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JANUARY 2017 TO JUNE 2018 REVIEW

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Introduction

Background

The NSW Resources Regulator's compliance audit program aims to:

- assess the level of compliance with the regulatory instruments
- provide feedback to improve title conditions, policies or general regulatory framework (protecting and improving system integrity)
- assess auditee performance and provide feedback on how they may be able to improve their performance
- increase stakeholder confidence in regulatory system
- increase the level to which titleholders are actively managing their own compliance.

The compliance audit strategy highlights that the audit schedule and focus for each year will be developed using a risk review process. A risk assessment methodology (broadly based on AS/NZS ISO 31000:2009 Risk management – Principles and guidelines) is used to develop a broad risk profile for each title (or group of titles) to facilitate the development of the annual audit program. Risk factors used include:

- whether the Regulator has primary regulatory responsibility
- the type, size and complexity of operations and activities
- the location of activities (environmental sensitivity of surrounding area and proximity of residents)
- results of previous audits and titleholder compliance history
- stakeholder concerns.

The compliance audit strategy and program include a requirement for annual review of the audit programs against the identified objectives. This report provides the review of the compliance audit program for January 2017 to June 2018.

Focus of the 2017-2018 audit program

For the mining sector, a key focus was to complete the baseline audits of the major industrial and metallic mineral mines that began in 2016. Two targeted audit/inspection programs were also undertaken. The first focussed on the management of coal mining infrastructure in WaterNSW catchment special areas, while the second focussed on the operational management of tailings storage facilities at selected mineral mines.

In the mineral exploration sector, the audits represented a sample of exploration projects predominantly in the western region of NSW. Each project had recently completed drilling programs under exploration activity approvals granted in the previous two years. Three of the exploration projects audited were successful in obtaining grant funding under the Division of Resources and Geoscience's New Frontiers Co-operative Drilling Program.

Table 1 Operations audited in 2017-2018

MINE NAME	TITLEHOLDER	TITLES	AUDIT SCOPE
Coal mining			
Charbon Colliery	Charbon Coal Pty Ltd	CCL732, ML1318, ML1384, ML1501, ML1524, ML1545, ML1647, ML1663, MPL270, MPL499, MPL505, MPL526	Mining operations, MOP, rehabilitation
Bulli Seam Operations	Endeavour Coal Pty Ltd	CCL767, CL388, CL381, ML1382, ML1433, ML1574, ML1687, CCL724, ML1473, ML1698, MPL200, MPL201	Mining operations, MOP, rehabilitation
Maules Creek Coal Mine	Maules Creek Coal Pty Ltd	CCL375, ML1701, ML1719	Mining operations, MOP, rehabilitation
Clarence Colliery	Centennial Coal Pty Ltd		Dam safety management
Russell Vale Colliery	Wollongong Coal Pty Ltd		Emplacement area management and ground stability

Dendrobium Mine and Cordeaux Colliery	Endeavour Coal Pty Ltd		WaterNSW joint program - Hazardous substances management, rehabilitation
Russell Vale and Wongawilli Collieries	Wollongong Coal Pty Ltd		WaterNSW joint program - Hazardous substances management, rehabilitation
Metropolitan Colliery	Metropolitan Collieries Pty Ltd		WaterNSW joint program - Hazardous substances management, rehabilitation
Wollondilly Washery	Burraborang Valley Coal Pty Ltd		WaterNSW joint program - Hazardous substances management, rehabilitation
Coal exploration			
Narrabri Mine exploration	Narrabri Coal Pty Ltd	ML1609, EL6243	Exploration operations and activity approvals
Mineral mining			
Perilya Southern Operations	Perilya Broken Hill Limited	CML8, CML9, CML10, CML11, CML12, CML13, EL2921, EL5614	Mining operations, MOP, rehabilitation, exploration
Thuddungra Magnesite Mine	Young Mining Pty Ltd	CML15	Mining operations, MOP, rehabilitation
Mt Carrington Mine	White Rock (MTC) Pty Ltd	GL5477, GL5478, ML5444, ML5883, ML1147, ML1148, ML1149, ML1150, SPL409, MPL259, MPL256, MPL24	Mining operations, MOP, rehabilitation
Eight Mile Alluvial Gold Mine	Tooloom Creek Pty Ltd	ML1237, ML1238, ML1385	Mining operations, MOP, rehabilitation
Stringers Gully and One Mile Mines	Yeltara Prospecting and Mining Pty Ltd	ML1330, ML1372, ML1333, ML1334	Mining operations, MOP, rehabilitation
Adelong Gold Mine	Challenger Mines Pty Ltd	ML1435, M(C)279 to M(C)L291,	Mining operations, MOP, rehabilitation

