

Coal Mine Safety Audit Report

Mine Safety Operations
February 2010



Industry &
Investment



FOREWORD

The *Coal Safety Audit Report* is the culmination of an extensive program undertaken by the Mine Safety Operations Branch (MSO) of Industry & Investment NSW. More than 290 audits were conducted at coal mines in NSW in the 12 months from January 2009.

I congratulate all the people involved in this extensive audit of coal mines operating standards in NSW.

These audits flow from the 2005 Wran NSW Mine Safety Review recommendations, which are being fully implemented by the NSW Government.

This Government is fully committed to achieving zero deaths and serious injury in NSW mining and extractive industry.

The objectives of the audit program were to assess compliance with four key risk management systems required under the *Coal Mine Health and Safety Act 2002* and associated Regulation.

The audit will allow the Government to devise policy and strategies for improved compliance. The Wran Review recommended that the *Coal Mine Health and Safety Regulation* be subject to regular audit and review.

The results of the audit program will encourage a cooperative approach between industry and the mine safety inspectors to address areas of concern.

The audit program results also show that many in the mining industry demonstrate commitment and innovation in developing and improving systems to manage the health and safety of mine workers and contractors.

The Wran Review has been an initiative in driving priorities for health and safety within the mining and extractives industry. It has made a significant contribution in progress towards the shared goal of world-leading occupational health and safety, the importance of which cannot be underestimated.

I commend the *Coal Mine Safety Audit Report* to you.

The Hon Ian Macdonald MLC
Minister for Mineral and Forest Resources

Executive Summary

Introduction

The *Coal Mine Health and Safety Act 2002* (CMHS Act) allows a government official to audit and review the health and safety management system of a coal operation at any time. An audit and review may occur periodically, after the occurrence of an event prescribed by the regulations or at any other time that the government official thinks is appropriate (section 152).

In response to the recommendations made in the report of the 2005 Wran Mine Safety Review, the Mine Safety Operations Branch (MSO) in the Department of Industry and Investment conducted an occupational health and safety audit program at coal operations in NSW.

Audit program

The audit program assessed the legislative compliance of four key systems and plans that form part of the health and safety management system required under the CMHS Act and the *Coal Mine Health and Safety Regulation 2006* (CMHS Regulation). The following systems and plans were included in the audit program:

- Health and Safety Management Systems (HSMS);
- Contractor Management Plans (CMP);
- Electrical Engineering Management Plans (EEMP); and
- Mechanical Engineering Management Plans (MEMP).

The audit objectives were to:

- a. assess whether the systems for managing health and safety at NSW coal operations include all matters, plans and procedures required under relevant legislative provisions;
- b. provide feedback to industry on the extent to which the systems for managing health and safety at NSW coal operations comply with the relevant legislative provisions;
- c. identify industry wide problems and issues in achieving compliance with the relevant legislative provisions and suggest strategies to address them; and
- d. establish baseline data on industry compliance with the legislative provisions to enable trend analysis in future compliance audit programs.

All inspectors and mine safety officers involved in the audit programme completed a safety auditor course which met the requirements for OHS Auditor Certification with the Quality Society of Australasia.

Coal operations in NSW were notified in writing of the audit program, which included an outline of the program and a copy of the audit assessment worksheet. Each coal operation was contacted by an MSO inspector or mine safety officer to make arrangements for the audit assessment. More than 290 audits were completed over a 12-month period from January 2009. Some operations were not included in the analysis because they did not have an updated profile on the COMET database at the time the analysis was undertaken. Table 1 below shows the number of audits included in the audit analysis by region and operation type.

Table 1: Number of coal mines safety audits included in the analysis by region and operation type.

Region	HSMS audit	CMP audit	EEMP audit	MEMP audit
Hunter	33	34	45	47
-Open Cut	17	17	19	20
-Processing	6	6	9	10
-Underground	10	11	17	17
Northern	8	8	9	9
-Open Cut	5	5	5	5
-Processing	2	2	3	3
-Underground	1	1	1	1
South East	24	24	22	25
-Open Cut	5	5	3	5
-Processing	3	3	4	4
-Underground	16	16	15	16
TOTAL	65	66	76	81

The scores from the assessment worksheets were entered on the COMET database. Score range, average and frequency were identified and percentage compliance ratings calculated. Comparisons were made between regions, operation types, and the type of audit. For reporting purposes, the state was divided into three regions. The South East region covers mines south of the Hawkesbury River and west from Sydney, including mines around Lithgow. Hunter region covers mines in the Hunter Valley up to Gloucester and Taree, with Northern region covering areas north of the Hunter Valley, including mines around Gunnedah, Narrabri and Boggabri.

Summary of audit results

This report collates and analyses the audit findings for each of the targeted health and safety management systems and plans. It provides a snapshot of the coal mining industries' overall compliance with the statutory requirements regulating health and safety management systems.

The report has been structured to include an overview of the audit program as well as chapters on audit findings for the four different plans and systems that were assessed as part of the audit program. Table 2 below shows the percentage compliance scores across the audit types. The findings for each of the audit types are summarised below.

Table 2: Summary of coal mines safety audit results across audit types.

Average Percentage Compliance	HSMS audit	CMP audit	EEMP audit	MEMP audit
Overall	95.65	95.03	86.53	88.95
Region				
- Hunter	96.49	97.16	90.17	90.67
- South East	94.43	90.91	79.95	85.30
- Northern	95.86	98.13	85.00	91.05
Operation type				
- Underground	95.15	92.44	85.85	87.19
- Open cut	96.49	96.57	88.32	91.91
- Processing	95.03	97.67	85.25	88.27

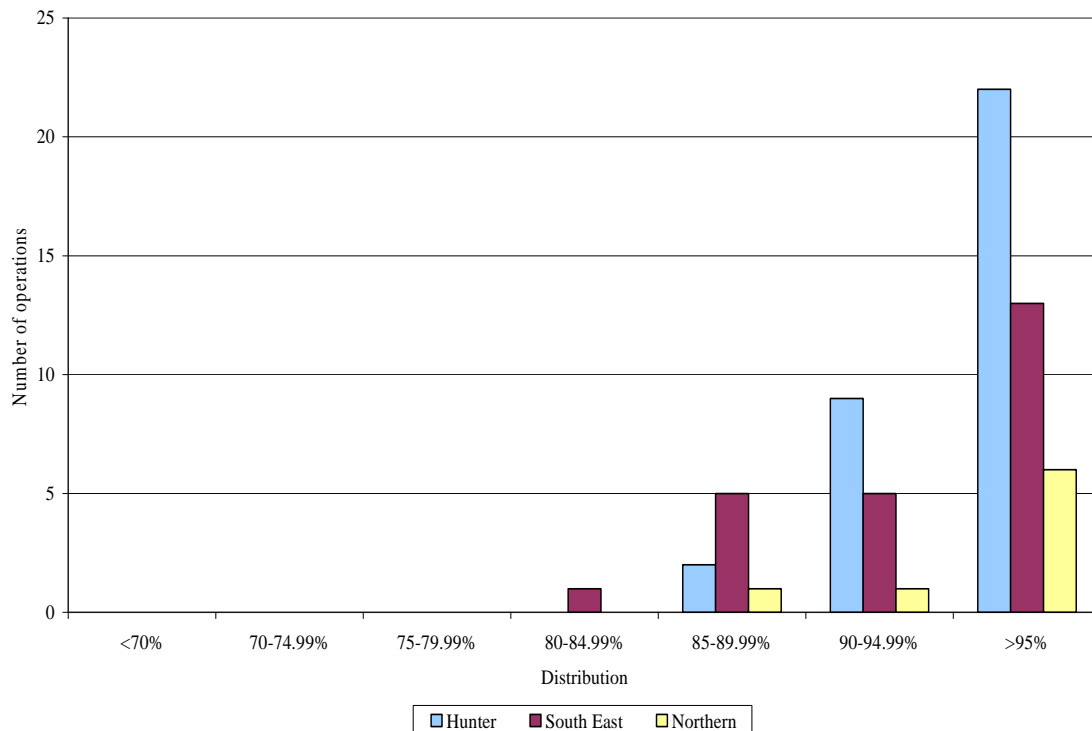
The HSMS audit

The HSMS audit consisted of 66 questions grouped into nine criteria based on the legislative requirements. Sixty-five operations were included in the audit analysis.

The audit findings indicate that overall compliance with HSMS requirements is excellent, with the 65 coal operations scoring an average overall compliance of 95.65%. Most operations scored over 95% compliance.

Hunter region operations had the highest overall HSMS audit compliance score (96.49%), followed by Northern region operations (95.86%) and South East (94.43%). Graph 1 below shows the distribution of overall compliance scores by region.

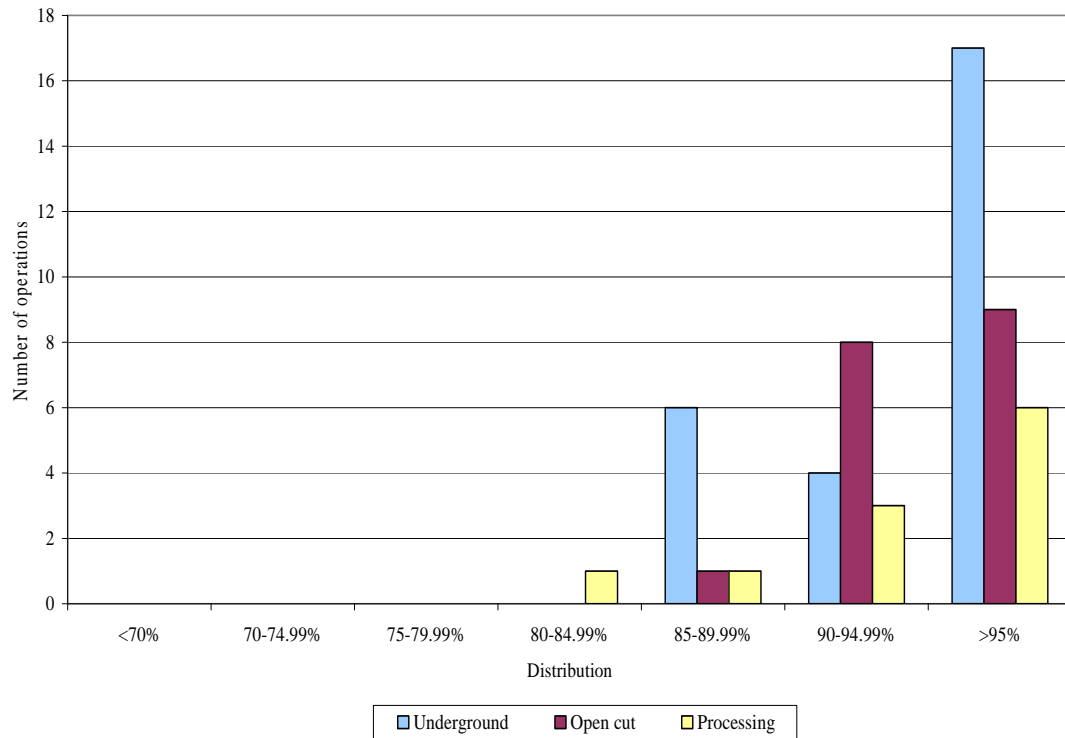
Graph 1: Distribution of percentage compliance scores for HSMS audit by region.



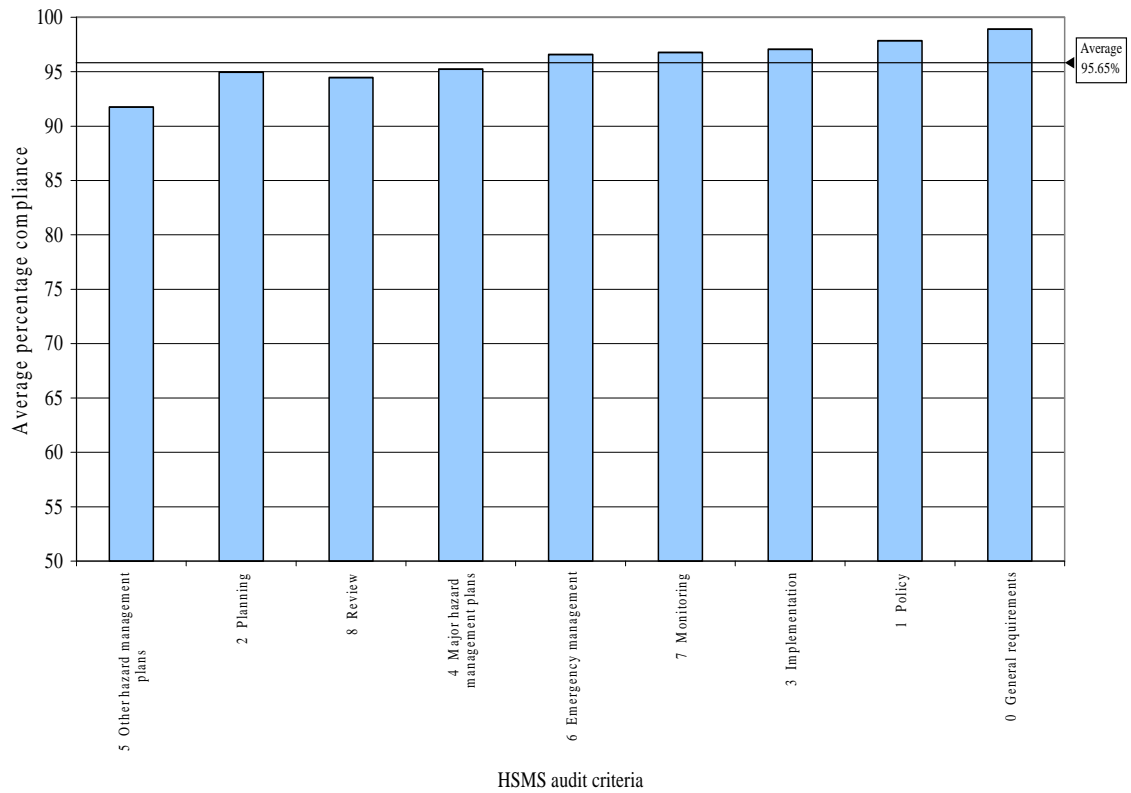
Within operation types, open cut had the highest HSMS compliance of 96.49%, followed by underground operations (95.15%) and processing (95.03%). Graph 2 shows the distribution of overall compliance scores by operation type.

Of the nine audit criteria in the HSMS audit, six criteria achieved an average score of over 95% and three were in the 90-94.99% distribution range. The weakest areas were planning (criterion 2), major hazard management plan (criterion 4), other hazard plans (criterion 5), review (criterion 8), which all scored lower than the criteria average of 95.65%. However, none of these criteria scored below 91% (Graph 3).

Graph 2: Distribution of percentage compliance scores for HSMS audit by operation type.



Graph 3: Average percentage compliance for HSMS audit criteria across all coal operations.



Underground operations performed relatively consistently across the regions. The underground operation in the Northern region performed the best, with South East underground operations the lowest. Open cut operations scored consistently across regions. There was some variation in the performance of processing operations across the regions. Processing operations in the Northern region did not perform as well as those in the South East and Hunter regions, with those in the Hunter region scoring highest.

The CMP audit

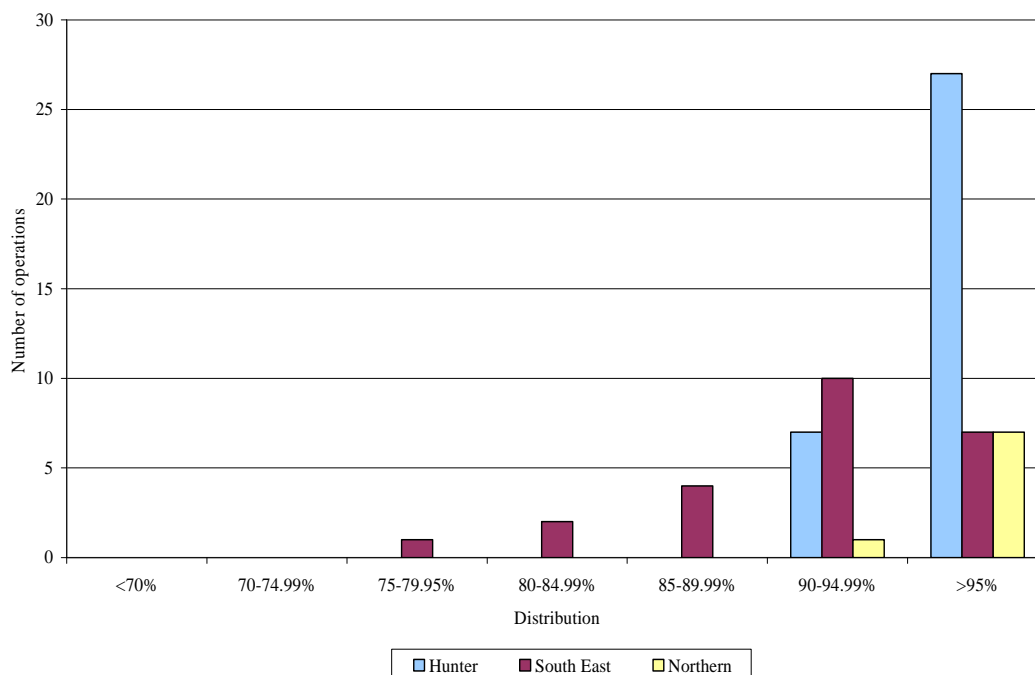
The CMP audit consisted of eight criteria based on legislative requirements. Sixty-six operations were included in the audit analysis.

Overall compliance with the CMP requirements was also excellent, with a compliance average of 95.03%. Again, most operations averaged above 95% compliance. However, the lowest overall average for a coal operation was 77.14%, scored by an underground operation in the South East.

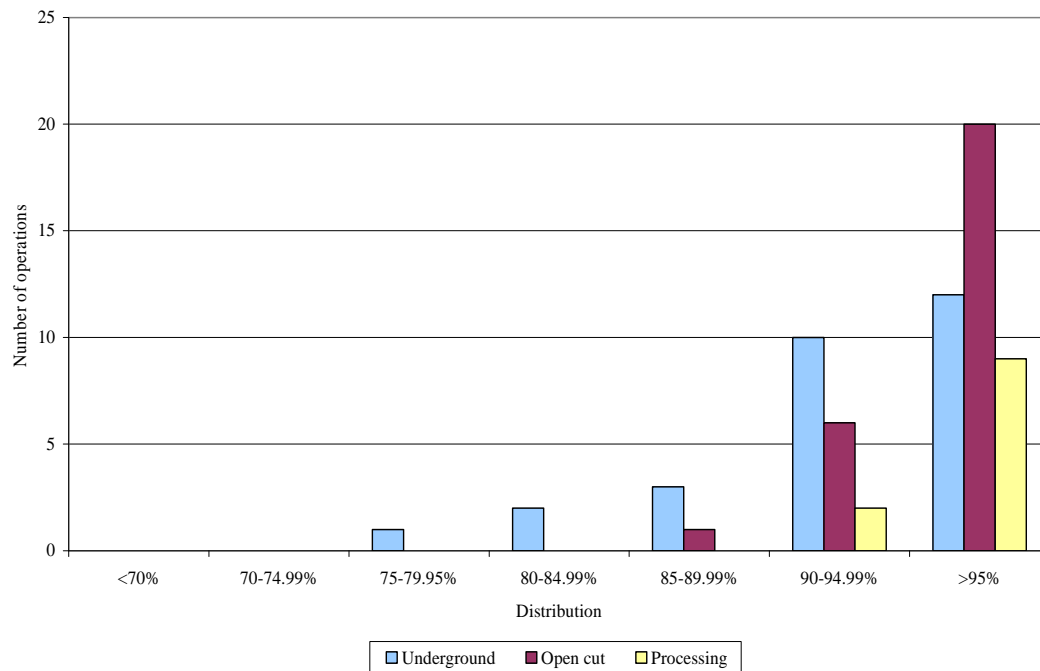
South East operations had the lowest overall compliance score (90.91%), but most scores in that region were still above the 90% mark. The range of average scores was much greater in the South East than the other regions. Northern region operations achieved the highest compliance of 98.13%, with most operations in that region scoring above 95%, and none below 90%. Hunter region operations averaged 97.16%, again with most operations scoring above 95% and none below 90%. Graph 4 below shows the distribution of overall compliance scores for the CMP audit by region.

For operation types, processing operations achieved the highest overall average of 97.67%. All processing operations scored over 90%, with most scoring above 95%. Underground operations scored the lowest average (92.44%), with a much greater range of scores. Open cut scored an average of 96.57%, with a low score of 87.5%. Graph 5 shows the distribution of overall compliance scores by operation type.

Graph 4: Distribution of percentage compliance scores for CMP audit by region.

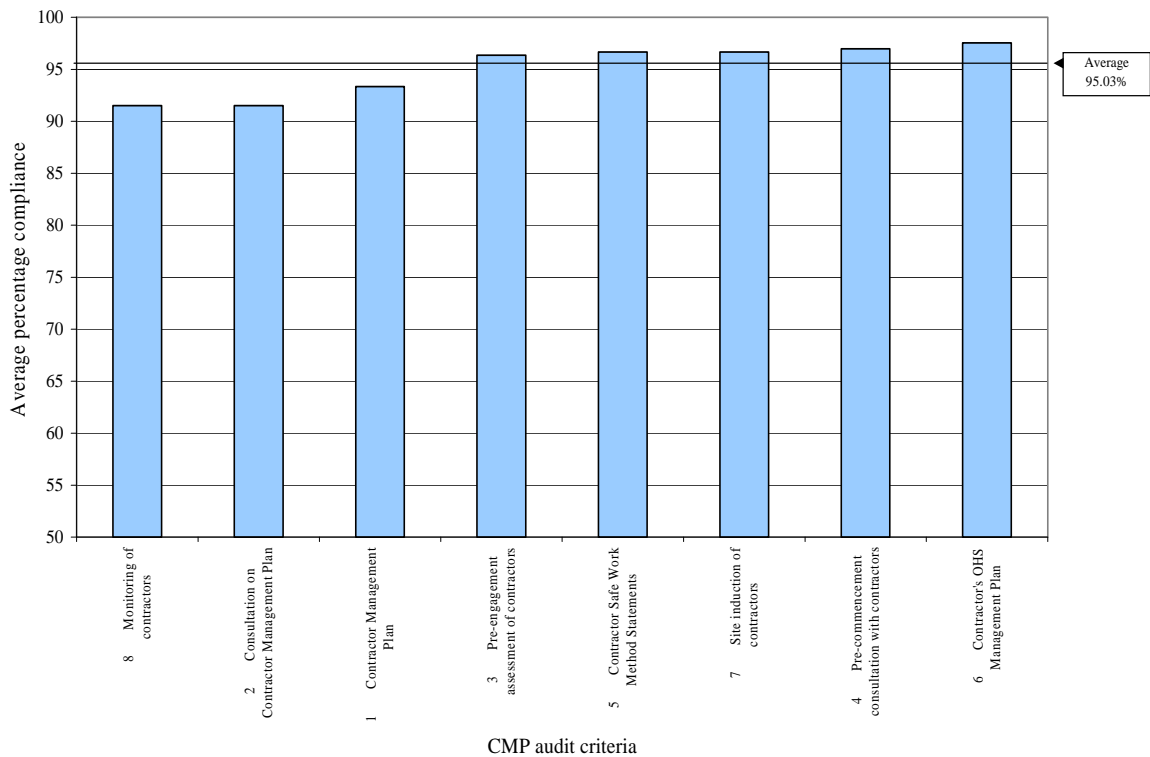


Graph 5: Distribution of percentage compliance scores for CMP audit by operation type.



The scores for CMP criteria were mostly above 95%. Three criteria scored below the 95.03% average. These were 91.53% for criterion 8 (monitoring of contractors) and criterion 2 (consultation on CMP) and 93.33% for criterion 1 (contractor management plans) (Graph 6).

Graph 6: Average percentage compliance for CMP audit criteria across coal operations.



Underground and open cut operations scored fairly consistently across the regions, with Northern region scoring highest for these operation types, followed by Hunter and South East. Hunter processing and Northern underground operations scored highest of all. Processing in the Northern region scored lower than processing in the Hunter and South East. South East processing scored slightly higher than underground and open cut in that region.

The EEMP audit

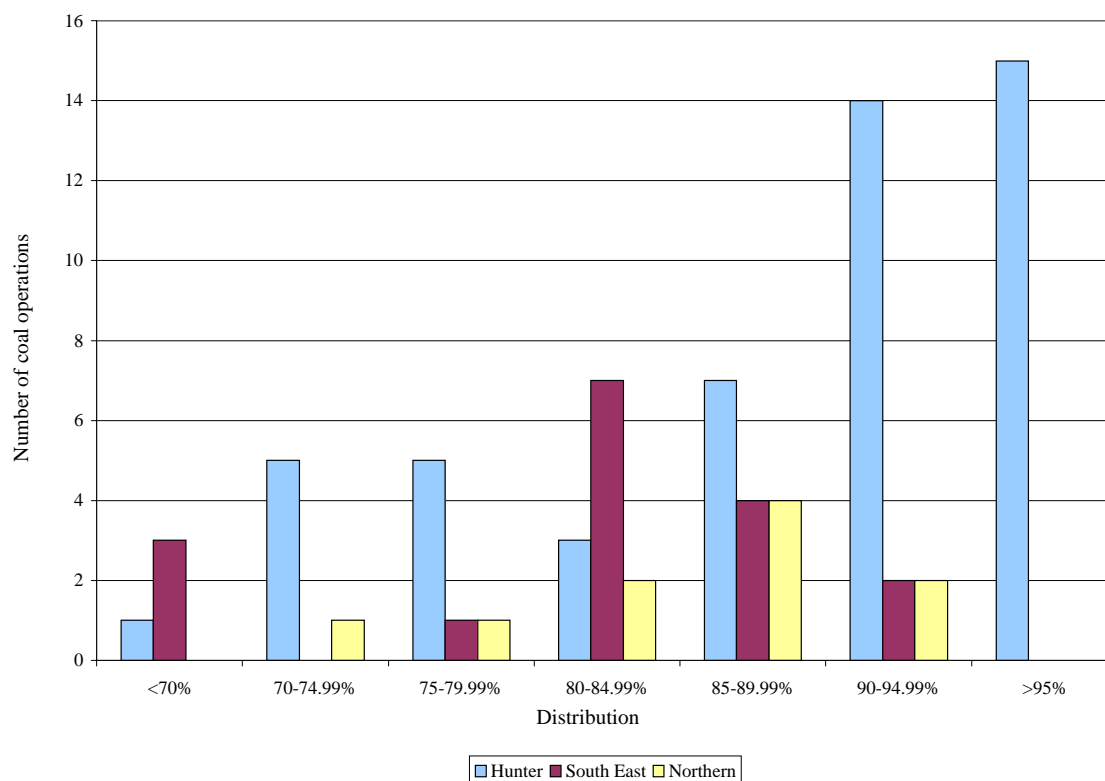
The EEMP audit consisted of 137 questions grouped into 26 criteria reflecting legislative requirements. Seventy-six coal operations were included in the audit analysis.

