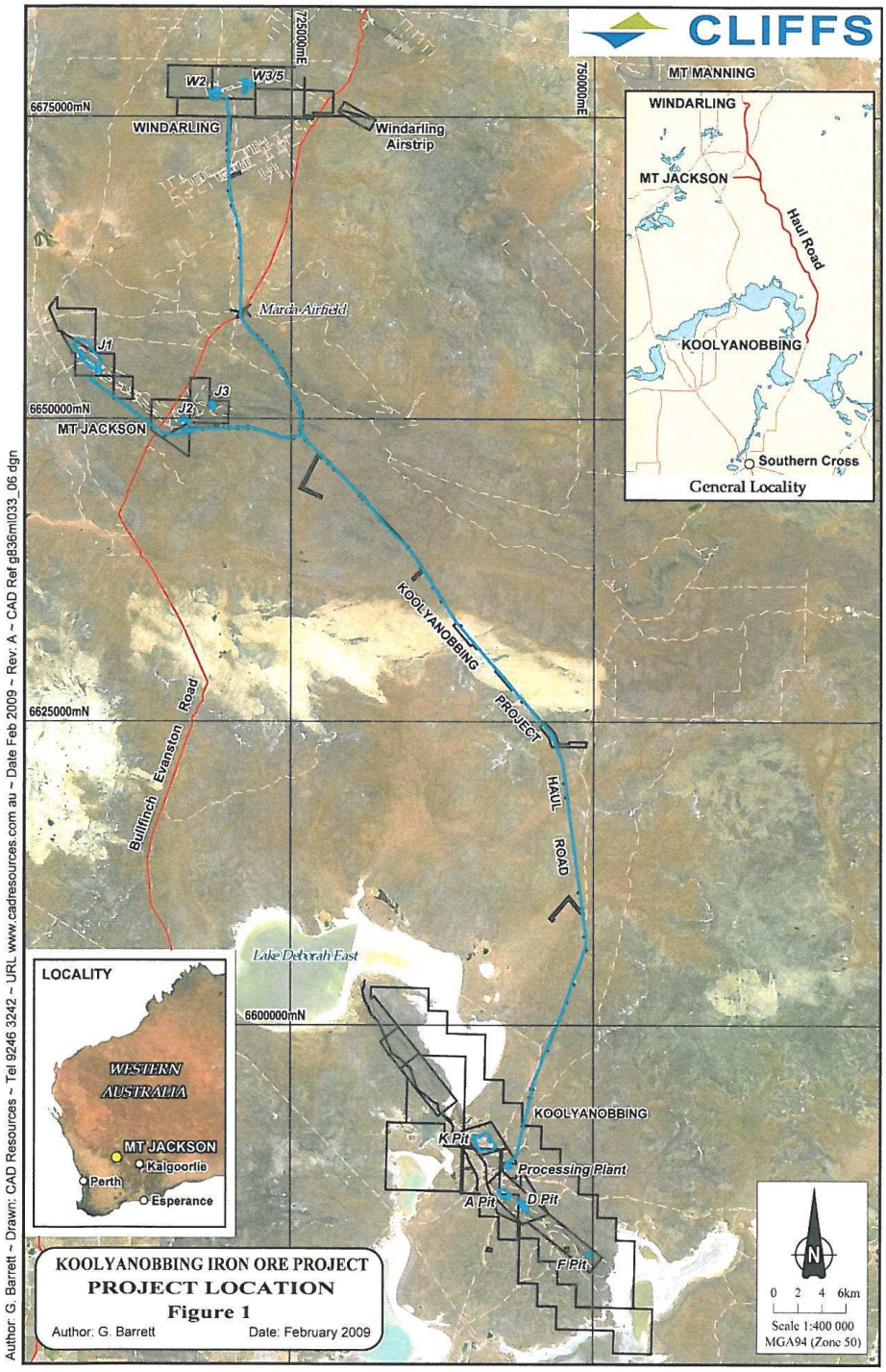
While the majority of the clearing required for the approved Windarling, Mt Jackson and Koolyanobbing operations has already been undertaken, additional clearing will be required as open pits, waste rock landforms and mine infrastructure are constructed to their full planned capacity. The Windarling and Mt Jackson areas, in particular, feature some vegetation of significant conservation value, including plant taxa declared Rare under the *Wildlife Conservation Act 1950* and other plant taxa that have been given Priority status. Furthermore, the threatened malleefowl (*Leipoa ocellata*) has been recorded at Mt Jackson and Windarling. The Koolyanobbing operation also occurs in an area that contains significant flora and fauna.

3.0 REGULATORY REQUIREMENTS AND STANDARDS

Cliffs has an obligation under Ministerial Statement 627, issued under the *Environmental Protection Act 1986*, to prepare and implement a Land Clearing Management Plan (Condition 12).

Cliffs is also obliged to comply with the following:

- *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*: State regulations to ensure clearing proposals are assessed against principles for environmental protection;
- *Wildlife Conservation Act 1950*: a State Act to provide for the conservation and protection of wildlife;
- *Conservation and Land Management Act 1984*: a State Act to make better provision for the use, protection and management of certain public lands and waters and the flora and fauna thereof; and the
- *Environmental Protection and Biodiversity Conservation Act 1999:* a Federal Act to manage nationally and internationally important flora, fauna, ecological communities and heritage places.


CLIFFS
725000mE
750000mE
6675000mN
6650000mN
6625000mN
6600000mN
W2
W3/5
WINDARLING
Windarling Airstrip
Marda Airfield
J1
J2
J3
MT JACKSON
KOOLYANOBBING PROJECT HAUL ROAD
Evanston Road
Bullfinch
Lake Deborah East
KOOLYANOBBING
K Pit
Processing Plant
A Pit
D Pit
F Pit
MT MANNING
WINDARLING
MT JACKSON
Haul Road
KOOLYANOBBING
Southern Cross
General Locality
LOCALITY
WESTERN AUSTRALIA
MT JACKSON
Kalgoorlie
Perth
Esperance
KOOLYANOBBING IRON ORE PROJECT
PROJECT LOCATION
Figure 1
Author: G. Barrett
Date: February 2009
N
0 2 4 6km
Scale 1:400 000
MGA94 (Zone 50)
Author: G. Barrett ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Date Feb 2009 ~ Rev: A ~ CAD Ref g836ml033_06.dgn

4.0 CONSULTATION

This draft plan will be reviewed by representatives from the Department of Environment and Conservation and Cliffs' Community Reference Group prior to finalisation.

5.0 POTENTIAL IMPACTS

Clearing can result in a loss of plants and vegetation of conservation significance, loss of fauna habitat and loss of stability of the ground surface. While limited clearing has been approved for all locations, it is critical that clearing beyond the approved limits does not occur and that it is conducted at the correct approved locations and in a manner that does not impact upon adjoining uncleared areas.

It may also be possible to salvage some timber products prior to clearing operations.

The Koolyanobbing Alliance must take a co-ordinated and systematic approach to ensure clearing is conducted in a manner that maintains compliance with environmental approvals and minimises the environmental impacts arising from clearing.

6.0 MANAGEMENT ACTIONS

The Koolyanobbing Alliance will undertake the following management actions:

Management Actions	Timing	Responsibility
Land Clearing		
1. All land clearing must be carried out in accordance with the Site Disturbance Permit procedure (EOP13) and must have an approved Site Disturbance Permit (ENVF04).	Ongoing	General Manager Operations
2. All approved Site Disturbance Permits must have the necessary approvals under the *Environmental Protection Act 1986* or the Environmental Protection (Clearing of Native Vegetation) Regulations 2004.	Ongoing	Alliance Environmental Superintendent
3. All clearing should be conducted when it is necessary and not before, unless there is a clear environmental benefit e.g. direct replacement of topsoil.	Ongoing	Alliance Environmental Superintendent
4. Actual clearing should be audited against approved Site Disturbance Permits on an annual basis.	Annually	Alliance Environmental Superintendent
Erosion and Sedimentation		
5. Where cleared areas have the potential to affect adjoining uncleared areas through the effects of erosion or sedimentation, ensure conditions are applied to the Site Disturbance Permit that control the effects of erosion and sedimentation, and that the conditions are subsequently implemented.	Ongoing	Alliance Environmental Superintendent
Environmentally Sensitive Areas		
6. Where clearing is proposed adjacent to environmentally sensitive areas, such as populations of Declared Rare Flora, ensure appropriate conditions are applied to the Site Disturbance Permit to protect those areas. Conditions could include short term fencing or the use of a spotter during clearing to check for excessively dusty conditions or potential damage to Declared Rare Flora.	Ongoing	Alliance Environmental Superintendent
Salvage of Timber Products		
7. Where large areas (> 50 ha) are proposed for clearing, the Forest Products Commission (FPC) should be contacted in advance to allow for the potential salvage of sandalwood, craft timber, saw logs or firewood.	Ongoing	Alliance Environmental Superintendent
Rehabilitation		
8. Rehabilitation of disturbed areas in accordance with EOP12 must occur as soon as those areas become available.	Ongoing	Alliance Environmental Superintendent
Education and Training		
9. All managers, supervisors and relevant personnel must be inducted in the use of Site Disturbance Permits. Refresher training must be provided should any non-conformances occur.	Ongoing	Alliance Environmental Superintendent

7.0 MONITORING

Monitoring will occur through inspection of areas as clearing occurs and through an annual audit of approved Site Disturbance Permits. Instances of clearing without an approved Site Disturbance Permit must be recorded in the Incident Reporting System.

8.0 PERFORMANCE INDICATORS

- No clearing conducted without an approved Site Disturbance Permit.
- Annual audits of site disturbance permits conducted.
- All managers, supervisors and relevant personnel trained in the Site Disturbance Permit system.

9.0 RECORDS AND REPORTING

Site Disturbance Permit records will be maintained within the site GIS database. Instances of clearing occurring without an approved Site Disturbance Permit must be reported within the Incident reporting System.

A summary of the areas cleared will be presented within the Annual Environmental Report.

10.0 REVIEW

Unless there are material changes to the project, or reporting indicates that the aims of the plan are not being met, the plan will be revised in 2012.

11.0 REFERENCES

Reports:

- Nil.

Related documents:

- ENVF04 Site Disturbance Permit form.
- EOP04 Clearing.
- EOP13 Site Disturbance Permit.
- Incident Reporting Guideline

APPENDIX 13

Environmental Operating Procedure
EOP16 Weed Management
(Cliffs 2008f)

CLIFFS	EOP16 Weed Management	Koolyanobbing Iron Ore Project

Objectives

- No increase in the abundance or species of weeds in the project area.

Associated Documentation

1. Weed Identification Handbook
2. ENVF07 Weed Hygiene Certificate

Management

- Vegetation will be progressively cleared to prevent weed colonisation on disturbed ground.
- Any equipment or vehicle considered to have been working in a weed risk area will be cleaned down before mobilising to Mt. Jackson or Windarling.
- It is a requirement that all earthmoving, drilling and construction equipment or machinery that could potentially have collected weed seeds or matter must be clean of soil and vegetation matter and inspected at Koolyanobbing prior to mobilisation for works at the Mt. Jackson or Windarling mine sites. ENVF07 Weed Hygiene Certificate will be completed by the Contractor or works Supervisor and submitted to the Environmental Department upon arrival.
- The Environmental Department must be informed of the intent to mobilise equipment to the Mt. Jackson or Windarling mine sites so it can be inspected upon arrival.
- Equipment will be turned away if they present to site dirty or without a Weed Hygiene Certificate.
- All vehicles, plant and equipment are restricted to designated mine areas and roads unless undertaking mineral exploration or approval has been sought from the Environmental Department.
- Identification of weeds should be reported to the Environmental Department. The Weed Identification Handbook will enable personnel to identify suspected weeds in the field.
- Weed control will be implemented when weed species are found.
- The use of pesticides on Cliffs' leasehold must be approved by the Environmental Department.

Monitoring

- The distribution and abundance of weed species is recorded as appropriate during ongoing botanical surveys.
- The status of recorded weed populations will be monitored.

Reporting

- Infestations of weeds or suspected weed species will be reported to the Environmental Department.
- Incidents relating to a failure in weed hygiene procedures will be reported as Environmental Incidents by completing the Koolyanobbing Alliance Incident Notification and Investigation Report Form (ENVF03).
- Status of weed species and control initiatives will be reported to the DoIR in the AER.

Document No:	EOP16	Prepared by:	JC	Revision No:	2
Document Name:	Weed Management	Reviewed by:	JC	Revision Date:	Feb 08
Location:	K:\Environmental\EMS\EMP\EOPs\EOP16 Weed Management	Authorised by:	RH	Page No:	1 of 1

APPENDIX 14

Environmental Operating Procedure
EOP03 Bushfire Management
(Cliffs 2008g)

CLIFFS	EOP03 Bushfire Management	Koolyanobbing Iron Ore Project

Objectives

- To minimise bushfire risk.
- Educate employees in fire prevention and response procedures.
- To assist the DEC, local government and FESA in the management and control of bushfires in the region.

Associated Documentation

1. Bushfire Contingency Plan

Prevention

- Relevant employees and Contractors to attend a basic training program on bushfire prevention and emergency response procedures. FESA are available to assist with training.
- Select site personnel will undergo more advanced training in fire prevention and suppression to form the basis of an emergency response team.
- A coordinated approach to bushfire control will be developed with relevant surrounding stakeholders, FESA and the DEC.
- Appropriate vehicles will carry fire fighting equipment and staff will be trained in its use.
- Hot work permits will be required for work that has the potential to create ignition sources.
- Fire safety and housekeeping inspections of plant and equipment will be undertaken by the Koolyanobbing Alliance.

Control

- In the event of a bushfire cannot be controlled and threatens mine infrastructure and personnel safety, the Environmental Department or General Manager Operations shall contact the Yilgarn Shire Fire Control Officer 9049 1001.
- Appropriately trained personnel to take immediate response to bushfire control.
- Mine site equipment will be made available for use by the DEC and FESA for the management and control of bushfires at the discretion of the General Manager Operations.
- Fire breaks will be constructed under the supervision of the DEC.

Monitoring

- Regular housekeeping inspections and routine maintenance of fire fighting equipment and all equipment that may cause bushfires will be undertaken by the Koolyanobbing Alliance.

Reporting

- All personnel are responsible for reporting potential fire hazards to their supervisor.
- The findings of all housekeeping inspections are to be reported to the Environmental Department.
- Bushfire frequency and details will be recorded by the Environmental Department.

Document No:	EOP03	Prepared by:	JC	Revision No:	3
Document Name:	Bushfire Management	Reviewed by:	JC	Revised Date:	Feb 08
Location:	K:\Environmental\EMS\EMP\EOPs\EOP03 Bushfire Management	Authorised by:	RH	Page No:	1 of 1

APPENDIX 15

Fauna Studies Summary

FAUNA STUDUES SUMMARY

FIELD SURVEYS

Notes:

- A synthesis of field surveys 1 to 18 are contained and referenced in *Fauna Surveys of the Mt Jackson Range, Western Australia, 2000-2008* (Bamford 2009).
- Reports 13 and 19 were produced from the same survey period.

No.	REPORT	LOCATION(S) OF STUDY	DATES OF SURVEY	PERSONNEL	SURVEY METHODS
1	Ecologia Environmental Consultants (2001) *Koolyanobbing Expansion Project - Fauna Assessment Survey.*	Mt Jackson Range, Windarling Range and Bungalbin Hill	18.11.2000 to 15.12.2000	G.W. Connell, M.T. Ladyman, B.M. Metcalf, M. Griffiths, S.S. Ford, M. Williams, S. Howe, S.J. Reynolds, M.A. Wells.	Pitfall, Elliott and cage trapping, and bird surveys in grids. Mist netting for bats, hand searching, spotlighting.
2	Ecologia Environmental Consultants (2003a) *Koolyanobbing Expansion Project - Transport Corridor Fauna Assessment Survey.*	Transport corridor between Windarling Range and Koolyanobbing Range	19.05.2003 to 27.05.2003	M. Ladyman, K. Rodda, R. Davis, J. Fraser, P. Cullen, B.M. Metcalf.	Pitfall, Elliott and cage trapping, and bird surveys in grids. Echolocation recording for bats, hand searching, spotlighting.
3	Bamford (2004) *Portman Iron Ore Ltd. Malleefowl Survey in the Mt Jackson Area, December 2003 and May 2004.*	Mt Jackson Range	17.12.2003, 10.05.2004 to 14.05.2004	Dr Mike Bamford plus up to 15 unlisted volunteer assistants.	'Human chain' Malleefowl mound search.
4	Bamford and Metcalf (2005) *Portman Iron Ore Windarling/Mt Jackson Project: Fauna Studies.*	Mt Jackson Range and Windarling Range	12.12.2004 to 18.12.2004	Dr Mike Bamford, Mr Brenden Metcalf, Mr Peter Smith, Mrs Sarah Smith.	Pitfall, Elliott, cage and funnel trapping, and bird surveys along transects.
5	Bamford *et al*. (2006) *Portman Iron Ore Windarling/Mt Jackson Project Report on the 2004/2005 Fauna Surveys.*	Mt Jackson Range and Windarling Range	16.11.2005 to 22.11.2005	Dr Mike Bamford, Dr Wes Bancroft, Mr Brenden Metcalf.	Pitfall, Elliott, cage and funnel trapping, and bird surveys along transects.
6	Bamford and Bancroft (2006) *Malleefowl survey in the Mt Jackson area, May 2005.*	Mt Jackson Range	10.05.2005 to 14.05.2005	Dr Mike Bamford, Dr Wes Bancroft and unlisted volunteer assistants.	'Human chain' Malleefowl mound search.