		M(C)L311 to M(C)L313, EL5728	
Marrangaroo Quarry	Metromix Pty Ltd	ML1522, ML4635, ML4636, ML6388, MPL22, PLL584, PLL602	Mining operations, MOP, rehabilitation
Conrad Silver Mine	Conrad Resources Pty Ltd	ML5992, ML6040, ML6041, EL5977	Mining operations, MOP, rehabilitation
Cow Flat and Ponsonby Quarries	Omya Australia Pty Ltd	ML4360, PLL1200, ML1253, ML1375, ML243, ML454, ML982, ML5991, ML1462, ML1463, PLL1085, PLL1157, MPL239	Mining operations, MOP, rehabilitation
Caloola Marble Mine	Marble Aggregates Holdings Pty Ltd	ML5460, M(C)L307, M(C)L308	Mining operations, MOP, rehabilitation
Kandos Quarry	Kandos Development Corporation Pty Ltd	CML12	Mining operations, MOP, rehabilitation
Arumpo Bentonite Mine	Arumpo Bentonite Pty Ltd	ML1507, AL5	Mining operations, MOP, rehabilitation
Mourquong Gypsum Mine	GM Richardson Pty Ltd	ML1644	Mining operations, MOP, rehabilitation
Cowal Gold Mine	Evolution Mining Pty Ltd		Tailings management - Operational performance
Northparkes Mine	CMOC Mining Pty Ltd		Tailings management - Operational performance
Tomingley Gold Mine	Tomingley Gold Operations Pty Ltd		Tailings management - Operational performance
CSA Mine	Cobar Management Pty Ltd		Tailings management - Operational performance
Endeavor Mine	Endeavor Operations Pty Ltd		Tailings management - Operational performance

Hera Mine	Aurelia Metals Pty Ltd		Tailings management - Operational performance
Mineral exploration			
Western Region Project	Gold and Copper Resources Pty Ltd	EL6377, EL6466, EL7103, EL6268, EL7207	Exploration operations and activity approvals
Tibooburra Project	Awati Resources Pty Ltd	EL6286, EL7437, EL8396	Exploration operations and activity approvals
Dobroyde Hill Project	New South Resources Pty Ltd	EL6516	Exploration operations and activity approvals
Loch Lilly Project	San Antonio Exploration Pty Ltd	EL8199, EL8200	Exploration operations and activity approvals
Woodlawn Exploration Project	Tarago Exploration Pty Ltd	S(C&PL)L20, EL7257	Exploration operations and activity approvals
Wagga Tank and Mallee Bull Prospects	Peel Mining Limited	EL6695, EL7461	Exploration operations and activity approvals
Red Tank Project	Isokind Pty Ltd	EL5693	Exploration operations and activity approvals
Shuttleton Project	Auricula Mines Pty Ltd	EL6223	Exploration operations and activity approvals
Mountain Tank Project	PGM Management Pty Ltd	EL7714	Exploration operations and activity approvals

Audit scopes

As noted in Table 1, the audit scopes varied across the program. A description of each audit scope is provided below.

Table 2. Description of audit scopes

AUDIT SCOPE	DESCRIPTION
Mining operations, MOP, rehabilitation	This audit scope included a compliance assessment against the requirements of the Mining Act and the mining leases issued for the operations. The scope included an assessment of compliance against the requirements of the approved MOP for the operations and an assessment of the progress of rehabilitation.
Exploration operations and activity approval	This audit scope included a compliance assessment against the requirements of the Mining Act and the exploration licences issued for the projects. The scope included an assessment of compliance against the requirements of any exploration activity approvals granted for the projects, including assessment against the titleholder's commitments in exploration activity approval documentation.
WaterNSW joint program - Hazardous substances management, rehabilitation	The scope of the joint audit program included the identification of all known mining-related infrastructure within the special areas at each colliery. This was achieved through mapping known infrastructure and a review of each colliery's MOP. Document review and interagency consultation was used to identify the location of all known transformers within the special areas. An inspection of all nominated sites with mining infrastructure or disturbance was undertaken by the audit team, focussing on the management of chemicals, fuels and other hazardous substances and the identification of redundant infrastructure.
Tailings management - Operational performance	This scope included an assessment of the operational management of tailings dams including a review of the mine's safety management systems in relation to management, monitoring and maintenance of dams and an assessment of the level of onsite implementation of risk management controls and management strategies. The audit scope also included an assessment of the identification and management of mine closure risks associated with the closure and rehabilitation of tailings storage facilities.
Dam safety management	This scope included a review of the mine's safety management systems in relation to management, monitoring and maintenance of dams and an assessment of the level of onsite implementation of risk management

controls and management strategies. The scope included a review of rehabilitation progress at each site and the ability of rehabilitated areas to reduce the water and sediment loading to dams on site.