The overall compliance of coal operations with EEMP requirements was good (86.53%), with the highest number of scores in the 90-94.99% distribution range.

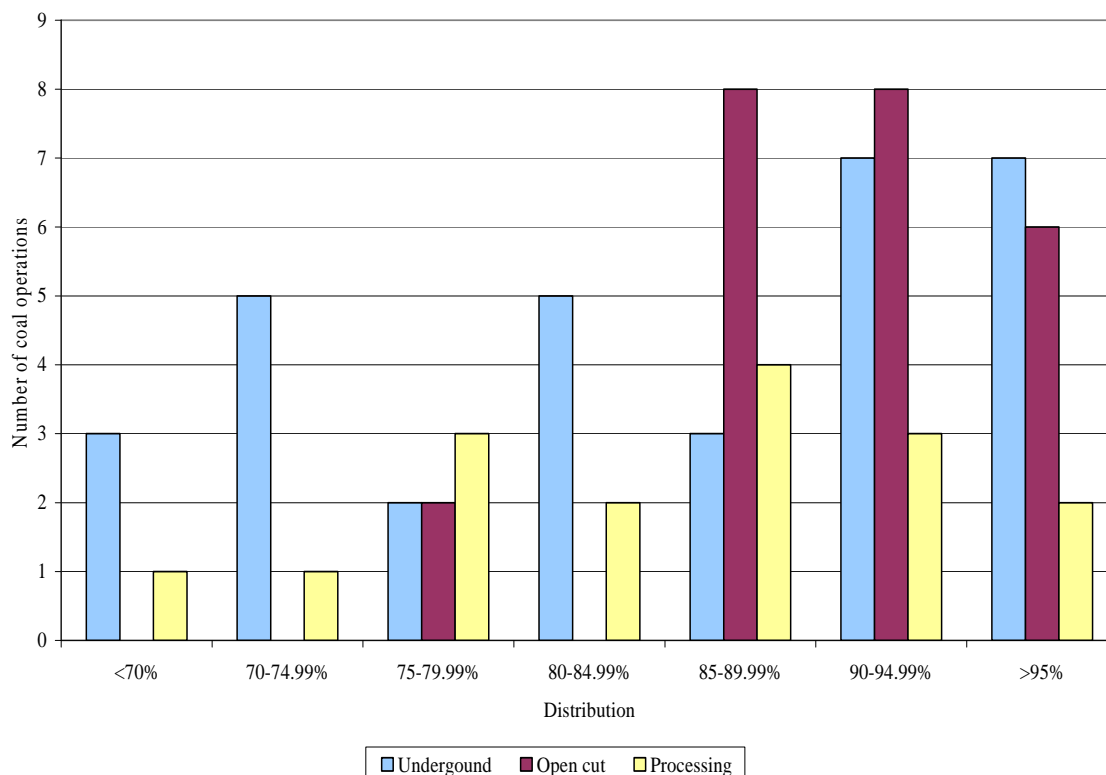
Hunter operations scored best overall (90.17%). All operations with a score over 95% were from the Hunter region. However, a Hunter operation also scored the lowest compliance score of 61.96%. South East region operations had the lowest average compliance (79.95%), with a low score of 63.07%. Northern region operations had an average of 85%, with most scores in the 80-84.99% range (see Graph 7).

For operation types, open cut had the highest compliance (88.32%). Underground and processing operations achieved similar results, with average compliance of 85.85% and 85.25% respectively. A processing operation scored the lowest (61.96%) and an underground operation the next lowest (63.07%). Graph 8 below shows the distribution of compliance scores across regions.

Graph 7: Distribution of percentage compliance scores for EEMP audit by region.



Graph 8: Distribution of percentage compliance scores for EEMP audit by type of operation



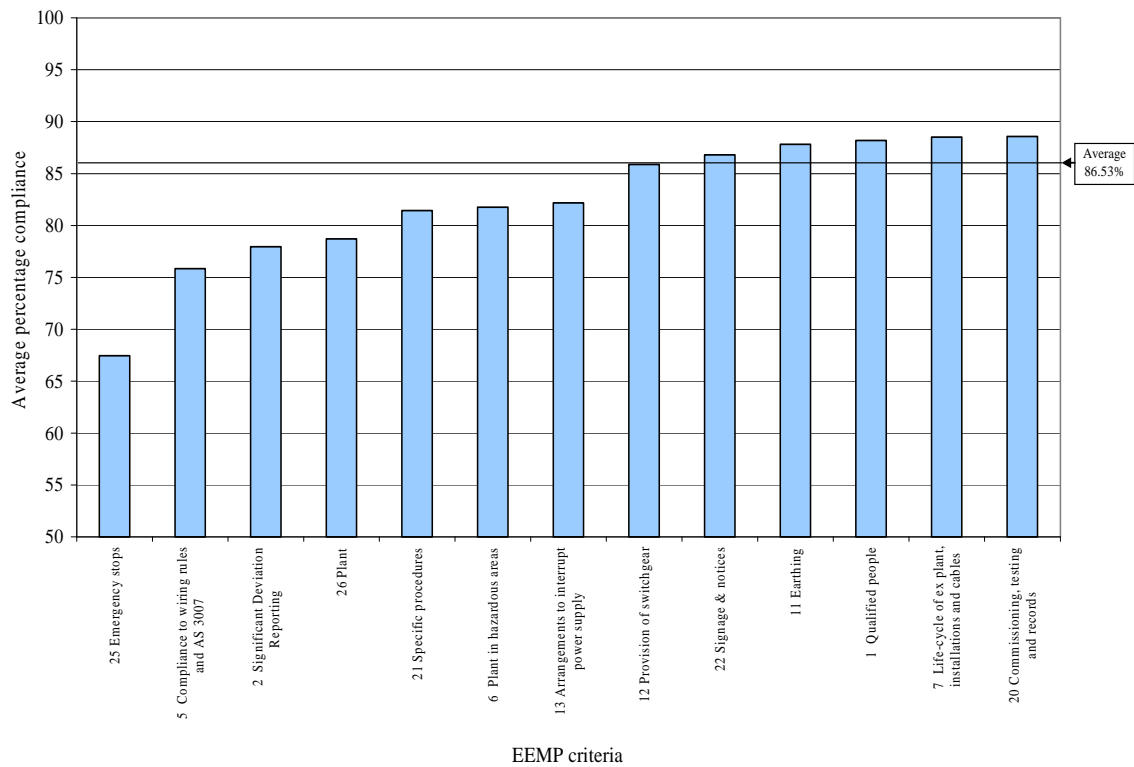
Averages for the 26 criteria tested in the EEMP audit most frequently fell in the 85-89.99% distribution range (Graph 9a and 9b). Eight criteria scored below that average, as follows:

- Criterion 25 (67.47%) - emergency stops
- Criterion 5 (75.84%) - compliance to wiring rules and AS/NZ3007
- Criterion 2 (77.96%) - significant deviation reporting
- Criterion 26 (78.71%) - design, registration, supply and working with plant
- Criterion 21 (81.43%) - procedures related to testing instruments and welding
- Criterion 6 (81.76%) - gazetted plant in hazardous areas
- Criterion 13 (82.18%) - arrangements to interrupt power supply
- Criterion 12 (85.88%) - provision of switchgear

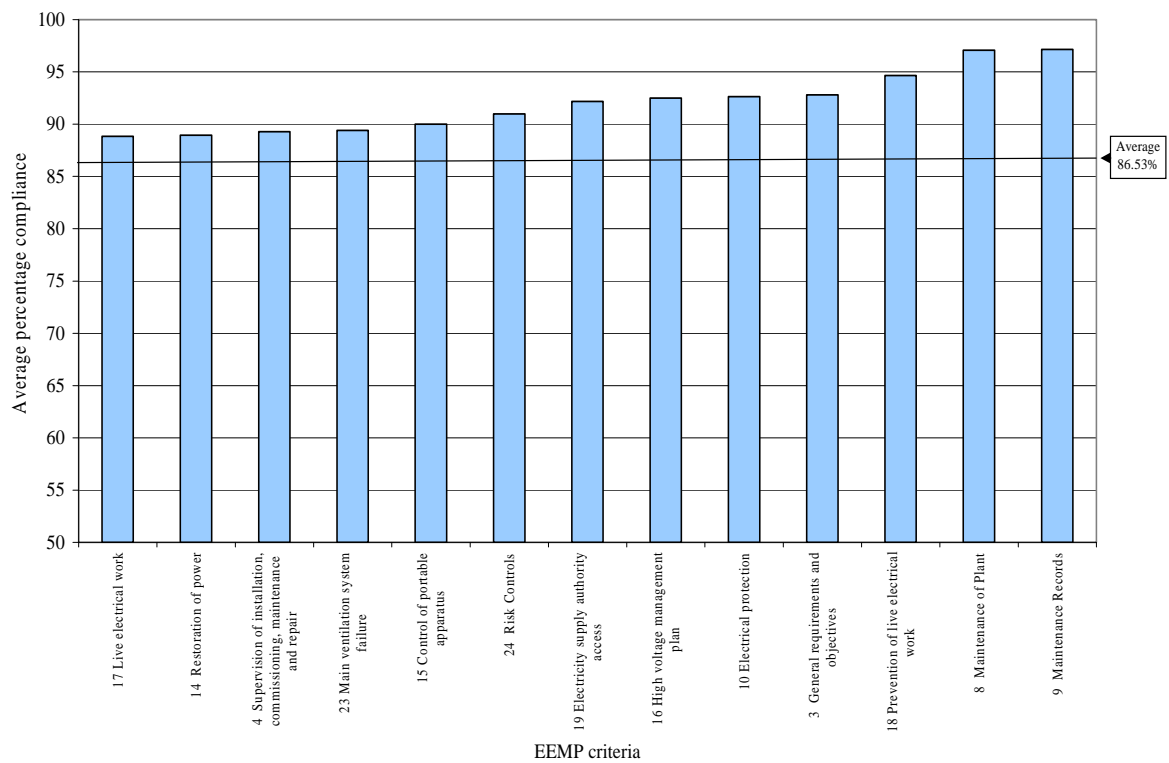
Although the percentage compliance for criterion 1 was above average (88.20%), this score is unexpectedly low considering that it was testing the inclusion of a competent electrical engineer in the management structure, which is a basic administrative requirement under section 37 of the CMHS Act. South East region scored a low of 79.40% compliance for this criterion.

Processing and open cut operations performed relatively consistently across the regions, but with South East open cut operations not performing quite as well as open cut in other regions. In contrast, underground mines in the Hunter region performed considerably better than those in the other regions.

Graph 9a: Average percentage compliance with EEMP audit criteria across coal operations



Graph 9b: Average percentage compliance with EEMP audit criteria across coal operations



The MEMP audit

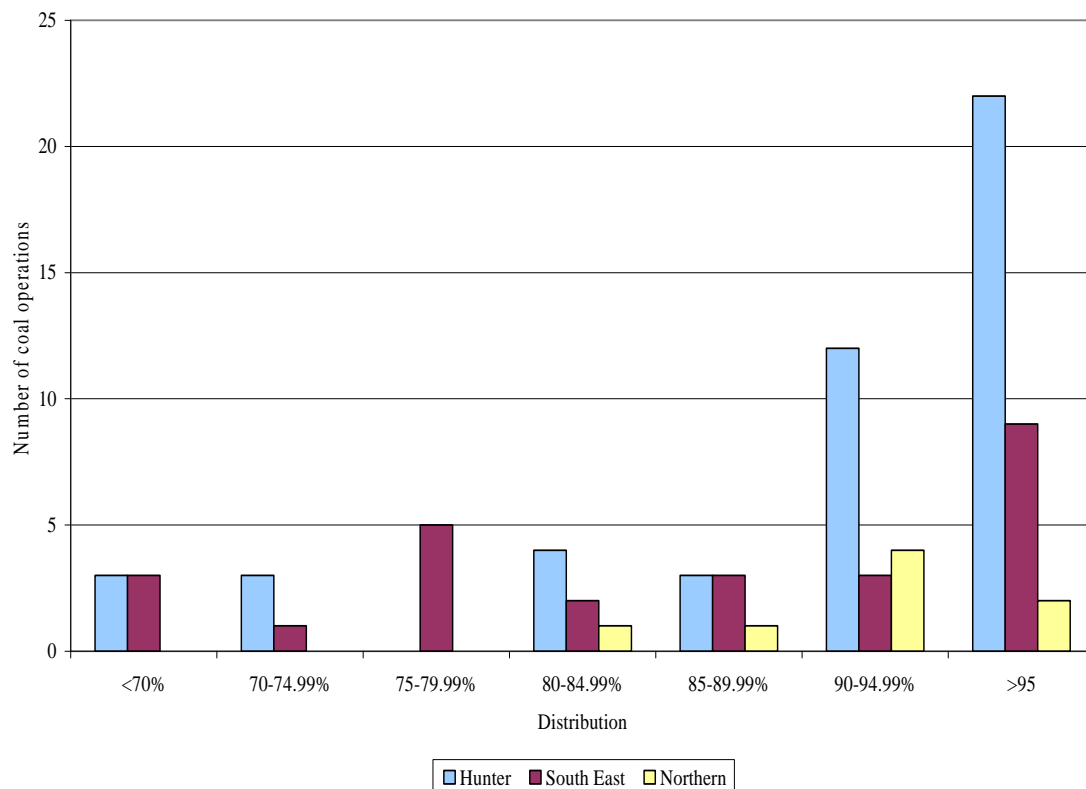
The MEMP audit consisted of 141 questions grouped into 35 criteria reflecting the legislative requirements. Eighty-one coal operations were included in the audit analysis.

The overall compliance of coal operations with MEMP requirements was good (88.95%), with the highest number of average scores in the 90-94.99% distribution range.

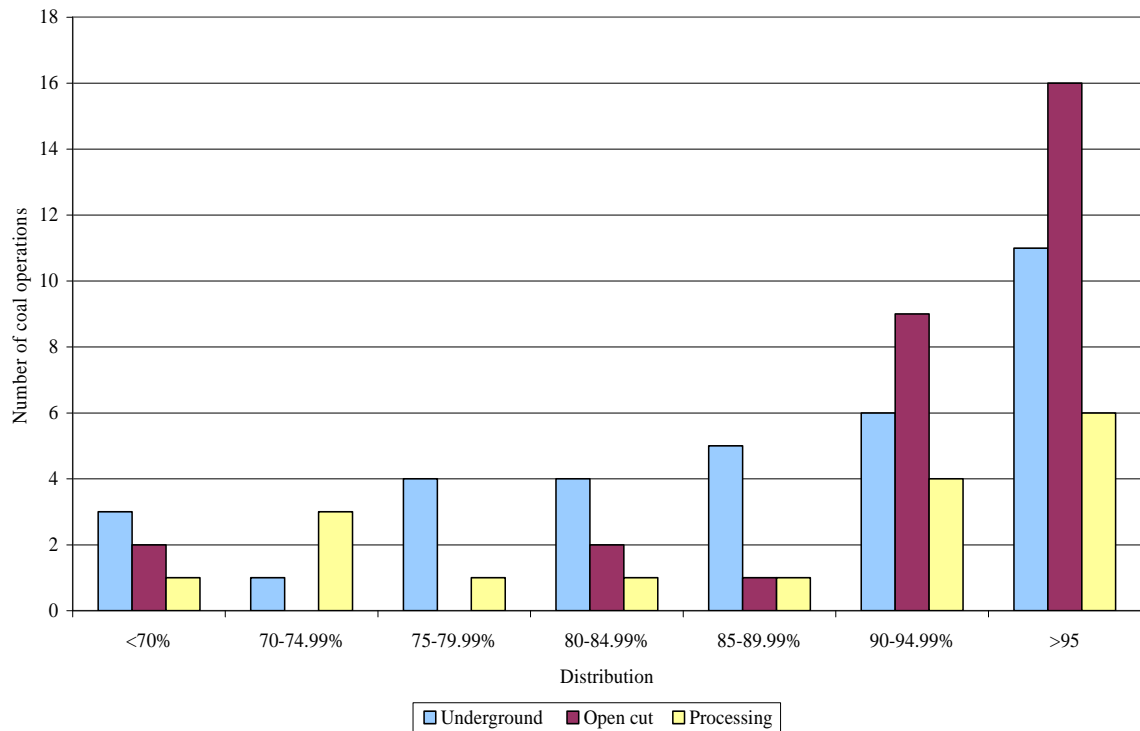
The results for Hunter and Northern operations were similar, with an average compliance of 90.67% and 91.05% respectively and the highest frequency of scores falling into the over 95% distribution range. However, the lowest score was 57.88% for a Hunter valley underground mine. South East operations scored the lowest overall average across the regions (85.30%). Graph 10 shows the distribution of compliance scores by region.

For operation types, open cut had the highest compliance (91.91%), with most open cut operations scoring above 90%. Underground and processing achieved similar results, with average compliance of 87.19% and 88.27% respectively. An underground operation scored the lowest compliance (57.88%). The lowest compliance score for a processing operation was 69.02%. As for open cut operations, compliance scores for underground and processing operations most frequently fell in the over 95% range, but had a more even distribution across the other distribution ranges than open cut (Graph 11).

Graph 10: Distribution of percentage compliance scores for MEMP audit by region.

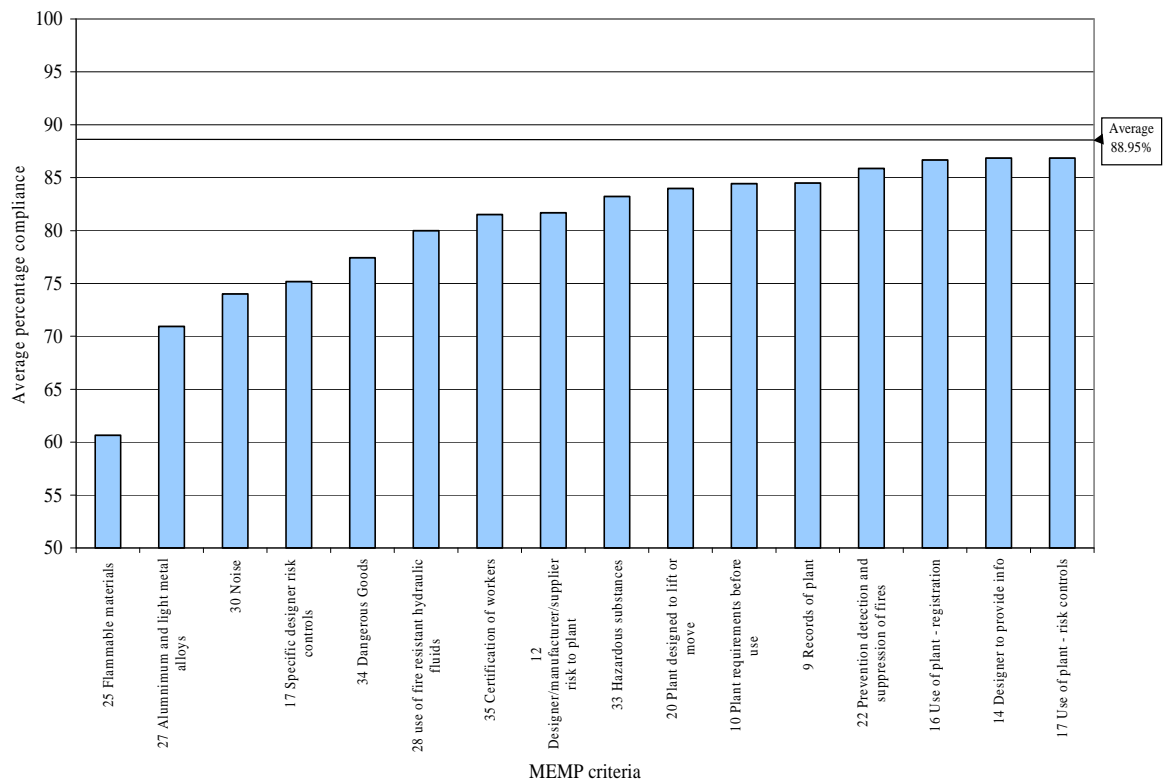


Graph 11: Distribution of percentage compliance scores for MEMP audit by operation type.

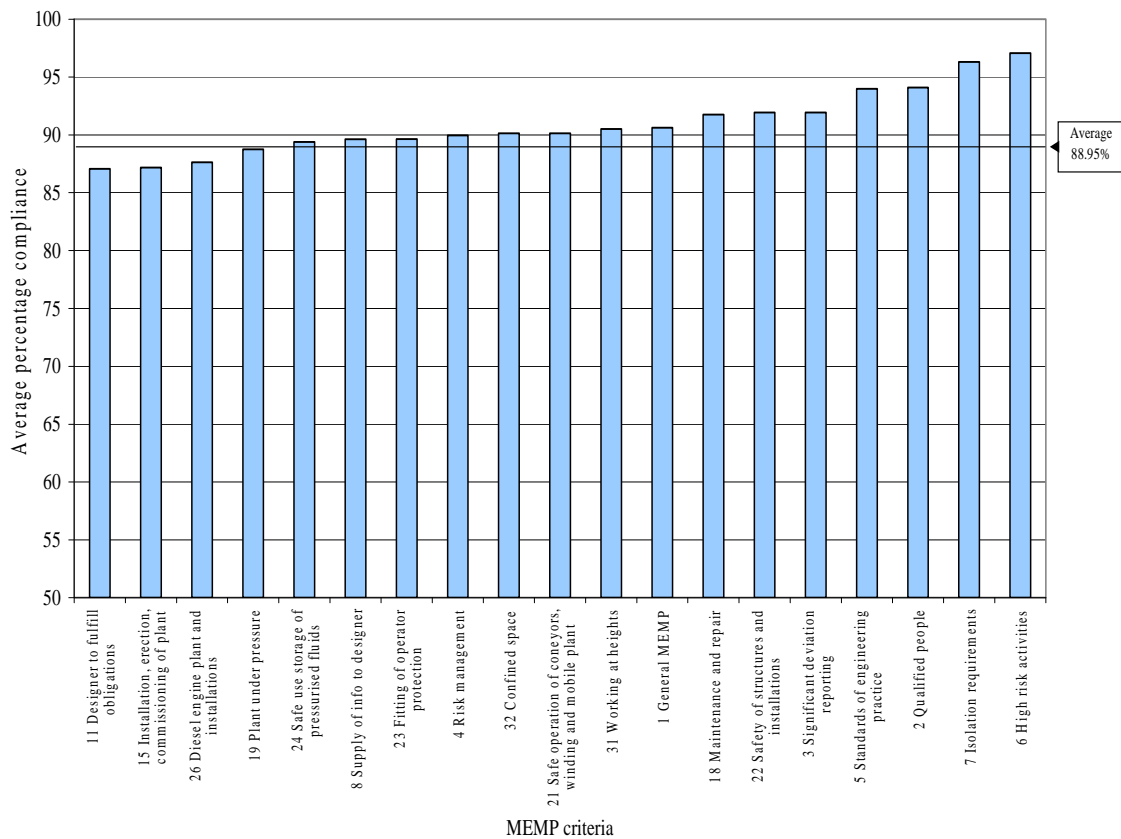


Averages for the 35 criteria tested in the MEMP audit most frequently fell in the 85-89.99%. Graphs 12a and 12b below show the average score for the 35 criteria across all coal operations.

Graph 12a: Average percentage compliance with MEMP audit criteria across coal operations



Graph 12b: Average percentage compliance with MEMP audit criteria across coal operations



Twenty criteria scored below the average of 88.95%, as follows:

- Criterion 29 (60.67%) - Flammable material
- Criterion 27 (70.94%) - Aluminium of light metal alloys
- Criterion 30 (74.00%) - Noise
- Criterion 13 (75.17%) - Specific designer risk controls
- Criterion 34 (77.43%) - Dangerous goods
- Criterion 28 (80.00%) - Fire resistant hydraulic fluids
- Criterion 35 (81.50%) - Certification of workers
- Criterion 12 (81.67%) - Designer/manufacturer/supplier to assess OHS risks
- Criterion 33 (83.21%) - Hazardous substances
- Criterion 20 (83.98%) - Plant designed to move or lift
- Criterion 10 (84.44%) - Plant requirements before use
- Criterion 9 (84.50%) - Records of plant
- Criterion 25 (85.87%) - Prevention, detection and suppression of fires
- Criterion 16 (86.67%) - Registration requirements of plant
- Criterion 17 (86.86%) - Particular risk controls for using plant
- Criterion 14 (86.85%) - Designer to provide OHS information
- Criterion 11 (87.05%) - Designer OHS obligations
- Criterion 15 (87.18%) - Installation, erection and commissioning of plant
- Criterion 26 (87.63%) - Control of diesel-engine plant and installations
- Criterion 19 (88.75%) - Plant under pressure

Open cut operations performed consistently across regions. Underground operations performed best in the Northern region, however, only one underground operation in this region was included in the analysis. Hunter region underground operations performed considerably better than those in the South East. Processing operations performed relatively consistently in the Northern and Hunter regions, but performed best in the South East.

Conclusion

The audit objectives have been achieved. The audit findings identified individual operations and areas within the various safety management systems where MSO resources could be channelled to increase industry understanding of risk management and compliance with statutory requirements. It also identified mines that are achieving high compliance, which is useful for MSO inspectors and mine safety officers to continue to assess and determine industry best practice and assist less compliant mines to implement better systems.

The audit program has also assisted the coal mining industry to understand the statutory requirements and areas for improvement in implementation of risk management principles. Coal operations undertaking the audits had to make a comprehensive assessment of their own safety management systems and identify areas where further work is required. MSO inspectors and mine safety officers provided immediate feedback during the audits, and will continue to provide feedback and assistance where needed. The audit documents will be a useful tool for coal operations to review the progress and maintenance of their health and safety systems.

The baseline information gathered through these audits is an important benchmark with which future compliance audits can be compared, as well as identifying operations and practices where enforcement actions may be required to improve compliance with legislation.