No.	REPORT	LOCATION(S) OF STUDY	DATES OF SURVEY	PERSONNEL	SURVEY METHODS
7	Bancroft and Metcalf (2006) *Notes on Invertebrate Sampling at Mount Jackson (August 2006).*	Mt Jackson Range	16.08.2006 to 20.08.2006	Dr Mike Bamford, Dr Wes Bancroft, Brenden Metcalf.	Targeted hand searching for SRE invertebrates.
8	Bamford (2007) *Portman Iron Ore Ltd. Malleefowl Survey in the Mt Jackson Area, 2003 to 2006.*	Mt Jackson Range	22.05.2006 to 26.05.2006	Dr Mike Bamford and unlisted volunteer assistants.	'Human chain' Malleefowl mound search.
9	Bamford and Turpin (2007) *Portman Iron Ore. Fauna assessment of the Koolyanobbing area.*	Koolyanobbing Range	30.07.2007 and 01.08.2007	Dr Mike Bamford, Jeff Turpin, Peter Smith, Sarah Smith.	Site inspection.
10	Bancroft and Bamford (2007) *Field Survey for Trapdoor Spiders (Mygalomorphae) in the J1 Project Area, Mount Jackson, 2007.*	Mt Jackson Range	02.03.2007 to 05.03.2007, 22.05.2007 and 23.05.2007	Dr Mike Bamford, Dr Wes Bancroft, Ian Harris, Peter Smith, Sarah Smith.	Quadrat surveys for trapdoor spiders.
11	Metcalf and Bamford (2007) *Portman Iron Ore Windarling/Mt Jackson Project Fauna Monitoring 2004 – 2006.*	Mt Jackson Range and Windarling Range	27.11.2006 to 03.12.2006	Dr Mike Bamford, Dr Wes Bancroft, Brenden Metcalf.	Pitfall, Elliott and cage trapping, and bird surveys along transects.
12	Bamford (2008a) *The Distribution of the Tree-stem Trapdoor Spider Aganippe castellum between J1 and J2 Deposits within the Mt Jackson Range.*	Mt Jackson Range	05.06.2008 and 06.06.2008	Dr Mike Bamford and field assistances Joyce Hegney, Buddy Kent, Kym Pearce, Joel Pell, Linda Strahan and Carol Trethowan	Transect surveys for trapdoor spiders.

No.	REPORT	LOCATION(S) OF STUDY	DATES OF SURVEY	PERSONNEL	SURVEY METHODS
13	Bamford (2008b) *Portman Iron Ore Ltd. Malleefowl Survey in the Mt Jackson Area, 2003 to 2007.*	Mt Jackson Range	20.05.2007 to 26.05.2007	Dr Mike Bamford, Carl Danzi, Alan Dennings, Susanne Dennings, Len Dudley, Bill Johnston, Ruby Johnston, Buddy Kent, Merrell Martin, John Mathwin, Kath Mathwin, Dorothy Minorgan, Ron Minorgan, Brian Moyle, Don Sclater, Margaret Snook, Ron Snook, George White.	'Human chain' Malleefowl mound search.
14	Bamford (2008d) *Portman Iron Ore. Investigations into the distribution and abundance of the Tree-stem Trapdoor Spider in the Koolyanobbing area.*	Koolyanobbing Range	12.02.2008 to 15.02.2008 and 17.03.2008 to 19.03.2008	Dr Mike Bamford, Ian Harris, Peter Smith, Sarah Smith, Neale Ogden.	Quadrat and transect surveys for trapdoor spiders.
15	Bancroft and Bamford (2008) *Survey for the Tree-stem Trapdoor Spider (Aganippe castellum) at Portman's Proposed Koolyanobbing Runway Realignment.*	Koolyanobbing Range	17.10.2008 and 18.10.2008	Dr Mike Bamford, Dr Wes Bancroft.	Transect surveys for trapdoor spiders.

No.	REPORT	LOCATION(S) OF STUDY	DATES OF SURVEY	PERSONNEL	SURVEY METHODS
16	Malleefowl Preservation Group (2008) *Mt Jackson Malleefowl Survey 1-7th June 2008.*	Mt Jackson Range	1.6.2008 to 7.6.2008	Dr Mike Bamford, Michael Bouette, Robert Clare, Alan Dennings, Susanne Dennings, Len Dudley, Joyce Henegy, Buddy Kent, Ann Lullfitze, David Lullfitze, Peter Mioduszewski, Kym Pearce, Joel Pell, Don Sclater, May Sclater, Rod Smith, Margaret Snook, Ron Snook, Linda Strahan, Ross Strahan, Carol Trethowan, Gib Trethowan, George White.	'Human chain' Malleefowl mound search, opportunistic recordings of other birds sighted.
17	Metcalf and Bamford (2008) *Portman Iron Ore Windarling/Mt Jackson Project Fauna Monitoring 2004 – 2007.*	Mt Jackson Range and Windarling Range	08.12.2007 to 13.12.2007	Dr Mike Bamford, Brenden Metcalf, Ian Harris.	Pitfall, Elliott and cage trapping, and bird surveys along transects.
18	Bancroft and Bamford (2009) *Second Survey for the Tree-stem Trapdoor Spider (Aganippe castellum) at Portman's Proposed Koolyanobbing Runway Realignment.*	Koolyanobbing Range	01.12.2008	Dr Mike Bamford, Dr Wes Bancroft.	Transect surveys for trapdoor spiders.
19	Malleefowl Preservation Group (2007) *Mt Jackson Malleefowl Survey 20-26th May 2007.*	Mt Jackson Range	20.5.2007 to 26.5.2007	Dr Mike Bamford, Carl Danzi, Alan Dennings, Susanne Dennings, Len Dudley, Bill Johnston, Ruby Johnston, Buddy Kent, Merrell Martin, John Mathwin, Kath Mathwin, Dorothy Minorgan, Ron Minorgan, Brian Moyle, Don Sclater, Margaret Snook, Ron Snook, George White.	'Human chain' Malleefowl mound search, opportunistic recordings of other birds sighted.

No.	REPORT	LOCATION(S) OF STUDY	DATES OF SURVEY	PERSONNEL	SURVEY METHODS
20	Bennelongia Pty Ltd (2008) *Troglofauna Survey of the Mt Jackson Range, Western Australia.*	Mt Jackson Range, Helena and Aurora Range and Koolyanobbing Range.	28.7.2007 to 16.9.2007; 29.2.2008 to 30.4.2008; 8.7.2008 to 16.10.2008.	Mike Scanlon, Jim Cocking, Andrew Trotter, Brad Scanlon, Peter Cocking, Megan Phillips, Jane McRae, Heather McLetchie.	Scrapes, S Traps and D Traps from 31 uncased bores in impact areas (J1 Deposit) and 59 uncased reference bores.
21	Wetland Research and Management (2008) *Stygofauna sampling at J1 Deposit.*	Mt Jackson Range, Windarling Range, and transport corridor between Windarling Range and Koolyanobbing Range	November 2006, October 2007, December 2007, February 2008.	Jess Lynas, Lisa Chandler, Sue Creagh, Adam Harman.	Sampling by plankton haul net at 7 impact bores (Mt Jackson J1 Deposit) and 40 non-impact reference bores on Mt Jackson Range, Windarling Range and south towards Koolyanobbing
22	Wetland Research and Management (2008) *Stygofauna sampling at W2.*	Mt Jackson Range, Windarling Range, and transport corridor between Windarling Range and Koolyanobbing Range	23.10.2007 to 27.10.2007; 17.12.2007 to 22.12.2007, 18.2.2007 to 21.2.2007.	Jess Lynas, Sue Creagh, Adam Harman.	Sampling by plankton haul net at 4 impact bores (Mt Jackson J1 Deposit) and 22 non-impact reference bores on Mt Jackson Range, Windarling Range and south towards Koolyanobbing
23	Wetland Research and Management (2009) *Stygofauna sampling at Mt Jackson J1 Deposit, Western Australia.*	Mt Jackson Range, Windarling Range, and transport corridor between Windarling Range and Koolyanobbing Range	11.7.2008 to 12.7.2008; 7.10.2008 to 8.10.2008; 14.12.2008 to 15.12.2008.	Jess Lynas, Jessica Sommer, Adam Harman.	Sampling by plankton haul net at 4 cased impact bores (Mt Jackson J1 Deposit) and 5 cased non-impact reference bores on Mt Jackson range and south towards Koolyanobbing
24	Biota Environmental Sciences (2009) *Targeted Survey for Short-Range Endemic Fauna Invertebrates at Mt Jackson Range, Western Australia.*	Mt Jackson Range	6.10.2008 to 12.10.2008	Roy Teale, Zoë Hamilton.	Hand foraging (raking leaf litter, turning rocks/logs, sieving litter, visual searches) multiple sites within 8 broad impact areas (Mt Jackson J1 Deposit) and non-impact areas.

DESKTOP REVIEWS

Notes:

- A synthesis of the desktop reviews 2 to 6 is contained and referenced in *Fauna Surveys of the Mt Jackson Range, Western Australia, 2000-2008* (Bamford 2009).

No.	REPORT	LOCATION(S) OF STUDY	REVIEW PURPOSE
1	Bamford (2009) Bamford (2009) *Fauna Surveys of the Mt Jackson Range, Western Australia, 2000-2008*	Mt Jackson Range, Windarling Range, Koolyanobbing Range, Bungalbin Hill, and the transport corridor between Windarling Range and Koolyanobbing Range	Desktop review of field surveys and desktop surveys/reports
2	Ecologia Environmental Consultants (2003b) *Portman Iron Ore Ltd. Koolyanobbing Expansion Project Malleefowl Conservation Plan (Rev9).*	Mt Jackson Range and Windarling Range	Management and Monitoring Plan for Malleefowl *Leipoa ocellata.*
3	Bamford (2006) *Portman Iron Ore Ltd. Fauna Assessment of the J1 Mining Area.*	Mt Jackson Range	Desktop review
4	Harvey (2006) *The Short-Range Invertebrate Fauna from the Mt Jackson Region, Western Australia.*	Mt Jackson Range	Report on invertebrate specimens collected from survey by Bancroft and Metcalf (2006).
5	Bamford (2008c) *Portman Iron Ore Ltd. Review of Investigations into the Malleefowl Leipoa ocellata in the Mt Jackson area.*	Mt Jackson Range	Desktop review
6	Bamford and Nielsen (2008) *Koolyanobbing A-Pit Expansion Project: Tree-stem Trapdoor Spider Management Plan.*	Koolyanobbing Range	Management and Monitoring Plan for Tree-stem Trapdoor Spider *Aganippe castellum.*

APPENDIX 16

Fauna Species List

AMPHIBIANS

Amphibians that may occur in the vicinity of Mt Jackson Range.

Notes:

- Status is assigned as described in Bamford (2009).
- "x" indicates species that were recorded by field surveys in 2000 (Ecologia 2001), 2003 (Ecologia 2003a), 2004 (Bamford and Metcalf 2005), 2005 (Bamford *et al.* 2006), 2006 (Metcalf and Bamford 2007) and 2007 (Metcalf and Bamford 2008).
- "*" indicates that this species was recorded opportunistically south of J1 Deposit during Malleefowl mound surveys in May 2007 (M. Bamford, pers. obs.).

Species		Status	2000	2003	2004	2005	2006	2007
Limnodynastidae (Burrowing frogs)								
Neobatrachus kunapalari	Kunapalari Frog			x				
Neobatrachus pelobatoides	Humming Frog							
Neobatrachus sutor	Shoemaker Frog							
Myobatrachidae (Ground frogs)								
Pseudophryne occidentalis	Western Toadlet			x				*
Total expected species = 4 **Total recorded species (any year) = 2**		**TOTALS:**	**0**	**2**	**0**	**0**	**0**	**1**

REPTILES

Reptiles that may occur in the vicinity of Mt Jackson Range.

Notes:

- Status is assigned as described in Bamford (2009).
- "x" indicates species that were recorded by field surveys in 2000 (Ecologia 2001), 2003 (Ecologia 2003a), 2004 (Bamford and Metcalf 2005), 2005 (Bamford *et al.* 2006), 2006 (Metcalf and Bamford 2007) and 2007 (Metcalf and Bamford 2008).
- some additional species were recorded in the Ecologia surveys (Ecologia 2001, 2003a) but have been excluded here. These species were either recorded from areas considerably distant from the Mt Jackson Range (e.g. Koolyanobbing) or in habitats not present in the vicinity of the Mt Jackson Range (e.g. sand plains). In either case they are not expected in the vicinity of the Mt Jackson Range.
- "†" indicates *Cryptoblepharus* species that have undergone taxonomic revision (see Horner 2007) since the most recent field studies at Mt Jackson Range and, therefore, their current status in the Mt Jackson area is unconfirmed. These species include the formerly recorded *C. carnabyi* (which is no longer a recognised species).
- "‡"indicates *Lerista* species that have undergone taxonomic revision (see Smith and Adams 2007) since the most recent field studies at Mt Jackson Range and, therefore, their current status in the Mt Jackson Range area is unconfirmed. These species were formerly treated (and recorded) as a single species: *L. muelleri*.
- "#" indicates that an opportunistic observation of this species was made some time between the 2000 (Ecologia 2001) and 2004 (Bamford and Metcalf 2005) field surveys (B. Metcalf, pers. comm.).
- "Δ" indicates that this species was recorded in a January 2009 survey (report in preparation).

Species		Status	2000	2003	2004	2005	2006	2007
Agamidae (Dragons)								
Ctenophorus cristatus	Crested Dragon		x					
Ctenophorus maculatus	Spotted Military Dragon							
Ctenophorus reticulatus	Western Netted Dragon		x	x	x	x	x	x
Ctenophorus scutulatus	Lozenge-marked Dragon		x		x	x	x	x
Pogona minor	Western Bearded Dragon		x	x	x	x	x	x
Tympanocryptis cephalus	Pebble Dragon		x					
Diplodactylidae (Diplodactylid geckos)								
Crenadactylus ocellatus	Clawless Gecko		x					
Diplodactylus granariensis	Western Stone Gecko		x		x	x		x
Diplodactylus pulcher			x	x	x	x	x	x
Lucasium maini			x	x			x	x
Lucasium stenodactylum	Sand-plain Gecko				x	x		
Oedura reticulata	Reticulated Velvet Gecko	CS2	x	x	x			
Rhynchoedura ornata	Beaked Gecko		x	x				
Strophurus assimilis	Thorn-tailed Gecko		x					
Carphodactylidae (Carphodactylid geckos)								
Nephrurus milii	Barking Gecko		x	x	x	x		
Nephrurus vertebralis								
Gekkonidae (Gekkonid geckos)								
Gehyra purpurascens								
Gehyra variegata	Variegated Dtella		x	x	x	x	x	x
Heteronotia binoei	Bynoe's Gecko		x	x	x	x		
Pygopodidae (Legless lizards)								

Species		Status	2000	2003	2004	2005	2006	2007
Delma australis			x			x		
Delma butleri			x	x				
Delma fraseri	Fraser's Legless Lizard	CS3			x			
Lialis burtonis	Burton's Legless Lizard							
Pygopus lepidopodus	Common Scaly-foot		x	x		x		
Pygopus nigriceps	Western Hooded Scaly-foot							
Scincidae (Skinks)								
Cryptoblepharus buchananii			†	†	†			
Cryptoblepharus plagiocephalus	Fence Skink		†	†	†			
Ctenotus leonhardii								
Ctenotus mimetes			x		x	x		
Ctenotus pantherinus	Leopard Ctenotus							
Ctenotus schomburgkii			x		x	x	x	x
Ctenotus severus								
Ctenotus uber			x	x	x	x	x	x
Cyclodomorphus melanops			x	x				
Egernia depressa	Pygmy Spiny-tailed Skink		x		x	x		x
Egernia formosa			x					
Egernia inornata	Desert Skink	CS3		x				x
Egernia striata		CS3						Δ
Eremiascincus richardsonii	Broad-banded Sand-swimmer		x		x	x	x	
Hemiergis initialis	Southern Five-toed Earless Skink		x					
Lerista gerrardii			x	x				
Lerista kingi			‡	‡	‡	‡	‡	‡
Lerista macropisthopus			x		x	x		x
Lerista rhodonoides			‡	‡	‡	‡	‡	‡
Menetia greyii	Common Dwarf Skink		x		x	x	x	
Morethia butleri				x	x	x		
Morethia obscura	Dusky Morethia							
Tiliqua occipitalis	Western Blue-tongue							
Varanidae (Monitors and goannas)								
Varanus caudolineatus	Stripe-tailed Monitor		x		x	x		
Varanus giganteus	Perentie	CS3	x			x		
Varanus gouldii	Sand Goanna		x	x	x	x		
Varanus panoptes	Yellow-spotted Monitor							
Varanus tristis	Black-headed Monitor		x			x		
Typhlopidae (Blind snakes)								
Ramphotyphlops australis	Southern Blind Snake		x	x	x	x		
Ramphotyphlops bituberculatus	Prong-snouted Blind Snake		x					
Ramphotyphlops hamatus			x					
Ramphotyphlops waitii								
Boidae (Pythons)								
Antaresia stimsoni	Stimson's Python							
Morelia spilota	Carpet Python	CS1	#					
Elapidae (Venomous land snakes)								

Species		Status	2000	2003	2004	2005	2006	2007
Acanthophis pyrrhus	Desert Death Adder							
Brachyurophis fasciolata	Narrow-banded Shovel-nosed Snake							
Brachyurophis semifasciata	Southern Shovel-nosed Snake		x				x	
Demansia psammophis	Yellow-faced Whipsnake							
Furina ornata	Moon Snake		x					
Neelaps bimaculatus	Black-naped Snake							
Parasuta gouldii	Gould's Snake							
Parasuta monachus	Monk Snake			x				
Pseudechis australis	Mulga Snake		x	x				
Pseudonaja modesta	Ringed Brown Snake							x
Pseudonaja nuchalis	Gwardar		x					
Simoselaps bertholdi	Jan's Banded Snake		x		x			
Suta fasciata	Rosen's Snake			x				
Total expected species = 72 **Total recorded species (any year) =54**		**TOTALS:**	**46**	**25**	**27**	**26**	**13**	**15**

BIRDS

Birds that may occur in the vicinity of Mt Jackson Range.

Notes:

- Status assigned as described in Bamford (2009).
- "x" indicates species that were recorded by field surveys as documented in Bamford ((2009) incorporating field surveys in 2000 by Ecologia (2001), 2003 by Ecologia (2003a), 2004 by Bamford and Metcalf (2005), 2005 by Bamford *et al.* (2006), 2006 by Metcalf and Bamford (2007), 2007 by Metcalf and Bamford (2008)), and as documented in 2007 by Malleefowl Preservation Group (2007) and in 2008 by Malleefowl Preservation Group (2008).
- Species marked with a superscript 'w' are generally dependent on wetlands.
- species marked with a superscript 'a' are highly aerial species.
- "?" indicates an unconfirmed record (these two species are difficult to separate without excellent observation conditions).