Emplacement area management and ground stability

This scope included general conditions of mining leases, but the focus was the management of dams and emplacement areas, including slope stability, ground or strata failure. Management of the use, handling, storage and disposal of hazardous substances was also assessed during the audit.

Audit findings

The reporting of results from each compliance audit was determined based on the definitions presented in Appendix 1. There were no significant issues identified that would threaten immediate harm to the environment. There were several issues where management action was required to minimise the risk of environmental harm. These issues related to poor environmental management practices during mining or exploration activities, or a failure to comply with the commitments made in the MOP.

Summary of findings

The 38 audits undertaken in the 18 months to June 2017 resulted in the identification of 11 non-compliances ranked NC2 (low risk), 67 ranked NC3 (administrative), 124 observations of concern and 54 suggestions for improvement as shown in Table 3. There were no NC1 (high risk) non-compliances identified. Two improvement notices under Section 191 of the Work Health and Safety Act were issued for work health and safety issues observed at one site.

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Table 3 Summary of audit findings

OPERATION	NC1	NC2	NC3	O	SI
Coal exploration	0	1	3	5	2
Coal mining	0	0	10	50	12
Mineral exploration	0	2	17	24	8
Mineral mining	0	8	37	45	32
Total	0	11	67	124	54

Where:

- NC1 = non-compliance level 1 (high risk)
- NC2 = Non-compliance level 2 (low risk)
- NC3 = Non-compliance level 3 (administrative)
- O = Observation of concern
- SI = Suggestion for improvement

A summary of the broad category of issues identified across each industry sector is shown in Table 4. Of the 256 issues identified, 51% of these were administrative in nature, including reporting or notification requirements. Environmental issues, including failure to comply with MOP commitments, accounted for approximately 28% of all issues.

Table 4 Issue category by industry sector

ISSUE CATEGORY	NC2	NC3	O	SI	TOTAL
Coal exploration					
Administrative	0	0	2	0	3
Reporting or notification	0	2	1	1	4
Environmental management	0	0	2	0	2
Environmental – exploration activity approval	1	0	0	0	1
Safety	0	1	0	0	1
Coal mining					
Administrative	0	4	1	2	7
Reporting or notification	0	1	2	1	4
Environmental management	0	0	11	2	13
Mining operations plan requirements	0	0	3	0	3

Safety	0	1	29	6	36
Other agency	0	4	4	1	9
Mineral exploration					
Administrative	0	4	7	6	17
Reporting or notification	0	6	4	1	11
Codes of practice	1	5	4	0	10
Environmental management	0	2	3	1	6
Environmental – exploration activity approval	1	0	6	0	7
Mineral mining					
Administrative	0	10	15	27	52
Reporting or notification	0	18	9	3	30
Environmental management	4	8	10	1	23
Mining operations plan requirements	4	1	10	1	16
Safety	0	0	1	0	1
Total	11	67	124	54	256

Average non-compliance rates vary from 1.1 non-compliances per audit in the coal mining sector, to four non-compliances per audit in the coal exploration sector. Given that only one coal exploration audit was undertaken in this program, the results for that sector may not be indicative of the sector as a whole.

Mineral exploration (2.1 non-compliances per audit) experienced a slightly lower rate of non-compliance than mineral mining (2.4 non-compliances per audit). However, consistent with the findings from the 2016 audit program, the minerals sector typically had a greater percentage of non-compliances compared to coal.

Findings by industry sector

Coal mining

There were no NC1 (high risk) or NC2 (low risk) ranked non-compliances identified in the coal mining audits undertaken in this program. There were 10 non-compliances ranked NC3 (administrative) and 50 observations of concern identified over the nine audits undertaken.

Table 5 provides a summary of the key non-compliance issues and observations of concern identified from the audits.