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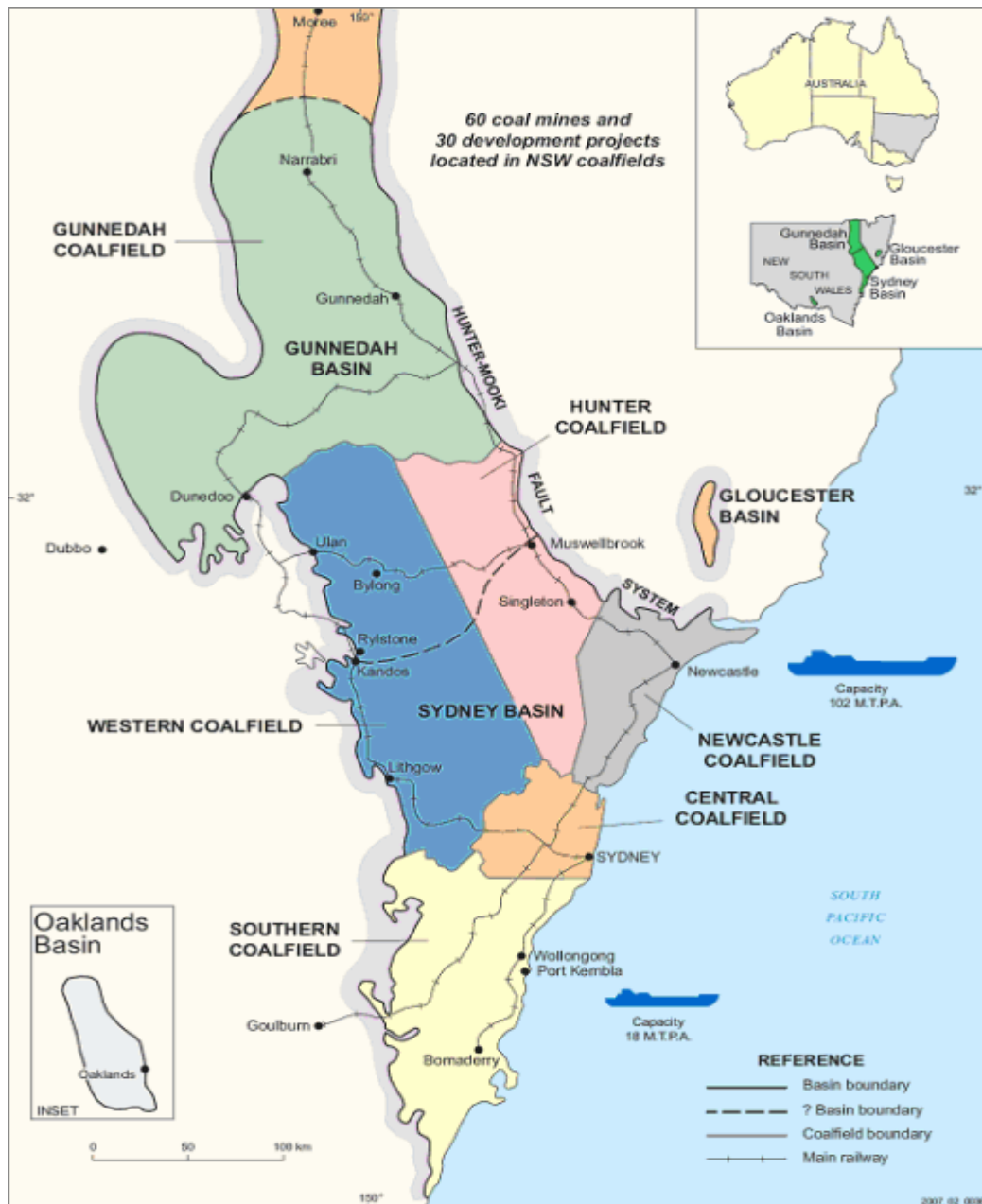
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1. Introduction

1.1 Description of NSW Coal Mining Industry

In 2007-08, the NSW coal industry produced about 177.2 million tonnes (Mt) of raw coal from four geographical basins. The Sydney-Gunnedah basin contains most of the coal reserves in NSW, with a large proportion of these reserves being accessible through multi-seam open cut mining. Smaller reserves of coal can be found in the Gloucester and Oaklands basins. The location of these basins and the major coalfields is shown in Figure 1 below.¹

Figure 1: Coalfields of NSW

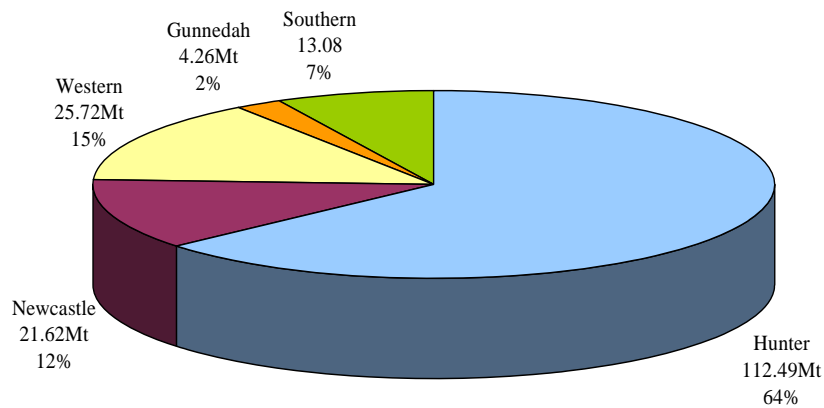


Source: NSW Department of Primary Industries, 2009 NSW Coal Industry Profile, page 2.

¹ NSW Department of Primary Industries, 2009 NSW Coal Industry Profile, pages 2-3.

There are five major coalfields in NSW. The Hunter coalfield located in the Sydney basin has the highest coal production in the state, contributing about 63.5% of the total raw coal produced in 2007-08 (Graph 1.1). The Western coalfield, also in the Sydney basin, is the next largest producer, contributing around 15% of raw coal production in 2007-08. The Gunnedah coalfield is the smallest producer, contributing around 2% of total raw coal. Production from the Western and Gunnedah coalfields may increase over the next decade with the potential for development of some larger operations in these regions. Production from the Newcastle and Southern coalfields, which currently produce around 12% and 7% of total raw coal in NSW respectively, may also increase slightly in the next few years mainly due to mine extensions.²

Graph 1.1: Raw coal production by coalfield in 2007-08



As at January 2010, there are a total of 89 coal operations in NSW consisting of 16 processing plants, four exploration/project areas, 35 open cut mines and 34 underground mines.³ Open cut mines have the highest production rates at 11 810 tonnes saleable output per employee, compared to 6 970 for underground mines in 2007-08. However, underground mining has higher saleable yields compared to open cut methods, with an average of 80% of raw product as saleable coal for underground mining compared to 74% for open-cut.⁴

The mining industry is a major employer in NSW, particularly in regional areas, with open cut and underground mines employing about 7 918 and 7 469 people respectively in 2007-08.⁵ A summary of coal statistics for NSW as at June 2008 is provided below in Table 1.1.

² NSW Department of Primary Industries, *2009 NSW Coal Industry Profile*, page 8.

³ NSW Department of Industry and Investment, COMET Mine Safety Database, 26 January 2010.

⁴ NSW Department of Primary Industries, *2009 NSW Coal Industry Profile*, page 8.

⁵ NSW Department of Primary Industries, *2009 NSW Coal Industry Profile*, page 6.

Table 1.1: NSW Summary Coal Statistics

	YEAR				
	2003-04	2004-05	2005-06	2006-07	2007-08
PRODUCTION '000 TONNES					
Raw Coal	147,046	156,309	161,140	170,324	177,167
-Underground	49,355	51,907	52,232	57,241	61,316
-Open cut	97,691	104,402	108,908	113,083	115,851
Saleable Coal	114,239	122,063	124,611	131,334	135,149
-Underground	40 736	43 186	42,297	46,202	48,974
-Open cut	73 503	78 877	82,314	85,132	86,175
Number of mines	52	55	58	60	60
-Underground	27	28	30	29	29
-Open cut	25	27	28	31	31
Employment	9,998	11,290	12,658	13,392	15,387
-Underground mines	5 054	5 620	6 541	6,792	7,469
-Open cut mines	4 944	5 670	6 117	6,600	7,918
Saleable Output per employee, tonnes	11,380	11,680	10,240	9,970	9,430
-Underground	7,900	8 170	6 820	6,860	6,970
-Open cut mines	15,030	15 280	13 800	13,230	11,810

Adapted from: NSW Department of Primary Industry, *2009 NSW Coal Industry Profile*, Table 2: Summary of coal statistics for NSW, page 6.

1.2 Mine Safety Regulatory Framework

There has been significant reform of occupational health and safety law in NSW over the last decade. The *Coal Mine Health and Safety Act 2002* (CMHS Act) and the *Coal Mine Health and Safety Regulation 2006* (CMHS Regulation) commenced in December 2006 as part of an overall reform of occupational health and safety legislation aimed at developing a risk-based approach to workplace safety.

The objects of the CMHS Act are as follows:

- (a) to assist in securing the objects of the *Occupational Health and Safety Act 2000* in relation to coal operations (including the object of securing and promoting the health, safety and welfare of people at work at coal operations or related places), and
- (b) to put in place special provisions necessary for the control of particular risks arising from the mining of or exploration for coal, and
- (c) to ensure that effective provisions for emergencies are developed and maintained at coal operations and related places.

In order to achieve these objectives, the CMHS Act requires a number of OHS management systems and plans to be in place prior to the commencement of mining. These management systems deal with identification, assessment and management of hazards of particular relevance to the mining industry.

Of relevance to this report, one of the main duties of an operator under the CMHS legislation is to ensure mining is not carried out at the coal operation unless a health and safety management system (HSMS) that complies with the CMHS Act and Regulation is implemented (section 21 of the CMHS Act). A HSMS must include, among other things, major hazard management plans and contractor management plans (CMP) as required, and anything else prescribed in the CMHS Regulation (section 23 of the CMHS Act). The CMHS Regulation sets out additional components to be included in a HSMS, including electrical engineering management plans (EEMP) and mechanical engineering management plans (MEMP) (see clauses 13, 19 and 20).

The operator must prepare a CMP as part of the HSMS where contractors are proposed to be used at the coal operation (section 39 of the CMHS Act).

The CMHS Act allows a government official to audit and review the HSMS, including the plans that form part of that HSMS. Such an audit and review may occur periodically, after the occurrence of an event prescribed by the regulations or at any other time that the government official thinks is appropriate (section 152).

The mining specific legislation works with the *Occupational Health and Safety Act 2000* (the OHS Act) and the *Occupational Health and Safety Regulation 2001* (OHS Regulation) to provide a comprehensive framework for health and safety in the NSW coal mining industry. Application of the OHS Regulation has been progressively extended to cover the coal mining industry to establish consistent standards across all workplaces in NSW. The OHS Regulation was extended to apply to the coal mining industry (with some exceptions) on 1 September 2008.

1.3 Mine Safety Reviews

The 2005 Report of the NSW Mine Safety Review conducted by Neville Wran (the Wran Report) recognised that the risk-based approach to mine safety must be supported by mechanisms for the regulator to check compliance of OHS management systems with the law. Auditing was identified as one of the key methods that regulators can use to check compliance.

At the time the Wran Report was written, the CMHS Regulation had not been made. The Report recommended that the Regulation be introduced without delay and be subject to further audit and review 24 months after commencement. Relevant to this audit report, several other recommendations were also made in relation to auditing. In summary, the recommendations of the Wran report relevant to this audit report are as follows:

- Recommendation 4 – the CHMS Regulation be subject to audit and review 24 months after commencement;
- Recommendation 17 – the regulator conduct a major audit of practice, performance and compliance of contractor management provisions in the CMHS Regulation after two years from their commencement;
- Recommendation 18 –the regulator monitor and audit contractor management systems; and
- Recommendation 25 – mine safety inspectors regularly check (monitor, audit, inspect, observe) the implementation of risk management plans and safety management systems in general.

The Wran report also recommended that the role of the mine safety inspectorate be strengthened and supported by ensuring adequate staffing, training, funding and resources (recommendation 27).

The *Digging Deeper* report released in 2007 also identified auditing, feedback and review as a key component of effective occupational health and safety management systems.

The Digging Deeper report recommended that, as well as conducting audits in its own right, the regulatory authority (then called the Department of Primary Industries) should establish inspection protocols that check whether sites have effective internal and external auditing processes and specify appropriate remedial actions where necessary (recommendation 24).

1.4 Enforcement of Mine Safety

The Mine Safety Operations Branch (MSO) in the Department of Industry and Investment enforces health and safety legislation at coal workplaces in NSW. For reporting purposes, the state is divided into three regions. The South East region covers mines south of the Hawkesbury River and west from Sydney, including mines around Lithgow. Hunter region covers mines in the Hunter Valley up to Gloucester and Taree, with Northern region covering areas north of the Hunter Valley, including mines around Gunnedah, Narrabri and Boggabri.

MSO Branch has a team of inspectors and mine safety officers throughout these regions that carry out assessments, investigations and verify appropriate safety systems, processes and standards. In 2008-09, inspectors and mine safety officers conducted 860 coal mine site assessments and issued more than 1140 health and safety notices and advice related to coal operations.⁶

Notices issued under the OHS and CMHS legislation provide a range of enforcement powers to MSO inspectors. Depending on the circumstances, the OHS Act allows for an Inspector to issue the following:

- Notices to obtain information, documents and evidence (section 62);
- Notices to take, dismantle and keep plant, substances and other things believed to have been used in commission of an offence under the OHS legislation (sections 60 and 70-75);
- Investigation notices to facilitate the exercise of the Inspectors powers (section 89);
- Improvement notices to remedy a contravention of the OHS legislation (section 91);
- Prohibition notices to prohibit an activity where there is an immediate risk to the health and safety of any person (section 93).

Of these OHS Act notices, improvement notices under section 91 are the most frequently issued by MSO inspectors. As shown in Table 1.2 below, 107 notices have been issued under section 91 of the OHS Act since December 2006. Over 75% of these notices were issued in relation to underground operations.

The CMHS legislation allows for issuing advice under section 150 of the CMHS Act and notices for prohibition, restriction, evacuation and closure under clause 51 of the CMHS Regulation. An advice under section 150 of the CMHS Act may be issued by an inspector to bring concerns about the health, safety or welfare of people who work at the coal operation to the attention of a senior person in the management structure of the coal operation. Consistent with the position of 'advice' on the lower end of the enforcement hierarchy, advice issued under section 150 of the CMHS Act are the most frequently issued of all notices, with 800 issued since the CMHS legislation commenced in 2006. Nearly 70% of these were issued in relation to underground operations.

The Chief Inspector has been given power under clause 51 of the CMHS Regulation to impose prohibitions and restrictions, require things to be carried out, or direct evacuation or closure of a coal operation. This power has been delegated to Inspectors. In summary, an Inspector may issue a notice under clause 51 where the Inspector forms the opinion that a coal operation or any thing in connection with the control or management of a coal operation is, or is liable shortly to become, dangerous to the health and safety of persons employed at the coal operation. As indicated in Table 1.2 below, over 190 of these notices have been issued since the CMHS Regulation commenced in 2006. Again, the majority of these (72.8%) have been issued in relation to underground operations.

⁶ NSW Department of Industry and Investment, COMET Mine Safety Database, 7 January 2010.

Table 1.2: Mine Safety Operations Branch enforcement notices summary for coal operations⁷

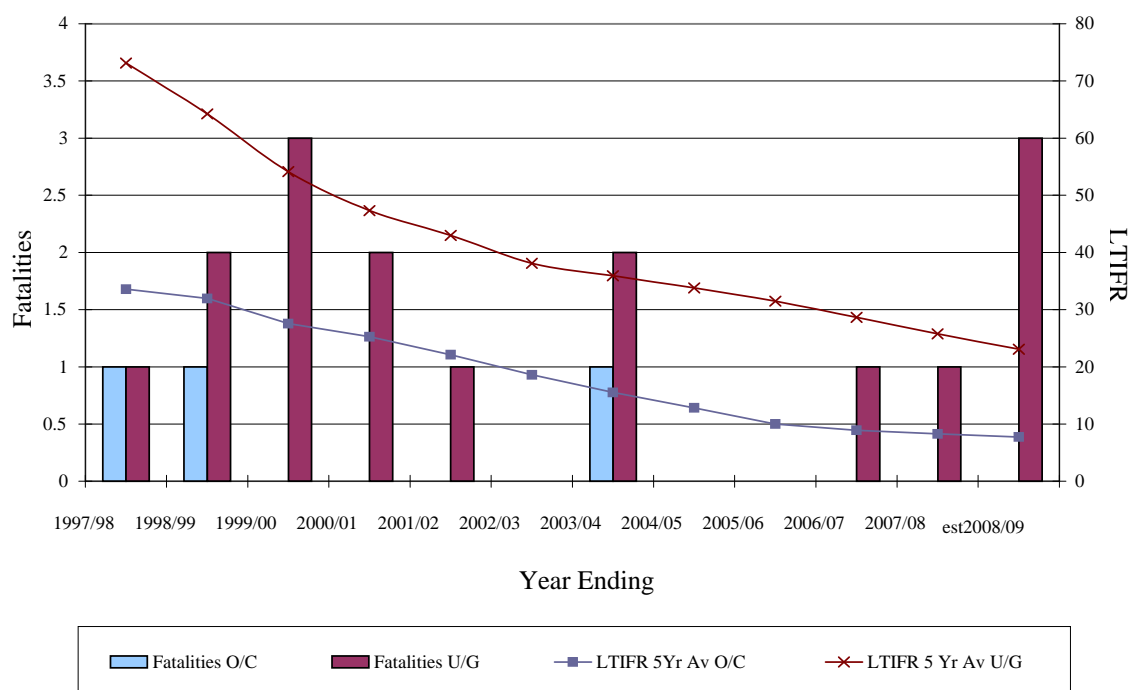
NOTICES ISSUED						
	Cl 51 CMHS Reg	s 150 CMHS Act	s 62 OHS Act	s 89 OHS Act	s 91 OHS Act	s 93 OHS Act
2006-07*	16	134	1	7	32	8
-Underground	10	88	0	7	27	8
-Surface	6	46	1	0	5	0
2007-08	60	243	1	1	25	9
-Underground	50	149	0	1	15	7
-Surface	10	94	1	0	10	2
2008-09	79	253	2	7	22	4
-Underground	52	193	2	6	18	4
-Surface	27	60	0	1	4	0
2009-10*	40	170	1	1	23	1
-Underground	30	129	0	1	15	0
-Surface	10	41	1	0	8	1
TOTAL	195	800	5	16	102	22

*from December 2006

1.5 Health and Safety in the NSW Coal Mining Industry

The NSW coal industry and the Department of Industry and Investment have worked together to achieve a significant reduction in the rate of fatalities and serious injury in the last decade. Accident notification data compiled by the Department of Industry and Investment shows that the frequency rates for lost time injury, serious bodily injury and fatalities have trended downwards in that time (Graph 1.2)⁸.

Graph 1.2: NSW Coal Fatalities and Lost Time Injury Frequency Rate 5 Year Average (LTIFR)



⁷ Data from NSW Department of Industry and Investment, COMET Mine Safety Database, 6 January 2010

⁸ Department of Industry and Investment, COMET Mine Safety Database, 3 November 2009.

The new regulatory approach to risk management, development of clear expectations about OHS culture and performance in the workplace, and increasing acceptance and adoption of these risk management principles in industry have all contributed to this improvement in OHS outcomes. However, the death of three mine workers since September 2008 shows that continued vigilance is needed if the goal of zero fatalities and serious injuries in the coal mining industry is to be achieved.

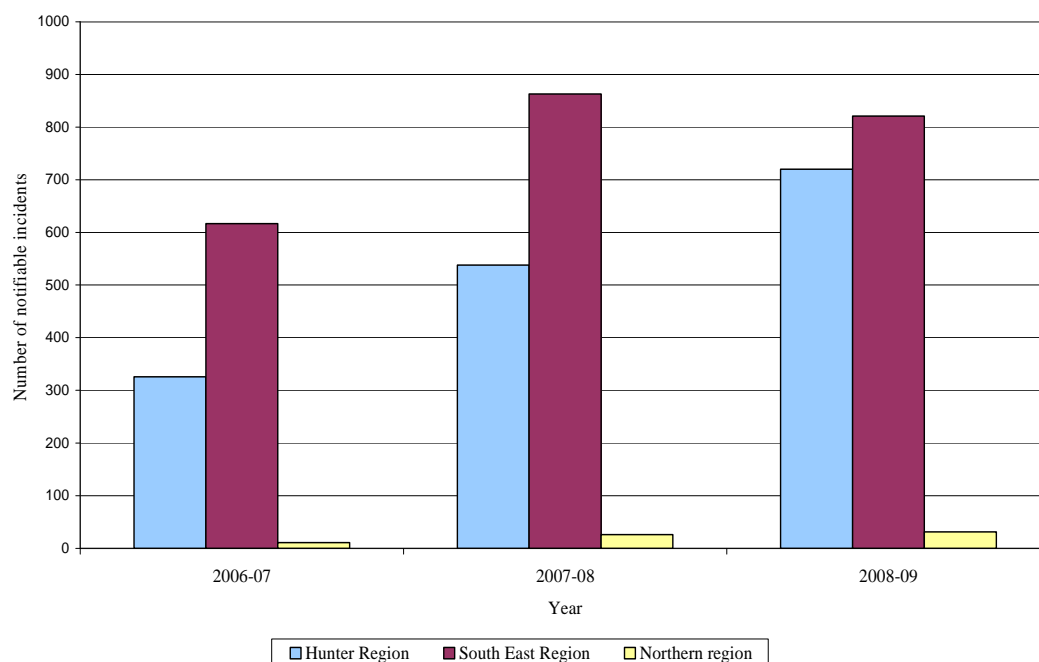
Clauses 55 and 56 of the CMHS Regulation list certain incidents, events and injuries relating to a coal operation that must be notified to the Department of Industry and Investment (collectively referred to in this report as ‘notifiable incidents’). These are recorded in the COMET mine safety database. For reporting purposes, notifiable incidents are grouped into the following three classifications:

- cause of incident (eg. outburst of gas, inrush of fluid);
- nature of the injury (eg. injection of fluid, serious burns);
- outcome of the incident (eg. illness or injury resulting in an injury to a person that results in the person being unfit, for a continuous period of at least 7 days, to attend the person’s usual place of work or to perform usual work duties).

Analysis of COMET indicates that in 2008-09, there was a total of 1581 cause of incident notifications to the Department of Industry and Investment under clause 55 and 56 of the CMHS Regulation. Underground operations have consistently notified a greater number of these incidents than open-cut operations. In 2008-09, underground operations reported 1274 cause of incident notifications, compared to 278 for open cut operations and 29 for coal processing plants. Since December 2006, COMET shows 81 incidents involved contractors.

The South-East region, which covers 27 coal operations, had the highest number of cause of incident notifications (821). The Hunter region, which covers 49 coal operations, was next highest (720). Northern region reported 31 cause of incident notifications, covering 9 coal operations. However, the number of cause of injury notifications for the South-East has decreased since 2007-08, while the number in the Hunter region has increased (Graph 1.3).

Graph 1.3: Numbers of notifiable incidents, injuries and events for coal operations by region



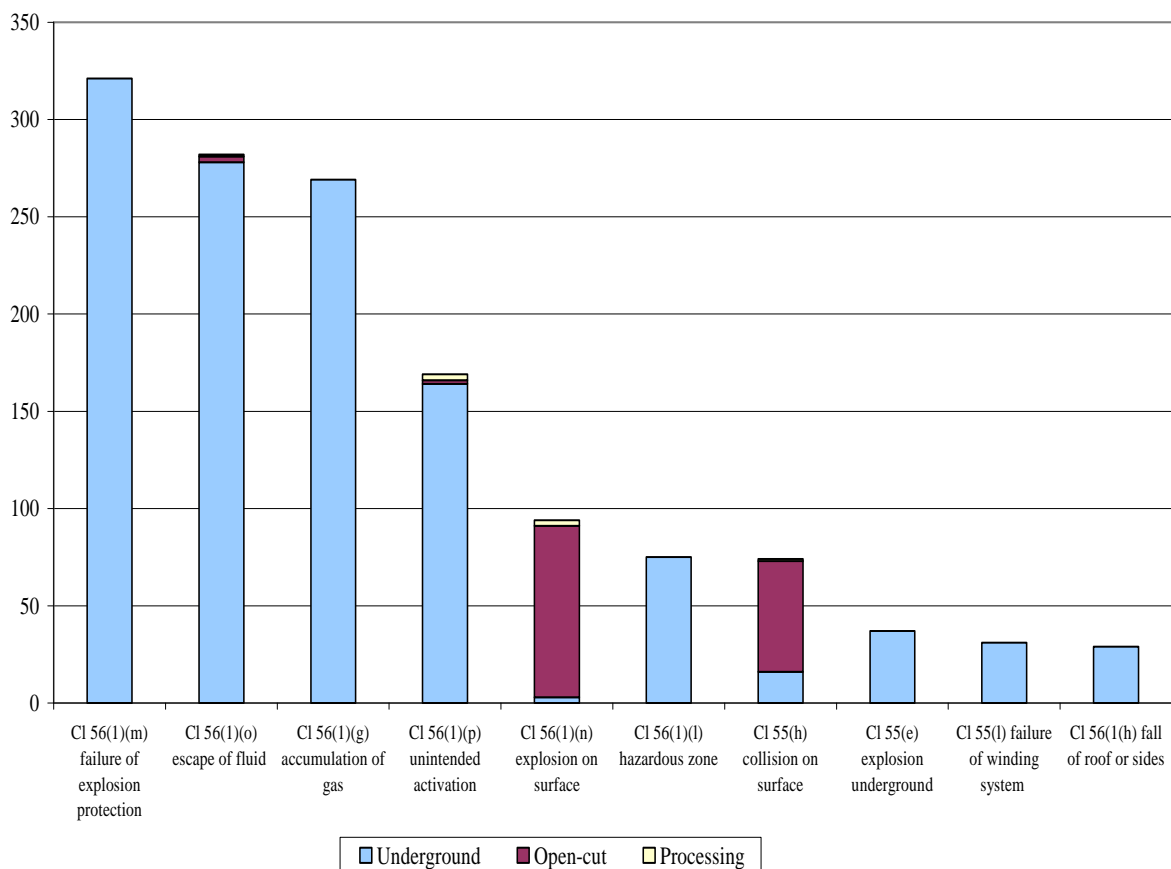
As shown in Graph 1.4, the four most frequently reported causes of incident notified under the legislation are:

- in-service failure of explosion protected equipment (clause 56(1)(m) of the CMHS Regulation);
- escape of fluid under pressure (clause 56(1)(o));
- accumulation of gas requiring withdrawal or resulting in tripping of electrical power (clause 56(1)(g)); and
- unintended activation of equipment or plant (clause 56(1) (p)).