Species		Status	2000	2003	2004	2005	2006	2007	2008
Casuariidae (Cassowaries and emus)									
Dromaius novaehollandiae	Emu		x	x			x		
Megapodiidae (Megapodes)									
Leipoa ocellata	Malleefowl	CS1	x	x	x	x	x	x	x
Phasianidae (Pheasants and allies)									
Coturnix pectoralis	Stubble Quail								
Anatidae (Ducks and allies)									
Cygnus atratus	Black Swan [w]				x				
Tadorna tadornoides	Australian Shelduck [w]					x			
Malacorhynchus membranaceus	Pink-eared Duck [w]								
Anas gracilis	Grey Teal [w]								
Anas superciliosa	Pacific Black Duck [w]								
Podicipedidae (Grebes)									
Poliocephalus poliocephalus	Hoary-headed Grebe [w]				x				
Columbidae (Pigeons and doves)									
Phaps chalcoptera	Common Bronzewing		x	x	x	x	x	x	x
Ocyphaps lophotes	Crested Pigeon			x	x	x			x
Geopelia cuneata	Diamond Dove				x				
Podargidae (Australian frogmouths)									
Podargus strigoides	Tawny Frogmouth		x	x		x		x	x
Eurostopodidae (Eared-nightjars)									
Eurostopodus argus	Spotted Nightjar		x	x	x	x	x		x
Aegothelidae (Owlet-nightjars)									
Aegotheles cristatus	Australian Owlet-nightjar		x	x			x		x
Apodidae (Typical swifts)									
Apus pacificus	Fork-tailed Swift [a]	CS1							
Pelicanidae (Pelican)									
Pelecanus conspicillatus	Australian Pelican [w]								
Ardeidae (Herons, bitterns and egrets)									
Ardea pacifica	White-necked Heron [w]								
Egretta novaehollandiae	White-faced Heron [w]								

Species		Status	2000	2003	2004	2005	2006	2007	2008
Threskiornithidae (Ibises and spoonbills)									
Threskiornis spinicollis	Straw-necked Ibis								
Accipitridae (Osprey, hawks and eagles)									
Elanus axillaris	Black-shouldered Kite								
Lophoictinia isura	Square-tailed Kite	CS3	x			x			
Hamirostra melanosternon	Black-breasted Buzzard								
Haliastur sphenurus	Whistling Kite					x			
Milvus migrans	Black Kite								
Accipiter fasciatus	Brown Goshawk		x	x					
Accipiter cirrocephalus	Collared Sparrowhawk		x					x	
Circus assimilis	Spotted Harrier								
Aquila audax	Wedge-tailed Eagle		x	x		x		x	x
Hieraaetus morphnoides	Little Eagle		x	x					
Falconidae (Falcons)									
Falco cenchroides	Nankeen Kestrel		x				x		
Falco berigora	Brown Falcon		x	x		x	x	x	x
Falco longipennis	Australian Hobby		x	x					
Falco subniger	Black Falcon								
Falco peregrinus	Peregrine Falcon	CS1	x	x	x	x			
Rallidae (Rails, gallinules and coots)									
Tribonyx ventralis	Black-tailed Native-hen								
Otididae (Bustards)									
Ardeotis australis	Australian Bustard	CS2	x						
Burhinidae (Stone-curlews)									
Burhinus grallarius	Bush Stone-curlew	CS2							
Recurvirostridae (Stilts and avocets)									
Himantopus himantopus	Black-winged Stilt [W]								
Charadriidae (Lapwings, plovers and dotterels)									
Charadrius ruficapillus	Red-capped Plover [W]								
Charadrius australis	Inland Dotterel								
Elseyornis melanops	Black-fronted Dotterel [W]								
Erythrogonys cinctus	Red-kneed Dotterel [W]								
Vanellus tricolor	Banded Lapwing								
Scolopacidae (Curlews, godwits, snipe, sandpipers and allies)									
Actitis hypoleucos	Common Sandpiper [W]	CS1							
Tringa nebularia	Common Greenshank [W]	CS1							
Tringa glareola	Wood Sandpiper [W]	CS1							
Calidris ruficollis	Red-necked Stint [W]	CS1							
Calidris acuminata	Sharp-tailed Sandpiper [W]	CS1							
Turnicidae (Button-quails)									
Turnix velox	Little Button-quail		x						
Cacatuidae (Cockatoos)									
Calyptorhynchus banksii	Red-tailed Black-Cockatoo		x			x			
Lophocroa leadbeateri	Major Mitchell's Cockatoo	CS1	x	x			x	x	
Eolophus roseicapillus	Galah		x	x	x	x	x		
Nymphicus hollandicus	Cockatiel								

Species		Status	2000	2003	2004	2005	2006	2007	2008
Psittacidae (Parrots)									
Glossopsitta porphyrocephala	Purple-crowned Lorikeet		x	x	x	x	x	x	x
Polytelis anthopeplus	Regent Parrot		x	x			x		
Barnardius zonarius	Australian Ringneck		x	x	x	x	x	x	x
Psephotus varius	Mulga Parrot		x						
Melopsittacus undulatus	Budgerigar					x		x	
Neopsephotus bourkii	Bourke's Parrot								
Neophema splendida	Scarlet-chested Parrot	CS3							
Cuculidae (Old world cuckoos)									
Chalcites basalis	Horsfield's Bronze-Cuckoo					x			
Chalcites osculans	Black-eared Cuckoo			x					
Cacomantis pallidus	Pallid Cuckoo			x					
Strigidae (Hawk owls)									
Ninox novaeseelandiae	Southern Boobook		x	x					
Tytonidae (Barn owls)									
Tyto javanica	Eastern Barn Owl		x	x					
Halcyonidae (Tree kingfishers)									
Todiramphus pyrrhopygius	Red-backed Kingfisher		x	x					
Todiramphus sanctus	Sacred Kingfisher								
Meropidae (Bee-eaters)									
Merops ornatus	Rainbow Bee-eater	CS1	x	x	x	x	x	x	
Climacteridae (Australo-Papuan treecreepers)									
Climacteris affinis	White-browed Treecreeper		x						x
Climacteris rufa	Rufous Treecreeper		x	x	x	x	x		x
Maluridae (Fairy-wrens, emu-wrens and grasswrens)									
Malurus splendens	Splendid Fairy-wren		x	x	x	x	x	x	x
Malurus leucopterus	White-winged Fairy-wren		x						
Malurus lamberti	Variegated Fairy-wren				?				?
Malurus pulcherrimus	Blue-breasted Fairy-wren		x		?				
Acanthizidae (Australasian warblers)									
Calamanthus cautus	Shy Heathwren	CS2	x	x	x				
Calamanthus campestris	Rufous Fieldwren	CS2	x						
Pyrrholaemus brunneus	Redthroat		x	x	x	x	x	x	
Smicrornis brevirostris	Weebill		x	x	x	x	x	x	x
Gerygone fusca	Western Gerygone			x				x	x
Acanthiza robustirostris	Slaty-backed Thornbill		x	x				x	
Acanthiza chrysorrhoa	Yellow-rumped Thornbill		x	x		x	x	x	x
Acanthiza uropygialis	Chestnut-rumped Thornbill		x	x	x	x	x	x	x
Acanthiza apicalis	Inland Thornbill		x	x	x	x	x	x	x
Aphelocephala leucopsis	Southern Whiteface		x	x					
Sericornis frontalis	White-browed Scrubwren								x
Pardalotidae (Pardalotes)									
Pardalotus punctatus	Spotted Pardalote		x						
Pardalotus striatus	Striated Pardalote		x	x	x	x	x	x	x
Meliphagidae (Honeyeaters)									
Certhionyx variegatus	Pied Honeyeater								

Species		Status	2000	2003	2004	2005	2006	2007	2008
Lichenostomus virescens	Singing Honeyeater		x	x	x	x	x	x	x
Lichenostomus leucotis	White-eared Honeyeater		x	x	x	x	x	x	x
Lichenostomus ornatus	Yellow-plumed Honeyeater		x	x	x	x	x	x	x
Lichenostomus plumulus	Grey-fronted Honeyeater		x						
Purnella albifrons	White-fronted Honeyeater		x	x					
Manorina flavigula	Yellow-throated Miner		x	x	x	x	x	x	x
Acanthagenys rufogularis	Spiny-cheeked Honeyeater		x	x		x	x	x	x
Anthochaera carunculata	Red Wattlebird		x	x	x	x	x	x	x
Conopophila whitei	Grey Honeyeater	CS3							
Epthianura tricolor	Crimson Chat		x			x			
Sugomel niger	Black Honeyeater								
Lichmera indistincta	Brown Honeyeater		x	x	x	x	x	x	
Melithreptus brevirostris	Brown-headed Honeyeater		x			x	x	x	x
Pomatostomidae (Babblers)									
Pomatostomus superciliosus	White-browed Babbler	CS2	x	x	x	x	x	x	x
Eupetidae (Quail-thrush and allies)									
Cinclosoma castanotum	Chestnut Quail-thrush		x	x	x	x	x	x	x
Cinclosoma castaneothorax	Chestnut-breasted Quail-thrush							x	x
Psophodes occidentalis	Chiming Wedgebill								
Neosittidae (Sitellas)									
Daphoenositta chrysoptera	Varied Sittella		x	x		x	x		x
Campephagidae (Cuckoo-shrikes and trillers)									
Coracina maxima	Ground Cuckoo-shrike		x						
Coracina novaehollandiae	Black-faced Cuckoo-shrike		x	x	x	x	x	x	
Lalage sueurii	White-winged Triller						x		
Pachycephalidae (Whistlers, shrike-thrushes and allies)									
Falcunculus frontatus	Crested Shrike-tit	CS2							
Pachycephala inornata	Gilbert's Whistler	CS3							
Pachycephala pectoralis	Golden Whistler				x	x			
Pachycephala rufiventris	Rufous Whistler		x	x	x	x	x	x	x
Colluricincla harmonica	Grey Shrike-thrush		x	x	x	x	x	x	x
Oreoica gutturalis	Crested Bellbird	CS2	x	x	x	x	x	x	x
Artamidae (Woodswallows, butcherbirds and currawongs)									
Artamus personatus	Masked Woodswallow						?		
Artamus cinereus	Black-faced Woodswallow		x	x			?		
Artamus cyanopterus	Dusky Woodswallow		x						
Artamus minor	Little Woodswallow		x		x	x	x	x	
Cracticus torquatus	Grey Butcherbird		x	x	x	x	x	x	x
Cracticus nigrogularis	Pied Butcherbird		x	x	x	x	x	x	
Cracticus tibicen	Australian Magpie		x	x			x	x	
Strepera versicolor	Grey Currawong		x	x	x	x	x	x	x
Rhipiduridae (Fantails)									
Rhipidura albiscapa	Grey Fantail		x			x	x		x
Rhipidura leucophrys	Willie Wagtail		x		x	x	x	x	

Species		Status	2000	2003	2004	2005	2006	2007	2008
Corvidae (Crows and allies)									
Corvus coronoides	Australian Raven		x	x		x	x	x	x
Corvus bennetti	Little Crow		x	x				x	
Corvus orru	Torresian Crow				x	x	x	x	
Monarchidae (Flycatchers, monarchs and magpie-lark)									
Grallina cyanoleuca	Magpie-lark				x	x	x	x	x
Petroicidae (Robins)									
Microeca fascinans	Jacky Winter		x	x		x	x	x	X
Petroica goodenovii	Red-capped Robin		x	x	x	x	x	x	x
Melanodryas cucullata	Hooded Robin		x	x			x	x	x
Eopsaltria griseogularis	Western Yellow Robin	CS3	x			x			
Drymodes brunneopygia	Southern Scrub-robin	CS3	x						
Megaluridae (Grassbirds)									
Cincloramphus mathewsi	Rufous Songlark								
Cincloramphus cruralis	Brown Songlark								
Hirundinidae (Swallows and martins)									
Cheramoeca leucosterna	White-backed Swallow		x	x					
Hirundo neoxena	Welcome Swallow		x	x	x	x	x		
Petrochelidon nigricans	Tree Martin		x	x	x	x	x		x
Petrochelidon ariel	Fairy Martin		x						
Nectariniidae (Sunbirds and allies)									
Dicaeum hirundinaceum	Mistletoebird		x	x	x	x	x		
Estrildidae (Finches)									
Taeniopygia guttata	Zebra Finch		x	x		x		x	
Motacillidae (Old world wagtails and pipits)									
Anthus novaeseelandiae	Australasian Pipit		x	x					
Total expected species = 144 **Total recorded species (any year) = 105**		**TOTALS:**	**86**	**67**	**46**	**59**	**55**	**49**	**43**

MAMMALS

Mammals that may occur in the vicinity of Mt Jackson Range.

Notes:

- Status is assigned as described in Bamford (2009).
- "x" indicates species that were recorded by field surveys in 2000 (Ecologia 2001), 2003 (Ecologia 2003a), 2004 (Bamford and Metcalf 2005), 2005 (Bamford *et al.* 2006), 2006 (Metcalf and Bamford 2007) and 2007 (Metcalf and Bamford 2008).
- Some additional species were recorded in the Ecologia surveys (Ecologia 2001, 2003a) but have been excluded here. These species were either recorded from areas considerably distant from the Mt Jackson Range (e.g. Koolyanobbing) or in habitats not present in the vicinity of the Mt Jackson Range (e.g. sand plains). In either case they are not expected in the vicinity of the Mt Jackson Range.
- "?" indicates an unconfirmed record (calls of *Vespadelus* were recorded but identification to species level was not possible).

Species		Status	2000	2003	2004	2005	2006	2007
Tachyglossidae (Echidnas)								
Tachyglossus aculeatus	Echidna		x	x	x	x	x	x
Dasyuridae (Dasyurids)								
Ningaui ridei	Wongai Ningaui							
Ningaui yvonneae	Southern Ningaui		x					
Pseudantechinus woolleyae	Woolley's Pseudantechinus	CS3	x					
Sminthopsis crassicaudata	Fat-tailed Dunnart							
Sminthopsis dolichura	Little Long-tailed Dunnart		x	x	x	x	x	x
Sminthopsis granulipes	White-tailed Dunnart							
Macropodidae (Kangaroos, wallabies and tree kangaroos)								
Macropus fuliginosus	Western Grey Kangaroo		x	x				
Macropus robustus	Euro		x	x	x	x	x	
Macropus rufus	Red Kangaroo		x	x			x	x
Burramyidae (Pygmy possums)								
Cercartetus concinnus	Western Pygmy-possum		x	x			x	
Vespertilionidae (Vespertillionid bats)								
Chalinolobus gouldii	Gould's Wattled Bat			x				
Chalinolobus morio	Chocolate Wattled Bat							
Nyctophilus geoffroyi	Lesser Long-eared Bat		x		x	x		
Nyctophilus timoriensis	Greater Long-eared Bat	CS2						
Scotorepens balstoni	Inland Broad-nosed Bat							
Vespadelus baverstocki	Inland Forest Bat		x	?				
Vespadelus regulus	Southern Forest Bat		x	?				
Molossidae (Freetail bats)								
Mormopterus sp. (Species 3) (see Adams *et al.* 1988)	Inland Freetail-bat							
Tadarida australis	White-striped Freetail-bat		x	x	x	x	x	x
Muridae (Rats and mice)								
Mus musculus	House Mouse	INT	x	x	x	x	x	
Notomys mitchellii	Mitchell's Hopping-mouse		x					
Pseudomys bolami	Bolam's Mouse							
Pseudomys hermannsburgensis	Sandy Inland Mouse		x	x				

Species		Status	2000	2003	2004	2005	2006	2007
Pseudomys occidentalis	Western Mouse	CS2						
Leporidae (Rabbits and hares)								
Oryctolagus cuniculus	Rabbit	INT	x	x	x	x	x	x
Canidae (Dogs and foxes)								
Canis lupus	Dingo/Dog	INT		x	x	x		x
Vulpes vulpes	Red Fox	INT	x		x	x		
Felidae (Cats)								
Felis catus	Cat	INT	x			x		
Camelidae (Camels)								
Camelus dromedarius	Dromedary Camel	INT						
Bovidae (Horned ruminants)								
Capra hircus	Goat	INT	x					
Total expected species = 31 **Total recorded species (any year) = 21**		**TOTALS:**	**19**	**14**	**9**	**10**	**8**	**6**

OTHER FAUNA

Other fauna recorded on the Mt Jackson Range by Biota (2009) and Bamford (2009).

Species
Land Snails
Bothriebryon sp.
Sinumelon kalgum
Pleuroxia affin. *elfina*
Millipedes
Antichiropus sp.
Antichiropus sp. nov. "Mt Jackson"
Antichiropus sp. "Mt Jackson 2"
Atelomastix sp. "Mt Jackson"
Mygalomorph Spiders
Aganippe affin. *castellum*
Aganippe rhaphiduca
Gaius villosus
Eucyrtops sp. "Single Clay Door"
Aname sp. "Hooded Burrow"
Aname sp. "Y-shaped Burrow"
Aname sp. "Volcano Burrow"
Aname sp. 1
Aname sp. 2
Aname sp. "Double Clay Door"
Cethegus ?*fugax*

TROGLOFAUNA

Troglofauna recorded on the Mt Jackson Range by Bennelongia (2008).

Species
Millipede
Polyxenida sp. B1
Centipede
Cryptops
Chilenophilidae sp. B1
Spider
Araneomorphae sp. B4
Pauropod
Paurapoda
Slater
Philosciidae sp B4
Troglarmidillo sp. B1
Trichorhinae sp. B2
Symphylan
Hanseniella sp. B3
Silverfish
Hemitrinemura sp.
Hemitrinemura sp. B2
Beetle
Curculionidae sp. B4
Curculionidae sp. B5
Pselaphinae sp. B4

APPENDIX 17

Environmental Operating Procedure
EOP06 Fauna
(Cliffs 2007b)

CLIFFS	EOP06 Fauna	Koolyanobbing Iron Ore Project

Objectives

- Minimise impact on native fauna, particularly species of conservation significance, and associated habitat.
- Reduce the abundance of feral predators in the region of mining operations.