Table 5 Issues identified in coal mining audits

ISSUE TYPE	NUMBER OF OCCURENCES
NC3	10
Failure to have approved MOP for operations	1
Failure to lodge environmental incident reports	1
Failure to obtain approval before suspending mining operations	1
Failure to pay or late payment of rents and levies	1
Failure to progress co-operation agreement	1
Lack of, or inadequate maintenance of, safety signs	1
WaterNSW access licence requirements	4
Observation of concern	
Poor hazardous substances management practices	8
Poor environmental management practices	7
Poor inspection and monitoring practices	6
Failure to undertake or inadequate risk assessment	5
Lack of or inadequate maintenance of safety signs	4
WaterNSW access licence requirements	4
Poor quality reports	4
Poor rehabilitation practices	3
Inadequate training and competency systems	2
Poor emergency response practices	2
Safety concerns	2
Failure to carry out operations in accordance with approved MOP	1
Failure to pay, or late payment of, rents and levies	1
Inadequate systems for recording and tracking corrective actions	1

Suggestion for improvement	12
Poor hazardous substances management practices	2
Poor inspection and monitoring practices	2
Poor environmental management practices	1
Poor compliance management practices	1
Poor emergency response practices	1
Failure to submit, or late submission of, an annual environmental management report	1
Failure to undertake or inadequate risk assessment	1
Inadequate systems for recording and tracking corrective actions	1
Lack of, or inadequate maintenance of, safety signs	1
WaterNSW access licence requirements	1

Four of the non-compliances identified at coal mines related to the requirements of other agencies (predominantly WaterNSW), identified during the joint audit program, for management of mining infrastructure in catchment special areas.

All mines audited had an approved MOP in place except for one, where the MOP did not include all the mining titles. Generally, reporting requirements were well managed by the mining companies. There were no non-compliances for failure to submit, late submission of annual exploration reports or an annual environmental management report. One mining operation failed to pay or was late paying rents and levies over several years and this same operation failed to obtain approval before the suspension of mining operations.

Two Section 191 improvement notices were issued to one colliery following the identification of significant safety issues associated with the management of emplacement areas and ground stability.

Mineral mining

Table 6 provides a summary of the key non-compliance issues and observations of concern identified from the audits. There were eight non-compliances ranked NC2 (low risk) and 37 ranked NC3 (administrative). A further 45 observations of concern were identified.

Table 6 Issues identified in mineral mining audits

ISSUE TYPE	NUMBER OF OCCURENCES
NC2	
Failure to carry out operations in accordance with approved MOP	4
Poor environmental management practices	2
Poor borehole sealing or capping practices	1
Poor hazardous substances management practices	1
NC3	
Failure to submit or late submission of annual environmental management report	7
Failure to submit or late submission of exploration reports	7
Failure to lodge or late lodgement of royalty returns and payments	4
Failure to have approved MOP for operations	3
Failure to obtain approval before suspending mining operations	3
Failure to pay or late payment of rents and levies	3
Failure to carry out operations in accordance with approved MOP	2
Failure to submit a rehabilitation cost estimate	2
Failure to maintain or submit mandatory records	2
Failure to notify DPI Water	1
Poor community or landholder consultation	1
Poor environmental management practices	1
Poor rehabilitation practices	1
Observation of concern	
Failure to carry out operations in accordance with approved MOP	8
Failure to submit or late submission of reports	7
Failure to undertake or inadequate risk assessment	5
Poor quality reports	4
Poor environmental management practices	3

Poor management of chip and core samples	3
Poor rehabilitation practices	3
Failure to have approved MOP for operations	2
Poor hazardous substances management practices	2
Poor inspection and monitoring practices	2
Failure to complete or lack of progress against approved work program	1
Inadequate systems for recording and tracking corrective actions	1
Lease expiry	1
Poor community or landholder consultation	1
Security increase not yet paid	1
Stockpiles off lease	1
Suggestion for improvement	
Poor compliance management practices	10
Poor inspection and monitoring practices	5
Inadequate systems for recording and tracking corrective actions	4
Failure to undertake or inadequate risk assessment	4
Document and data management	3
Inadequate training and competency systems	2
Failure to submit or late submission of rehabilitation report	1
Poor community or landholder consultation	1
Poor rehabilitation practices	1
Revised MOP due	1

Similar to the findings from the 2016 audit program, there continued to be a large number of non-compliances related to the failure to carry out operations in accordance with an approved Mining Operations Plan (MOP). For three mines in this sector, generally smaller mineral miners in the western regions of NSW, the operations did not have an approved MOP in place.

Three of the 19 mineral mines audited failed to seek approval before suspending mining operations. Reporting and notification generally comprised the greatest percentage of the NC3 non-compliances.

Exploration

Table 7 provides a summary of the key non-compliance issues and observations of concern identified from the audits.