These incidents are primarily notified by underground mine operations. The most commonly reported cause of incident notifications for open-cut mining operations are:

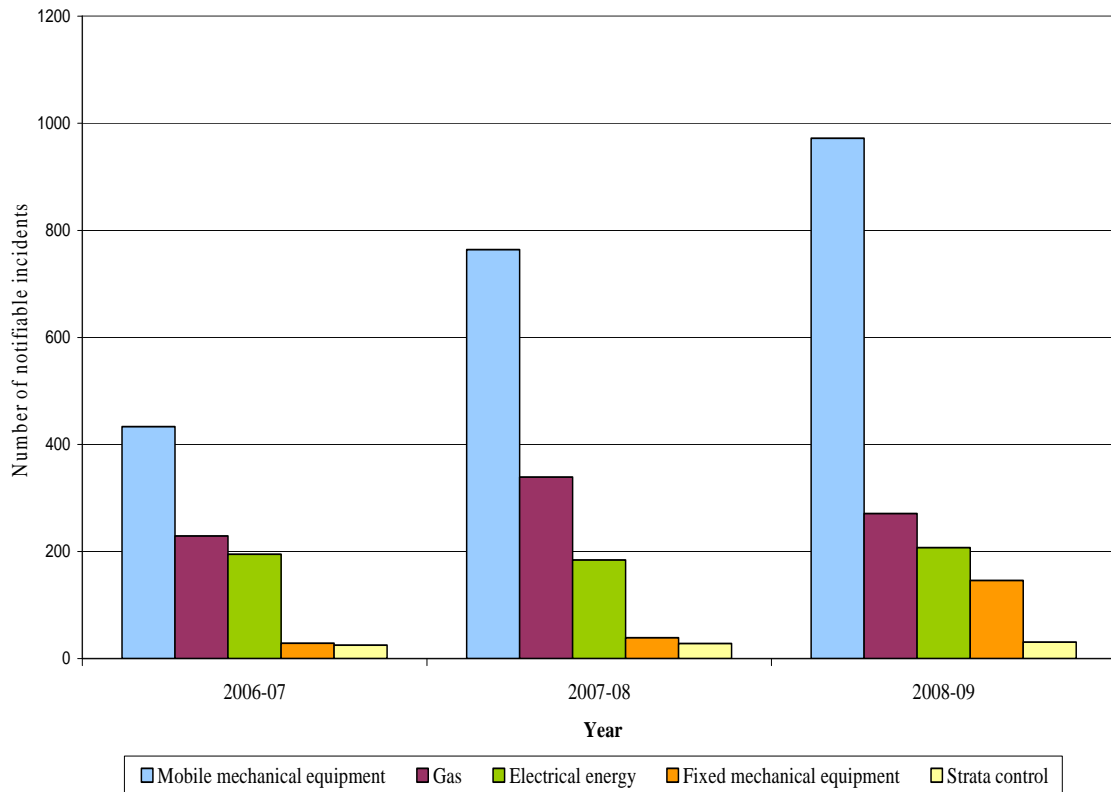
- uncontrolled fire or misfire of explosives on the surface (clause 56(1)(n) of the CMHS Regulation); and
- collision on the surface involving a vehicle or mobile plant greater than 2 tonnes (clause 55(h)).

Graph 1.4: Most frequently reported notified causes of incident for coal operations in 2008-09.



COMET data for 2008-09 shows that cause of incident notifications most commonly involved mobile mechanical equipment (972). Gas (271), electrical energy (210) and fixed mechanical equipment (146) were also commonly involved in cause of incident notifications (Graph 1.5).

Graph 1.5: Five most commonly notified causes of incident for coal operations classified by incident type



2. Audit Objectives, Scope and Methodology

2.1 Audit Objectives and Scope

This audit program was conducted by MSO Branch in response to recommendations made in the Wran Report.

The objectives of the audit program were to:

- a. assess whether the systems for managing health and safety at NSW coal operations include all matters, plans and procedures required under relevant legislative provisions;
- b. provide feedback to industry on the extent to which the systems for managing health and safety at NSW coal operations comply with the relevant legislative provisions;
- c. identify industry wide problems and issues in achieving compliance with the relevant legislative provisions and suggest strategies to address them; and
- d. establish baseline data on industry compliance with the legislative provisions to enable trend analysis in future compliance audit programs.

The following systems were audited as part of the program:

- Health and Safety Management Systems;
- Contractor Management Plans;
- Electrical Engineering Management Plans; and
- Mechanical Engineering Management Plans.

The audits were conducted at almost all operating coal operations in NSW. Over 290 audits were conducted in the 12 months to January 2010.

2.2 Audit Methodology

The audits were designed to assess the compliance of a coal operation with legislative provisions in relation to the four main systems of managing health and safety risks required by the CMHS legislation and related OHS provisions. In order to do this effectively, the audit criteria were based on the requirements set out in that legislation.

All MSO inspectors and mine safety officers involved in the audit program completed a safety auditor course meeting the requirements for OHS Auditor Certification with the Quality Society of Australasia. The MSO Area Managers of South-East and North-East nominated an inspector or mine safety officer as the audit assessment officer for each coal operation. To facilitate consistency of results, audit officers attended a briefing on audit program objectives and procedures.

Coal operations (excluding exploration operations) in NSW were notified in writing of the audit program. The notice included:

- information about the objectives and scope of the audit program;
- an outline of the audit assessment procedure;
- a copy of the audit assessment worksheet setting out audit criteria;
- an indication of documents to be made available and the range of persons to be interviewed during the audit assessment;
- a request for a contact person for the coal operation to assist in coordination of the assessment; and
- contact details for the audit assessment officer.

The audits of EEMP and MEMP were desktop audits that assessed the extent to which the required legislative elements were addressed and integrated into the documented plans and safety management systems used at the coal operation. The HSMS and CMP audits involved additional interviews with employees and contractors at the coal operation to assess practical understanding of the plans and communication of relevant information to the workforce.

Prior to the audits taking place, a pre-assessment briefing was conducted with a representative of each coal operation and arrangements for conducting the audit were confirmed. Audit assessment officers conducted on-site interviews with the nominated representatives of the coal operation and reviewed relevant documentation against the audit criteria in the assessment worksheet. Scores and comments were recorded on an assessment worksheet. The following scoring system was used for the EEMP and MEMP audits.

1	Just starting	Elements not considered
	No formal plans(s)	Elements considered but not addressed in a formal plan
3	Progressing – formal plan developed	Elements considered and incorporated into a formal plan
4	Significant progress but not fully integrated	Elements addressed but not fully integrated
5	Done	Elements addressed and fully integrated
6	Not Applicable	

The same scoring system was used for the HSMS and CMP audits, except “0” was recorded for non-applicable audit criteria.

On completion of the interview, the audit assessment officers provided a brief verbal summary of the findings to the coal operation representatives. Each coal operation was provided with a feedback report including a copy the assessment worksheet completed for their operation.

The scores from the assessment worksheets were entered on the COMET database. Score range, average and frequency were identified and percentage compliance ratings calculated. Scores reflecting the ‘non-applicable’ rating and operations without updated profiles in the COMET database were excluded from the calculations. No audits were conducted for exploration operations. Comparisons were made between regions, operation types, and the type of audit. As already indicated, the South East region covers mines south of the Hawkesbury River and west from Sydney, including mines around Lithgow. Hunter region covers mines in the Hunter Valley up to Gloucester and Taree, with Northern region covering areas north of the Hunter Valley, including mines around Gunnedah, Narrabri and Boggabri.

3. Background

3.1 Health and Safety Management Systems

A coal operator is required to prepare a Health and Safety Management System (HSMS) prior to the commencement of mining (see sections 20 and 21 of the CMHS Act). Section 23 of the CMHS Act provides that a HSMS must include:

- system elements, including health and safety policy, risk management, training and competence, information control and system evaluation;
- major hazard management plans for prescribed major hazards;
- a management structure setting out competent persons filling management positions;
- a contractor management plan;
- any other matter prescribed in the regulations.

The CMHS Regulation prescribes the following additional HSMS components (see clause 13):

- an inspection program to ensure detection and control of hazards;
- information and communication arrangements for provision of health and safety information to employees;
- supervision arrangements;
- an electrical engineering management plan;
- a mechanical engineering management plan; and.
- withdrawal conditions setting out conditions under which people are to be withdrawn from work areas due to health and safety risks.

The HSMS for underground mines must also include:

- monitoring arrangements setting out requirements for the type and location of underground air quality and gas monitoring equipment.
- ventilation arrangements which comply with detailed technical design and component requirements.

The HSMS must be consistent with Australian Standard AS4804:2001 *Occupational health and safety management systems - general guidelines on principles, systems and supporting techniques* (section 23(4) of CMHS Act and clause 14 of the CMHS Regulation).

The HSMS audit was designed to test the compliance with the overarching HSMS requirements and excluded the more specific requirements for CMP, EEMP and MEMP, which were dealt with in detail in other audits. The audit criteria covered system elements, health and safety policy, risk management training and competence, information control and communication, management structure and competency of people in management positions, major hazard management plans, inspection programs, supervision arrangements, withdrawal conditions, and for underground mines, monitoring and ventilation.

The audit consisted of 66 questions grouped into nine criteria, with each criterion covering an element of the HSMS. In addition to assessing HSMS documents, brief interviews based on the audit criteria were held with on site employees and contractors. Answers given in interviews

were not scored but provided insight into how well the HSMS was communicated and understood in practice.

A total of 65 coal operations were included in analysis of audit results (Table 3.1). Those not included either did not have an audit profile because they were not undertaking mining operations at the time of the audits or did not have an updated audit profile in COMET at the time of analysis. Some of these were processing plants that were covered under an audit of a mining operation run by the same operator, and were not given a separate updated profile on COMET.

Table 3.1: Number of coal operations included in HSMS audit analysis by region and type of operation.

Region	Number of coal operations included in HSMS audit
Hunter	33
-Open Cut	17
-Processing	6
-Underground	10
Northern	8
-Open Cut	5
-Processing	2
-Underground	1
South East	24
-Open Cut	5
-Processing	3
-Underground	16
TOTAL	65

3.2 Contractor Management Plans

As part of the HSMS for a coal operation where contractors are proposed to be used, the operator must prepare a CMP stating how the risks arising from the use of contractors at the coal operation will be managed (section 39 of the CMHS Act). Sections 41 to 43 of the CMHS Act set out in more detail the duties of an operator in relation to contractors, including ensuring contractor familiarity and compliance with health and safety systems at the coal operation.

The CMP must contain the information prescribed in clause 40 of the CMHS Regulation, including pre-assessment of OHS arrangements, site inductions and monitoring of contractor compliance with OHS requirements.

The CMP audit consisted of eight criteria covering consultation, safe work method statements, pre-engagement of contractors, contractor's OHS management plans, site induction and monitoring. Interviews with on-site contractors were done to assess implementation and understanding of the CMP in practice, but answers given in these interviews were not scored.

A total of 66 coal operations were included in analysis of audit results (Table 3.2). Those not included did not have an audit profile because they were not undertaking mining operations at the time of the audits or did not have an updated audit profile in COMET at the time of analysis. Some of these were processing plants that were covered under an audit of a mining operation run by the same operator, and were not given a separate updated profile on COMET.

Table 3.2: Number of coal operations included in CMP audit analysis by region and type of operation.

Region	Number of coal operations included in CMP audit
Hunter	34
-Open Cut	17
-Processing	6
-Underground	11
Northern	8
-Open Cut	5
-Processing	2
-Underground	1
South East	24
-Open Cut	5
-Processing	3
-Underground	16
TOTAL	66

3.3 Electrical Engineering Management Plans

Clause 13(1)(e) of the CMHS Regulations requires that a HSMS include an Electrical Engineering Management Plan (EEMP) covering the life cycle of electrical plant and installations and electrical engineering practices that is developed, implemented and periodically reviewed through consultation with a qualified electrical engineer, to control risks as follows:

- (i) to prevent injury to people from sources of electrical energy,
- (ii) to prevent uncontrolled fires where electrical energy is the ignition source,
- (iii) to prevent initiation of gas or coal dust explosions by electrical energy,
- (iv) to prevent unintended operation of plant,
- (v) to provide electrical safeguards for electrical and non-electrical hazards, with a probability of failure appropriate to the degree of risk posed by the hazard,
- (vi) to provide the means by which the safety of electrical plant and electrical engineering practices is or are managed, including requirements of the Act and this Regulation and any relevant requirements of the regulations made under the *Occupational Health and Safety Act 2000*.

Clause 19 of the CMHS Regulation sets out in detail the prescribed contents of an EEMP.

The EEMP audit contained 137 questions grouped into 26 criteria covering the requirements under the legislation. In summary, the audit criteria dealt with the following:

1. qualifications and competence of people in the management structure;
2. reporting of significant deviations from OHS standards;
3. general content and objectives of the EEMP;
4. supervision, installation, commissioning, maintenance and repair of plant;
5. compliance with wiring rules and AS 3007;
6. electrical plant in hazardous zones;
7. life cycle management of explosion protected plant and cables in hazardous zone;
8. maintenance of plant;
9. maintenance records;
10. electrical protection;
11. earthing;

12. provision of switchgear;
13. arrangements to interrupt power supply;
14. arrangements for restoration of power;
15. portable apparatus;
16. high voltage management plan;
17. prevention of live electrical work;
18. safe systems of work for working on electrical equipment;
19. access of electricity supply authority;
20. commissioning, testing and records of electrical installations;
21. procedures related to welding plant, test instruments and overhead cables;
22. signs and notices;
23. ventilation systems;
24. risk controls for safety of electrical installations;
25. emergency stops; and
26. testing and inspection of plant by supplier or manufacturer.

A total of 76 out of the 89 coal operations listed in COMET were included in the EEMP audit analysis (Table 3.3). Most of the excluded operations were not undertaking mining activities (such as exploration and rehabilitation areas). Others did not have an audit profile in COMET.

Table 3.3: Number of coal operations included in EEMP audit analysis by region and type of operation

Region	Number of coal operations included in EEMP audit
Hunter	45
-Open Cut	19
-Processing	9
-Underground	17
Northern	9
-Open Cut	5
-Processing	3
-Underground	1
South East	22
-Open Cut	3
-Processing	4
-Underground	15
TOTAL	76

3.4 Mechanical Engineering Management Plans

Clause 13(1)(f) of the CMHS Regulation requires that a HSMS include an MEMP, covering the life cycle of mechanical plant and installations and mechanical engineering practices at the coal operation, that is developed, implemented and periodically reviewed through consultation with a qualified mechanical engineer, to control risks as follows:

- (i) to control risks to health and safety from mechanical plant and installations over their life cycle,
- (ii) to prevent injury to people from sources of mechanical energy,
- (iii) to provide safeguards to prevent the release of uncontrolled mechanical energy and to prevent unintended operation of mechanical plant,
- (iv) to prevent catastrophic failure of mechanical plant or installations,
- (v) to prevent uncontrolled fires being initiated or fuelled by mechanical plant or installations,
- (vi) to prevent initiation of gas or coal dust explosions by mechanical energy,

- (vii) to minimise exposure to toxic or harmful materials associated with mechanical plant and installations,
- (viii) to provide safeguards for mechanical plant and installations, with a probability of failure appropriate to the degree of risk posed by any mechanical plant or installation,
- (ix) to generally provide the means by which the safety of mechanical plant and installations is managed including requirements of the Act and this Regulation and relevant plant safety requirements of the regulations made under the *Occupational Health and Safety Act 2000*.

Further detail about the content of a MEMP is set out in clause 20 of the CMHS Regulation.

The audit assessment consisted of 141 questions grouped into 35 criteria based on MEMP legislative requirements. In summary, the audit criteria dealt with the following:

1. general objectives and requirements of MEMP under the CMHS Regulation;
2. qualifications and competence of people in management structure;
3. reporting of significant deviations from OHS standards;
4. risk management under the OHS Regulation;
5. standards of engineering practice for mechanical plant;
6. high risk activities;
7. isolation requirements;
8. supply of health and safety information to designers of plant;
9. records of plant;
10. plant requirements before use;
11. design of plant;
12. control of risks by designer, manufacturer and supplier of plant;
13. specific designer risk controls;
14. provision of information by designer;
15. installation, commissioning and erection of plant;
16. registration of plant requirements;
17. particular risk controls for use of plant;
18. maintenance and repair of plant;
19. plant under pressure;
20. plant designed to lift or move;
21. safe operation of conveyors, winding and mobile plant;
22. safety of structures and mechanical plant;
23. fitting of operator protective equipment;
24. safe use and storage of pressurised fluids;
25. fire prevention and suppression;
26. control of diesel-engine plant and installations;
27. aluminium or light metal alloys;
28. use of fire resistant hydraulic fluid;
29. flammable materials;
30. noise control;
31. working at heights;
32. working in confined spaces;
33. hazardous substances;
34. dangerous goods;
35. certification of workers.

A total of 81 of the 89 coal operations listed in COMET were included in the audit analysis (Table 3.4). The excluded operations were not undertaking mining activities at the time the audits were conducted or did not have a MEMP audit profile in COMET.

Table 3.4: Number of coal operations included in MEMP audit analysis by region and type of operation.

Region	Number of coal operations included in MEMP audit
Hunter	47
-Open Cut	20
-Processing	10
-Underground	17
Northern	9
-Open Cut	5
-Processing	3
-Underground	1
South East	25
-Open Cut	5
-Processing	4
-Underground	16
TOTAL	81

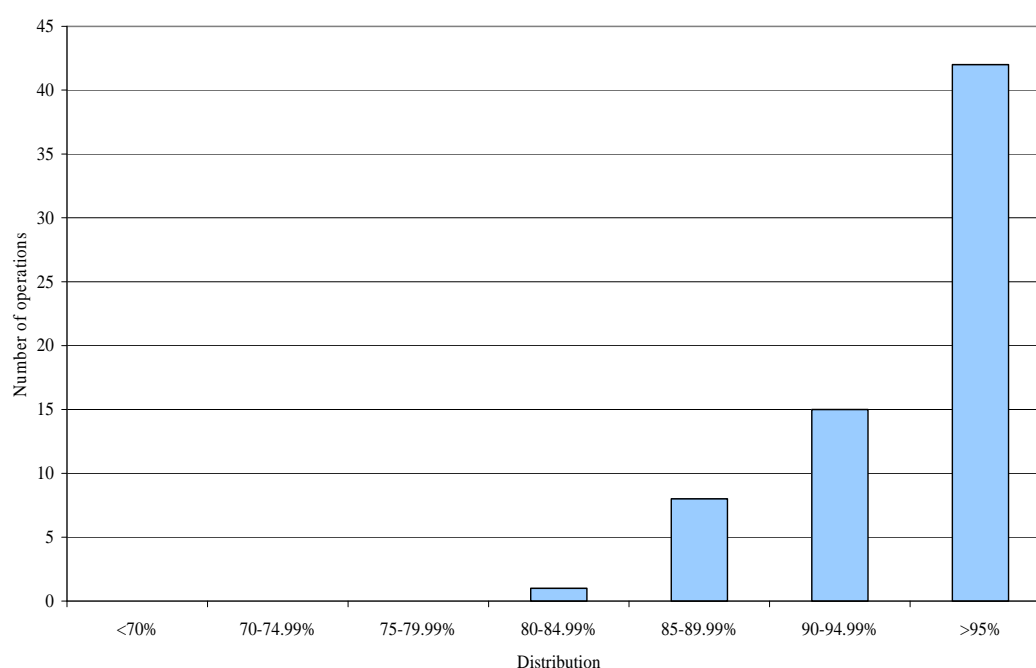
4. Health and Safety Management System Audits

4.2 Compliance by coal operation

Overall

The overall percentage compliance across the 65 coal operations included in the audit analysis ranged from 81.43% to 100% with an average of 95.65%. Most operations fell within the over 95% compliance range (Graph 4.1)

Graph 4.1: Distribution of overall percentage compliance scores for HSMS audits across coal operations



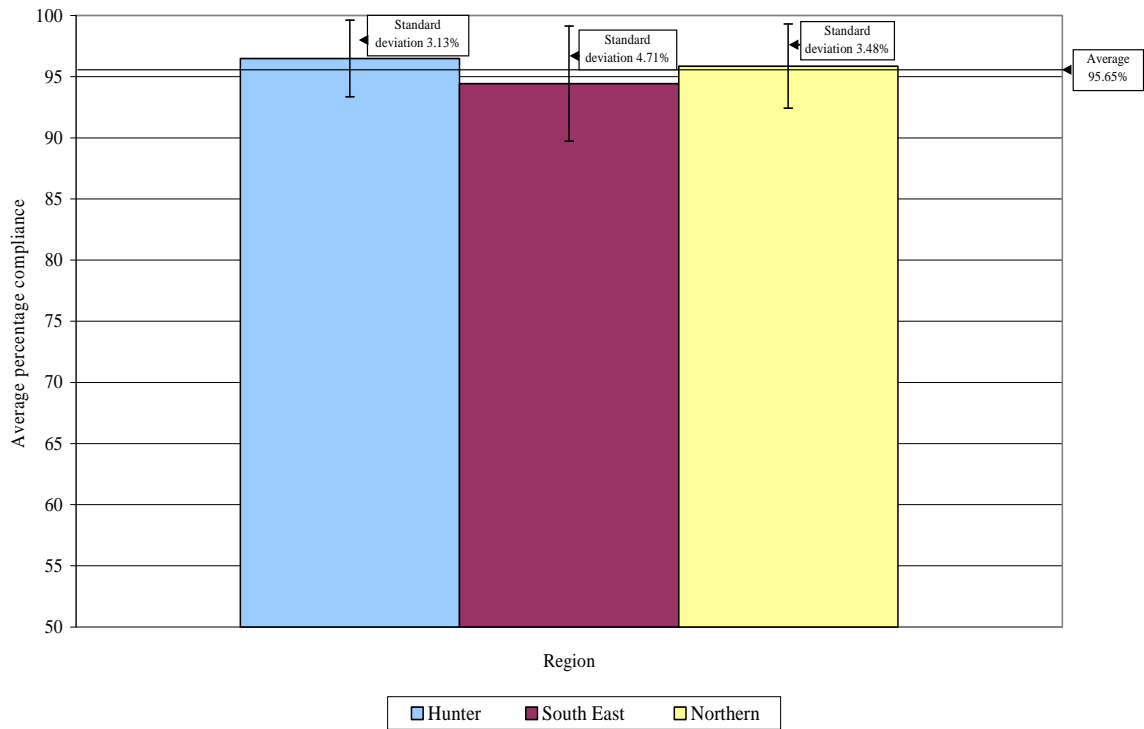
Regions

The Hunter region had the highest overall compliance score, averaging 96.49%, with a standard deviation 3.13% (Graph 4.2). The majority of coal operations in the Hunter region had an overall compliance of over 95% (Graph 4.3). There were no Hunter operations below the 85% distribution mark, with the lowest score in the Hunter region being 88.27% and the highest 100%, with a median score of 96.1%.

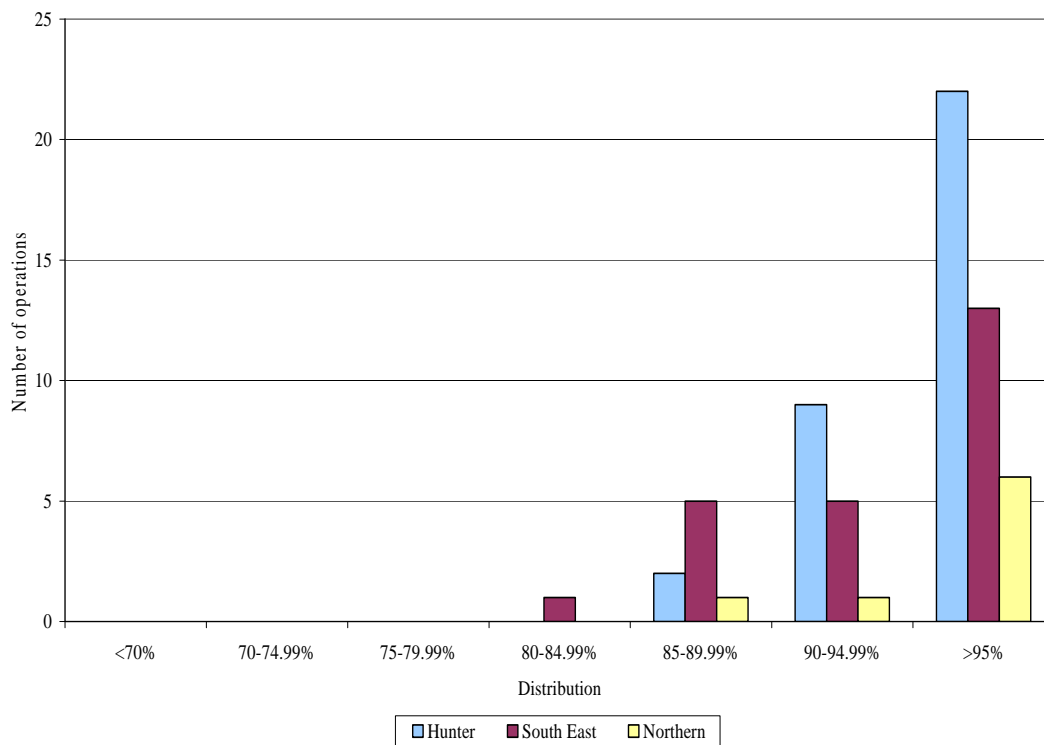
South East region operations had the lowest overall compliance at 94.43% (standard deviation 4.71%). Scores for South East operations were also most frequently in the over 95% range distribution range. The lowest score was 81.43% and the highest 100%, with a median of 95.06%.

Northern region had an overall compliance of 95.86% (standard deviation 3.49%). Again, compliance scores most frequently fell within the 95% range. The highest score was 99.61%, the lowest 88.16% and the median 96.08%.

Graph 4.2: Average overall percentage compliance with HSMS audit by region.



Graph 4.3: Distribution of percentage compliance scores for HSMS audit by region.