Associated Documentation

1. Biodiversity Research and Conservation Plan
2. Malleefowl Conservation Plan
3. Animal Sightings Register

Management

- Off-road vehicle use is prohibited.
- All personnel will adhere to the speed restrictions applied to mine roads.
- Other than formal monitoring, native fauna will not be captured or intentionally harmed.
- Native fauna have right of way.
- Firearms and pets are prohibited on the leasehold.
- Do not feed native or feral animals and ensure foodstuffs are stored and disposed appropriately.
- Control of feral animals at camps and around the mine sites will be undertaken. All personnel must not interfere with feral animal control programmes.
- Vegetation clearing will be kept to a minimum and infrastructure located to preserve fauna habitat, particularly that of rare fauna.
- Road kills will be removed from the road at least 30m into the vegetation to avoid further impacts on fauna feeding on carcasses.
- All lined dams will be fenced and have appropriate fauna egress matting installed.
- Drill holes will be immediately capped/plugged on completion of drilling and be securely plugged at a minimum depth of 400mm below ground level, tamped, backfilled and mounded over with soil to encourage water to drain away from the drill hole.

Monitoring

- A strategic plan for monitoring feral animal populations has been developed in consultation with the DEC.
- Native fauna monitoring will be undertaken annually at selected sites by qualified ecologists.

Reporting

- Monitoring programmes, feral animal control programmes and fauna deaths associated with lined dams will be reported to DoIR and included in the AER.
- Observations of feral species will be reported by all personnel to the Environmental Department and/or recorded on the Fauna Sightings Register located in office buildings.
- Fauna mortality and sightings on the main haul road to the Koolyanobbing site are reported monthly to the Environmental Department by the haulage Contractor.
- Feral animal sightings around the mining areas are reported to the Environmental Department monthly.

Document No:	EOP06	Prepared by:	JC	Revision No:	1
Document Name:	Fauna	Reviewed by:	JH	Revision Date:	Jun 07
Location:	K:\Environmental\EMS\EMP\EOPs\EOP06 Fauna	Authorised by:	JH	Page No:	1 of 1

APPENDIX 18

Environmental Operating Procedure
EOP07 Groundwater
(Cliffs 2008i)

CLIFFS	EOP07 Groundwater	Koolyanobbing Iron Ore Project

Objectives

- Ensure effective management of groundwater resources.
- Prevent adverse impacts on groundwater quality and quantity associated with mining activities.

Associated Documentation

1. Operating Strategy for Water Supply Borefield Northern Haul Road Network and Minesite Facilities.
2. Groundwater Well Licence No. GWL154459.
3. Koolyanobbing Operating Strategy and GWL

Management

Supply and storage

- Extraction from the northern tenements bore fields will not exceed 2 250 000 kL/yr in accordance with DEC GWL 154459.
- Flow meters will be fitted to all production bores.
- Automated high level detection shut off devices will be fitted on all saline water pipelines discharging to water storage dams.
- Freeboard of 300mm will be maintained in water storage dams.
- All pipelines will be appropriately bunded or buried.
- Water cart operators are to be present and continuously supervise refilling to prevent spillage due to overfilling.
- Water storage dams will be lined with an impermeable membrane to prevent seepage.
- Water storage dams and standpipe fill point areas will be constructed to prevent ingress of surface water run-off.
- Spillage from standpipes will be directed back to water storage dams.
- For public and wildlife safety, access to water storage dams will be restricted by fencing.
- Water storage dams will have appropriate fauna egress matting installed.

Quality

- Equipment servicing will take place in the workshop areas whenever practicable, field servicing will be undertaken in a manner which meets best practice field servicing guidelines.
- All chemicals stored or transported in the mining area will be in accordance with Dangerous Goods Regulations.
- Groundwater management will be undertaken in accordance with the DEC approved operating and monitoring strategy.

Monitoring

- Static water levels in production bores: measured 6-monthly (Mar/Apr; Sept/Oct)
- Water salinity in operating production bores: measured annually (Oct) and/or when a bore is recommissioned or decommissioned.
- Water abstraction quantities: recorded monthly.
- Environmental impacts: vegetation around installations visually monitored monthly.
- Monitoring will be undertaken by the Environmental Department or their delegate and recorded in the Groundwater Monitoring Register.

Reporting

- Each year monitoring data will be collated, assessed and forwarded in a Groundwater Monitoring Report to the DEC within 60 days of the reporting period January to December.

Document No:	EOP07	Prepared by:	DM	Revision No:	2
Document Name:	Groundwater	Reviewed by:	DM	Revision Date:	Feb 08
Location:	K:\Environmental\EMS\EMP\EOPs\EOP07 Groundwater	Authorised by:	RH	Page No:	1 of 1

APPENDIX 19

Environmental Operating Procedure
EOP05 Dust Management
(Cliffs 2008k)

CLIFFS	EOP05 Dust Management	Koolyanobbing Iron Ore Project

Objectives

- Minimise dust generation from mining activities.
- Minimise risk of adverse impacts of dust on vegetation, particularly rare flora populations.

Associated Documentation

1. ENVF06 W3/5 Blast Planning Checklist
2. ENVF16 W3/5 Water Cart Movement Form

Management

General Mining Activities

- Progressive clearing will be undertaken to minimise dust generation from exposed surfaces.
- Bare surfaces will be progressively rehabilitated as soon as possible.
- At least one water cart will be utilised for dust suppression at each mining operation. Where excessive dust cannot be effectively controlled, additional resources will be employed. If required, alternative methods of dust suppression could be investigated.
- Regular housekeeping will be undertaken by the Koolyanobbing Alliance to collect and remove earth material that may contribute to airborne dust.
- Product stockpiles will be monitored to determine whether there is significant dust generated and stabilised if necessary.
- Personnel must inform their supervisor if they deem there to be excessive levels of dust generated from mining activities.
- A water cart shall be designated to the W3/5 operation to control dust. ENF16 Water Cart Movement Form must be completed for every shift and submitted to Cliffs at the morning meeting the following day.

Designated Mine Roads and Water Storage Dams

- Vehicle speeds on site will be restricted to minimise dust generated.
- Overspray of saline water for haul road dust suppression will be prevented by spray bar and nozzle design and management of spray pressure.
- Water cart operators are to be present and continuously supervise refilling to prevent spillage due to overfilling.
- Prior to parking up, water tankers will be emptied with spray bars shut off.
- Water storage dams will be lined with an impermeable membrane to prevent seepage of saline groundwater.
- Water storage dams and standpipe fill point areas will be constructed to prevent ingress of surface water run-off.
- Spillage from standpipes will be directed back to water storage dams or to contained drainage on roads.
- For public and wildlife safety, access to water storage dams will be restricted by fencing.
- Water storage dams will have appropriate fauna egress matting installed.

Blasting

- Blasting at the W3/5 site will be timed to coincide with favourable climatic conditions.
- ENVF06 W3/5 Blast Planning Checklist must be initiated the morning of the intended blast and completed 1 hour prior to any blasting activity at W3/5. A blast cannot be undertaken if the form has not been signed by either of the Cliffs Environmental Department, Cliffs Mine Manager or their delegate.

Calibration and Maintenance of Osiris Dust Monitor

- The Osiris Dust Monitor will be sent to the supplier for calibration on an annual basis or as required.
- For routine maintenance procedures including monthly filter changes and operational criteria for the Osiris Dust Monitor, refer to documentation provided in W:\Environmental\Air Quality\Osiris.

Document No:	EOP05	Prepared by:	JC	Revision No:	2
Document Name:	Dust Management	Reviewed by:	JC	Revision Date:	Feb 08
Location:	K:\Environmental\EMS\EMP\EOPs\EOP05 Dust Management	Authorised by:	RH	Page No:	1 of 2

CLIFFS	EOP05 Dust Management	Koolyanobbing Iron Ore Project

Monitoring

- Dust emissions from mining activities are monitored via the Osiris dust monitor situated within the conservation zone on W3. Readings are downloaded monthly by the Environmental Department.
- Passive dust levels are monitored using particulate deposition gauges, eight of which are installed across the main Windarling Range, west of the W3 deposit. Sample bottles are collected and sent to the laboratory for analysis every two months.
- Monitoring of the health and vigour of *Tetratheca paynterae* and *Ricinocarpos brevis* populations will be undertaken by the Environmental Department and qualified botanists.
- Health and vigour of remnant vegetation adjacent to the mining operations will be monitored to assess impacts from dust or saline water.
- General dust levels around site will be monitored by the Environmental Department.

Reporting

- Monthly dust emissions are reported internally in monthly due diligence reports prepared by the Environmental Department.
- Dust generation will be reported via the annual National Pollutant Inventory (NPI).
- Methods undertaken to control dust emissions will be reported in the DoIR AER.

Document No:	EOP05	Prepared by:	JC	Revision No:	2
Document Name:	Dust Management	Reviewed by:	JC	Revision Date:	Feb 08
Location:	K:\Environmental\EMS\EMP\EOPs\EOP05 Dust Management	Authorised by:	RH	Page No:	2 of 2

APPENDIX 20

Aboriginal Heritage Operating Procedure (Cliffs 2009h)

CLIFFS	Aboriginal Heritage Operating Procedure	Koolyanobbing Iron Ore Project

Objectives

- Inform exploration and operational mine personnel of Aboriginal Heritage.
- Identify the presence of Aboriginal heritage sites within exploration and mine development areas.
- Prevent disturbance to Aboriginal Heritage sites except where disturbance has been consented to under Section 18 of the *Aboriginal Heritage Act 1972* (WA).
- Identify actions to be taken in the event that new potential Aboriginal Heritage sites are identified during exploration and mine development.
- Protect known heritage sites outside of the exploration and mine development footprints.

Management

- Mine site inductions will include presentations on Aboriginal Heritage sites identified on and near mine tenements. The presentations will discuss the importance of avoiding these sites and how to identify other potential Aboriginal Heritage sites in the field.
- Ethnographic surveys (and if deemed necessary, archaeological surveys) for Aboriginal Heritage sites will be undertaken in consultation with the relevant traditional owners and consultants prior to the any land disturbance.
- Unless consent under s18 of the *Aboriginal Heritage Act 1972* (WA) has been granted by the Minister for Indigenous Affairs, identified Aboriginal Heritage sites will not be disturbed.
- Identified Aboriginal Heritage sites will be marked in exploration and mine development plans. Where practicable, Aboriginal Heritage sites will also be marked in the field by the Mine Manager (or delegate), on advice of the Senior Community Relations Advisor, relevant traditional owners and the Department of Indigenous Affairs.
- The Department of Indigenous Affairs will be notified of identified Aboriginal Heritage sites where consent of the relevant traditional owners has been obtained.
- If mine personnel identify a previously unrecorded area of Aboriginal Heritage artefacts, the mine operations within nominally 20m of the artefacts will temporarily cease and the discovery reported to the Senior Community Relations Advisor. The Senior Community Relations Advisor will arrange for an archaeologist (and the traditional owners, if appropriate) to attend to the area to determine the significance (if any) of the identified artefacts.
- If mine personnel identify skeletal material that may be of Aboriginal Heritage significance, the work within nominally 20m of the skeletal material will temporarily cease and the discovery reported to the Senior Community Relations Advisor. The Senior Community Relations Advisor will arrange for the Police (Southern Cross Police Station: 08 9049 1000) and an archaeologist to attend to the site to determine the significance (if any) of the skeletal material. If the skeletal material is deemed to be of Aboriginal Heritage significance, the Senior Community Relations Advisor will notify the relevant traditional owners and the Department of Indigenous Affairs (where consent of the relevant traditional owners has been obtained).
- Where work is temporarily ceased due to identification of artefacts or skeletal material, works will only recommence following direction of the Mine Manager on advice from the archaeologist and/or the Police (as appropriate).
- If it is identified that an Aboriginal Heritage site requires particular management actions for its long-term protection, the Senior Community Relations Advisor (or delegate) will prepare and implement a Cultural Materials Management Plan for that site.

Monitoring

- During clearing activities, the Mine Manager will ensure that the clearing remains within the designated clearing area.
- The Senior Community Relations Advisor (or delegate) will periodically monitor known Aboriginal Heritage to confirm that disturbance has not occurred.

Reporting

- Unauthorised interference to an identified Aboriginal Heritage site will be reported to the Senior Community Relations Advisor. The Senior Community Relations Advisor will advise the traditional owners and the Department of Indigenous Affairs of the unauthorised disturbance.

Document No:		Prepared by:	S Hawkins	Revision No:	4
Document Name:	Aboriginal Heritage Operating Procedure	Reviewed by:	C Hayward	Revision Date:	June 2009
Location:		Authorised by:	V Roberts	Page No:	1 of 1

APPENDIX 21

Consultation on draft EIA (PER) document

The table below identifies comments received from EPA, DEC, DoW, and DIA as part of consultation (via EPA) on the draft EIA (PER) document (Revision E), and Cliffs' response/comment. Cliffs understands that DMP and the Shire of Yilgarn were also consulted via EPA, however, no comments were received. Where the table identifies that the EIA (PER) document has been amended in response to the comments received, these amendments have been incorporated into the EIA (PER) document.

No	DMA	DMA Comment	Cliffs' Response
General Advice			
1	EPA SU	Backfilling of the J1 West Pit In ESD (p. 87) raised an interesting point regarding backfilling of the J1 West Pit "the J1 East Pit does not contain a sufficient volume of overburden to backfill the J1 West Pit to a level that would prevent the formation of permanent surface water." If after further assessment this statement is still true it should be addressed in the PER.	As identified in Section 1.6.1 of the EIA (PER) document (Rev E), backfilling of the J1 West Pit to the natural groundwater level of 417mAHD (the level conservatively required to prevent permanent surface water) would require 4,200,000m^3 of overburden material. As also identified in Section 1.6.1, the J1 East Pit contains 4,060,000m^3 of overburden material. The volume of overburden material within the J1 East Pit would therefore be insufficient to backfill the J1 West Pit to the natural groundwater level. Consideration of mine staging to enable backfilling is discussed in detail in Section 1.6.1. Section 1.6.1 does not place significant emphasis on the differential volumes as there are greater constraints affecting backfilling opportunities (i.e. resource efficiency, operational efficiency and potential resource development as detailed in Section 1.6.1 of the EIA (PER) document (Rev E)). Action: 1. No changes to the EIA (PER) document are considered necessary.
2	EPA SU	Non-significant impacts The PER should demonstrate why other impacts such as waste, noise, vibration and gaseous emissions are not considered to be significant and therefore will not be assessed.	One of the purposes of an ESD is to identify the factors relevant to a proposal that will be assessed in an EIA document, and reach agreement on such factors between EPA and the proponent. Noise and vibration, waste and gaseous emissions were identified in the ESD (Cliffs 2009a) as being non-significant factors that would not be assessed in the EIA (PER) document. Despite the above, Cliffs will insert the text regarding on non-significant impacts that is contained in the ESD into Section 1.8.1 of the EIA (PER) document to resolve this matter. Action: 1. The EIA (PER) document has been amended in Section 1.8.1 to include the text on non-significant impacts as contained within the ESD.
3	EPA SU & DEC	Stand alone proposal The PER should reflect the statement in the ESD that this proposal in not dependent on approval of any future proposals.	The relationship between the Mt Jackson J1 Deposit proposal and Cliffs' existing Koolyanobbing Iron Ore Project operations is detailed in Section 1.7 of the EIA (PER) document (Rev E). As identified in Section 1.7, the relationship between the Mt Jackson J1 Deposit proposal and Cliffs' existing Koolyanobbing Iron Ore Project is identified as use of part of the existing haul road, crushing of the ore within the Koolyanobbing processing facility, rail transport to the Esperance Port and export to international customers. These relationships do not form part of the Mt Jackson J1 Deposit proposal (due to this infrastructure being existing and approved under separate statutory approvals). Cliffs was of the understanding that this question by EPA and DEC was resolved in discussions and amendments on the ESD for this proposal. Accordingly, the intention of DEC and EPA in again raising this

			question is unclear and of concern to Cliffs. This appears to stem from an incorrect view that ore in the Mt Jackson J1 Deposit is not of an independent marketable value. As identified in Section 1.4.1 of the EIA (PER) document (Rev E), the iron grade of the Mt Jackson J1 Deposit is 60.06% Fe; being above the current market standard. As there is no suggestion within the Mt Jackson J1 Deposit project referral or ESD or EIA (PER) document or any other documents or correspondence produced by Cliffs to date that the Mt Jackson J1 Deposit proposal being dependent on approval of other deposits, that this matter was previously addressed in the ESD, and further that the relationship between the Mt Jackson J1 Deposit proposal and Cliffs' existing mine operations is currently clear in the EIA (PER) document (Rev E), a change to the EIA (PER) document is not considered relevant or necessary. <u>Action:</u> 1. No changes to the EIA (PER) document are considered necessary.
4	DEC	<u>Project definition</u> The PER should clearly define, to the extent possible, the proposed locations and footprints of all infrastructure within the document, and impact assessments for flora, fauna (including short range endemics) and vegetation types accordingly.	The layout of the main components for the Mt Jackson J1 Deposit proposal are identified in Figures 1-3 and 1-4 of the EIA (PER) document (Rev E). The main components of the proposal are identified as the haul road and gravel pit, mine pits, overburden landform and operational areas. The specific location of the haul road and gravel pit, mine pits and the overburden landform are identified in the EIA (PER) document. The locations of the operational areas (stockpiles, administration/office buildings, workshops and storage buildings, water supply dams and internal access roads) are specified to the extent that they will occur within the mine area outside of the areas designated for the mine pits, overburden landform and operational areas, and limited to a maximum of 223ha in area. As identified in Section 1.4.3, the location of individual components of the operational areas have not been specified in order to maintain flexibility during mine development. It has been Cliffs' experience that specifying operational areas to fine detail can prevent incremental environmental improvements that may be possible during mine development, such as realignment of internal mine roads or repositioning of stockpile areas. Such specificity effectively 'locks-in' impacts; to alter the specified locations would require further government approvals, which in turn, would unnecessarily result in project delays and increased costs despite seeking to achieve an environmental improvement. Accordingly, in order to maintain the ability to minimise environmental impacts during mine operations such flexibility is necessary. In noting the above, the locations of the operation areas are not without constraints; they are capped at a total clearing area (223ha) and areas identified as having highest flora values (refer Section 3.1) and fauna values (refer Section 3.2) have been demarcated within Biodiversity Areas to protect such values. Accordingly, the mine operational areas have a specified maximum area and will occur within the areas of comparatively lower flora and fauna values. As also identified in Sections 3.1 (flora and vegetation) and 3.2 (fauna), the impact assessment has considered impacts to all areas within the mine area outside of the biodiversity areas, and therefore is

			conservative. Accordingly, specifying the exact locations of the operational areas would not increase the level of impact assessed in the EIA (PER) document. This approach of identifying broad infrastructure areas, without specifying detailed components, has also been accepted by EPA for other development proposals. <u>Action:</u> 1. No changes to the EIA (PER) document are considered necessary.
5	DEC	<u>Access route and infrastructure</u> The PER should clarify why the haul road is not aligned on existing access tracks; include biodiversity conservation constraints.	Cliffs considers that any detailed discussion within the EIA (PER) on aligning the haul road to existing access tracks would be non-sensical and misleading. Haul roads need to be relatively straight and on relatively flat ground so as not to present an ongoing operational hazard to mine staff. As the existing access tracks are not straight and sections are on sloped land due to being near the base of the Mt Jackson Range. Accordingly, it would be non-sensical and misleading to suggest that Cliffs has considered aligning the haul road to existing tracks, when it has not. The haul road alignment has been based on safety and engineering considerations (e.g. straight alignment, gentle topography, sight lines, etc) as well as environmental considerations (e.g. minimising total vegetation clearing, avoiding or minimising impacts on flora and fauna values, etc). The EIA (PER) document has been amended to clarify this. <u>Action:</u> 1. The EIA (PER) document (Rev F) has been amended to clarify that the basis for the haul road location has been based on safety and engineering considerations (e.g. straight alignment and on relatively flat land) as well as environmental considerations (e.g. minimising vegetation clearing, avoiding significant flora and fauna values).
6	DEC	<u>Reliance on un-audited existing management practices</u> The PER should contain discussion verifying that the current management practices are adequate in fulfilling the intent and obligations of Statement 627 (including the outcomes of audits), thereby confirming they are acceptable for application in the J1 proposal.	The suggestion by DEC that Cliffs' existing management plans are un-audited is incorrect. Cliffs' last independent audit of its environmental management plans under Statement 627 was issued to DEC on 29 August 2007 in accordance with the conditions under Statement 627. Consistent with Cliffs' ISO 14001:2004-certified Environmental Management System, internal and external review (audit) of these plans and procedures are undertaken regularly. These internal and external reviews have confirmed that these plans and procedures are adequate in fulfilling the intent and obligations of Statement 627, and due to site and operational similarities with Cliffs' existing mine operations (under Statement 627) this suite of plans and procedures are also considered appropriate for the Mt Jackson J1 Deposit proposal. The EIA (PER) document has been amended to clarify this. It should be noted that management plans and procedures are not normally provided with an EIA (PER) document; Cliffs has exceeded the standard assessment requirements in providing the management plans and procedures up-front, rather than post-approval as occurs for many development projects. It should be further noted that management plans and procedures submitted as a requirement of the EIA (ERMP – Environmental Review and Management Plan) process, being the level of assessment above an EIA (PER) process, are also not assessed against their previous implementation.