Table 7 Issues identified in exploration audits

ISSUE TYPE	NUMBER OF OCCURENCES
NC2	
Poor environmental management practices	1
Poor hazardous substances management practices	1
Poor rehabilitation practices	1
NC3	
Failure to maintain or submit mandatory records	4
Failure to obtain relevant approvals for exploration activities	4
Failure to submit or late submission of reports	4
Failure to submit required notifications	3
Failure to undertake or inadequate risk assessment	2
Failure to pay or late payment of rents and levies	1
Poor community or landholder consultation	1
Poor quality reports	1
Observation of concern	
Poor environmental management practices, including rehabilitation	8
Failure to maintain or submit mandatory records	3
Poor quality reports	3
Poor compliance management practices	2
Poor contractor management practices	2
Poor borehole sealing or capping practices	2
Failure to submit safety notification	2
Failure to lodge environmental incident reports	1

Failure to meet minimum expenditure requirements	1
Failure to obtain approval for exploration activities	1
Inadequate training and competency systems	1
Poor community or landholder consultation	1
Poor inspection and monitoring practices	1
Poor management of chip and core samples	1
Suggestion for improvement	
Poor compliance management practices	4
Failure to undertake or inadequate risk assessment	2
Poor quality reports	2
Poor inspection and monitoring practices	1
Poor rehabilitation practices	1

The audits of exploration projects identified three non-compliance ranked NC2 related to the failure of environmental controls for drilling operations (for example spill control matting under drill rigs not capturing oil leaks). There were 20 non-compliances identified that were ranked NC3. As with the mining operations, these non-compliances typically related to a failure to notify, report to, or seek approval from the Regulator or other agencies on a range of matters.

There was a range of issues identified as observations of concern with most of these issues relating to a failure to undertake exploration operations in accordance with the description of operations contained in the approved *ESF4 Application to conduct exploration activities* (for example, drill holes not sealed in accordance with requirements, or drilling sumps not lined or fenced), or in accordance with the mandatory requirements of the codes of practice.

The issues identified in the 2017-2018 audit program were very similar in nature to those identified during audits in 2016. Given that not all exploration titles have transitioned to the new exploration licence conditions, following the Improved Management of Exploration Regulation (IMER) project, there are some non-compliances that relate to requirements that are no longer included in the IMER conditions. It is expected that over time, these issues will be resolved.

Key issues

Compliance management

The audit findings show that there are many titleholders who are not actively managing their compliance requirements. A significant proportion of the suggestions for improvement related to the development of robust compliance management systems, particularly in relation to:

- failure to undertake or inadequate risk assessment
- inadequate systems for recording and tracking corrective actions
- inadequate training and competency systems
- poor inspection and monitoring practices.

Risk assessment was an area that was observed to be typically poorly implemented. As noted in 2016, the smaller mining operations (including those audited from January 2017 to June 2018) generally did not undertake any assessment of their compliance risks and consequently had no systems or processes in place to manage those risks. In most cases, basic health and safety risk assessments were completed but there was likely to be some benefit to the titleholders in undertaking a more holistic and process-based approach to the risk assessment, integrating safety, environmental and other compliance risks into a comprehensive risk assessment for their operations.

Similarly, the identified failures to notify or report, in accordance with the timeframes required, are symptomatic of a failure to have compliance management systems in place. The development of some simple tools and templates, such as a calendar template that titleholders could use to identify the dates for submission of annual reports, payment of royalties and rents and levies, timing of renewal applications for the mining lease and exploration licences, would assist titleholders to better manage their compliance obligations.

The development of a simple compliance management and tracking spreadsheet, for example, may provide the titleholders with a better understanding of the compliance requirements and obligations arising from the conditions of the mining lease and the obligations contained in the MOP.

As part of the 2016 audit program review, the audit team recommended the development of guidance material on identifying and interpreting compliance requirements, to assist in reducing the number of non-compliances identified among mineral explorers. A self-audit checklist has now been developed for exploration and was issued at the end of June 2018. The checklist should assist in reducing the number of non-compliances and observations in the exploration sector. This will be monitored over the next 12 to 24 months.

Contractor management was identified as an observation of concern in the 2016 audit program. Similar observations of concern were identified in the 2017-2018 audit program, particularly in the exploration sector. In many exploration programs, responsibility for safety and environmental management is often passed to a drilling contractor. However, in this instance, the titleholder retains accountability for the compliance of its contractors. It is this accountability that many titleholders fail to manage. It was observed during the audit program that often, there was little to no oversight of contracted workers, and in many cases, contractors were not always aware of their compliance obligations responsibilities.

The development of educational material focused on tips for actively managing compliance obligations, including the importance of contractor management, may assist in increasing the number of titleholders actively managing their compliance obligations. This would be expected to decrease the number of non-compliances being identified. The audits undertaken have included an educational component, particularly for smaller miners and explorers. This type of engagement has been very well received.

Hazardous substances management

Management of hazardous substances was a focus of the joint audit program for the management of mining infrastructure in catchment special areas. A summary report for this program was published by the Regulator in January 2019.