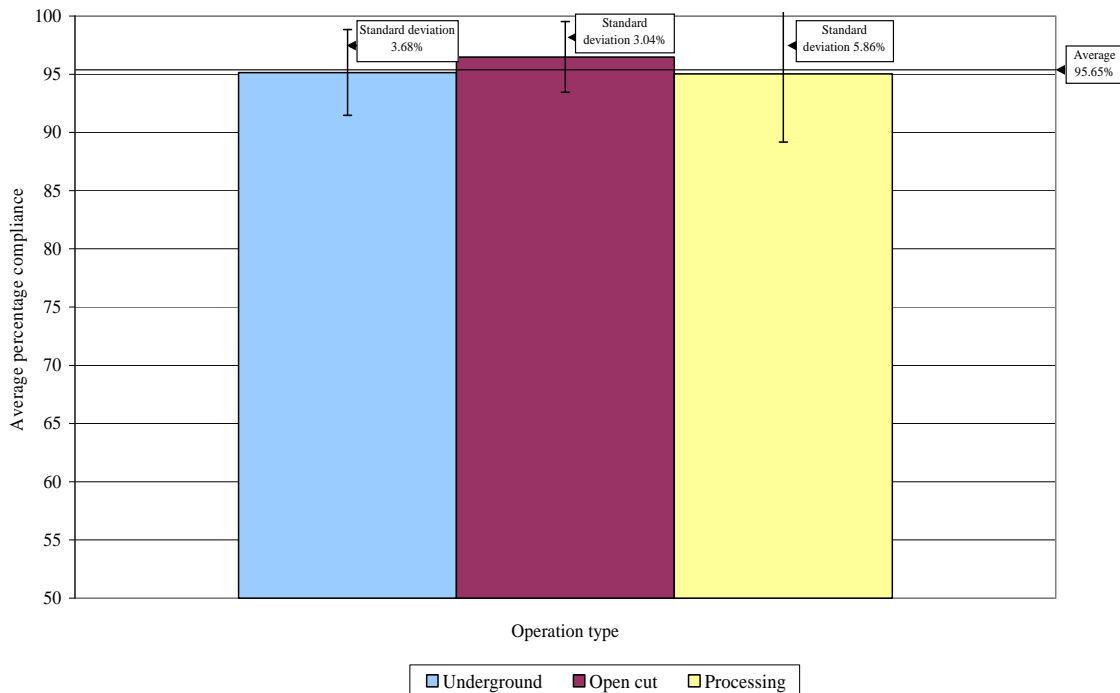
Operation types

Within operation types, processing operations scored the lowest average compliance of 95.03% (standard deviation 5.86%) (Graph 4.4). The distribution graph below (Graph 4.5) shows that the highest number of processing operations scored in the over 95% distribution range. Processing operations scored the lowest (81.43%), and the highest scores (100%), with a median of 95.29%.

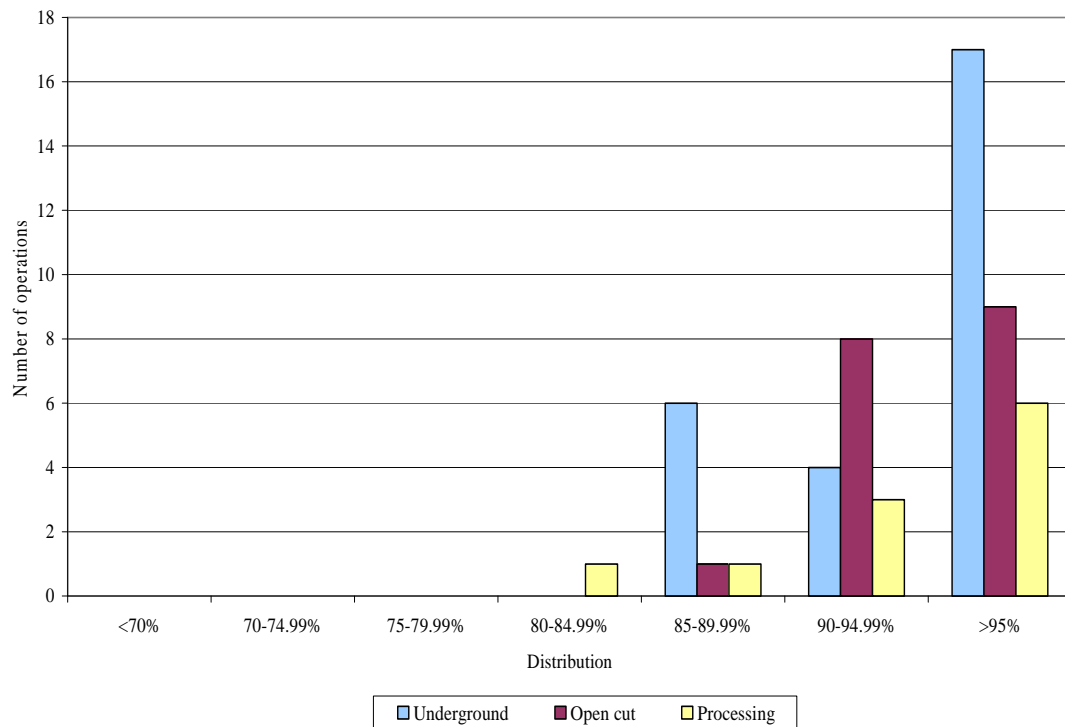
Underground scored a compliance of 95.15% (standard deviation 3.68%). The distribution graph below shows that the majority of underground operations scored in the over 95% distribution range. There were no underground operations below the 85-89.99% distribution range, with the lowest score 87.80% and the highest 99.69% and a median of 96.27%.

Open cut operations scored the highest average compliance of 96.49% (standard deviation 3.04%). The highest score was 100% and lowest 88.21%. The median score was 96.82%. Again, the highest frequency of scores was in the over 95% range.

Graph 4.4: Average overall percentage compliance with the HSMS audit by operation type.



Graph 4.5: Distribution of overall percentage compliance scores for HSMS audit by operation type.

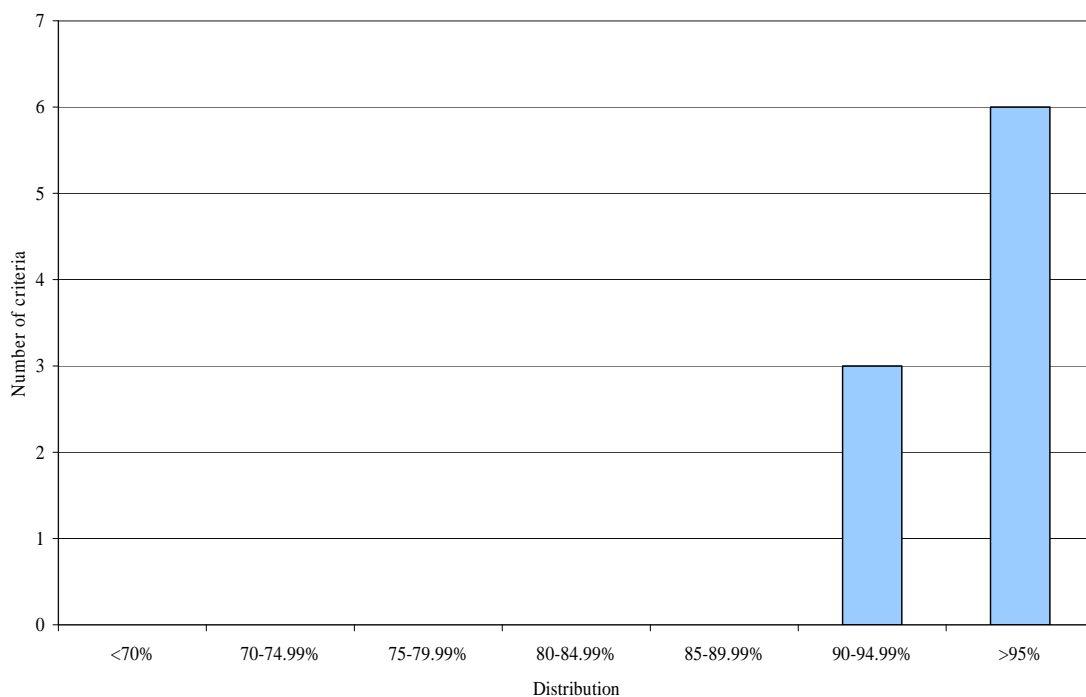


4.2 Compliance by criteria

Overall

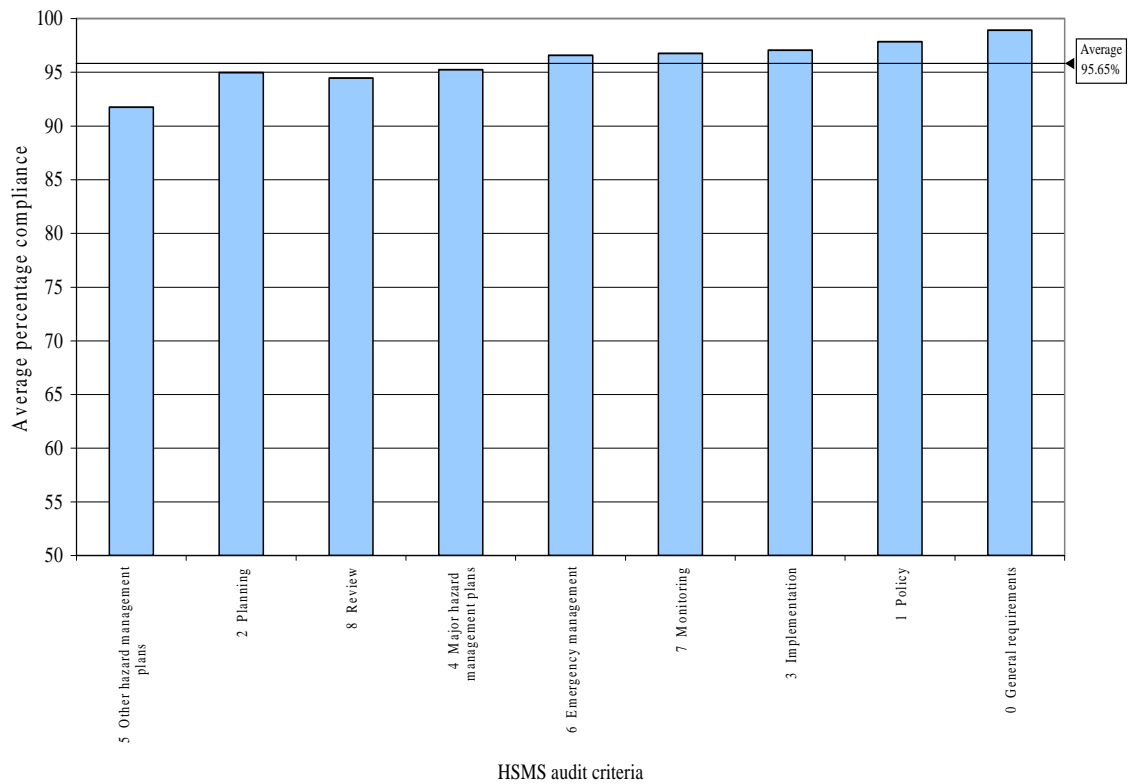
The distribution graph below (Graph 4.6) shows that the majority of scores for the nine criteria in the HSMS audit were above 95%, and all were above 90%.

Graph 4.6: Distribution of average compliance scores for HSMS audit criteria across all coal operations



As Graph 4.7 shows below, the highest percentage compliance score was 98.92% for the general requirements (criterion 1), with other hazard plans (criterion 5) the lowest at 91.75%.

Graph 4.7: Average percentage compliance for HSMS audit criteria across all coal operations.



Four criteria scored below the average, as follows:

- Criterion 5 (91.75%) - other hazard plans. As indicated, this was the lowest scoring criteria overall. The weakest question within this criterion was question 5.1.5 (system ventilation audits). This was primarily aimed at underground operations, although open cut operations in the Hunter recorded a score of 20%. Of underground operations, those in the South East scored lowest for this question (77.14%). Underground mines in the Hunter and Northern region scored 90 and 100% respectively.

Question 5.1.4 (ventilation officers) scored 88.15%. Again, this question was primarily aimed at underground operations, although open cut operations in the Hunter recorded a score of 20%. Of underground operations, those in the South East again scored lowest for this question (81%). Underground mines in the Hunter and Northern region scored 100%.

The question within criterion 5 dealing with dangerous goods assessment also returned a comparatively low score (84.80%). Open cut operations in the Northern region only scored 52% for this question.

- Criterion 2 (94.96%) – planning. The average for this criterion was lowered by the result for question 2.1.1 which dealt with survey and plan arrangements. The overall compliance for this question was 89.53%. Open cut operations had the lowest

average for this question at 85.83%, with open cut operations in the South East scoring 72%.

- Criterion 8 (94.46%) – review. The underground operation in the Northern region scored the lowest at 80% for this criterion, and processing operations in the South East scored 86.67%. Other operations in the other regions averaged over 90%.
- Criterion 4 (95.24%) – major hazard management plans. Question 4.4 relating to outburst was the lowest, scoring 89.60%, due to the Northern region underground mine scoring 40% on this question. Other questions within this criteria scored over 92%.

Also of note was the result for question 0.2 in criterion 0. Criterion 0 covered general requirements for HSMS under the legislation, with question 0.2 testing provision of the HSMS summary to the Department. Processing operations in the Hunter and Northern regions scored 93.33% and 90% respectively for this question. Underground operations in the South East scored 95%. These scores are unexpected given that provision of an outline of the HSMS to the Chief Inspector is a basic administrative requirement under the CMHS legislation. Other scores across regions and operations types were 100%.

Regions

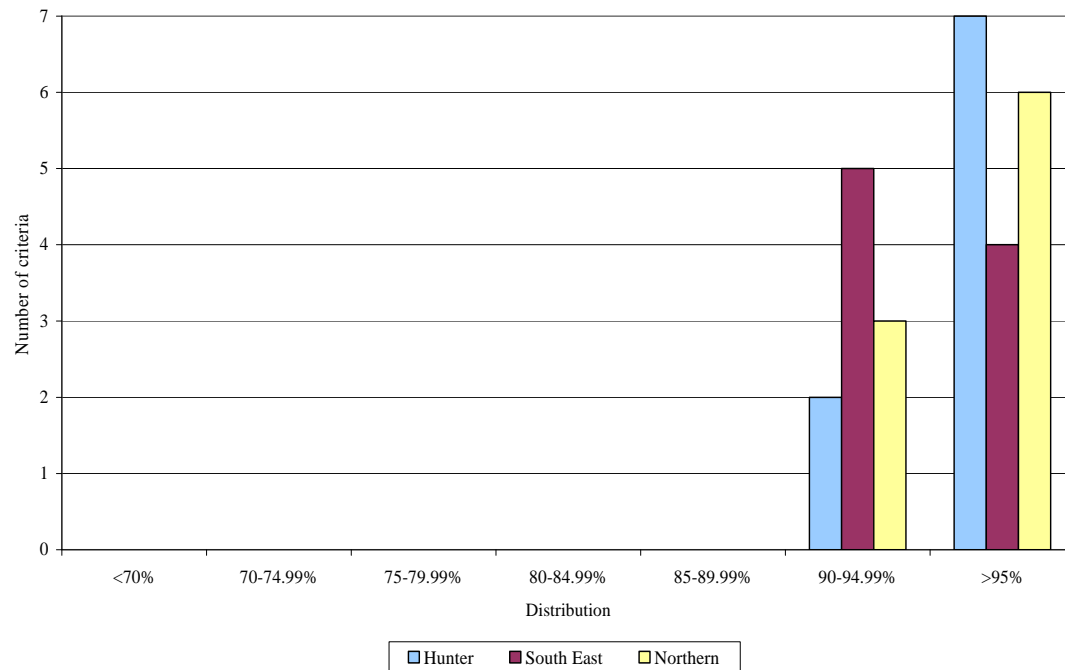
The graph of distribution of scores below (Graph 4.8) shows that for Hunter and Northern operations, the highest frequency of scores was the above 95% distribution range. South East region had the highest frequency of criteria scores in the 90-94.99% range.

The range and relative scores for each criterion are shown below in Graph 4.9. Hunter region had a range of 92% for criterion 5 (other hazard plans) and a high of 99.39% for criterion 1 (general requirements), with a median score was 97.67%.

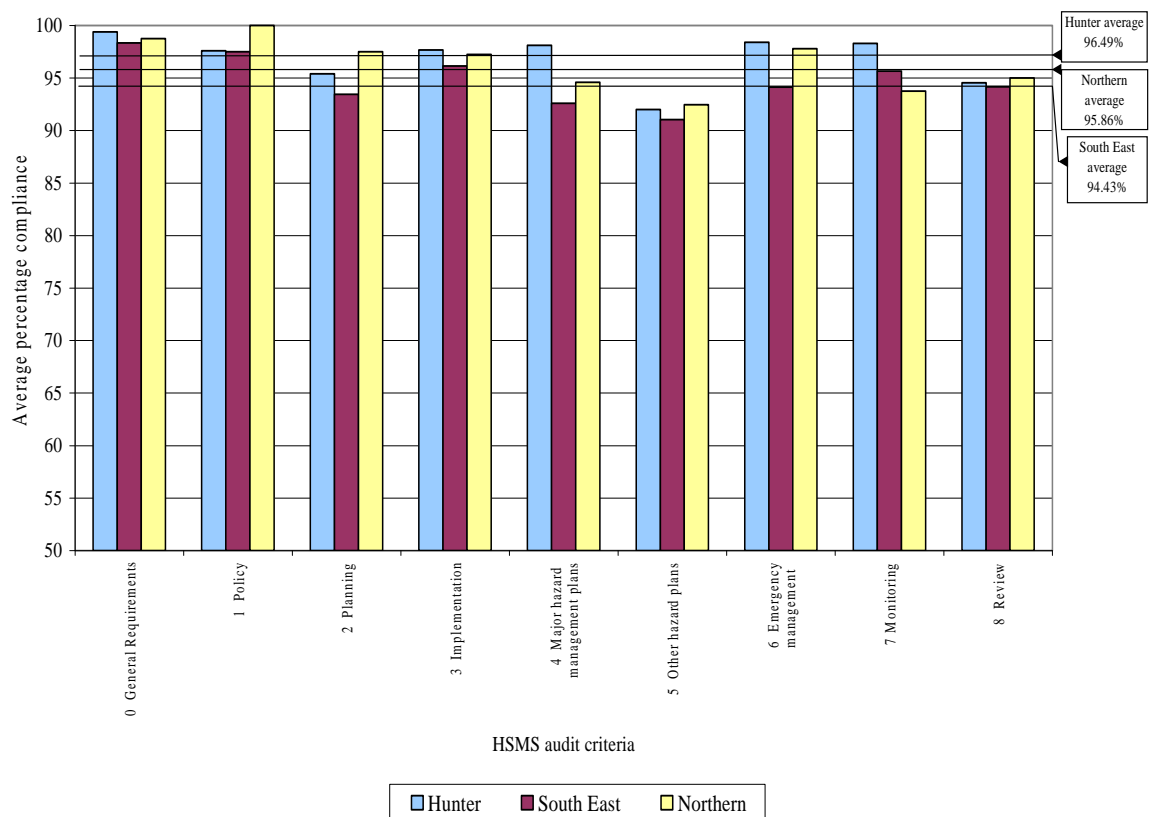
The lowest score in the South East was 91.03% for criterion 5 (other hazard plans) to a high of 98.33% for criterion 0 (general requirements), with a median score of 94.17%.

The lowest score for a Northern operations was 92.47% for criterion 5 (other hazard plans), to a high of 100% for criteria (policy).

Graph 4.8: Distribution of average compliance scores for HSMS audit criteria by region



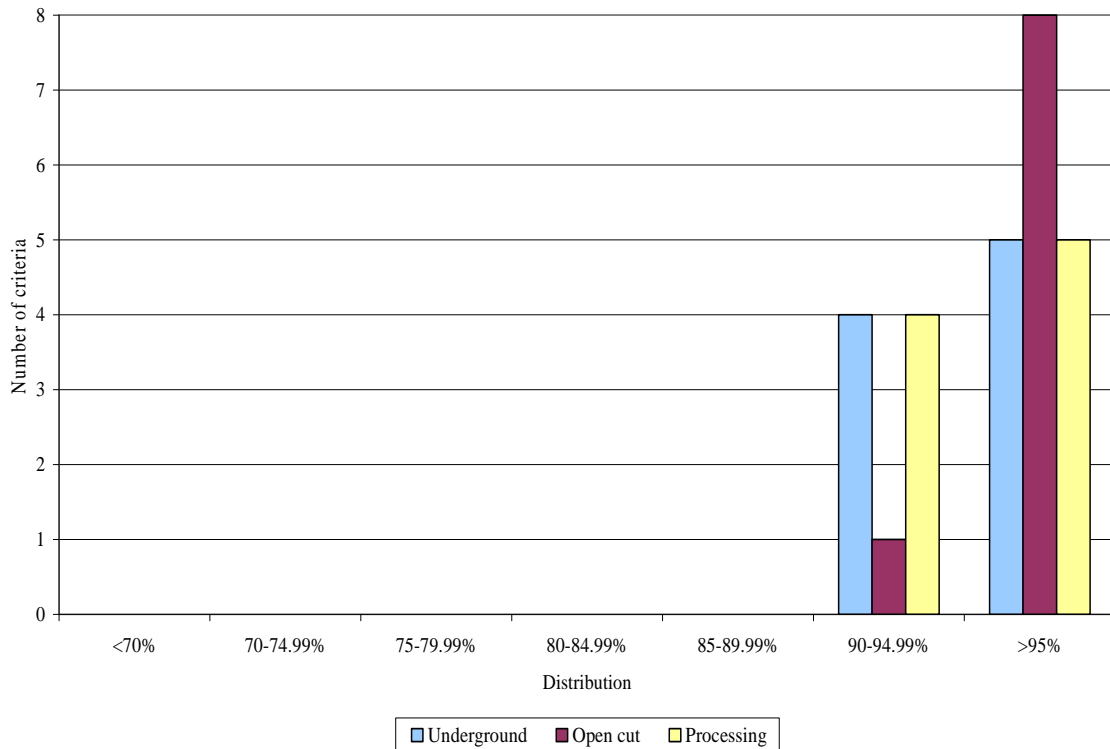
Graph 4.9: Average percentage compliance scores for HSMS audit criterion by region.



Operation types

The distribution graph below (Graph 4.10) shows that the distribution of scores for underground and processing operations were similar, with most scores in the above 95% range, and the remainder in the 90-94.99% range. The median scores were 95.8% and 95.45% respectively. The vast majority of highest scores for open cut operations also fell in the above 95% distribution range, with a median score of 97.45%.

Graph 4.10: Distribution of average percentage compliance scores for HSMS criteria by operation type.

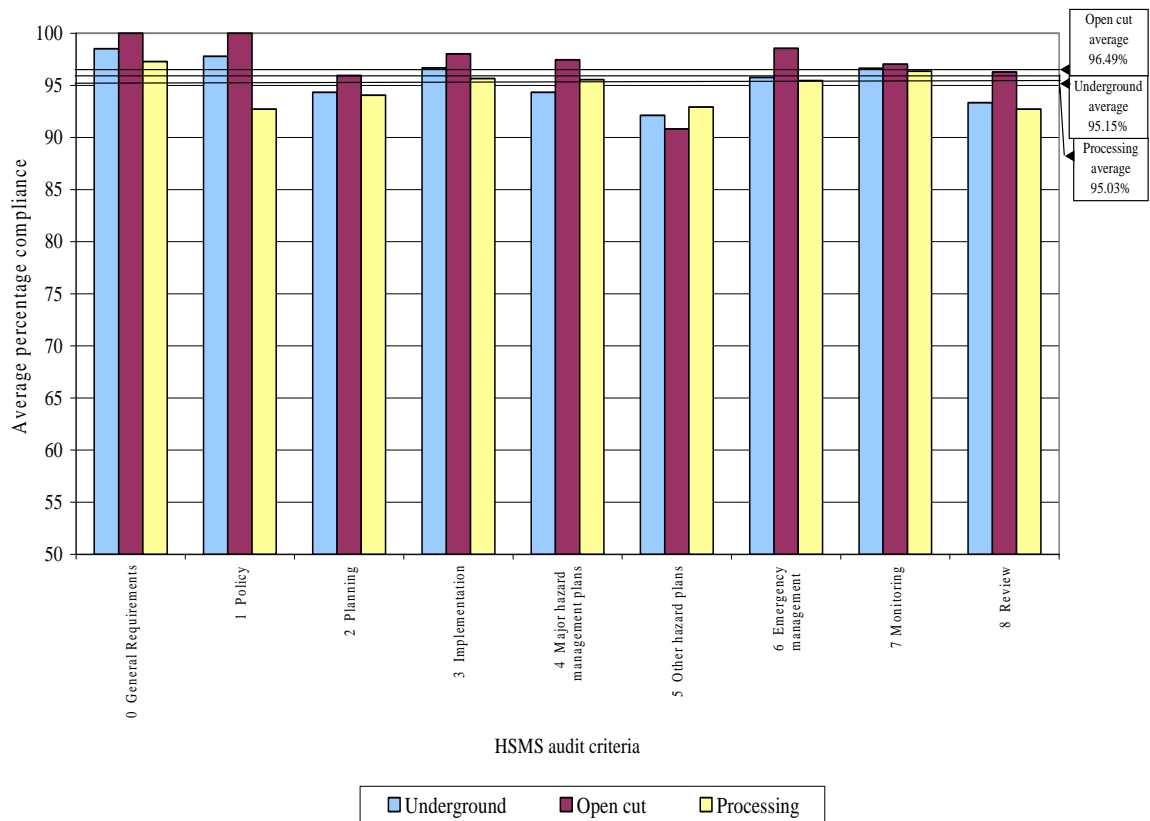


Graph 4.11 below shows the range and relative score for each criterion by operation type. An open cut operations scored the highest and lowest criterion average. The highest was 100% for both criteria 0 (general requirements) and 1 (policy). The lowest was 90.81% for criterion 5 (other hazard plans).

The lowest compliance score for underground operations was 92.12% for criterion 5. The highest score was 98.52% for criterion 1 (policy).

The highest score for processing operations was 97.27 % for criterion 0 (general requirements), and the lowest 92.73% for criteria 8 (review) and 1 (policy).