			Cliffs has prepared and provided these management plans and procedures with the EIA (PER) document so that they can be considered and commented on by Government and the public during the environmental impact assessment process. Cliffs welcomes specific comments on the management actions contained in these plans and procedures. <u>Action:</u> 1. Section 1.4.7 of the EIA (PER) document (Rev F) has been amended to provide general comment on auditing and compliance with Cliffs' existing management plans and procedures.
7	DEC	To assist DEC in providing high quality advice to the EPASU please supply electronic shape files providing the locations of flora, fauna, vegetation community types and the proposed J1 mine footprint are provided by the proponent for comparison with DEC datasets covering the area.	Shape files of the Mt Jackson J1 Deposit proposal infrastructure and the environmental values of the Mt Jackson Range were provided to EPA with the proposal referral documentation. In response to the DEC comment (left), Cliffs submitted a copy of the following digital data each to EPA and DEC on 17 June 2009: Mt Jackson J1 Deposit proposal: o mine area boundary; o overburden landform boundary; o mine pit boundary; o biodiversity area boundaries; o haul road boundary; and o gravel pit boundary. Flora and vegetation: o vegetation community boundaries (including PEC); o flora species locations (DRF, DEC-classified Priority flora, and flora of conservation interest). Fauna: o Malleefowl mounds and interpreted habitat; and o Tree-stem Trapdoor Spider burrows and interpreted habitat. <u>Action:</u> 1. Cliffs has provided the requested information. No further actions are necessary.
8	DEC	Details on all surveys and taxonomic investigations should be provided to DEC and the EPA. This information would provide some level of certainty that species have been identified outside the proposed disturbance area as reported. All surveys and investigations should also be provided with the PER.	All relevant survey and investigation reports were provided with the EIA (PER) document provided to DEC and other DMAs (subject to copyright limitations). Electronic copies of these documents will be provided with hard copies of the EIA (PER) document. Electronic copies of these documents will also be provided on Cliffs' website during the 6-week public review period. <u>Action:</u> 1. Cliffs to continue its practice of providing electronic copies of cited references (subject to copyright restrictions) with the EIA (PER) document.
Biophysical - Flora & Vegetation			
9	DEC	As the vegetation mapping provided in the PER suggests	Figure 3-6 and Table 3-2 of the EIA (PER) document (Rev E) identifies that vegetation community *DaS* -

		that the vegetation community – Banded Ironstone Formations with *Dryandra arborea,* occurs within the proposed impact area the PER document should: • reference *A Biodiversity Audit of Western Australia* (CALM 2003) which rates the vegetation community, as a community at risk; and • address the impacts to this community and the potential to minimise, mitigate, manage etc these impacts.	*Dryandra arborea Shrubland on banded ironstone* will be impacted by the Mt Jackson J1 Deposit proposal. The area of impact (14ha), the extent of the vegetation community on the Mt Jackson Range (108ha), the percentage of impact to the vegetation community (13%) and Western Botanical's impact ranking (Moderate) is also identified. This community is also assessed as part of the impacts of the Mt Jackson J1 Deposit proposal on the recommended Mt Jackson Range Priority Ecological Community (PEC). As detailed assessment within the EIA (PER) document are undertaken only for predicted impacts considered to be *high*, and the predicted impacts to this vegetation community were considered to be *moderate*, a detailed discussion within the EIA (PER) document on impacts to this vegetation community are not considered necessary. With regard to referencing the document *A Biodiversity Audit of Western Australia* published in 2003 by DEC (formerly as the Department of Conservation and Land Management), Cliffs has reviewed this document and considers that reference to it would not provide any additional benefit to the assessment of the proposal in addition to that already provided in the EIA (PER) document. The threatening processes to this community listed in *A Biodiversity Audit of Western Australia* (grazing pressure, feral animals, and changed fire regimes) as they relate to the Mt Jackson J1 Deposit proposal are already addressed in the EIA (PER) document (Rev E). As further identified by Figure 3-6 of the EIA (PER) document, impacts to this vegetation community from the Mt Jackson J1 Deposit proposal occur only from the mine pits. Cliffs has already minimised its impacts to this community to the greatest extent possible through all other locations of this community within the mine area being demarcated within biodiversity areas. Accordingly, there are no potential additional measures which Cliffs could implement or consider within the EIA (PER) document that would further avoid or minimise impacts to this vegetation community. Action: 1. No changes to the EIA (PER) document are considered necessary.
10	DEC	Given the proposed impacts of various Cliffs' proposals (including J1) DEC is currently assessing the status of: • Priority 3 *Spartothamnella* sp. Helena and Aurora against IUCN criteria (potential to be DRF). • *Banksia* (*Dryandra*) *arborea*. DEC has recommended this species be listed as Priority Flora. The results of this review should be included in the final PER.	Cliffs will assess the impacts of its proposals on flora species based on the most current classification level. If the classification level of any flora species changes prior to public release of the EIA (PER) document, then the EIA (PER) document will be amended accordingly with the latest classification level. If the classification level changes after public release of the EIA (PER) document, then such changes could be acknowledged in the response to public submissions and/or the EPA assessment report. If a change to the classification level for *Spartothamnella* sp. Helena and Aurora Range and/or *Dryandra arborea* occurs, this will not change the potential impact of the proposal on these species and therefore only minor changes to the EIA (PER) document would be necessary. Action: 1. No changes to the EIA (PER) document are considered necessary at this stage, however, if the classification level of any species changes during the assessment this will be acknowledged through an appropriate manner subject to the timing (i.e. PER, Response to Public Submissions or EPA Assessment Report).

11	DEC	Cumulative impacts to the Priority 3 *Spartothamnella* sp. Helena and Aurora, are discussed for Mt Jackson (less than 6%). The regional impact of 17.24% should also be clearly presented (see Table 27: Western Botanical, 2009, p. 114) within the PER document.	Table 3-1 of the EIA (PER) document (Rev E) identifies the cumulative impact to the regional population from Cliffs operations will be ≤18%. As also identified in Table 3-1 and Section 3.1.4, the regional impact on this species is difficult to accurately determine due to the number of individuals within some populations being unknown, and therefore counted only as a single individual in calculations. Accordingly, the impact has been identified as being ≤18% in recognition of this inherent uncertainty, rather than potentially misleading the reader by stating a specific 17.24%. This approach has been discussed with Western Botanical as a conservative and acceptable approach for the EIA (PER) document given the uncertainties in regional population numbers for this species. As the cumulative impact to this species is currently identified in the EIA (PER) document, changes to the EIA (PER) document are not considered necessary. <u>Action:</u> 1. No changes to the EIA (PER) document are considered necessary.
12	DEC	The PER should address the management of *Spartothamnella* sp. Helena and Aurora. This should be based on the undertaking and results of: • an assessment of the habitat requirements of *Spartothamnella* sp Helena and Aurora to identify possible areas for survey and protection; • investigations into the risk of the species from dust impacts as known individuals are in close proximity of to the mine pit and haul road (anatomical features of the species may make it highly susceptible to adverse chronic dust impacts); and • investigations into seed germination potential and mechanisms, and the likely success of the species in rehabilitation. This information should be provided as soon as possible for review and should also be provided with and addressed in the PER.	As identified in Section 3.1.4 of the EIA (PER) document (Rev E), the Mt Jackson J1 Deposit will impact between 2 and 5 individuals of *Spartothamnella* sp. Helena and Aurora Range. An assessment of the potential impacts and proposed avoidance and management measures are assessed in Section 3.14. Western Botanical has advised both Cliffs (March 2009) and the DEC's Goldfields Threatened Flora Recovery Team (May 2009) that based on the identified individuals and habitats for *Spartothamnella* sp. Helena and Aurora Range to date, this species does not show any particular habitat association. This species has been located only opportunistically during field surveys. It has been suggested that birds may be the transporters of seeds of this species, and its location and distribution dependent on the largely random location of where such birds defecate. Accordingly, identification of possible areas for targeted surveys and subsequent protection does not appear feasible or practical. The EIA (PER) document has been amended to clarify this. With regards to dust impacts, as identified in Section 3.5 of the EIA (PER) document (Rev E) and based on Cliffs' existing mine operations, the dust impacts from a mine pit which could *potentially* create chronic dust impacts occur within approximately 50m of a mine pit and within approximately 10m of a haul road. As identified in Figure 3-2, individuals of *Spartothamnella* sp. Helena and Aurora Range located with biodiversity areas occur at more than 150m from the J1 West Pit, and therefore is considered to be beyond the area which chronic impacts could potentially occur. As identified by Figure 3-1, individuals of *Spartothamnella* sp. Helena and Aurora Range are located adjacent to the haul road corridor (6 individuals located at approximately between 3m and 87m from the haul road corridor boundary), and partially on the haul road corridor (3 individuals located at between 0m and 3.6m from the haul road corridor boundary). As discussed in Section 3.1.4, Cliffs will seek to avoid the 3 individuals of *Spartothamnella* sp. Helena and Aurora Range during construction of the haul road, however, if direct impacts are avoided these individuals of *Spartothamnella* sp. Helena and Aurora Range would still be within the haul road corridor

			and directly adjacent to the haul road. This creates as 'catch-22' scenario, in that by seeking to avoid direct impacts through removing these individuals this may expose these individuals to indirect dust impacts. Due to the proximity identified above, the potential impact of dust on this species is unable to be accurately determined other than to identify that individuals within approximately 10m of the haul road may be subject to dust loading, excepting the individuals located greater than 10m from the haul road to which no indirect dust impacts would be expected. The EIA (PER) document has been amended to clarify this. For many arid species, including *Spartothamnella* sp. Helena and Aurora Range, the seed germination potential, mechanisms for germination and the likely success in rehabilitation is not known until it is tested during rehabilitation works. This lack of knowledge does not, however, lend to a conclusion that species such as *Spartothamnella* sp. Helena and Aurora Range will not be successful in rehabilitation; but simply that there is an absence of certainty regarding its success or failure. Given this absence of information, Cliffs has made commitments to collect topsoil and seed from areas containing *Spartothamnella* sp. Helena and Aurora Range for use in rehabilitation works. The above commitments are considered practicable means by which Cliffs can seek to mitigate its impacts on *Spartothamnella* sp. Helena and Aurora Range; with the results of rehabilitation resolving the current uncertainty as to the likelihood of success of this *Spartothamnella* sp. Helena and Aurora Range in rehabilitation. <u>Action:</u> 1. The EIA (PER) document has been amended in Section 3.1.4 to clarify that targeted surveys for *Spartothamnella* sp. Helena and Aurora Range do not appear possible due to this species not displaying specific habitat affinities. 2. The EIA (PER) document has been amended in Section 3.1.4 to clarify that indirect dust impacts to *Spartothamnella* sp. Helena and Aurora Range immediately adjacent to the haul road are unable to be accurately determined. 3. The EIA (PER) document has been amended in Section 3.1.4 to clarify the uncertainty regarding the seed germination potential, mechanisms for germination and the likely success in rehabilitation for *Spartothamnella* sp. Helena and Aurora Range (in context with this same uncertainty being relevant for many other arid species).
13	EPA SU & DEC	Conditional approval of the J1 East Pit is the province of the Minister not the proponent therefore reference to this should be removed from the PER (p.73 & 75). Also reference to an economic value of *Bossiaea* sp. Mt Jackson is not appropriate and should be removed from the PER document.	As identified in Section 3.1.4 of the EIA (PER) document (Rev E), Cliffs has considered a range of potential options to seek to minimise or mitigate impacts on this *Bossiaea* sp. Jackson Range. Seeking conditional approval of the J1 East Pit is one of the potential options considered by Cliffs due to this pit impacting 12% of the 18% impact of the Mt Jackson J1 Deposit proposal on this species. It is of significant value for government and the public to be informed of all options that Cliffs has considered to minimise or mitigate impacts on this species, not simply options that have been selected. If this potential option was not considered in the EIA (PER) document, then it may be open for the government and the public to criticise Cliffs for not considering this option. Accordingly, Cliffs considers that deletion of the discussion on this potential option is would detract from the transparency in Cliffs' mine planning considerations. Further to the above, Cliffs has amended the discussion to have reference to a constraining proponent

			commitment rather than a condition from the Minister for the Environment. With regards to the economic value of *Bossiaea* sp. Jackson Range, Cliffs acknowledges the concern of placing an economic value on each of the 67 individuals of *Bossiaea* sp. Jackson Range to be impacted by the J1 East Pit. Accordingly, Cliffs has amended the EIA (PER) document to reflect the total value of the J1 East Deposit as a whole, rather than the value per individual to be impacted. <u>Action:</u> 1. The EIA (PER) document has been amended in Section 3.1.4 to change Cliffs' consideration regarding approval of the J1 East Pit and *Bossiaea* sp. Jackson Range from consideration of a conditional approval (i.e. a Minister imposed condition) to a constraining proponent commitment (i.e. a commitment proposed by the Proponent). 2. The EIA (PER) document has been amended in Section 3.1.4 to delete reference to a theoretical economic value of each of the 67 individuals of *Bossiaea* sp. Jackson Range to be impacted by the J1 East Pit.
Biophysical – Fauna			
14	DEC	Copies of the summarised and outstanding reports referenced in Bamford (2009) should be provided for review prior to the finalisation of the PER.	Fauna surveys on the Mt Jackson Range and the surrounding region have been undertaken over a period of 9 years; between 2000 and 2008. Some of these surveys were prepared for Cliffs' internal use, and were not prepared for public review. Due to the number of fauna surveys undertaken and the varying purpose of reports produced, Cliffs engaged Dr Mike Bamford of Bamford Consulting Ecologists to prepare a detailed consolidation of all studies undertaken during the 9 year period for inclusion with the EIA (PER) document. This was considered to be the most practicable manner in which to present the results of the various studies in a single consolidated report for public review, and without unnecessarily complicating review of the proposal through multiple fauna survey reports. As some of the fauna surveys also follow previous surveys, the consolidated report prevents possible data misinterpretation or confusion. Accordingly, Cliffs does not consider it necessary or appropriate to provide the reports referenced in Bamford (2009) for public review with the EIA (PER) document. Despite the above, if DEC would like any specific information or clarification on any of the work identified in Bamford (2009), Cliffs will be happy to provide such information and/or seek advice from Dr Bamford. <u>Action:</u> 1. No changes to the EIA (PER) document are considered necessary.
15	EPA SU	<u>Malleefowl</u> At EPA Meeting No 951, 5 March 2009, the Members approved the ESD subject to the ESD noting that the PER will clarify the importance of inactive Malleefowl mounds particularly with regard to Malleefowl movement, potential for Malleefowl to reuse old 'inactive' nests and population trends. Ensure that the PER addresses this requirement.	Section 3.2.4 of the EIA (PER) document (Rev E) states that "*L. ocellata* may move mounds between breeding seasons, and therefore the protection of habitat containing inactive *L. ocellata* mounds is considered important". The EIA (PER) document has been amended to expand on this matter, including clarification that the *L. ocellata* on the Mt Jackson Range have showed a general tendency to occupy the same mounds in each breeding year, with two inactive mounds becoming active during 6 years of the surveys. With regard to population trends, despite the Mt Jackson Range being the largest survey area in Australia

			for *L. ocellata*, and surveys being undertaken over a period of 6 years (2004 to 2009), long-term data on population trends are not available beyond identifying mounds that are recently active or are inactive, and their locations, as depicted in Figures 3-16 and 3-17. In order to accurately evaluate population trends of the Mt Jackson Range *L. ocellata* population, additional types of data would need to be collected and a greater survey period would be required. Further, although information on population trends of the Mt Jackson Range *L. ocellata* population would be interesting, it would unlikely change the impact assessment outcome for this species due to the Mt Jackson J1 Deposit proposal avoiding impacts to all recently active *L. ocellata* mounds, minimal impact to inactive *L. ocellata* mounds (≤9 mounds of the ≥206 mounds on the Mt Jackson Range), the separation distances from recently active mounds and mine infrastructure (310m to >2,000m separation), and a minimal impact on interpreted *L. ocellata* nesting habitat (≤14% of ≥3,504ha on the Mt Jackson Range). Accordingly, a change to the EIA (PER) document to consider population trends is not considered necessary. Action: 1. The EIA (PER) document has been amended in Section 3.2.4 to clarify the potential for previously inactive *L. ocellata* mounds to be used, specifically noting the data which identifies that of the 10 recently active *L. ocellata* mounds identified on the Mt Jackson Range (for which more than one year of data exists) 8 mounds have remained consistently active and 2 previously inactive mounds have become active.
16	DEC	Similarly, a Malleefowl impact assessment should be undertaken using available data on the local population, rates of mortality, fecundity, longevity and predation. This impact assessment should include an analysis of the viability of the local population following mining. Based on this report the PER should adequately quantify and evaluate the extent to which this species may be impacted. Adopting habitat as a surrogate for Malleefowl populations does not identify whether the Mt Jackson Malleefowl population will remain viable following this level of impact.	As identified in Section 3.2.4 of the EIA (PER) document (Rev E), Bamford (2009) estimated that, the Mt Jackson Range may contain between 20 to 35 pairs of *L. ocellata* based on mound density and the area of interpreted habitat. Section 3.2.4 of the EIA (PER) document has been amended to reflect this estimate. With regards to DEC request for rates of mortality, fecundity, longevity and predation, such data is not available for the Mt Jackson Range *L. ocellata* population, and would similarly not be available for most populations of *L. ocellata* throughout Australia. As identified in Section 3.2.4 of the EIA (PER) document, the Mt Jackson J1 Deposit proposal is not expected to have a significant impact on *L. ocellata* individuals or *L. ocellata* habitat. Accordingly, the Mt Jackson J1 Deposit proposal would not expected to affect the viability of the Mt Jackson Range population. Section 3.2.4 of the EIA (PER) document has been amended to clarify that the non-significant impact expected from the Mt Jackson J1 Deposit proposal is not expected to affect the viability of the Mt Jackson Range *L. ocellata* population. Action: 1. The EIA (PER) document has been amended in Section 3.2.4 to identify the Mt Jackson Range *L. ocellata* population estimate contained in Bamford (2009). 2. The EIA (PER) document has been amended in Section 3.2.4 of the EIA (PER) document has been amended to clarify that the non-significant impact expected from the Mt Jackson J1 Deposit proposal is not expected to affect the viability of the Mt Jackson Range *L. ocellata* population.