Management of hazardous substances was also identified as a concern in several audits of exploration activities. The very small sample size of hazardous substances audits conducted to date does not give a robust assessment of the issues. However, some significant issues were identified in the audits conducted.

Tailings management

A selected sample of six mineral mining operations were inspected to assess the operational performance of tailings management systems. Generally, the tailings storage facilities at each site were observed to be well managed.

No significant issues were identified, however there were two observations of concern and five suggestions for improvement identified by the inspection teams. Both observations of concern related to the inspection and monitoring programs being implemented at the mines.

Site inspections of each of the tailings dams did not identify any issues (e.g. erosion of dam walls, excess vegetation, seepage) that had not already been identified by the mine during routine inspections. For example, at one mine, it was observed that there were some large erosion scours on the buttress walls (refer to figure 1). It was noted that these were identified by the dam engineer in the mine's surveillance report dated April 2018. It stated that the erosion scours were not deemed to be detrimental to the

safety of the dam and were recommended to be monitored until remediation, as part of the closure plan.

All six sites inspected had developed and implemented dam safety management systems appropriate to the hazard category of the dams on site. Risk assessments had been undertaken, and controls implemented, to manage the risks of dam failure. Risk controls primarily consisted of inspection and monitoring programs, as documented in the operation and maintenance manuals for the tailings dams.

One of the sites inspected formed part of the joint agency audit program on mine dams conducted in 2016. Following a review of the corrective actions that arose from that audit, evidence was sighted to verify that the company had actioned and closed out all the corrective actions from the 2016 audit.

In some cases, mines have implemented management controls above the minimum requirements. For example, in addition to their annual surveillance inspections required under the Dam Safety Act, one mine recently had a tailings stewardship program where tailings experts from the USA parent company visited the site and inspected every dam wall of each of the tailings facilities, in conjunction with the mine's nominated dam engineers and the mine's tailings dam staff. This inspection program also included an independent tailings dam engineer from Western Australia that had not previously been on site. This was a good initiative as it provided an independent review of the facilities from experts in tailings management. The mine is proposing to undertake this process every two years, which is considered best practice.

Outcomes of audit findings

The audit of a colliery in the Wollongong area resulted in two safety improvement notices being issued, requiring the mine operator to address key issues of concern in relation to risk management and management of the reject emplacement area. Follow-up inspections of this site by the Regulator during 2018 resulted in another five notices being issued, relating to management of hazardous substances and use of machinery. During follow-up inspections, most of the issues were closed out.

One penalty infringement notice and 20 official cautions were issued for non-compliances detected during the audits, with an approximate 30 observations of concern referred for further investigation. Generally, issues identified during audits were followed up by inspectors as part of routine inspections.

Case studies

There were several examples of good practices in the mining and exploration sectors identified during the audit program. Case studies were developed to showcase some examples of good practice.

Mining rehabilitation and closure planning

The Charbon Colliery has been operating since the 1920s, initially supplying coal to the former Charbon Cement Works, adjacent to the northern boundary of the colliery. Following closure of the Charbon Cement Works in 1977, the mine stayed in production to meet regional demand for steaming coal.

Both open cut and underground mining has occurred at Charbon Colliery. Underground production ceased in April 2014 due to a depletion of resources resulting from 90 years of mining. Additionally, the open cut operations ceased in August 2015. Charbon is now preparing a mine closure plan and has begun rehabilitation efforts. Effective closure planning is an essential component of leading practice sustainable mine closure.

The rehabilitation and closure objectives stated in the MOP include:

- the short-term rehabilitation objective, developed in consultation with landowners. This will create a stable post-mining landform that is consistent with the surrounding landform, minimising the risk of erosion and ensuring there no safety hazard is introduced which did not exist prior to mining.
- the long-term rehabilitation objective. This will achieve a self-sustaining vegetation cover to create a combination of native bushland and mixed native grasses, equal with the pre-mining conditions.

Inspection of the rehabilitated areas in September 2017 showed that the post mining landforms appear to have been constructed according to the plans shown in the MOP, including the drainage design report. By comparing initial and post mining slopes, it was observed that over much of the rehabilitation, slopes remain similar to or less than, those recorded before mining started and appear to be considerably less than the slopes of very steep unmined areas south of the rehabilitation. Berms have been constructed (refer to figure 2), ripping carried out across the site on contour (refer to figure 3), a rock retaining wall constructed around the southern end of the Southern Open Cut, and sediment control dams constructed within the rehabilitation to assist in managing erosion from the site and ensure that water leaving disturbed areas are adequately treated before release. Rehabilitation has merged into the adjacent landform very well (refer to figure 4).