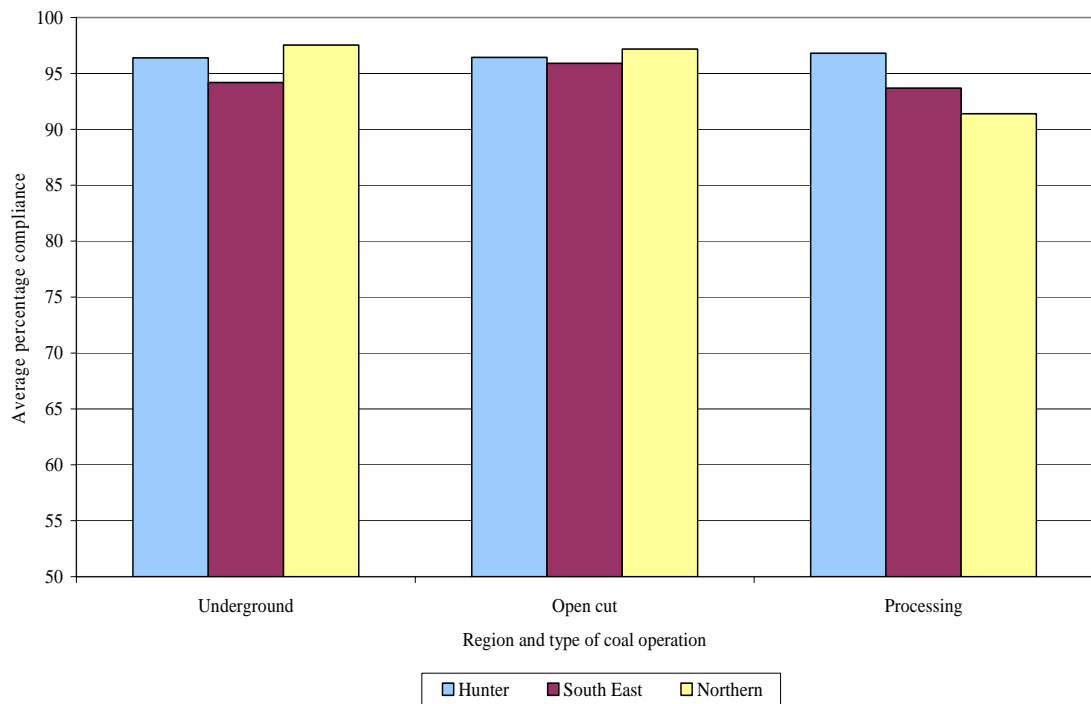
Graph 4.11: Average percentage compliance scores for each criterion in HSMS audit by operation type



Region and type of operation

Graph 4.12 below shows that underground operations performed relatively consistently across the regions. The underground operation in the Northern region performed the best, with South East underground operations least compliant. Open cut operations scored very consistently across regions. There was some variation in the performance of processing operations across the regions. Processing operations in the Northern region did not perform as well as those in the South East and Hunter regions, with those in the Hunter region scoring highest.

Graph 4.12: Overall average percentage compliance with HSMS audit criteria across regions by operation type.



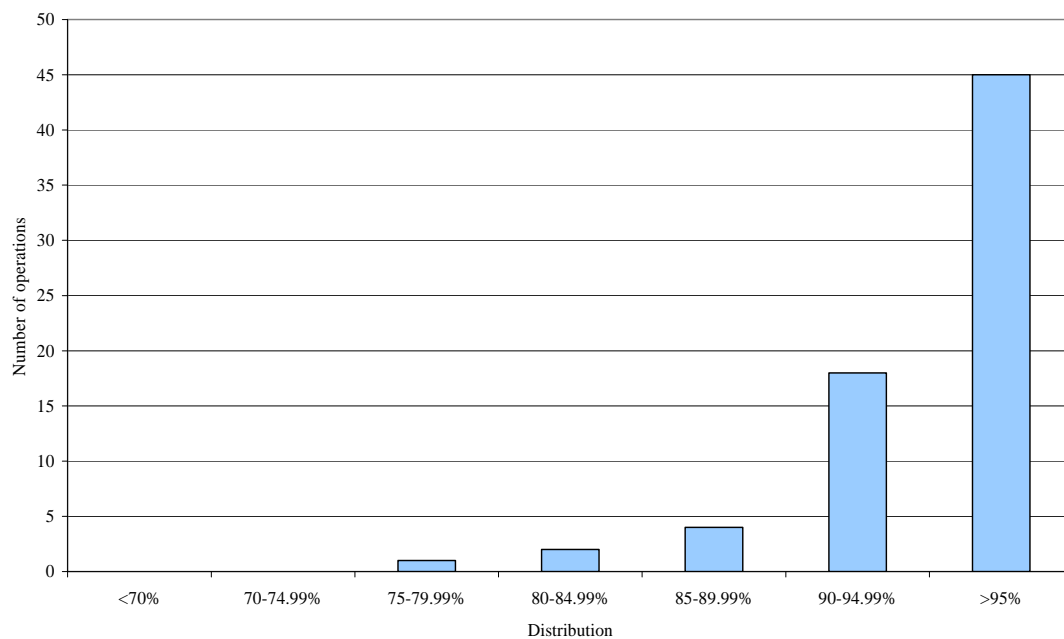
5. Contractor Management Plan Audits

5.1 Compliance by coal operation

Overall

The overall percentage compliance across the 66 coal operations included in the CMP audit analysis ranged from 77.14% to 100% with an average of 95.03%. Most operations fell within the over 95% compliance range (Graph 5.1)

Graph 5.1: Distribution of overall percentage compliance scores for CMP audits across coal operations



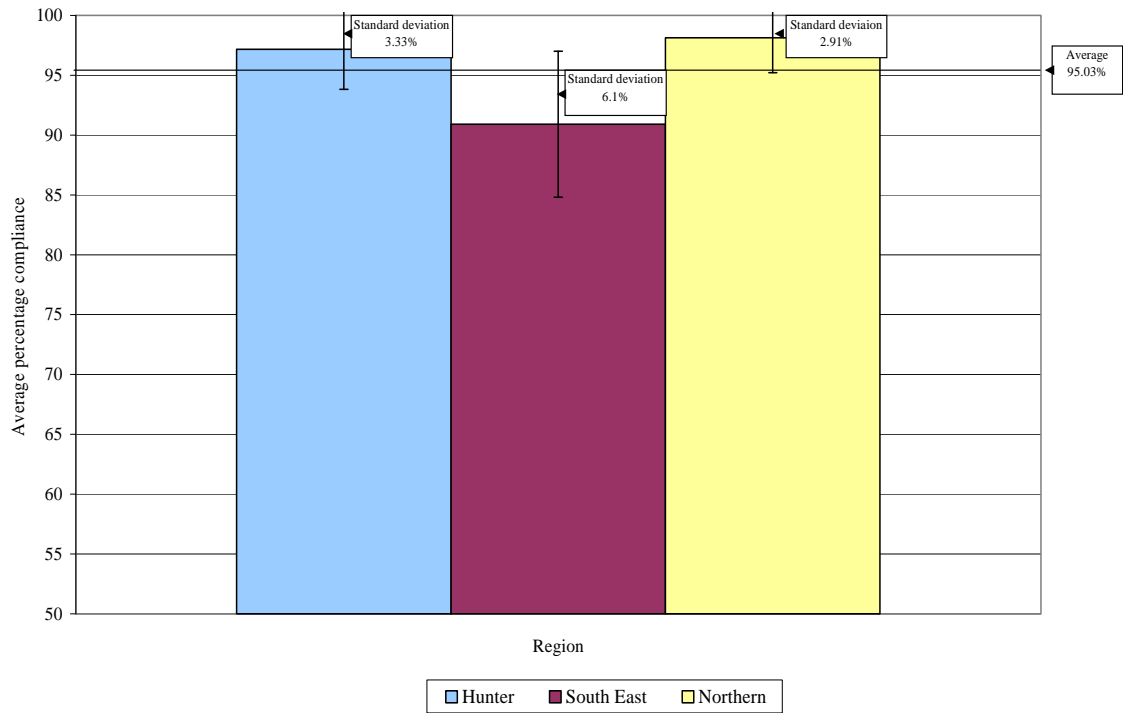
Regions

Northern region coal operations had the highest overall compliance of 98.13% (standard deviation 2.91%) (Graph 5.2). Compliance scores most frequently fell within the 95% distribution range (Graph 5.3), with no mines in the region below the 90-94.99% range. The lowest score was 92.5% and the highest 100% with a median of 100%.

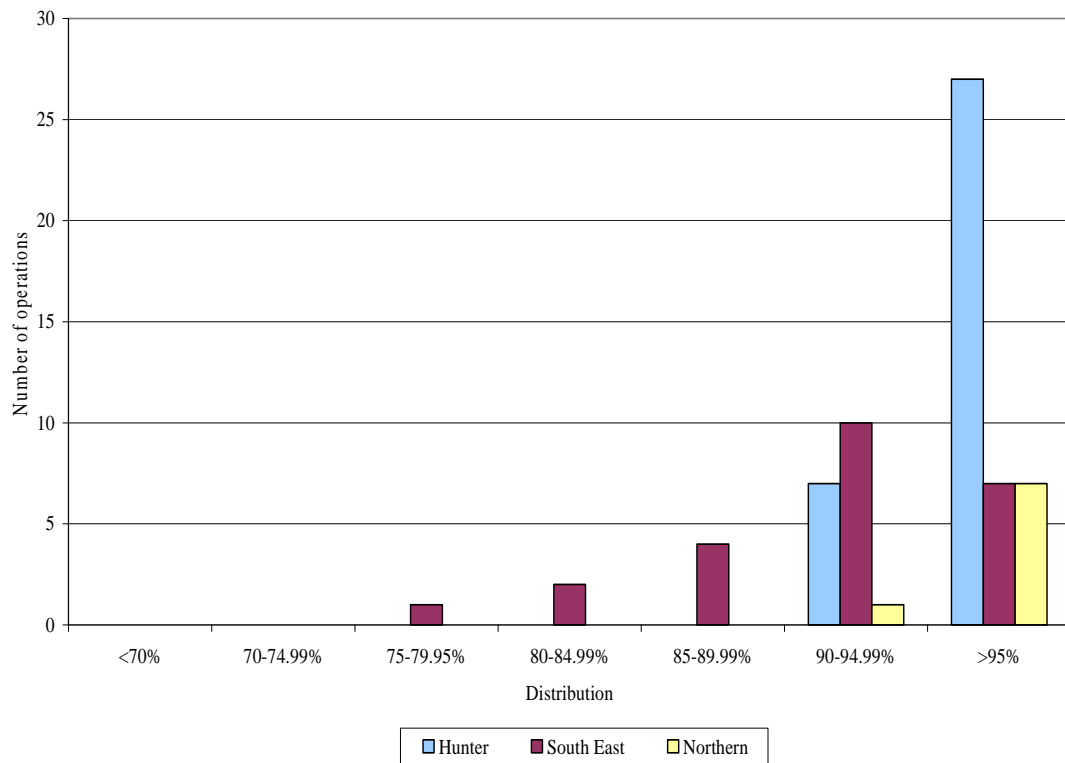
The Hunter region operations had the next highest overall compliance score, averaging 97.16% with a standard deviation 3.33%. The majority of coal operations in the Hunter region had an overall compliance of over 95%. There were no Hunter operations below the 90% distribution mark, with the lowest score in the Hunter region being 90% and the highest 100%, with a median score of 97.5%.

The average for coal operations in the South East region was 90.91% (standard deviation 6.1%). Scores for South East operations were most frequently in the 90-94.99% distribution range. The lowest score was 77.14% and the highest 100%, with a median of 92.5%.

Graph 5.2: Average percentage compliance with CMP audit by region.



Graph 5.3: Distribution of percentage compliance scores for CMP audit by region.



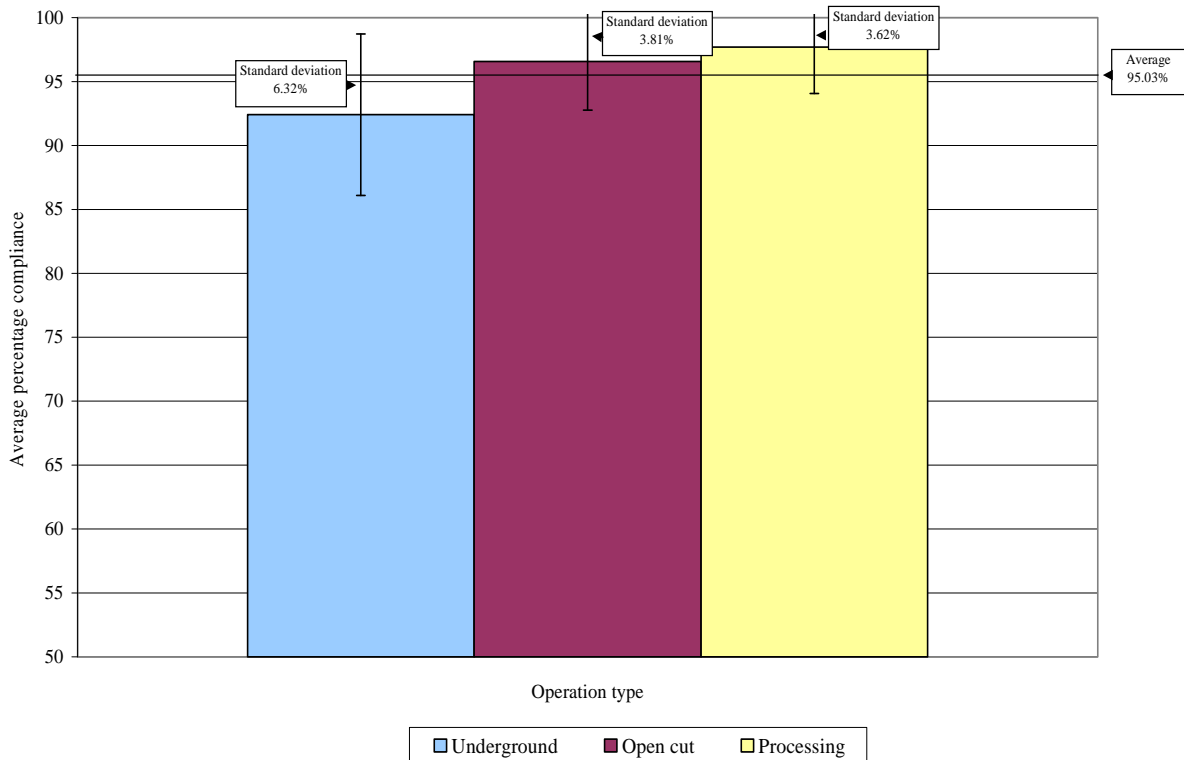
Operation types

Within operation types, processing operations achieved the highest overall compliance score of 97.67% (standard deviation 3.62%) (Graph 5.4). The distribution graph below (Graph 5.5) shows that the majority of processing operations scored in the over 95% distribution range. There were no processing operations below the 90-94.99% distribution range, with the lowest score 90%, the highest 100% and a median of 100%.

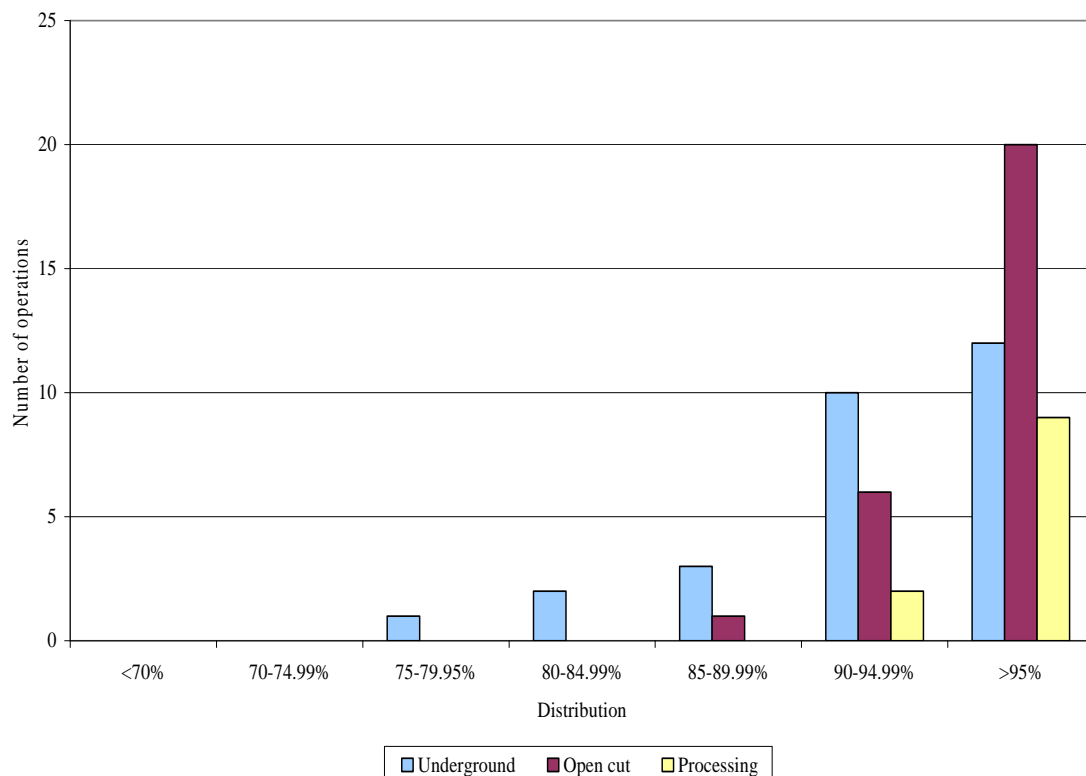
Open cut scored an average compliance of 96.57% (standard deviation 3.81%). Again, the highest frequency of scores was in the over 95% range. The range of scores was larger than processing operations, with the highest score of 100% and a low of 87.5%. The median score was 97.5%.

Underground operations scored the lowest average of 92.44% (standard deviation 6.32%) and the highest range, with a low score of 77.14% and a high of 100%. The median score was 93.39%.

Graph 5.4: Average percentage compliance with the CMP audit by operation type.



Graph 5.5: Distribution of percentage compliance scores for CMP audit by operation type



5.2 Compliance by criteria

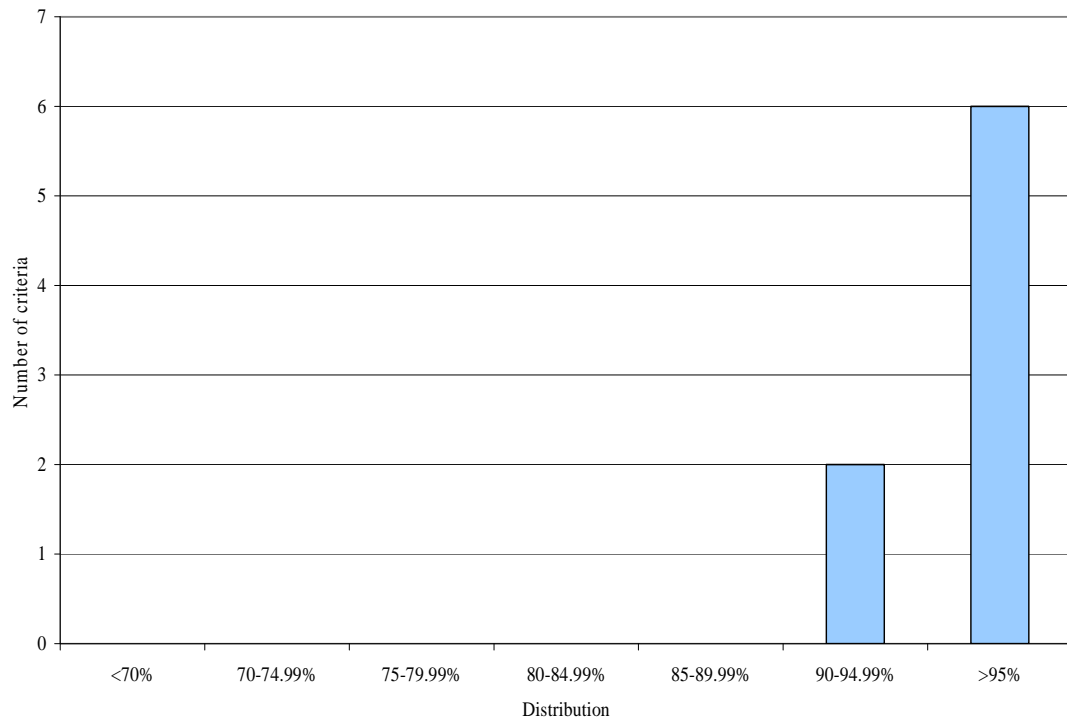
Overall

The majority of average compliance scores for the eight criteria were above 95% with the rest in the 90-94.99% distribution range (Graph 5.6).

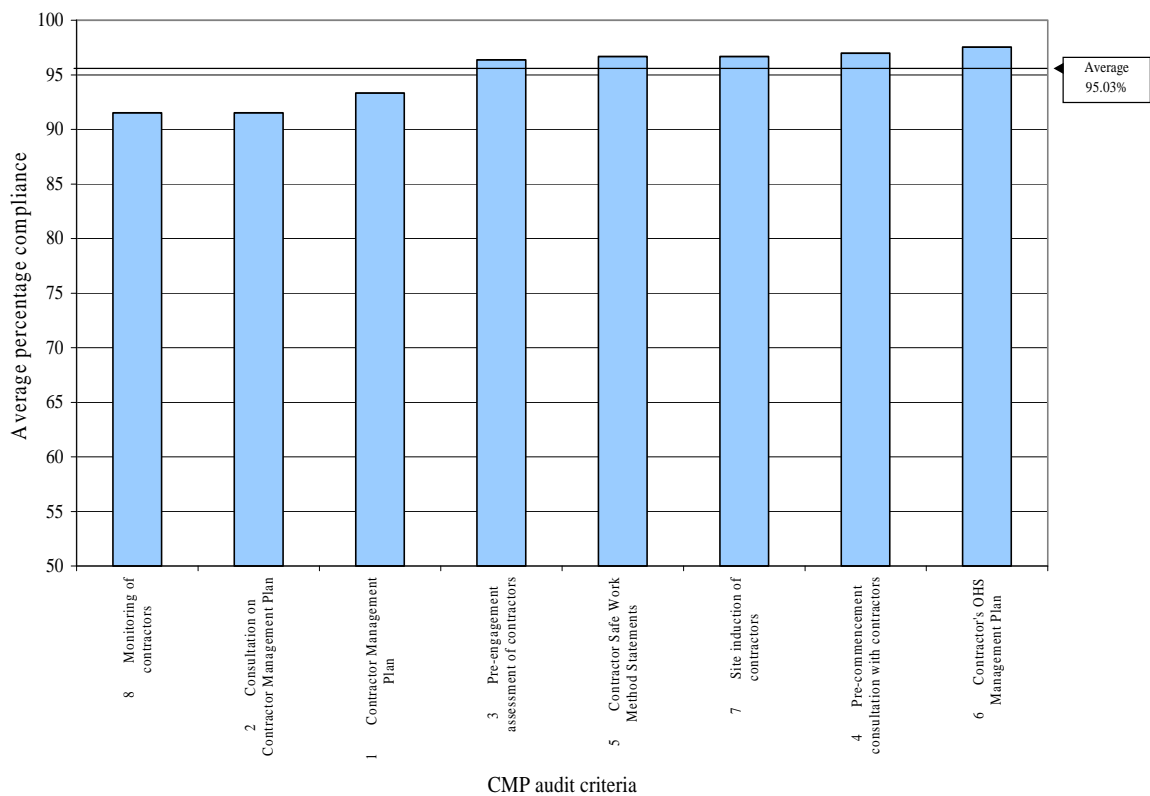
Graph 5.7 shows that three criteria were below average, as follows:

- **Criteria 2 (91.25%) - consultation on CMP.** Underground operations in the South East scored a low of 81.25% for this criterion. Open cut and underground operations in the Hunter scored 90.59% and 90.91% respectively. Other scores for operation types by region were 100%.
- **Criterion 8 (91.25%) - monitoring of contractors.** Open cut and underground operations in the Northern region and processing operations in the Hunter scored 100% for this criterion. The lowest scores were 81.25% and 84% for underground and open cut operations in the South East region. Other scores for operation types by region were above 90%.
- **Criterion 1 (93.33%) - contractor management plan.** Processing operations in the Northern region and South East open cut operations scores lowest at 80% and 84% respectively. Other scores for operation types by region were over 90%.

Graph 5.6: Distribution of average percentage compliance scores for CMP audit criteria across all coal operations



Graph 5.7: Average percentage compliance for CMP audit criteria across coal operations.



Regions

For the Northern and South East regions, the highest frequency of scores was in the over 95% distribution range, with the remainder in the 90-94.99% range (Graph 5.8). The median scores were 97.65% and 92.08% respectively.

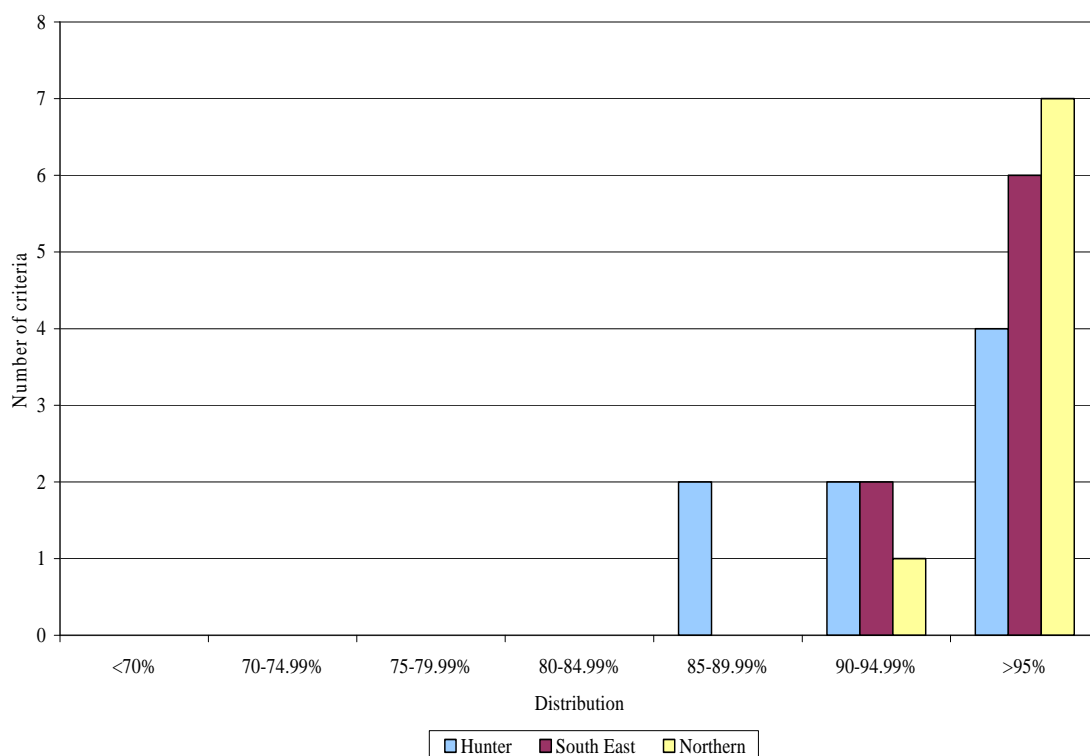
For the Hunter, the graph of distribution of scores below shows the highest frequency of scores in the above 95% distribution range, with the remainder spread evenly between the 85-89.99% and 90-94.99% distribution scores. The median score was 97.65%.