17	DEC	<u>Short Range Endemic Fauna - Millipedes</u> Unless evidence can be provided that *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson is located outside of the mining foot print (see McMillan 1996 referenced in the Ecologia 2001 report), a further survey is required to determine their presence outside of the mining footprint. The survey methodology should be designed in accordance with the new EPA Short Range Endemic Guidance Statement 20 (which will be available on 25 May 2009) and in consultation with and agreement by DEC. A further Survey is required as: • The two short range endemic (SRE) millipedes (*Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson) are only known from records within the J1 West pit (draft PER p. 104). • The previous survey was undertaken under inappropriate dry environmental conditions. To successfully collect adult millipedes for taxonomic determination, wet conditions are required and at least one further survey should be undertaken during appropriate conditions (i.e. during the wetter parts of the year, May to August) when the likelihood of success is much greater. • Given the Mt Jackson Range is a series of discontinuous peaks with distinct landforms, vegetation associations and elevations (see Western Botanical, 2009), there is very significant potential for different peaks within the Mt Jackson Range to contain unique species of millipedes. Vegetation mapping alone is not a suitable habitat surrogate for these species. This information should be provided as soon as possible for review and should also be provided with and addressed in the PER.	The DEC comment recommends an additional SRE survey in order to reduce uncertainty on the distribution of the millipedes *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson. Cliffs disagrees with this recommendation as outlined below. Firstly, the reference by DEC to McMillan (1996, in Ecologia 2001) appears irrelevant. McMillan's work relates to a recording of shells of the land snail *Sinumelon kalgum* for Cliffs' existing Koolyanobbing Iron Ore Project mine operations, not *Antichiropus* sp. nov. Mt Jackson or *Atelomastix* sp. Mt Jackson. Secondly, both species were initially identified in 2006 (refer to Bamford 2009) in the area of the J1 West Pit, as depicted in Figure 3-23 of the EIA (PER) document (Rev E). Following this, a second survey was subsequently undertaken in 2008 by Biota (2009) to assist in determining if these species occur in non-impact areas of the Mt Jackson Range. DEC (EMB) was consulted on 25 August 2008 regarding the Mt Jackson J1 Deposit proposal (including Cliffs' proposed range of surveys, including the SRE fauna survey), and further, Dr Mark Harvey of the Western Australian Museum was consulted on the specific survey scope for the SRE fauna survey. This survey was undertaken in accordance with EPA Guidance Statement No. 20. As identified by Biota (2009) and in Section 3.2.4 of the EIA (PER) document (Rev E), this second survey yielded individuals from the *Antichiropus* genus (juveniles, females and fragments), however, did not yield adult males that would have enabled identification to a species level. As also identified in Biota (2009) and in Section 3.2.4 of the EIA (PER) document (Rev E), this second survey did not yield any individuals from the *Atelomastix* genus. A third survey, as recommended by DEC, may similarly not yield suitable individuals (adult males) of *Antichiropus* sp. nov. Mt Jackson or *Atelomastix* sp. Mt Jackson species. The DEC comment that "the previous survey *(being Biota (2009))* was undertaken under inappropriate dry conditions" is not supported. Data from the Australian Bureau of Meteorology (Site: Southern Cross) identifies that the monthly rainfall recorded in October 2008 during the Biota (2009) survey was 21.4mm, being 137% of the long-term monthly average (15.6mm), and the preceding month of September 2008 had 36mm of rainfall, being 185% of the long-term monthly average (19.4mm). Both these months had greater rainfall than in August 2006 (16.0mm, being only 51% of long-term monthly average) when *Antichiropus* sp. nov. Mt Jackson or *Atelomastix* sp. Mt Jackson were recorded, and higher rainfall than the preceding month of July 2006 (15.4mm, being only 40% of the long-term monthly average). Accordingly, the DEC comment that "the previous survey was undertaken under inappropriate dry conditions" is not supported by the independent meteorological data. Further, the recording of a new species of millipede of the genus *Antichiropus* (this species subsequently referred to as *Antichiropus* sp. Mt Jackson 2) during the Biota (2009) survey also contributes to doubt on the DEC comment that the Biota (2009) survey was undertaken during inappropriate dry conditions. As identified in Section 3.2.4 of the EIA (PER) document (Rev E), it is not uncommon for SRE fauna species not to be recorded in successive fauna investigations due to the typical characteristics of such species. It is likely that *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson were not recorded by Biota (2009) as a result of these typical characteristics. A third round of sampling for these species, even

			during the period of May to August as recommended by DEC, may not yield suitable individuals (adult males) of *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson. The above points are supported by the comments within EPA Guidance Statement No. 20 on SRE fauna which states: *"While numerous males of a single taxon may be recorded after rain, in other cases a taxon may be represented by only a single capture event. This is a common pattern in fauna sampling programs, which typically record an abundance of individuals of a few common species, while only single or occasional records are obtained of numerous less common or rare species. This can present an issue for EIA when single records of potential SRE species are situated inside a proposed development area"*. (EPA 2009b, page 10). *"While EPA will expect reasonable effort to be expended in an attempt to place single SRE records from impact areas into context, the EPA recognises that in some cases this may not yield any further records in a reasonable timeframe."* (EPA 2009b, page 10). Accordingly, rather than undertaking a third SRE fauna investigation which may or may not yield *Antichiropus* sp. nov. Mt Jackson and/or *Atelomastix* sp. Mt Jackson, the EIA (PER) document (Rev E) identified that there was uncertainty regarding the distribution of these species and adopted a risk-based assessment. Cliffs' risk-based assessment used vegetation as a surrogate for habitat; consistent with EPA Guidance Statement No. 20 on SRE fauna which states: *"A risk based approach will also be adopted for situations where surveys have been completed, but potential SREs are only recorded from planned impact areas. In this situation a risk-based approach will be considered in cases where:* • *a potential SRE taxon is represented by one or few specimens from only within proposed development areas;* • *contextual data on the wider distribution and status of the taxon is unavailable from the WA Museum or the DEC; and* • *additional targeted surveys appear unlikely to yield results in a reasonable timeframe.* *For potentially restricted taxa that meet the above criteria, the use of habitat as a surrogate for inferring distributional boundaries can again be considered. While there are limitations to the use of such surrogates, this provides the only practicable method of undertaking an informed assessment as to the likelihood of small-scale SRE distributional restrictions."* (EPA 2009b, pages 11-12). *"Vegetation types reflect changes in geology, landform, soil type and hydrology - all of which are likely factors in governing the distribution of SRE taxa."* (EPA 2009b, page 11). As identified by Figure 3-23 of the EIA (PER) document (Rev E), *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson were identified within vegetation communities of codes *AmjS* and *AllaS*. As the scale of vegetation community mapping by Western Botanical (2009) has a high degree of resolution (compared to, for example, the 'Beard' vegetation mapping scale), the mapped vegetation communities are at an appropriate scale for use as a surrogate in assessing potential SRE invertebrate fauna distribution. Vegetation communities AllaS and AmjS occur within both impact and non-impact areas within the mine

			area, and this habitat is connected between the impact and non-impact areas. The assessment identifies that as the habitat occurs within both impact and non-impact areas, and that this habitat is connected, it is considered likely that these species will occur within both the impact and non-impact areas. This assessment and likelihood is supported EPA Guidance Statement No. 20 on SRE fauna, which states: *"If vegetation units are restricted to the potential impact area, and are especially different from adjoining units, then there is the potential for some SREs to be similarly confined (an example might be a granite outcrop in an otherwise sandy environment). In contrast, if similar vegetation units are contiguous and broadly distributed outside of the proposed impact area then the likelihood of SREs being confined to the impact area is reduced."* (EPA 2009b, page 11). With regards to the 3rd DEC point of comment, it appears that DEC may have misinterpreted the assessment on the habitats for *Antichiropus* sp. nov. Mt Jackson and/or *Atelomastix* sp. Mt Jackson in the EIA (PER) document (Rev E) by making reference to Western Botanical (2009) out of context. The Western Botanical (2009) discussion is based on the central and western Mt Jackson Range as a whole and comprising of discontinuous peaks across the approximately 13km length of the range. The assessment of habitat for *Antichiropus* sp. nov. Mt Jackson or *Atelomastix* sp. Mt Jackson contained in the EIA (PER) document (Rev E) asserted only that the vegetation types where these species were recorded occur within habitat that is connected and occurs in both impact and non-impact areas. The areas where this habitat is connected and occurs in both impact and non-impact areas do not both stretch across the discontinuous peaks referred to by Western Botanical (2009). As identified by Figures 3-23, 4-5, 4-7 and 4-8 and of the EIA (PER) document (Rev E), the proposal will impact approximately 45% of the peak on which the Mt Jackson J1 Deposit; with 55% of this one peak not to be impacted. Accordingly, if *Antichiropus* sp. nov. Mt Jackson and/or *Atelomastix* sp. Mt Jackson were limited only to the peak on which the Mt Jackson J1 Deposit is located (which is not suggested, but would be a cautious position DEC may adopt), a risk-based assessment would still conclude that the Mt Jackson J1 Deposit proposal would unlikely place this species at risk due to most of this one peak not being impacted. Representatives for DEC, Cliffs and Biota met on 24 June 2009 to discuss the SRE fauna surveys, and in particular the millipede species *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson. Cliffs and DEC agreed that: • The SRE fauna surveys undertaken to date meet the guidance contained in EPA Guidance Statement No. 20 on SRE fauna surveys, however, there remains uncertainty on the distribution of the millipede species *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson and potential impacts of the Mt Jackson J1 Deposit proposal (due to only one individual of each species being recorded within the mine area). • Due to the uncertainty arising from the survey outcomes, the risk risk-based assessment contained in Biota (2009) and in Cliffs' EIA (PER) document (Rev E) is an appropriate approach to adopt for environmental impact assessment (and consistent with the recommendations of EPA Guidance Statement 20). Further SRE surveys to locate the millipede species *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson are not considered essential, however, additional surveys may be beneficial in reducing this uncertainty.

			• In order to reduce uncertainty and provide improved confidence to DEC that Cliffs' risk-based assessment is appropriate, Cliffs will include additional information in the EIA (PER) document to describe the potential millipede habitat on the Mt Jackson Range, and specifically describe the habitat values of vegetation communities AmjS and AllaS where the millipede species *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson were identified. • While the EIA (PER) document is out for its 6-week public review, Cliffs and DEC will continue discussions on the opportunities for an additional SRE survey including representatives from both Cliffs and DEC and to assist in gaining a clearer understanding of potential habitat distribution. <u>Action:</u> 1. The EIA (PER) document has been amended in Section 3.2.4 to make reference to EPA Guidance Statement No. 20 on SRE Fauna (which was published since submission of the EIA (PER) document (Rev E) to EPA in April 2009). 2. The EIA (PER) document will be amended to include additional information describing the potential millipede habitat on the Mt Jackson Range, and specifically describe the habitat values of vegetation communities AmjS and AllaS where the millipede species *Antichiropus* sp. nov. Mt Jackson and *Atelomastix* sp. Mt Jackson were identified. 3. Cliffs and DEC will continue discussions on the opportunities for an additional SRE survey and potential habitat validation (including representatives from both Cliffs and DEC) while the EIA (PER) document is out for its 6-week public review,
18	DEC	<u>Short Range Endemic Fauna – Land Snails</u> The PER should accurately reflect the outcomes of the Ecologia 2001 report (p. 52). The PER should identify the location of the Rail Corridor in which *Sinumelon kalgum* and *Bothriembryon sp*. were identified and how far away this rail corridor is from Mt Jackson. This will provide confidence that the land snails are distributed through out the Mt Manning region.	As identified by Ecologia (2001), the land snail *Sinumelon kalgum* was recorded at Sites MJ2, BN16, RC19, and RC23, and the land snail *Bothriembryon* sp. was recorded at Site MJ3. For the Mt Jackson Range, the recorded sites were MJ2 (coordinates: 30o15'22''; 119o16'27'') for *Sinumelon kalgum* and MJ3 (coordinates: 30o 14' 59''; 119o 14' 19'') for *Bothriembryon* sp.. Sites MJ2 and MJ3 were located in the vicinity of Cliffs' existing Mt Jackson J2 and J3 Deposit mine operations; not at any impact location for the Mt Jackson J1 Deposit proposal. Accordingly, an amendment to the EIA (PER) document to reflect the outcomes of these species is not considered necessary. Cliffs acknowledges that it may have contributed to a misunderstanding on this matter as the copy of Ecologia (2001) provided with the EIA (PER) document (Rev E) did not contain a map of the fauna sampling sites. This has now been corrected. The rail corridor considered in Ecologia (2001) relates to Cliffs' existing rail corridor, and does not form part of the Mt Jackson J1 Deposit proposal. Accordingly, the location of *Sinumelon kalgum* or *Bothriembryon* sp. identified in the rail corridor does not need to be considered for the EIA (PER) document for the Mt Jackson J1 Deposit proposal. It should also be noted that the assessment of the Mt Jackson J1 Deposit proposal does not need to demonstrate that *Sinumelon kalgum* or *Bothriembryon* sp. are widely distributed throughout the Mt Manning Region as suggested by the DEC comment. <u>Action:</u>