Soil provides rehabilitation with physical structure for root establishment and stability, nutrients, seeds and a seed bed, microbial biomass, moisture. Some soil types can also assist in protection against erosion.

Creating a good establishment and growth medium is critical for achieving good mine rehabilitation outcomes. This is not always easy given that in many parts of Australia, topsoil quality is relatively poor and may contain low concentrations of key nutrients.

Topsoil was salvaged before mining of the land, where possible. Much of this was stockpiled and respread following the establishment of post-mining landforms. The depth of respread topsoil is understood to have been 200 millimetres, enough for plant establishment. Some areas, near Stony Creek, did not receive topsoil due to its limited availability. For these areas, dark Permian spoil material was used. This is not the same as topsoil and would contain lower concentrations of some nutrients, and little or no native seed, microbial biomass and other organic material. It can provide a good growth medium and there were examples observed on site where such spoil material was used to establish good mine rehabilitation.

Vegetation on mining disturbance areas at Charbon is being established by seeding, with predominantly local native species, as well as some pasture species (in the Woodland domain areas) and a cover crop.

Seeding initially took place in October 2015, with a further seeding in February 2017. A combination of hand seeding for smaller, more difficult to access areas, and aerial seeding by helicopter, were used. It is understood that seed was spread either at the same time or within a short time of final soil surface disturbance. It is important to ensure surface crusting does not occur and inhibit seed germination.

The use of a cover crop is appropriate. A good cover crop was established following substantial rain in March 2017. The remnants of the cover crop are still apparent in the areas rehabilitated in 2017. It is apparent that it has provided early ground cover and stability.

A weed management strategy is in place, with a weed action plan carried out by a weed management contractor. Records were maintained of the works carried out as part of the weed management activities. Areas inspected at those times included rehabilitation and adjacent unmined areas. It was concluded that at this stage, weed monitoring and control are being carried out. If this continues, weeds are not likely to pose a threat that might prevent good rehabilitation.

Improvements to the monitoring program, including additional monitoring sites, have been recommended to ensure a fully representative coverage of the site and to assist with objectively tracking rehabilitation progress against the completion criteria.

Overall, it was concluded from the Regulator's site inspection that the standard of rehabilitation was generally of high quality. As sites are still young, we cannot be certain how well they will develop in

the long term. However, early monitoring at Stony Creek shows promising development of rehabilitation established in October 2015, in terms of a number of key vegetation parameters.

Exploration compliance management

Loch Lilly Project

Exploration licences 8199 and 8200 (EL8199 and EL8200) are held by San Antonio Exploration Pty Ltd. The company entered into a joint venture with a subsidiary of Argent Minerals Limited, which is the operator of the tenements.

Exploration within the tenements had previously focussed on:

- reviewing available exploration data
- relogging and sampling of historical exploration diamond drill holes
- reprocessing of available geophysical data
- a gravity survey and a magnetic induced polarisation survey (magnetic IP survey).

In June 2017, San Antonio submitted, and had approved, an application to conduct exploration activities on EL8199 and EL8200, which involved the drilling of one 500 metre deep exploration borehole, using diamond drilling methods, on each exploration tenement. Argent undertook the exploration drilling works on behalf of the joint venture. When a change was required to the drilling program, Argent prepared and applied to modify the original approval before undertaking the works.

Drilling of the two exploration drill holes on EL8199 and EL8200 was partly funded by a grant under the NSW Government New Frontiers Co-operative Drilling Program. During the audit of the drilling works, it was found that Argent had good systems and processes in place to manage its compliance obligations.

Argent contracted the services of a contract driller for the Loch Lilly project. As part of the tender process, site-specific requirements and compliance obligations from the activity approval (and modification) were included in the drill plan prepared by Argent and formed the basis for the contractor scope of works. Argent required the successful contractor to prepare a safety, health, environment and community management plan (SHEC Plan), based on the requirements of the drill plan, before commencing on site. Supervision of the contracted drilling works was undertaken by the Argent project geologist and field supervisor, who also undertook spot audits during the drilling works.

In terms of environmental management of the exploration activities, drilling muds, chemicals and oils were stored on bunded pallets, covered with tarpaulins (photograph 5). A register of goods on site was

maintained by the driller, along with safety data sheets for each of the products. All products were in original containers, in good condition, and fully labelled. A fully stocked spill kit was also available on site (refer to figure 6) and an interview with drilling staff indicated that they had been trained in the use of the spill kit. Spill control matting was in place under the drill rig (refer to figure 7) and other pieces of plant, to catch any drips or spills of hydrocarbon-based fluids used.

Water for the drilling operations was sourced from a landowner's bore with the consent of the landowner. Shallow inground sumps were used to manage water used during the drilling process. These sumps were lined and fenced (refer to figure 8).