The range and relative scores for each criterion are shown below in Graph 5.9. Hunter region had a range of 92.35% for criterion 2 (consultation on CMP) and a high of 100% for criterion 7 (monitoring), with a median score of 97.65%.

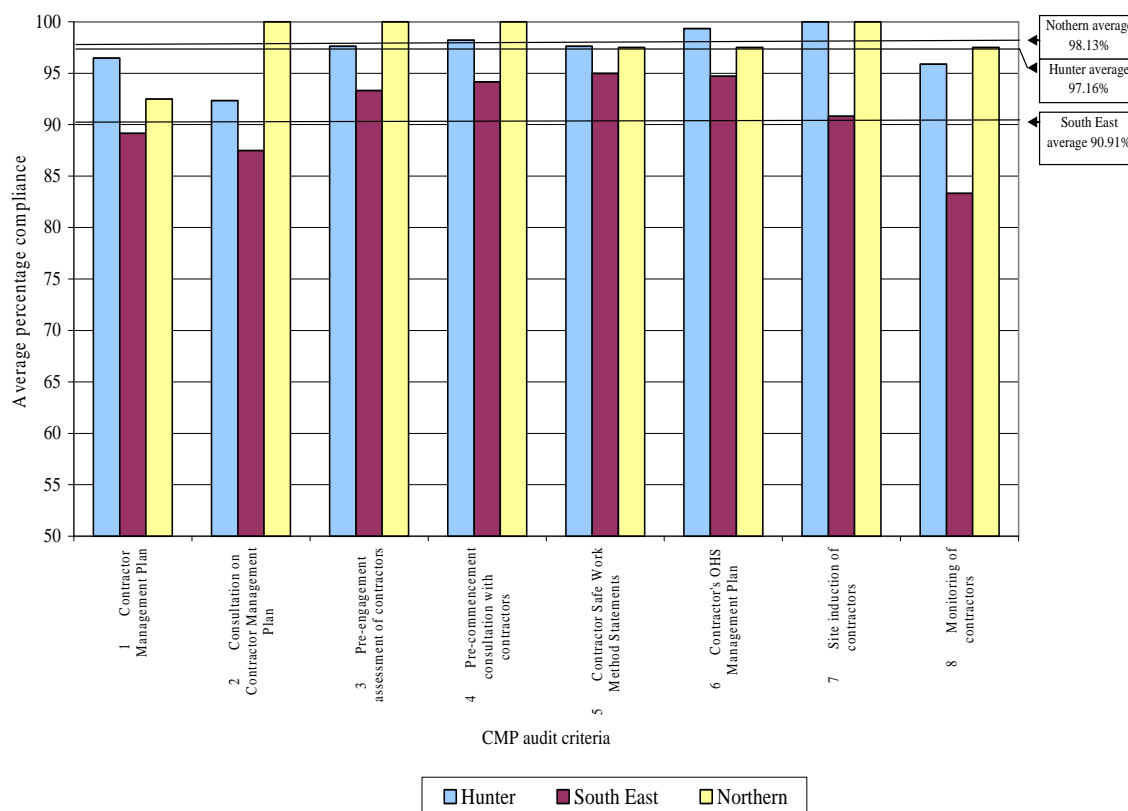
The lowest score in the South East was 87.5%, also for criterion 2, to a high of 95% for criterion 5 (contractor safe work method statements), with a median score of 92.03%.

The lowest score for a Northern operations was 92.5% for criterion 1 (contractor management plans), to a high of 100% for criteria 2 (consultation on CMP), 3 (pre-engagement assessment) and 4 (pre-commencement consultation with contractors). The median was 97.65%.

Graph 5.8: Distribution of average percentage compliance for CMP audit criteria by region



Graph 5.9: Average percentage compliance scores for CMP audit criteria by region



Operation types

The distribution graph below (Graph 5.10) shows that underground operations scored most frequently in the above 95% distribution range, with the rest evenly distributed across the 85-89.99% and 90-94.99% ranges.

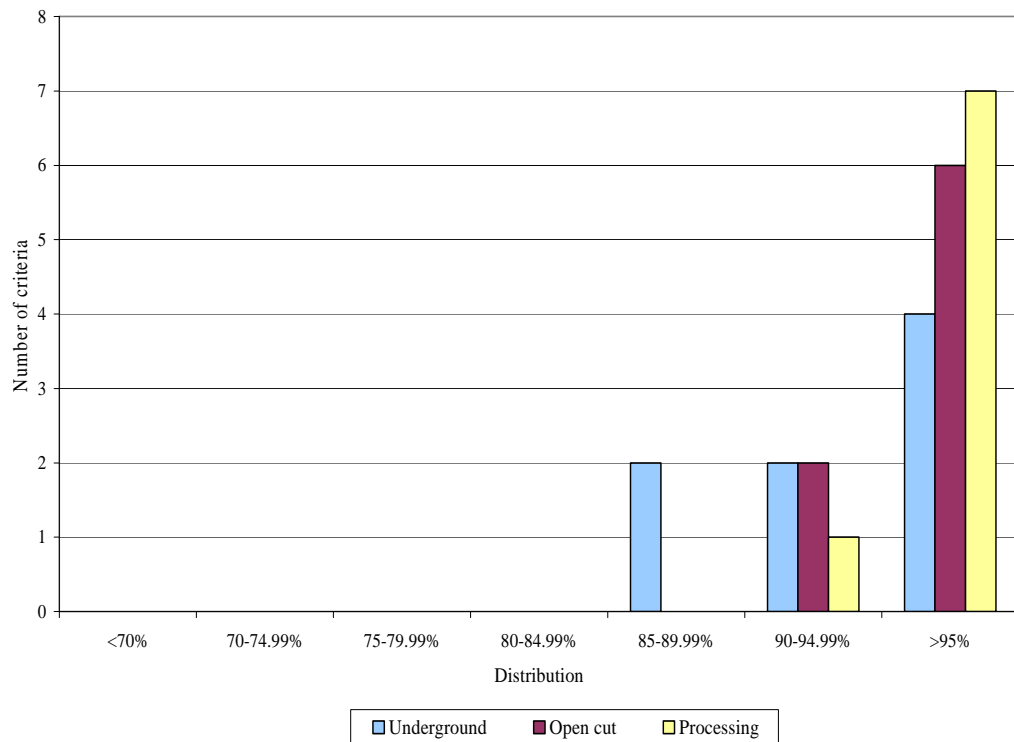
For open cut and processing, the majority of scores were in the above 95% distribution range, with the rest scoring between 90-94.99%.

Graph 5.11 below shows the range and relative score for each criterion by operation type. Processing operations scored a high of 100% for three criteria (criterion 2 - consultation on CMP, criterion 3 – pre-engagement assessment, and criterion 4 – pre-commencement consultation). The lowest score for processing operations was 94.55% for criterion 1 (contractor management plans). The median score was 97.27%.

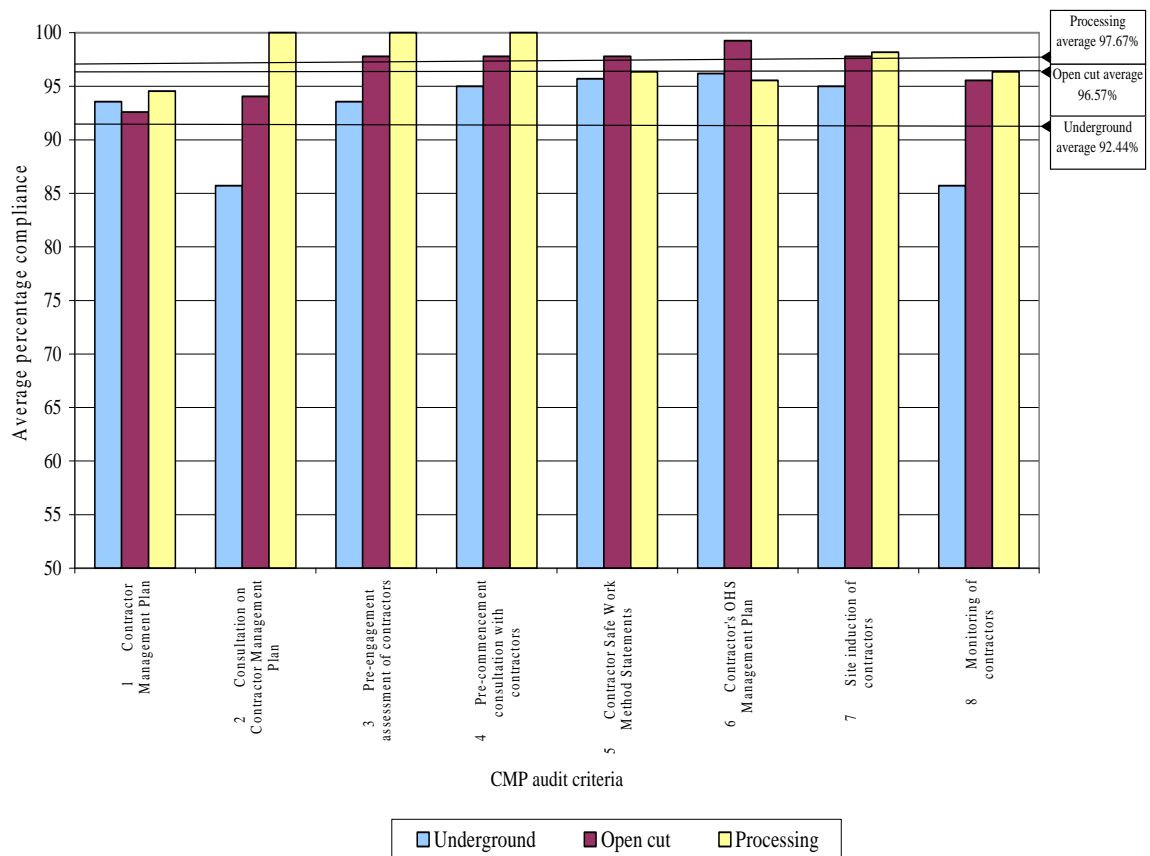
Open cut operations scored the next highest for a criterion, with 99.26% for criterion 6 (contractors OHS management plans). The lowest criterion score for open cut operations was 92.59%, also for criterion 1. The median score was 97.78%.

The lowest average compliance for a criterion (85.71%) was scored by underground operations, for criterion 2 (consultation on CMP). The highest score for underground operations was 96.19% for criterion 6 (contractors OHS management plans). The median score was 94.29%.

Graph 5.10: Distribution of average percentage compliance scores for CMP criteria by operation type.



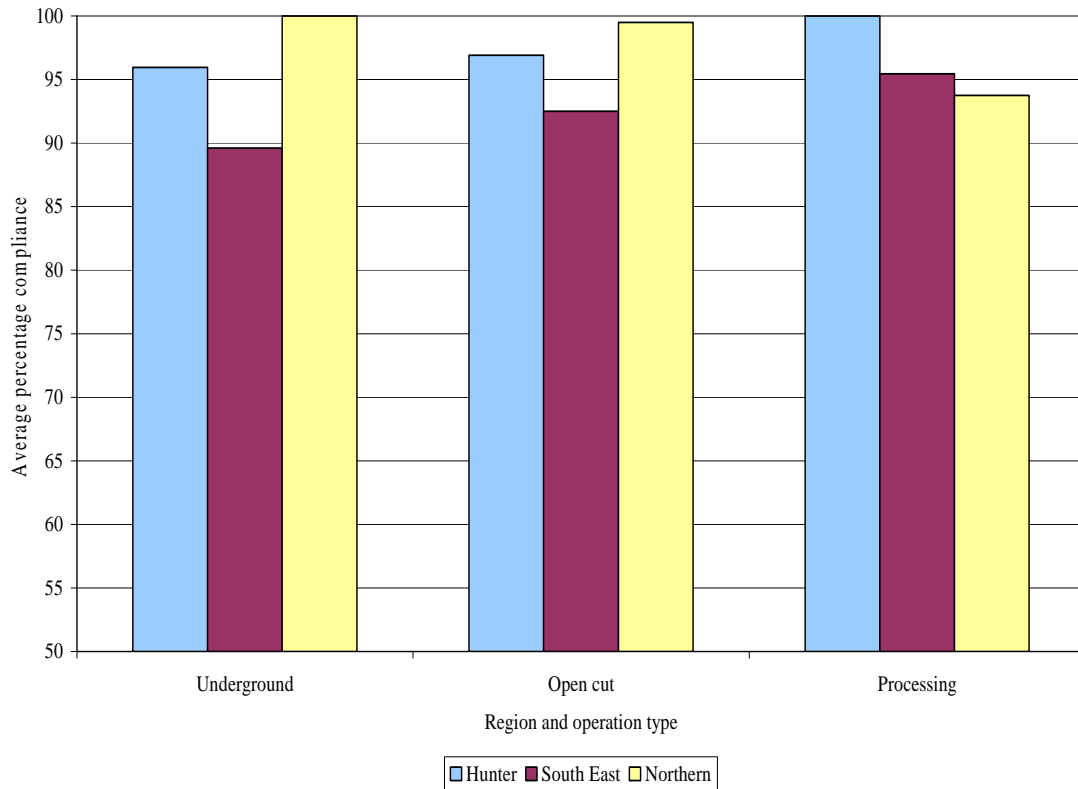
Graph 5.11: Average percentage compliance scores CMP audit criteria by operation type.



Region and type of operation

Underground and open cut operations scored similarly by region, with Northern region scoring highest for these operation types, followed by Hunter and South East. Hunter processing and Northern underground operations scored highest of all. Processing in the Northern region were less compliant than processing in the Hunter and South East. South East processing scored slightly higher than underground and open cut in that region (Graph 5.12).

Graph 5.12: Overall average percentage compliance with CMP audit criteria across regions by operation type.



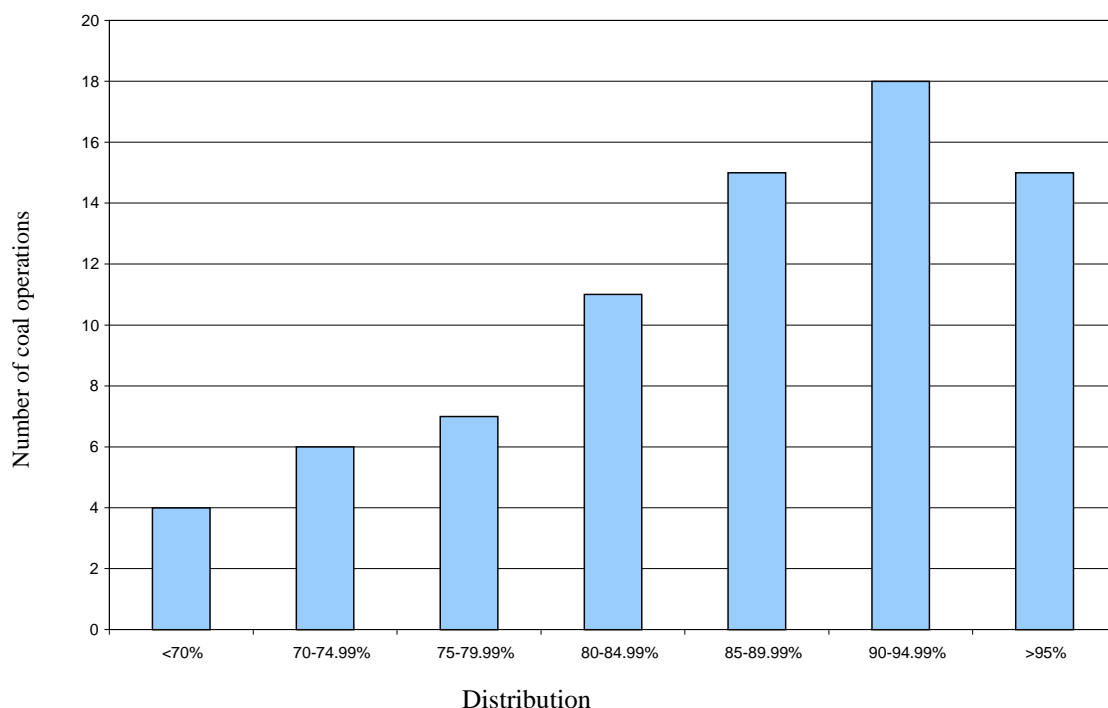
6. Electrical Engineering Management Plan Audits

6.1 Compliance by coal operation

Overall

The overall percentage compliance across the 76 coal operations included in the audit analysis ranged from 61.96% to 99.56%, with an average of 86.53%. Scores most frequently fell within the 90- 95% compliance range (Graph 6.1)

Graph 6.1: Distribution of overall percentage compliance scores for EEMP audits across all coal operations



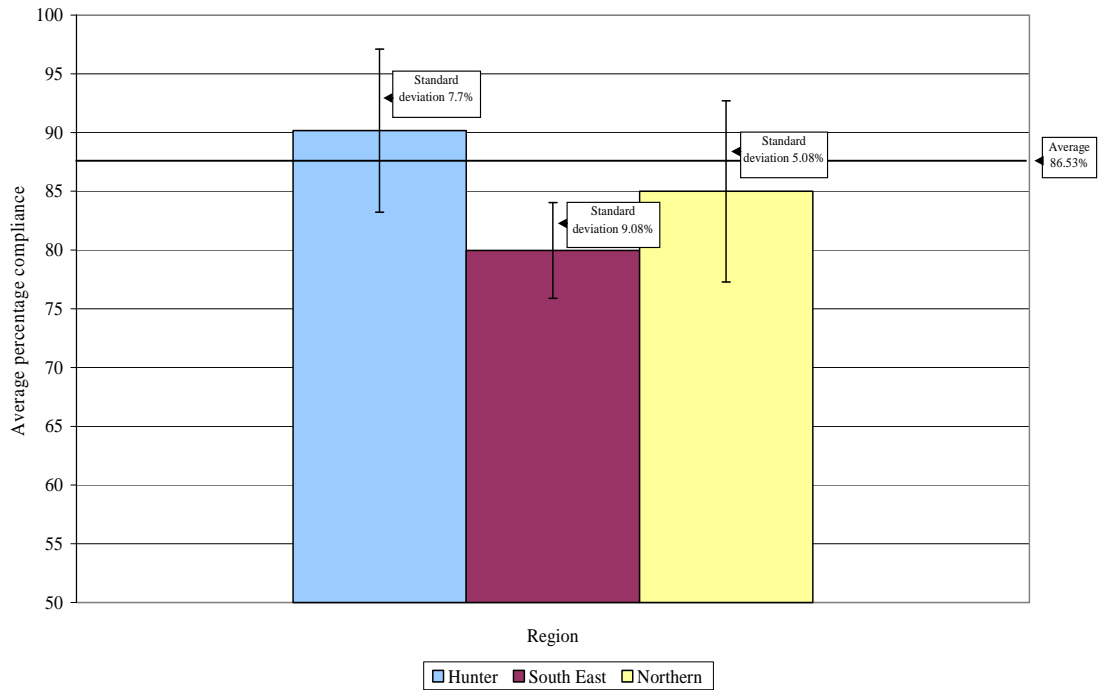
Regions

The Hunter region had the highest overall compliance score, averaging 90.17%, with a standard deviation 7.7% (Graph 6.2). The majority of coal operations in the Hunter region had an overall compliance of over 90%, with the highest number of operations falling in the 90-94.99% compliance range (Graph 6.3). The median score was 92.08%. All operations with a score over 95% compliance were from the Hunter region. However, Hunter operations had the greatest range of scores, achieving both the highest (99.56%) and the lowest (61.96%).

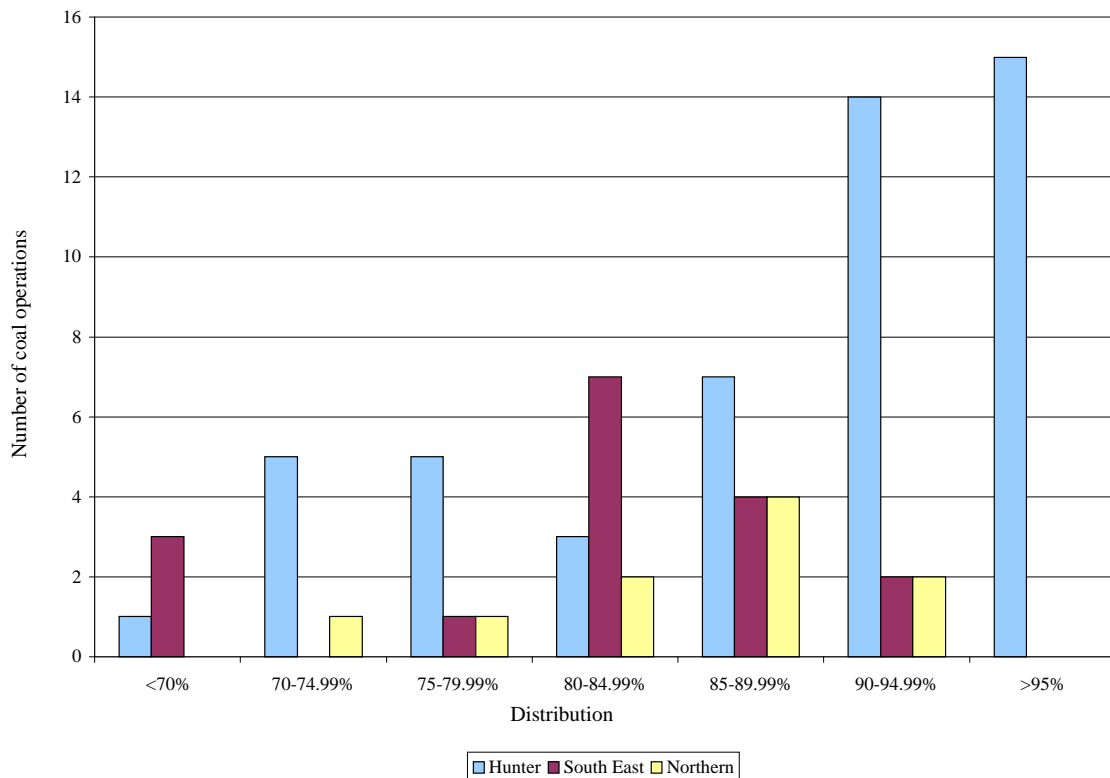
The average for Northern and South East region operations was below the overall average of 86.53%. The average compliance for the Northern region was 85%, with a standard deviation of 5.08%. Compliance scores most frequently fell within the 80-85% range. The highest score was 93.27% and lowest 74.15% with a median of 86.67%.

Compliance in the South East region averaged 79.95% with a standard deviation of 9.08%. The most frequent compliance score for South East region operations was also in the 80-85% distribution range. The scores ranged from 63.07% to 92.21%, with a median of 81.41%.

Graph 6.2: Average overall percentage compliance with EEMP audit by region.



Graph 6.3: Distribution of overall percentage compliance scores for EEMP audit by region.



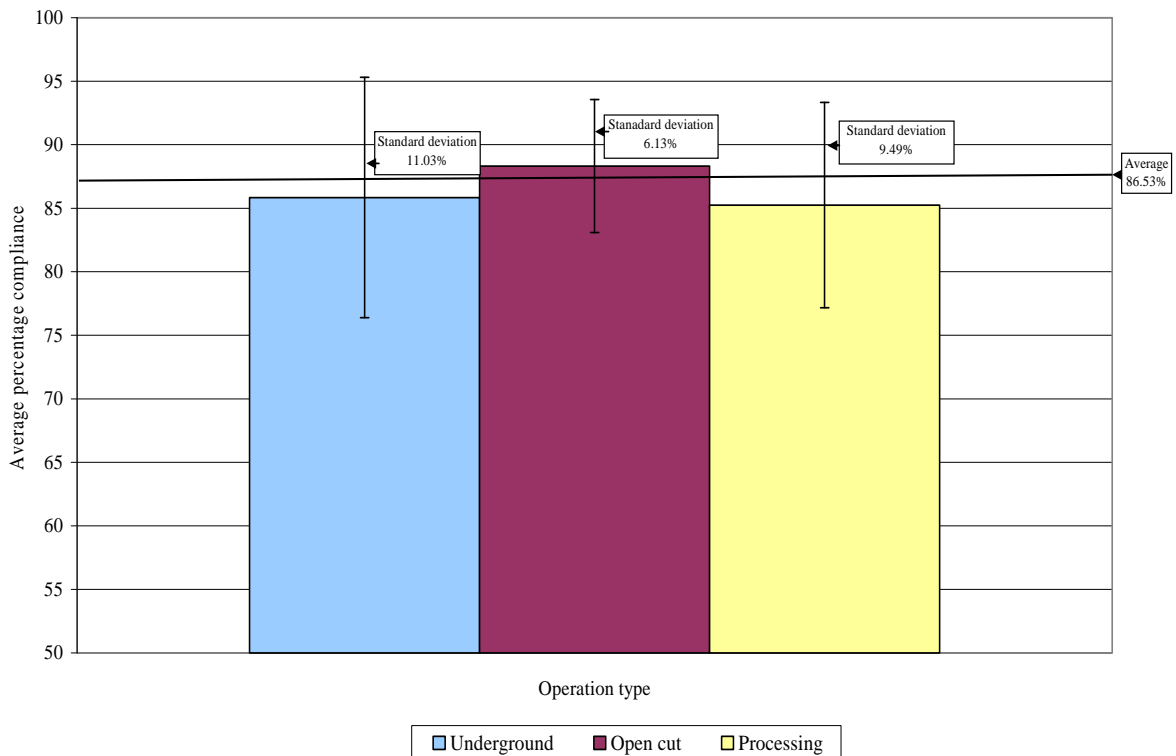
Operation types

Within operation types, open cut operations achieved the highest compliance score of 88.32% (standard deviation 6.13%) (Graph 6.4). The distribution graph (Graph 6.5) shows that open cut operations most frequently scored between 85% and 95%, with a median of 90.8%. The maximum score was 98.58% and the minimum 76.17%.