			1. The copy of Ecologia (2001) provided with the EIA (PER) document has been replaced with a copy containing maps of the fauna sampling sites.
19	DEC	<u>*Aganippe castellum*</u> <u>(Tree-stem Trapdoor Spider)</u> Data and/or independent expert opinion should be provided to verify the conclusions made on page 97 of the draft PER that '*A. castellum* are unlikely to be significantly affected by long-term mine operations' and surrounding individuals not directly impacted by the proposal (i.e. individuals in close proximity to the footprint) 'are unlikely to be indirectly impacted by mine operations'. This information should be provided as soon as possible for review and should also be provided with and addressed in the PER. Specialist reports should be provided as soon as possible for review and should also be provided with and addressed in the PER, including: • a report detailing the methodologies, and associated limitations, used to estimate the population size and inferred habitat for the Wildlife Conservation Act (Schedule 1) listed Tree-stem Trapdoor Spider *Aganippe castellum*. • genetic studies on collections of A. castellum from the Wheatbelt and BIF Ranges in the Goldfields. It was previously indicated that these studies were commissioned in an attempt to investigate whether the Tree-stem Trapdoor Spider(s) 'at the Mt Jackson Range, Windarling Range and Koolyanobbing Range is *A. castellum* (or subspecies of *A. castellum*), or alternatively, a different species with similar characteristics	The results of field surveys and an assessment of the potential impacts of the Mt Jackson J1 Deposit proposal are identified in Section 3.2.4 of the EIA (PER) document (Rev E). As identified in Section 2.3.4, the surveys and the report were produced by the independent consulting scientists at Bamford Consulting Ecologists. The methodologies for surveys and populations estimates for *A. castellum* are detailed in Section 4.22 of Bamford (2009), which was provided with the EIA (PER) document (Rev E). As this information is currently contained in Bamford (2009), an amendment to Bamford (2009) to include this information is not considered necessary. Bamford (2009) provided an independent estimate of approximately 200,000 individuals of *A. castellum* on the Mt Jackson Range, identified that the Mt Jackson J1 Deposit proposal may have a moderate impact on this species, and notes that the Mt Jackson J1 Deposit proposal will have a direct impact to approximately 5.9% of the interpreted habitat. Additional data or an additional expert opinion is not considered necessary. Further to the above, the potential impacts of the Mt Jackson J1 Deposit proposal on *A. castellum* (as identified by Bamford (2009)) are also stated in the EIA (PER) document (Rev E). As stated in the EIA (PER) document, although impacts to approximately 6% of the *A. castellum* population on the Mt Jackson Range (approximately 12,000 individuals) could be regarded as high in number, in context with the total estimated population (200,000 individuals) these direct impacts (6%) are considered to be non-significant, and in consideration of the impacts being confined to the western extent of the Mt Jackson Range any indirect impacts could equally expected to be confined to the western extent. As the above information is currently contained in the EIA (PER) document (Rev E), no changes to this document are considered necessary. Further to the above, the EIA (PER) document (Rev E) identifies that, based on observations at Cliffs' Koolyanobbing mine operations, individuals of *A. castellum* have been identified as being present and recruiting within metres of an active mine pit. Further, a regional survey near the Helena and Aurora Range for *A. castellum* undertaken since submission of the EIA (PER) document (Rev E) has now identified that *A. castellum* demonstrate opportunistic characteristics with this species colonising areas disturbed by mineral exploration activities at higher densities than adjacent non-impact areas (pers. com. Mr Ian Harris of Aprasia Wildlife Pty Ltd and in prep with Bamford Consulting Ecologists). The sum of this information supports the view in Section 3.2.4 of the EIA (PER) document that *A. castellum* are unlikely to be significantly affected by indirect impacts from mine operations. The EIA (PER) document will be amended to include the additional information obtained from surveys for *A. castellum* on the Helena and Aurora Range. As identified in Section 3.2.4 of the EIA (PER) document (Rev E), Cliffs is undertaking a genetic assessment of *A. castellum* which is part of Cliffs' ongoing fauna studies in the wider Yilgarn Region, and that this specifically does not form part of Cliffs' Mt Jackson J1 Deposit proposal. The EIA (PER)

			document (Rev E) assess the potential impact of the Mt Jackson J1 Deposit proposal in a conservative precautionary approach, as identified in Section 3.2.4, being consideration that the trapdoor spider on the Mt Jackson Range and other ranges is the Specially Protected Fauna *A. castellum*, and separately, that it is a SRE species distinct from *A. castellum.* The precautionary assessment identifies that in either scenario, the Mt Jackson J1 Deposit proposal will not have a significant impact. This precautionary assessment negates the need to have the genetic studies completed for assessment of the Mt Jackson J1 Deposit proposal. Cliffs' genetic assessment of *A. castellum* being undertaken in the wider Yilgarn Region are scheduled to be completed in Q4 2009, and presented to DEC at that time. As identified above, the precautionary assessment in the EIA (PER) document negates the need to have the genetic studies completed for assessment of the Mt Jackson J1 Deposit proposal, and accordingly, Cliffs does not propose to delay assessment of the Mt Jackson J1 Deposit proposal until such studies are completed. Irrespective of the above, some initial results from the genetic assessment have been received since submission of the EIA (PER) document (Rev E) to EPA (and also communicated to DEC by Cliffs). The initial results received have identified (through genetic sequencing) that the population on the Mt Jackson Range is the same species as those collected from Merredin (Wheatbelt, located approximately 165km south-west) and Heitmans (Wheatbelt, located approximately 200km south-west). Having regard to these preliminary results, it is anticipated that the genetic sequencing results for the individuals taken from the Windarling Range, Koolyanobbing Range, Helena and Aurora Range, Kewlken (Wheatbelt) and Depot (Wheatbelt) will yield results consistent with this. The EIA (PER) document has been updated with this initial information on the genetic assessment of *A. castellum*. <u>Action:</u> 1. The EIA (PER) document has been amended in Section 3.2.4 to include the additional information obtained from surveys for *A. castellum* on the Helena and Aurora Range. 2. The EIA (PER) document has been amended in Section 3.2.4 to include the discussion on the initial information of the genetic assessment of *A. castellum*.
20	DEC	<u>Troglofauna</u> The cumulative risk to troglofauna species conservation that is posed by all of Cliffs' iron ore mining areas in the Koolyanobbing area should be explored in the PER using all available survey data on the distribution of troglofauna species known from this area. To ensure the Troglofauna survey (Bennelongia 2008) complies with the requirements of Guidance Statement No54A the Bennelongia 2008 report should be revised to include (or provide further information on) the following: • a troglofauna habitat assessment (undertaken in	The Bennelongia (2008) troglofauna survey report has used all available survey and species data; which includes data from the Mt Jackson Range, Helena and Aurora Range and the Koolyanobbing Range. Cliffs welcomes any additional survey or species data from DEC for the region if such additional data is available and relevant to the assessment of the potential impacts of the Mt Jackson J1 Deposit proposal. Firstly, Cliffs feels obliged to identify that EPA Guidance Statements are guidance for environmental impact assessments and are not statutory requirements. As such, it would be misleading to identify the guidance in terms of compliance or requirements suggested by the DEC comment. With regards to the guidance referred to in the DEC comment on a troglofauna habitat assessment, EPA Guidance Statement 54a recommends: *"that reports on subterranean fauna should include, as appropriate, the following information:* *…• Subterranean fauna habitat (description of available habitat and the extent of predicted*

		consultation and agreement by DEC), to determine the likelihood of troglofauna habitat outside of the project footprint in areas that will not be impacted (e.g. habitat found in areas outside of other project footprints); • a species accumulation curve, which would enable the assessment of the sampling adequacy; • information on the length of the trapping period; • information on the taxonomic identification (limitations) for troglofauna such as spiders, centipedes and millipedes as these were not identified to species level. This information should be provided as soon as possible for review and should also be provided with and addressed in the PER.	*impacts to this habitat, supported by hydrogeological evidence)"* (EPA Guidance Statement 54a, Page 25). A troglofauna habitat assessment, as requested by DEC, is not considered necessary (i.e. *as appropriate*) for assessment of the Mt Jackson J1 Deposit proposal as 4 of the 6 troglofauna species recorded at the Mt Jackson J1 Deposit were recorded in non-impact areas on the Mt Jackson Range and the connecting Helena and Aurora Range, and the remaining 2 species of troglofauna were also recorded on the Koolyanobbing Range. The broad distribution of these species identifies that none of the troglofauna species recorded are restricted only to the Mt Jackson J1 Deposit proposal area. Accordingly, it is reasonable to conclude that the Mt Jackson J1 Deposit proposal is unlikely to impact any of the 6 troglofauna species recorded to a degree where it could place these species at risk. Accordingly, a troglofauna habitat assessment, as requested by DEC, is not considered necessary for assessment of the Mt Jackson J1 Deposit proposal as the data provided in Bennelongia (2008) or the EIA (PER) document (Rev E) is sufficient to demonstrate that the troglofauna recorded at the Mt Jackson J1 Deposit have a wide distribution. With regards to a species accumulation curve, Bennelongia have subsequently prepared one in response to the DEC comment (Bennelongia 2009). This species accumulation curve was provided to DEC (Environmental Management Branch) on 18 June 2009 and will also be made publicly available with the EIA (PER) document. As is the case for all troglofauna surveys, it is possible that additional sampling may yield additional species, however, as advised by Dr Stuart Halse of Bennelongia, the sampling of troglofauna undertaken should be regarded as being "greater than standard effort outlined in the Guidance Statement because scraping was used in addition to trapping… use of the two sampling methods to collect each sample, as was done in this assessment, means that there is at least twice the specified effort" (pers. com Dr S Halse of Bennelongia to S Hawkins of Globe Environments, 9 June 2009). Although additional sampling may yield additional species, the impact assessment outcome for the Mt Jackson J1 Deposit would not be expected to change if additional species are identified as such species would similarly be expected to occur beyond the proposal's impact area in the same manner as the 6 troglofauna species currently recorded. As identified in Section 4.2 of Bennelongia (2008), the sampling of the 31 uncased bore on the Mt Jackson J1 Deposit occurred from 28/29 August 2007 with samples retrieved on 15/16 October 2007 (49 days), and again set on 29 February 2008 and retrieved on 30 April 2008 (61 days). Scrapes were also taken on 29 February 2008. As this information is currently contained within Bennelongia (2008), no changes to this report are considered necessary. With regards to taxonomic identification, Bennelongia (2008) identified troglofauna to species/morpho-species level. The identification of troglofauna to a species level is limited by the absence of taxonomic frameworks, which is an inherent limitation recognised by EPA in Guidance Statement 54a, which states: *"...at times the imperfect state of invertebrate taxonomy makes it difficult for even the best taxonomists to achieve species, or even morpho-species, identifications for many groups of subterranean fauna. The problem exists for most troglofauna…"* (EPA Guidance Statement 54a, Page 13)

			Bennelongia has confirmed that the identification of troglofauna using existing taxonomic frameworks and morphological characteristics (as contained in Table 5.1 of Bennelongia (2008)) would be regarded by a competent taxonomist as appropriate (pers. com Dr S Halse of Bennelongia to S Hawkins of Globe Environments, 9 June 2009). Accordingly, a change to Bennelongia (2008) is not considered necessary. Further to the above, representatives from Cliffs, Bennelongia and DEC met on 18 June 2009 to discuss the DEC comments on troglofauna (left). Following this meeting, the DEC representatives confirmed their acceptability of the troglofauna studies undertaken and the environmental impact assessment on troglofauna. Accordingly, this mater is now considered resolved and no additional field studies or additional impact assessment are considered necessary. <u>Action:</u> 1. The EIA (PER) document has been amended in Section 3.2.4 to include reference to a troglofauna species accumulation curve (Bennelongia 2009).
Biophysical – Biodiversity Areas			
21	DEC-EMB	The PER should clarify the intent of the proposed biodiversity areas, and outline commitments to preservation of these areas. The PER should demonstrate that the proposed management for J1 does not detract from, or is consistent with, the purpose of the proposed biodiversity areas. For example, would the proposed stock fencing restrict species such as Malleefowl from utilising suitable habitat within the biodiversity areas?	The intent of the Biodiversity Areas is outlined in Section 1.4.4 of the EIA (PER) document (Rev E). Cliffs' commitments for the Biodiversity Areas is contained in Chapter 7 of the EIA (PER) document (Rev E), with the benefits of the biodiversity areas in the protection of flora values, fauna values and Aboriginal heritage values discussed within Sections 3.1, 3.2 and 4.1, respectively. As this information is currently contained within the EIA (PER) document (Rev E), no changes are considered necessary. With specific regard to the stock fencing to be installed around the internal mine boundaries of the Biodiversity Areas, this stock fencing will not prevent fauna movement, including movement of *L. ocellata*. Stock fencing typically consists of between 3 to 5 parallel wire strands between posts. Stock fencing is not of a chain-mesh (also termed 'ring-lock') or barbed wire construction which could prevent fauna movement or cause fauna to be trapped or injured. The stock fencing will only prevent inadvertent access by mine personnel. <u>Action:</u> 1. No changes to the EIA (PER) document are considered necessary.
Pollution – Air Quality			
22	EPA SU & DEC	Dust has been considered to be a key issue for Cliffs' existing operations in the Mt Manning area, as such sufficient evidence should be provided to support the PER's assessment (p. 134-140). This should include information used to determine deposited dust from the mine site during various meteorological conditions.	Section 3.5.4 of the EIA (PER) document has been amended to clarify how dust deposition data is collected at Cliffs' existing operations, and to clarify that the dust deposition data collected covers the range of meteorological conditions throughout each year of operation. A summary of the dust loading occurring throughout the year (i.e. various metrological conditions) is depicted in the graph of Cliffs (2007d) provided with the EIA (PER) document. This graph has been now inserted into the EIA (PER) document as Figure 3-34 to assist to demonstrate the varying dust levels in different seasons. <u>Action:</u>

			1. The EIA (PER) document has been amended in Section 3.5.4 to clarify how dust deposition data is collected at Cliffs' existing operations, and to clarify that the dust deposition data collected covers the range of meteorological conditions throughout each year of operation. 2. The EIA (PER) document has been amended in Section 3.5.4 to insert data adapted from Cliffs (2007d) as a new Figure 3-34.
23	DEC	The PER (p. 134) should clarify the statement "there are no areas of permanent human occupation near the Mt Jackson J1", i.e. state the distance to nearest residences (whether these are in the town site of Koolyanobbing or the mine campsite etc) even if it is not a short distance. Confirm that particulate concentrations are below national air quality guideline levels for this receptor.	The nearest occupied residence is Diemals Station, located on the Diemals Pastoral Lease at more than 50km from the Mt Jackson J1 Deposit. The EIA (PER) document has been amended to clarify the distance to the nearest residence. As there is no possibility of the Mt Jackson J1 Deposit proposal resulting on dust impacts to the nearest residence due to the separation distance, it is not necessary for the EIA (PER) document to be amended to identify the particulate dust concentrations at this residence or whether the dust concentrations at this residence meet national air quality guidelines. Action: 1. The EIA (PER) document has been amended in Section 3.5.4 to clarify the more than 50km distance between the nearest occupied residence and the Mt Jackson J1 Deposit proposal.
24	DEC	Whilst the draft PER indicates 'Vegetation impacts from dust suppression have not been recorded at Cliffs' existing operations' (draft PER, p. 132) no data related to monitoring the impact of dust on adjacent vegetation has been provided. If this information is available from specialist consultants, it is recommended that the appropriate report is made available and referenced in the PER.	The text on Page 132 of the EIA (PER) document (Rev E) in Section 3.4.3 on the environmental factor of Groundwater contains an accidental omission. The text should have stated "Vegetation impacts from groundwater used in dust suppression have not been recorded at Cliffs' existing operations...". Section 3.4.3 of the EIA (PER) document will be amended to correct this error. With regards to any specific data from specialist consultants, this information is from visual observations from Cliffs' site-based Environmental Advisors who inspect the haul road each week. No specialist consultants have been required to document this. Section 3.4.3 of the EIA (PER) document will be amended to clarify this matter. Action: 1. The EIA (PER) document has been amended in Section 3.5.4 to correct this statement. 2. The EIA (PER) document has been amended in Section 3.5.4 to clarify that Cliffs' Environmental Advisors inspect the haul road monthly and that no impacts to vegetation from groundwater used in dust suppression have been recorded from these inspections.
25	DEC	Other emission sources (apart from dust) associated with the phases of the project (construction, operation and rehabilitation) need to be identified even if those impacts are small. It is the proponent's responsibility to demonstrate that impacts are low.	One of the purposes of an ESD is to identify the factors relevant to a proposal that will be assessed in an EIA document, and reach agreement on such factors between EPA and the proponent. Noise and vibration, waste and gaseous emissions were identified in the ESD (Cliffs 2009a) as being non-significant factors that would not be assessed in the EIA (PER) document. Despite the above, Cliffs will insert the text regarding on non-significant impacts that is contained in the

			ESD into Section 1.8.1 of the EIA (PER) document to resolve this matter. <u>Action:</u> 1. The EIA (PER) document has been amended in Section 1.8.1 to include the text on non-significant impacts as contained within the ESD.
Pollution - Groundwater			
26	EPA SU	The PER should address any excess dewater or short fall for dust suppression and mining activities. Management of any excess or short fall should be addressed and reference made to additional licences that may be required.	Cliffs does not expect any shortfall or excess of groundwater for dust suppression or other mining activities. The volume of groundwater abstracted will be managed to meet Cliffs' operational requirements. As identified in Section 3.4.4 of the EIA (PER) document (Rev E), groundwater modelling undertaken for the Mt Jackson J1 Deposit proposal (Rockwater 2007a) and monitoring of groundwater abstraction at Cliffs' existing Windarling mine operations indicates the abstraction volume at the Mt Jackson J1 Deposit proposal is expected to be similar. As this information is currently contained within the EIA (PER) document (Rev E), no changes to this document are considered necessary. With regards to additional licences, Section 3.4.4 of the EIA (PER) document (Rev E) identifies that Cliffs will seek an amendment from DoW to include the Mt Jackson J1 Deposit proposal area in Cliffs' existing groundwater licence GWL154459 under the *Rights in Water and Irrigation Act 1914* (WA). This is also identified in Section 1.7.4 of the EIA (PER) document (Rev E). Accordingly, as this information is currently contained within the EIA (PER) document (Rev E), no changes to this document are considered necessary. <u>Action:</u> 1. No changes to the EIA (PER) document are considered necessary.
27	EPA SU & DEC	The PER should demonstrate that aquifer testing has been carried out at an appropriate scale and time frame to ensure that the long term behaviour of pit dewatering is being appropriately assessed.	As identified in Section 3.4.4 of the EIA (PER) document (Rev E) and in Rockwater (2007a), groundwater modelling has been undertaken based upon field groundwater pumping tests (i.e. aquifer testing). Accordingly, as this information is currently contained within the EIA (PER) document (Rev E), no changes to this document are considered necessary. With regards to the long-term behaviour of the pit dewatering, the modelled area of groundwater drawdown is identified in Figure 3-32 of the EIA (PER) document (Rev E) and in Rockwater (2007a). The groundwater modelling was been based on the final year of groundwater dewatering (i.e. the long-term behaviour of the pit dewatering). As identified in Section 3.4.4 of the EIA (PER) document (Rev E), any further groundwater modelling as refinement of the current groundwater model is unlikely to change the current modelled outcome. Accordingly, the field groundwater pumping tests and subsequent groundwater modelling have been conducted at an appropriate scale and timeframe for the assessment of dewatering. As this information is currently contained within the EIA (PER) document (Rev E), no changes to this document are considered necessary. <u>Action:</u> 1. No changes to the EIA (PER) document are considered necessary.
28	DEC	The PER should indicate the outcomes of modelling with regard to the removal of part of the BIF ridge and the	As identified in Section 3.4.4 of the EIA (PER) document (Rev E) and in Rockwater (2007a), the groundwater aquifer is expected to recover following the cessation of groundwater abstraction to a level