While there was minimal vegetation and no mature trees, the drill site was demarcated with flagging tape (refer to figure 9) to ensure minimal disturbance outside of the approved footprint. Given the flat nature of the land and the limited potential for runoff, a risk assessment undertaken by the drilling contractor identified erosion and sediment run off to be very low risk and as such no specific controls were required. This risk was confirmed as part of the audit with no erosion identified.

From the evidence reviewed and observations made on site during the audit, it was concluded that the titleholder and its joint venture partner had achieved a high level of compliance with the requirements of the exploration licences and the activity approvals issued for exploration activities.

Conclusions and recommendations

There were 38 audits completed as part of the 2017-2018 audit program. There were no NC1 (high risk) ranked non-compliances detected. However, there were 11 NC2 (low risk) and 67 NC3 (administrative) non-compliances detected. A further 124 observations of concern and 54 suggestions for improvement were noted by the auditors. There were no issues identified that threatened immediate environmental harm, with most issues having the potential for only localised minor impacts.

Generally, the audit findings reflect what was identified during the 2016 audit program. A key observation of the audits undertaken was that the smaller operators (either mining or exploration) lack the systems and resources to effectively manage their compliance obligations.

Key recommendations for titleholders arising from the review of the audit findings include:

- Titleholders should undertake a more holistic and process-based approach to integrate safety, environmental and other compliance risks into a comprehensive risk assessment for their operations.
- The development of a simple compliance management and tracking spreadsheet, for example, may provide the titleholders with a better understanding of their compliance

requirements and obligations, arising from the conditions of title and the obligations contained in the MOPs or exploration activity approvals.

- Where contractors are used in mining or exploration activities, titleholders need to be aware that they retain accountability for the contracted works and should implement a program of monitoring or surveillance of those works.
- Titleholders should undertake a review of any hazardous chemicals use, handling and storage practices to check their level of compliance with the requirements of the *Work Health and Safety Act 2011* and *Work Health and Safety (Mines and Petroleum Sites) Act 2013*.

Photographs

Figure 1 Large erosion scour on a tailings dam buttress wall



Figure 2 Contour berm at Stony Creek rehabilitation, protecting a slope from erosion



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Figure 3 Rip lines on the contour providing protection against erosion and establishment sites for seedlings



Figure 4 Rehabilitation area showing tie-in to the surrounding landscape



Figure 5 Oil drums stored on a banded pallet covered with a tarpaulin



Figure 6 Fully stocked spill kit available on site



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Figure 7 Spill control matting under the drill rig



Figure 8 Inground sumps lined and fenced



Figure 9 Drill site marked with flagging tape and barrier fencing



Appendices

Appendix 1

Compliance assessment definitions

ASSESSMENT	CRITERIA
Compliance (C)	Sufficient and appropriate evidence is available to demonstrate that the particular requirement has been complied with.
Non-compliance (NC)	<p>Clear evidence has been collected to demonstrate that the particular requirement has not been complied with. There are three subcategories of non-compliance reflecting the severity and level of risk associated with the non-compliance:</p> <p>NC1 – the absence of planning or implementation of a required operational element which has the potential to result in a significant risk</p> <p>NC2 – an isolated lapse or absence of control in the implementation of an operational element which is unlikely to result in a significant risk</p> <p>NC3 – an administrative or reporting non-compliance which does not have a direct environmental or safety significance</p>
Observation of concern (O)	<p>Where an auditee may be compliant at the time of the audit but there are issues that exist that could result in the potential for future non-compliance if not addressed.</p> <p>Observation of concern was also used where an issue may not have particular compliance requirements, but which was not conducive to good management or best practice.</p>
Suggestion for improvement (SI)	Where changes in processes or activities inspected or evaluated at the time of the audit could deliver improvement in relation to risk minimisation, sustainable outcomes and management practices.
Not determined (ND)	<p>The necessary evidence has not been collected to enable an assessment of compliance to be made within the scope of the audit.</p> <p>Reasons why the audit team could not collect the required information include:</p> <ul style="list-style-type: none"> ■ insufficient information on the file relating to the period covered by the audit or insufficient evidence collected to reach a conclusion

- the wording on the criteria (approval condition) meant that no evidence could be gathered or it was too difficult to gather the evidence.

A 'not determined' assessment was also made where the condition was outside of the scope of the audit.

Not applicable (NA)

The circumstances of the authorisation or titleholder have changed and are no longer relevant, e.g. no longer mining, mining equipment and plant has been removed, etc.
An invoking element in the criteria was not activated within the scope of the audit.