		creation of a mine void lake. The implications to groundwater recharge and the creation of a discharge feature should be addressed. Include the modelling implications for evaporation from the mine void lake and whether this will increase the salinity of the groundwater in the area. Management of potential impacts should be addressed.	which will create a permanent surface water feature within the J1 West Pit. As also identified in Section 3.4.4 of the EIA (PER) document (Rev E) and in Rockwater (2007a), the J1 West Pit is expected to function as a groundwater sink (groundwater flowing into the J1 West Pit from the surrounding aquifer), not as a groundwater source (groundwater flowing out of the J1 West Pit into the surrounding aquifer). As the water within the J1 West Pit is not expected to move into the surrounding groundwater aquifer, impacts to the groundwater from the water within the J1 West Pit are not expected; irrelevant of the salinity level of the water within the J1 West Pit. Accordingly, modelling of the salinity of the water within the J1 West Pit for determining impacts to regional groundwater quality is not necessary. Action: 1. No changes to the EIA (PER) document are considered necessary.
29	DEC	It appears that the proponent has committed to biannual monitoring of water levels in production bores and monthly monitoring of water levels in at least four monitoring bores (Section 3.4.5). However the exact commitment for water level monitoring in monitoring bores versus production bores is not clear and should be clarified in the PER.	As identified in Section 3.4.5 of the EIA (PER) document (Rev E), Cliffs proposes to monitor production bores biannually and monitor the monitoring bores monthly. The frequency of monitoring for the production bores is in accordance with Cliffs' existing Environmental Operating Procedure EOP07 Groundwater (Cliffs 2008i) and the DoW-approved Operating Strategy (Cliffs 2008h, as required under Groundwater Licence GWL154459 (DoW 2008)). The monitoring frequency for the monitoring bores is more frequent given that these bores (not the production bores) will be used to determine the groundwater aquifer's response to groundwater abstraction beyond the area of the J1 West Pit. The monitoring frequency for the monitoring bores is contained in Commitment 8-3 in Chapter 7 of the EIA (PER) document (Rev E). Cliffs acknowledges that this difference, and the basis for the difference, could be made clearer. Cliffs has amended the EIA (PER) document accordingly. Action: 1. The EIA (PER) document has been amended in Section 3.4.5 to clarify that the production bores will be monitored biannually and the monitoring bores will be monitored monthly.
30	DEC	It is recommended that the risk of leachate discharging to mine void lakes and groundwater aquifers is assessed using the methodology outlined in the DEC contaminated Site risk assessment guideline.	Cliffs has reviewed the DEC contaminated sites document *The Use of Risk Assessment in Contaminated Site Assessment and Management* (presumably the *contaminated site risk assessment guideline* referred to by DEC), however this document does not appear a relevant consideration for the Mt Jackson J1 Deposit proposal. As identified in Section 3.4.4 of the EIA (PER) document (Rev E), approximately 6.6% of the overburden material within the Mt Jackson J1 Deposit has a sulphur content ≥0.3%; being the recognised concentration in the mining industry for potentially acid forming material (material <0.3% is regarded as non-acid forming). The 6.6% calculation is regarded as conservative as it includes all forms of sulphur; both reactive sulphur (potentially acid forming) and non-reactive sulphur (non-acid forming). With regards to the management of the excavated overburden material, Cliffs has outlined in Sections 3.4.4 and 3.4.5 of the EIA (PER) document (Rev E) that this material will be managed in accordance with the DMP (2001) and DEWHA (1997) guidance, which will specifically include isolation and containment of

			this material within the centre of the overburden landform and encapsulation within a minimum of 5m of non-acid forming material. In addition, the overburden landform will be nominally 50m above the natural groundwater level; with this distance providing an additional separation buffer from the groundwater. Further, overburden landforms at Cliffs' existing mine operations on the Mt Jackson Range, Windarling Range and Koolyanobbing Range have not shown any physical indication of acid leachate formation. The above management actions are expected to prevent potentially acid forming material within the excavated overburden from impacting groundwater. Accordingly, as the above information is currently contained in the EIA (PER) document (Rev E), a change to the document for this matter is not considered necessary. It is acknowledged that overburden material not excavated from the mine pit (e.g. mine pit walls) will also contain sulphur at a relatively similar concentration to the excavated overburden material (i.e. 6.6% by volume at ≥0.3% total sulphur (reactive and non-reactive)). The reactive sulphur component may oxidise and form an acid leachate, which could move into the J1 West Pit with groundwater. As the J1 West Pit will act as a groundwater sink and not a groundwater source (as identified in Point 28 above and Section 3.4.4 of the EIA (PER) document (Rev E)) any potential water quality impacts would be limited to the water within the J1 West Pit and with no potential to impact the surrounding groundwater. As the volume of material at ≥0.3% sulphur is low, and oxidization will be limited to areas immediately near the mine pit, significant impacts to the water quality within the J1 West Pit are not expected. Irrespective of such expectations, if changes to water quality within the J1 West Pit did occur then such impacts would be confined to the surface water within the J1 West Pit and there would be no practicable management actions which Cliffs could implement to alter such water quality. The EIA (PER) document has been amended to include the above information. <u>Action:</u> 1. The EIA (PER) document has been amended in Section 3.4.4 to include the potential for overburden material not excavated from the mine pit (e.g. mine pit walls) to oxidise and potentially impact the water quality within the J1 West Pit.
31	DoW	Ensure that the PER (p. 29) identifies that the quality of the treated potable water from abstracted groundwater will meet the Department of Health requirements for drinking water.	Section 1.4.3 of the EIA (PER) document (Rev E) identifies that the water treatment plant will produce potable water. Cliffs has amended the EIA (PER) document to clarify that the potable water produced will seek to meet the water quality targets contained in the *Australian Drinking Water Guidelines* produced by the National Health and Medical Research Council and the Natural Resource Management Ministerial Council (2004). <u>Action:</u> 1. The EIA (PER) document has been amended in Section 1.4.3 to make reference to NHMRC & NRMMC (2004) for potable water quality.
Pollution – Waste			
32	EPA SU	The PER should indicate whether waste management of over burden, inert, putrescible and contaminated wastes	Section 1.4.2 of the EIA (PER) document (Rev E) identifies that the overburden landform will be used for the disposal of overburden material, and may also be used for the disposal of inert wastes, putrescible

		meets best practice requirements and will be managed in accordance with the relevant standards (identify the standards).	wastes and contaminated wastes. As identified in Section 1.4.2 of the EIA (PER) document (Rev E), the wastes will be isolated and contained towards the centre of the overburden landform; consistent with the practices at Cliffs' existing mine operations. This action is also consistent with accepted and standard mine practices throughout Western Australia. The management practices proposed are expected to result in nil environmental impact. It is Cliffs' understanding that there are no published standards for this. Section 1.4.2 of the EIA (PER) document has been amended to clarify that the proposed management is consistent with the management of such materials at mines throughout Western Australia and that there are no published standards for this. <u>Action:</u> 1. The EIA (PER) document has been amended in Section 1.4.2 to clarify that the proposed management of overburden material, inert wastes, putrescible wastes and contaminated wastes is consistent with the management of such materials at mines throughout Western Australia, and that there are no published standards for such management.
Social Surroundings - Aboriginal Heritage			
33	DIA	The PER (p. 159) should identify specific measures that will be been taken in regard to the protection of Aboriginal sites which will not be disturbed by the development of the mine, for example the document states that DIA 5602, 20089 and 25820 will be avoided. These measures should include be physically protection (e.g. fencing). The 'field marking' of these sites referred to in the PER should be explained along with the method and frequency of monitoring. The PER (p. 159) should state that any new sites located during the project would also be reported to the DIA, with the consent of the relevant Aboriginal people. In regard to skeletal material, the DIA should also be notified, as well as the police and relevant Aboriginal people, with the police being the first group to be notified.	The management actions contained in Section 4.1.5 of the EIA (PER) document (Rev E) is taken from Cliffs' Aboriginal Heritage Operating Procedure (Cliffs 2009g). The Aboriginal Heritage Operating Procedure states that identified sites will be marked in exploration and mine development plans (as per Figure 4-1 of the EIA (PER) document) and that they will also be marked in the field. Aboriginal Heritage Operating Procedure also states that Cliffs will 'periodically monitor" identified sites to confirm disturbance has not occurred. The above terms are not specific or absolute due to the type of site (artefact scatter, mythological, etc), the size of the site and the location of the site being the overriding considerations in determining the best method of field making and the necessary frequency of monitoring. Pre-determined field marking methods and pre-determined frequencies of monitoring is likely to be inappropriate for all sites. For example, Site ID 5602 is at a location distant from mine operations and in topography largely inaccessible; meaning that field marking by signage would be more appropriate than fencing, and that due to its risk for impact being low that the frequency of monitoring would not need to be regular. In contrast, Site ID 20089 is located adjacent to proposed mine operations on easily accessible land and therefore fencing and a higher frequency of monitoring would be appropriate. Accordingly, Cliffs considers that the flexible terms used should be retained. As also identified in the Aboriginal Heritage Operating Procedure, the field marking will be based on advice of Cliffs' Senior Community Relations Advisor (Aboriginal Heritage Advisor). Cliffs acknowledges that DIA and traditional owners may also wish to be afforded opportunity to provide advice on type/method of field marking, and the Aboriginal Heritage Operating Procedure has been amended accordingly. With specific regard to Site ID 20089 for the Curragibbin Hill West artefact scatter, Cliffs has made

			commitments to demarcate a biodiversity area over this site, and install stock fencing and signposting around the internal mine boundary for its protection. This is identified in Section 4.1.5 of the EIA (PER) document (Rev E). As this matter is currently addressed in the EIA (PER) document, no change to this document is considered necessary. With regards to notification to DIA of identified Aboriginal heritage sites, action item 7 contained in Section 4.1.5 of the EIA (PER) document and management action 5 in the Aboriginal Heritage Operating Procedure state that DIA will be notified of identified (i.e. new) Aboriginal heritage sites subject to consent of the relevant Aboriginal persons. As this matter is currently addressed in the EIA (PER) document and Cliffs' Aboriginal Heritage Operating Procedure, no change to these documents is considered necessary. With regard to the potential identification of skeletal material, Cliffs' Aboriginal Heritage Operating Procedure identifies under management action 7 that the Police and/or an archaeologist will be contacted. If the Police and/or the archaeologist determine that the skeletal material is of Aboriginal heritage significance, then DIA and traditional owners would be notified in accordance with management action 5 of the Aboriginal Heritage Operating Procedure. Cliffs understands that this linking may not have been clear, and has amended the Aboriginal Heritage Operating Procedure to clarify this matter. <u>Action:</u> 1. The Aboriginal Heritage Operating Procedure (Cliffs 2009g) has been amended to include consultation with DIA and traditional owners regarding the field marking of Aboriginal heritage sites. 2. The Aboriginal Heritage Operating Procedure (Cliffs 2009g) has been amended clarify that DIA and relevant traditional owners will be notified if skeletal material is identified during mine operations and considered by the Police and/or an archaeologist to be of Aboriginal heritage significance.
Other - Rehabilitation and Closure			
34	EPA SU & DEC	The objective for decommissioning and rehabilitation to achieve 'a condition suitable for continued pastoral use under the Mt Jackson Pastoral Lease' (draft PER, p. 142) should be amended to reflect the EPA's objective for conservation of flora 'To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement of knowledge' (EPA, 2004) as quoted in the draft PER, page 47. The EPA SU is aware of the proponent's reluctance to change this statement and notes that if the statement remains unchanged then it is likely that this issue would be	Cliffs has no concern if this point is raised during the public submission period. Cliffs welcomes public submissions on all components of its EIA (PER) document, management plans and procedures, including those relating to decommissioning and rehabilitation. As a result of the comment from EPA and DEC (left), Cliffs is concerned that EPA and DEC may be misguided as to Cliffs' intentions regarding decommissioning and rehabilitation. The EPA and DEC position as to why it has concern of Cliffs' decommissioning and rehabilitation objective is unclear. The EPA's objectives for decommissioning, land, fauna and flora are stated in full in Section 3.6.2 of the EIA (PER) document. These objectives are included to clearly document the EPA's objectives, which have been used also as the foundation for Cliffs' objective. Cliffs' concern in exclusively adopting EPA's objective for flora, and recommended by EPA and DEC (left), is that the EPA's objective does not place the purpose of the rehabilitation in context with future land use.

		raised again during the public submission period.	As identified in Section 3.6.4 of the EIA (PER) document and Cliffs' Decommissioning and Rehabilitation Plan (Cliffs 2009f), Cliffs' objective for decommissioning and rehabilitation is: *"to decommission and rehabilitate the mine area with native vegetation to a condition suitable for continued pastoral use under the Mt Jackson Pastoral Lease".* Cliffs' objective is not inconsistent with the EPA objectives; Cliffs' objective simply includes reference to the future land use for appropriate context and direction. Consideration of the future land use in planning for decommissioning and rehabilitation of a mine site is consistent with the recommendations of both ANZMEC & AMI (2000) and DITR (2006); both of which are recommended guidance material supported by DMP for mine rehabilitation in Western Australia. To not include an appropriate context and direction would result in reduced certainty as to why decommissioning and rehabilitation is being done. As Cliffs' objective is consistent with the decommissioning planning recommendations contained in both ANZMEC & AMI (2000) and DITR (2006), and is not inconsistent with the EPA objectives, Cliffs does not consider it appropriate or necessary to amend the decommissioning and rehabilitation objective. <u>Action:</u> 1. No changes to the EIA (PER) document are considered necessary.
35	EPA SU & DEC	The performance indicators on page 147 of the draft PER are unclear. Based on current 12 to 37 species diversity, rehabilitation to a performance indicator of 20 species per quadrat would be over 70% diversity not 20%.	Cliffs' rehabilitation performance indicators, as measured in representative 20m x 20m quadrats within rehabilitation areas, are stated as: • ≥ 20% projected foliar cover; • ≥ 20 flora species; and • ≤ 5 % weed cover. Section 3.6.4 of the EIA (PER) document (Rev E) contained a number of typographical errors stating "≥ 20% flora species"; which should not have included a "%" symbol. This has now been corrected in the EIA (PER) document. <u>Action:</u> 1. Section 3.6.4 of the EIA (PER) document has been amended to delete reference to "%" for Cliffs' flora species performance indicator.
36	EPA SU & DEC	A 20% species diversity does not comply with EPA Guidance Statement No. 6. At EPA Meeting No 951, 5 March 2009, the Members approved the ESD subject to the ESD stating that the PER will ensure the rehabilitation criteria comply with Guidance Statement No.6 particularly with regard to the specified targets of plant species diversity based on reference plot data which are usually set at 70% of pre-existing taxa.	Cliffs' rehabilitation performance indicators, as measured in representative 20m x 20m quadrats within rehabilitation areas, are stated as: • ≥ 20% projected foliar cover; • ≥ 20 flora species; and • ≤ 5 % weed cover. Section 3.6.4 of the EIA (PER) document (Rev E) contained a number of typographical errors stating "≥ 20% flora species"; which should not have included a "%" symbol. This has now been corrected in the EIA (PER) document.

			Further to the above, Cliffs feels obliged to identify that EPA Guidance Statements are guidance for environmental impact assessments and are not statutory requirements. As such, it would be misleading to identify the guidance in terms of compliance or requirements as inferred by the EPA comment. Further, Guidance Statement No. 6 does not specify a percentage rehabilitation completion criteria, and accordingly, to suggest that Cliffs has not complied with a percentage rehabilitation completion criteria is incorrect. With specific regard to the ESD, Cliffs at no stage stated that the EIA (PER) document would simply adopt recent EPA-recommended completion criteria. At the EPA meeting of 5 March 2009, Cliffs committed to providing site specific rehabilitation completion criteria (performance indicators) in the EIA (PER) document that considered recent EPA-recommended criteria, rehabilitation outcomes at existing mine operations, the characteristics of the natural environment and specialist advice from botanical consultants. Cliffs has abided by its commitment on this. <u>Action:</u> 1. Section 3.6.4 of the EIA (PER) document has been amended to delete reference to "%" for Cliffs' flora species performance indicator.
37	EPA SU	ESD committed to identifying shortcomings, and adaptive management techniques to indicate how appropriate outcomes for rehabilitation will be achieved in the PER. This was not evident in the draft PER and should be addressed.	Cliffs' contingency actions (i.e. adaptive management) in the event that the rehabilitation and decommissioning performance indicators are not achieved are contained in Cliffs' Decommissioning and Rehabilitation Plan (Cliffs 2009f), however, Cliffs acknowledges that this information was not also contained in the EIA (PER) document (Rev E). The EIA (PER) document has been amended to include discussion on the contingency actions in relation to rehabilitation. <u>Action:</u> 1. Sections 3.6.4 and 3.6.5 of the EIA (PER) document have been amended to include discussion on the rehabilitation contingency actions contained in the Decommissioning and Rehabilitation Plan (Cliffs 2009f).
38	DEC	The PER should address completion criteria that have been developed in accordance with Guidance Statement No. 6 for soil and landform reconstruction, vegetation structure and species composition based on the attributes of the surrounding environment and previous rehabilitation works (Mt Jackson J2 & J3 Deposit mines) (refer Western Botanical, 2009, p. 136)	As identified in Section 3.6.4 of the EIA (PER) document (Rev E), rehabilitation performance indicators (completion criteria) have been developed in consideration of EPA Guidance Statement No. 6, the surrounding natural environment, advice from Cliffs' botanical consultants and the results of previous rehabilitation works at Cliffs' Mt Jackson J2 and J3 Deposit mine operations. The performance indicators specifically address species composition. Accordingly, as this information is currently contained within the EIA (PER) document (Rev E), no changes are considered necessary. Vegetation structure is not specifically addressed in the EIA (PER) document (Rev E) as the structure of the rehabilitation works will be dependent on the species that germinate from seed through direct application (seeding) and that germinate from retained topsoil; and as the germination potential of many arid species are unknown any particular vegetation structure is equally unknown. Despite this, it can reasonably be expected, based on rehabilitation works at Cliffs' existing Mt Jackson J2 and J3 Deposit mines that a range of flora species with different structural characteristics (i.e. lower storey, mid-storey and upper-storey) will germinate. The EIA (PER) document has been amended to clarify this.

			With regards to soil reconstruction, as described in Section 3.6.4 of the EIA (PER) document (Rev E) and within Cliffs' Land Clearing Management Plan (Cliffs 2009b) and Decommissioning and Rehabilitation Plan (Cliffs 2009f), topsoil and vegetation will be removed and stockpiled during initial mine development for later use in rehabilitation. These actions will assist in the reconstruction of a soil profile suitable for revegetation. Accordingly, as this information is currently contained within the EIA (PER) document (Rev E), Cliffs' Land Clearing Management Plan (Cliffs 2009b) and Decommissioning and Rehabilitation Plan (Cliffs 2009f), no changes are considered necessary. With regards to landform reconstruction, the shape, size and height of the overburden landform is described in Section 1.4.2 of the EIA (PER) document (Rev E). As identified, the landform will be constructed parallel to the existing Mt Jackson Range to a nominal height of 510mAHD and based on a 15^{o} slope and 10m berms. Accordingly, as this information is currently contained within the EIA (PER) document (Rev E), no changes are considered necessary. <u>Action:</u> 1. Sections 3.6.4 of the EIA (PER) document have been amended to clarify the basis for not including rehabilitation criteria for vegetation structure.