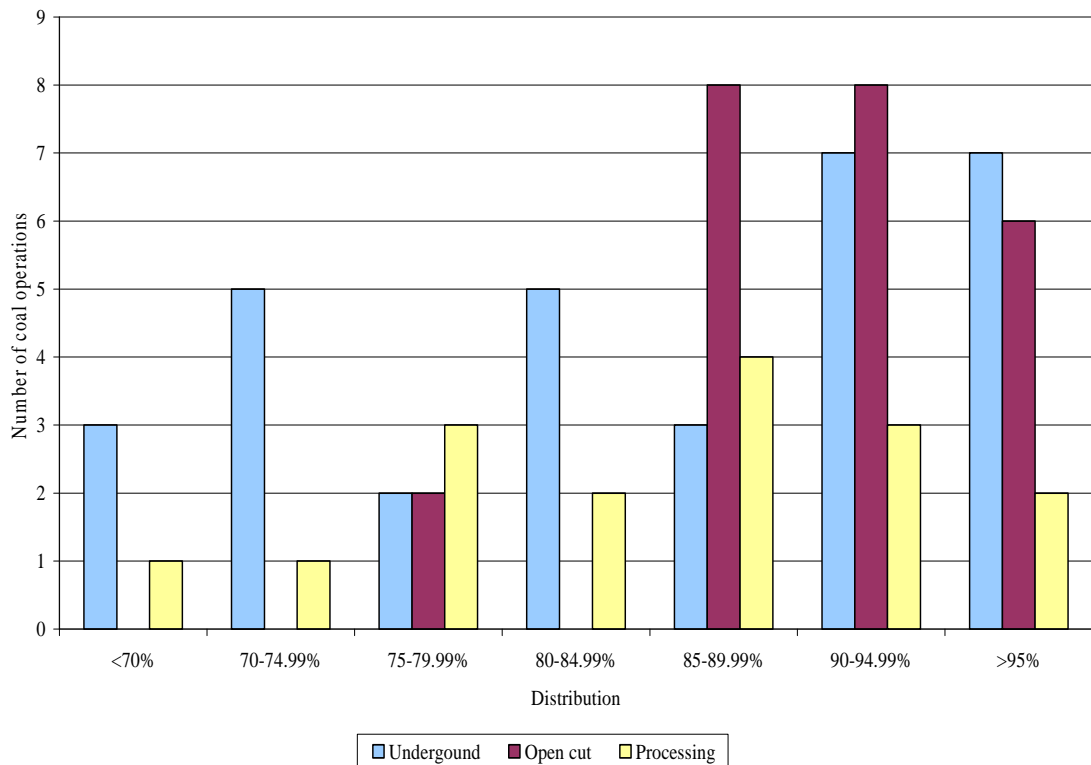
Underground and processing operations achieved similar results. Processing operations scored slightly lower than underground at an average at 85.25% (standard deviation 9.49%). A processing operation scored lowest overall at 61.96%, with the highest score for a processing operation at 98.6%. Processing operations most frequently scored in the 85 to 89.99% distribution range, with a median score 86.56%.

Underground operations scored an average of 85.85% (standard deviation 11.03%). Underground had a similar range to processing operations, with a low of 63.07% to the highest overall score of 99.56%. Graph 5.5 below shows that underground operations most frequently scored between 90 and 100%.

Graph 6.4: Average overall percentage compliance with EEMP audit by operation type.



Graph 6.5: Distribution of overall compliance scores for EEMP audit by operation type.



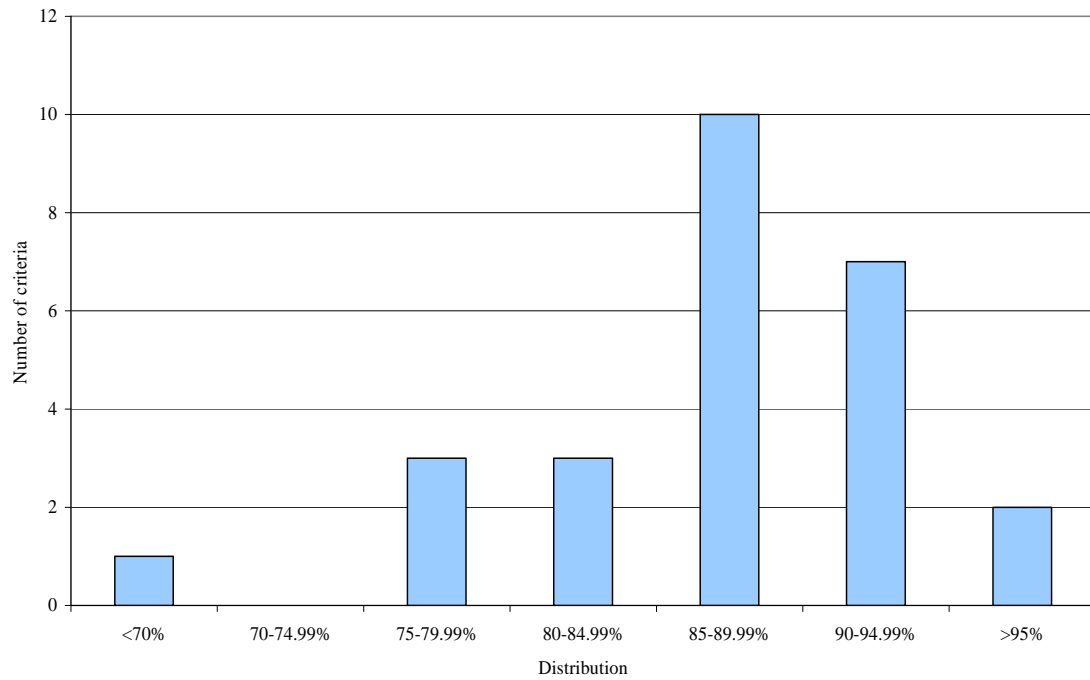
6.2 Compliance by criteria

Overall

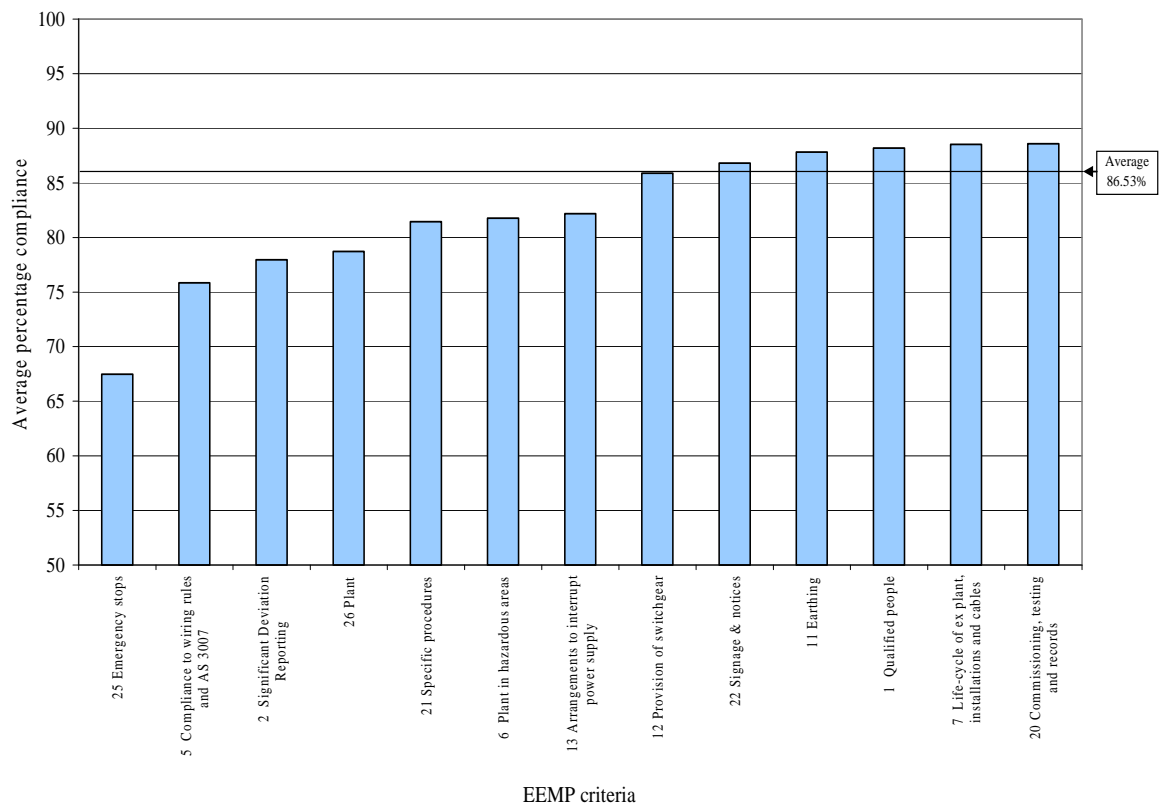
The distribution graph below (Graph 6.6) shows that the most frequently recorded average compliance score across the criteria was in the range of 85-89.99%.

As Graphs 6.7a and 6.7b below show, the highest percentage compliance score was 97.16% for the maintenance records criterion (criterion 9), with criterion 25 (emergency stops) the lowest at 67.47%. Eight criteria scored below the average.

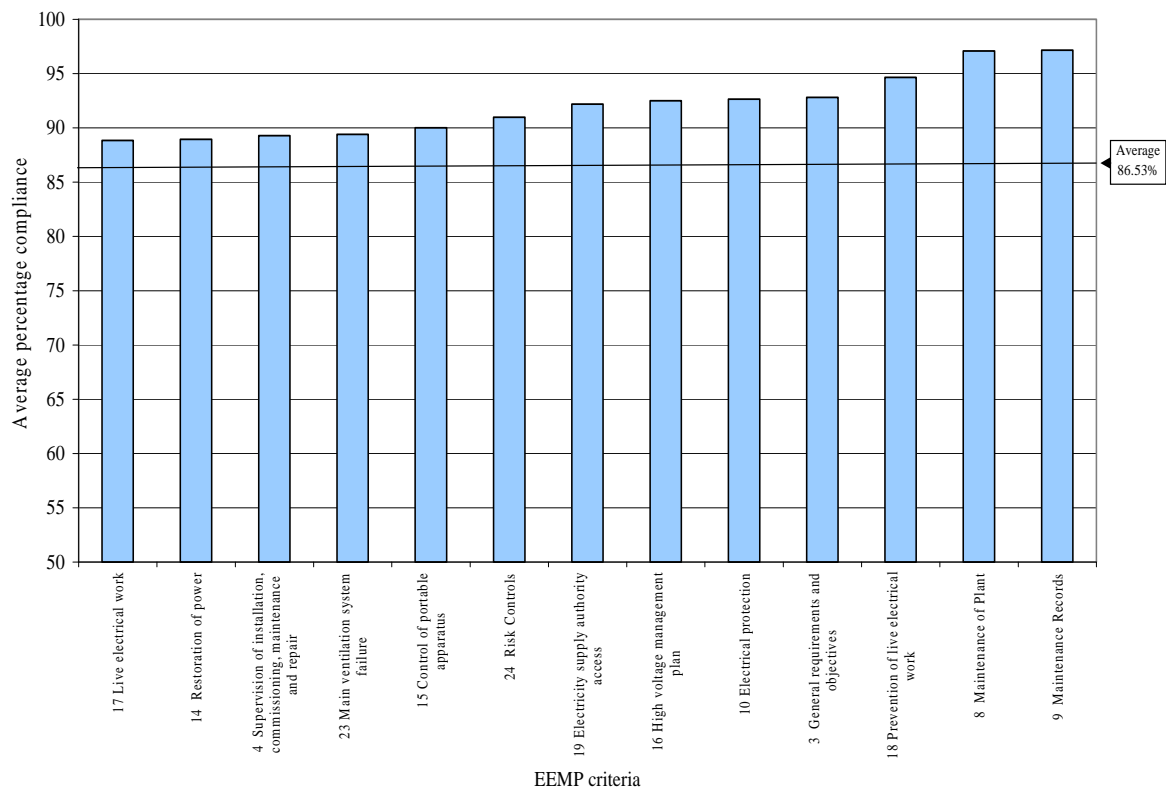
Graph 6.6: Distribution of average compliance scores for EEMP audit criteria across all coal operations



Graph 6.7a: Average percentage compliance with EEMP audit criteria across coal operations



Graph 6.7b: Average percentage compliance with EEMP audit criteria across coal operations



The eight criteria scoring below the average are as follows:

- Criterion 25 (67.47%) – emergency stops (clause 92 OHS Regulation). Most scores were in the 60-75% range across regions and operation types, however, underground mines in the Northern region scored 20% compliance and open cut mines in the South East scored 86.67%.
- Criterion 5 (75.84%) - compliance to wiring rules and AS/NZ3007 (clause 19(1)(b) of CMHS Regulation). The lowest scoring questions within this criterion were in relation to AS/NZS3007 audits (questions 5.5 to 5.7). However, Northern region scored considerably better in these questions (87.8%) than Hunter and South-East regions (76.6% and 69.67% respectively).
- Criterion 2 (77.96%) – significant deviation reporting (sections 64(2) and 67 of CMHS Act). The weakest area within this criterion was the definition of significant deviation by the coal operation (question 2.2), which scored an average of 61.05%. This was the lowest scoring question in this criterion across regions and operation types.
- Criterion 26 (78.71%) – design, registration, supply and working with plant (Chapter 5 of OHS Regulation). Processing operations scored considerably lower in this criterion than open cut or underground operations, averaging just 65.5%, compared to over 80% for the other operation types.
- Criterion 21(81.43%) - procedures related to testing instruments and welding (clause 19(1)(s) of CMHS Regulation). South East Region operations scored the lowest in this

criterion, with an average compliance of 69.86%, compared to over 85% for the other regions. The lowest scoring question (62.37%) in this criterion was about whether a risk assessment had been undertaken for the use of test instruments (clause 208 of the OHS Regulation).

- Criterion 6 (81.76%) - gazetted plant in hazardous areas (clause 19(1)(c) of CMHS Regulation). This criterion generally only applied to underground operations, although some results were recorded for processing operations in relation to reclaim tunnels. For underground operations, the South East region scored the lowest, at 65.33%, compared to 94.12% and 100% for the Hunter and Northern regions respectively.
- Criterion 13 (82.18%) - arrangements to interrupt power supply (clause 19(1)(k) of CMHS Regulation). Overall, South East region scored the lowest (71.16%), with the region average being dragged down by underground operations, which scored 68.45% compared to over 81% for other operation types in the region. Northern scored an average of 78.78% for the criterion, with processing operations in that region scoring 55.44%. Hunter region scored a criterion average of 88.81%.
- Criterion 12 (85.88%) - provision of switchgear (clause 19(1)(j)). Scores across questions, regions and operations types were fairly even in this criterion, except for underground operations in the Northern region, which scored 55% compliance.

Although the percentage compliance for criterion 1 (qualified people) was above average at 88.20%, this score is unexpectedly low considering that it was testing the inclusion of a competent electrical engineer in the management structure, which is a basic administrative requirement under section 37 of the CMHS Act. South East region scored a low of 79.40% compliance for this criterion.

The average for criteria 7 (life cycle management of explosive protected plant, installations and hazardous zone cables) was above average at 88.52%, but the score for question 7.7 within that criterion was 71.52%. Question 7.7 asked whether the EEMP identified how ignition of gas will be prevented by sources of static charge.

Also of note was the results for criterion 3 (general requirements and objectives). The overall average was 92.81% compliance, however, South East region and Hunter region averaged 59.09% and 79.11% respectively for question 3.7 within that criterion. Question 3.7 dealt with review of the EEMP since the OHS Regulation was extended to apply to the mining industry. In contrast, Northern region scored 97.78% compliance for this question.

Regions

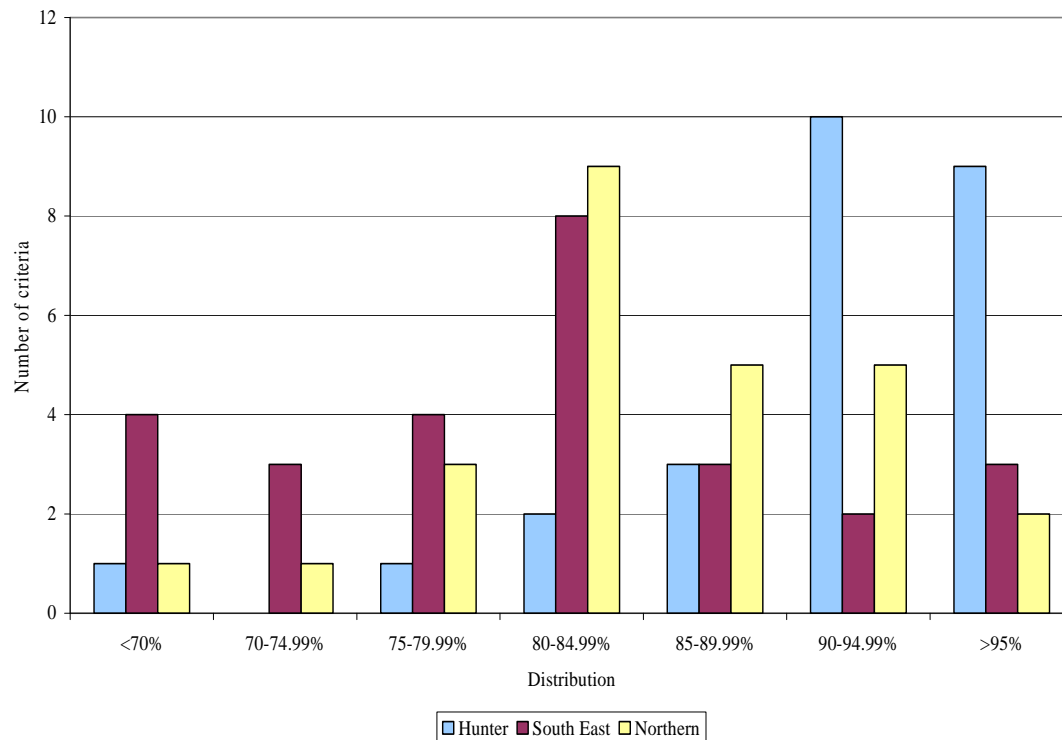
Hunter region operations had a range of 69.77% for criterion 25 (emergency stops) and a high of 99.26% for criterion 18 (prevention of live electrical work), with a median score of 92.89%. The graph of distribution of scores below (Graph 6.8) shows the highest frequency of scores in the 90-94.99% range.

The lowest score for a Northern operations was 58.89% for criterion 25, to a high of 100% for criterion 6 (plant of gazetted types in hazardous areas) and criterion 8 (maintenance of plant), with a median of 82.61%. The highest frequency of scores was in the 80-84.99% range.

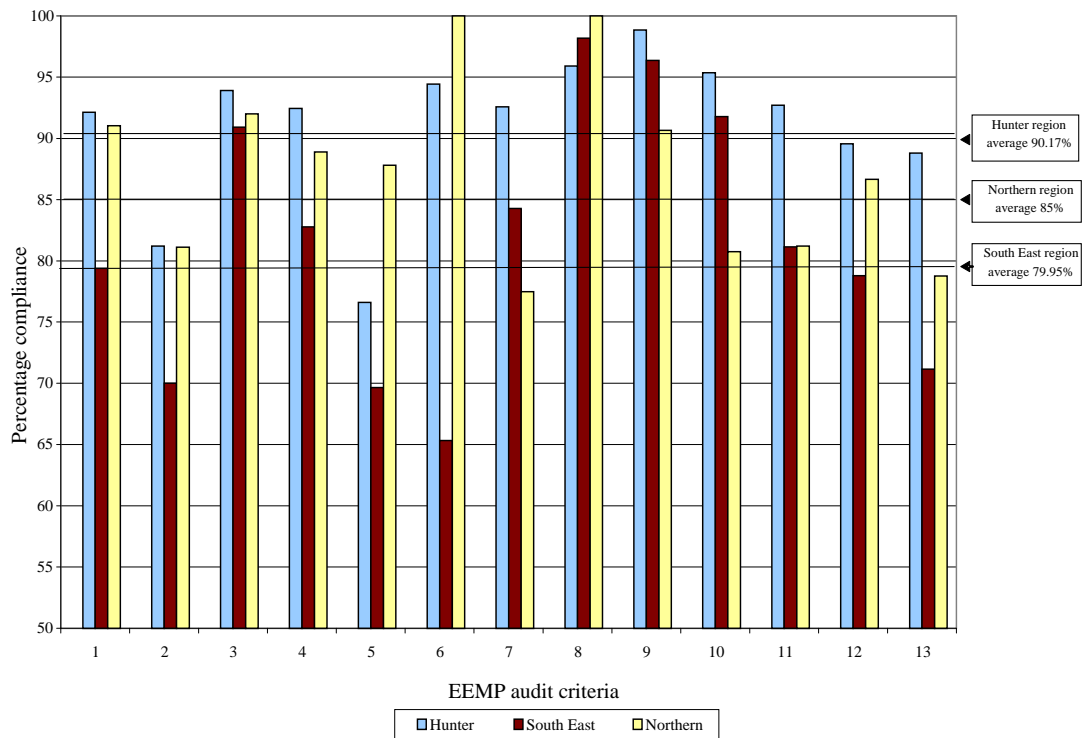
South East region also had the highest frequency of average scores for criteria in the 80-84.99% range. The lowest score in the South East was 65.33% for criterion 6 (plant in hazardous zones) to a high of 98.18% for criterion 8 (maintenance of plans), with a median score of 81.76%.

The range and relative scores for each criterion are shown below in Graphs 6.9a and 6.9b. Hunter had a range of 69.77% for criterion 25 (emergency stops) to 99.26% for criterion 18 (prevention of live electrical work). Northern had a range of 58.89% for criterion 25 to a high of 100% for criterion 6 (plant in hazardous zone) and criterion 8 (maintenance of plant). South East scored a low of 66.36%, also for criterion 25, and a high of 98.18% for criterion 8.

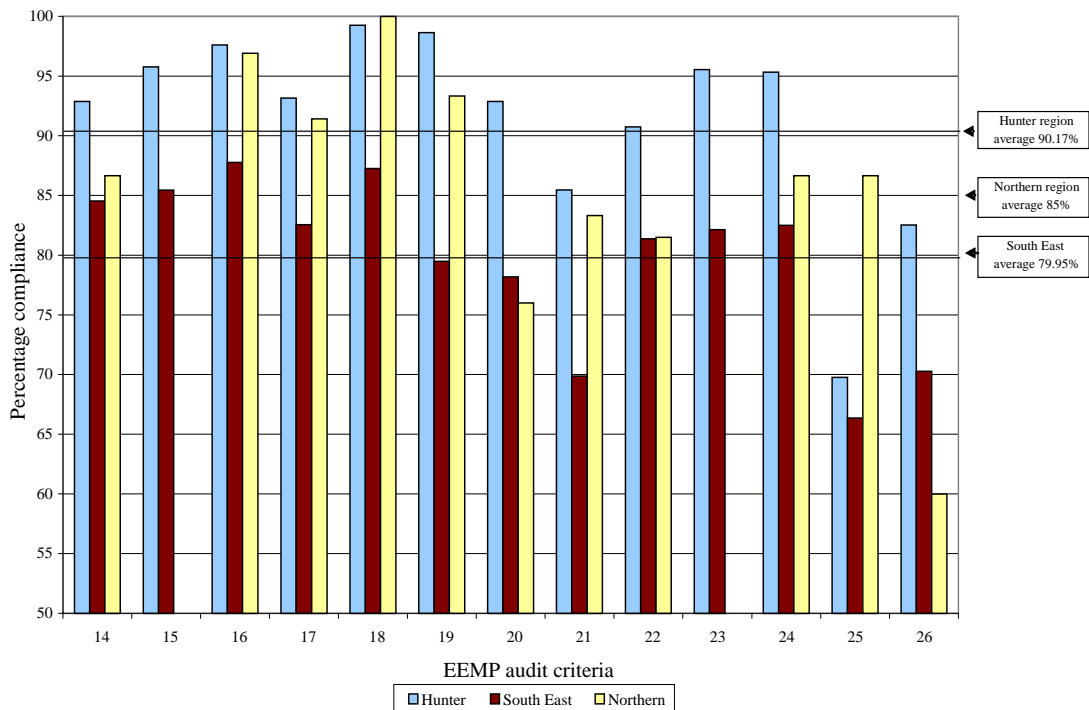
Graph 6.8: Distribution of average compliance scores with EEMP audit criteria by region



Graph 6.9a: Average percentage compliance scores for each criterion in EEMP audit by region.



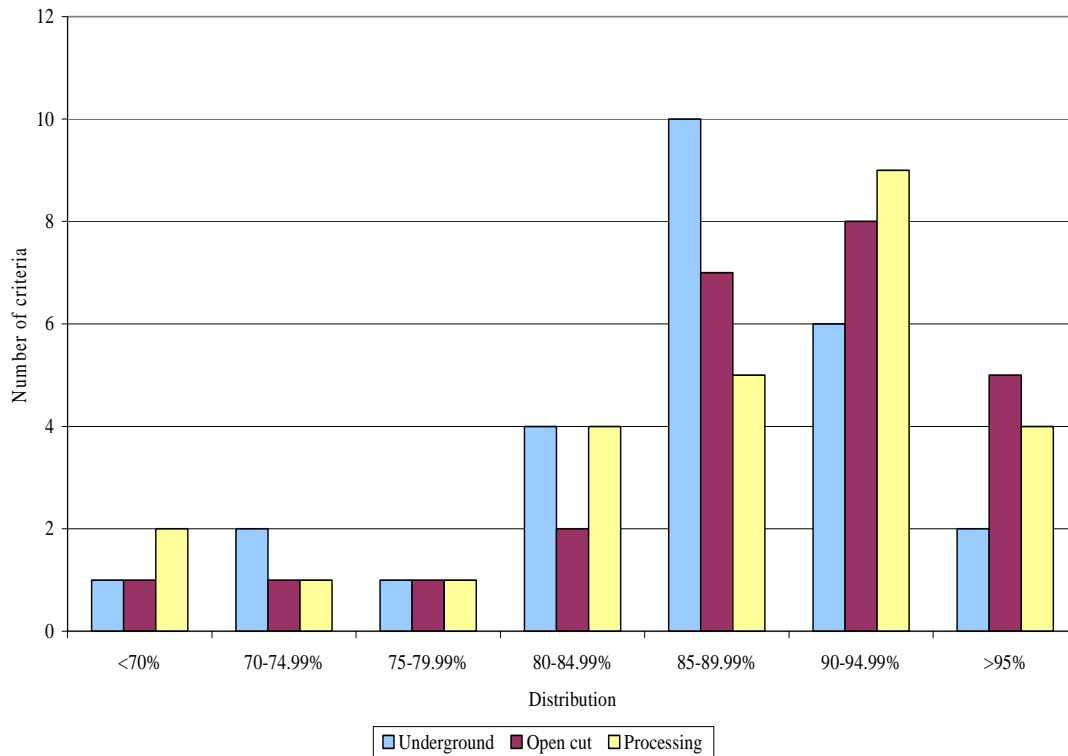
Graph 6.9b: Average percentage compliance scores for each criterion in EEMP audit by region.



Operation types

The distribution graph below (Graph 6.10) show that the highest frequency of scores for underground operations fell in the 85-90% range (median 87.82%), compared to 90-95% for open cut (median 90.84%), and processing (median 88.79%).

Graph 6.10: Distribution of average percentage compliance scores for EEMP criteria by operation type.

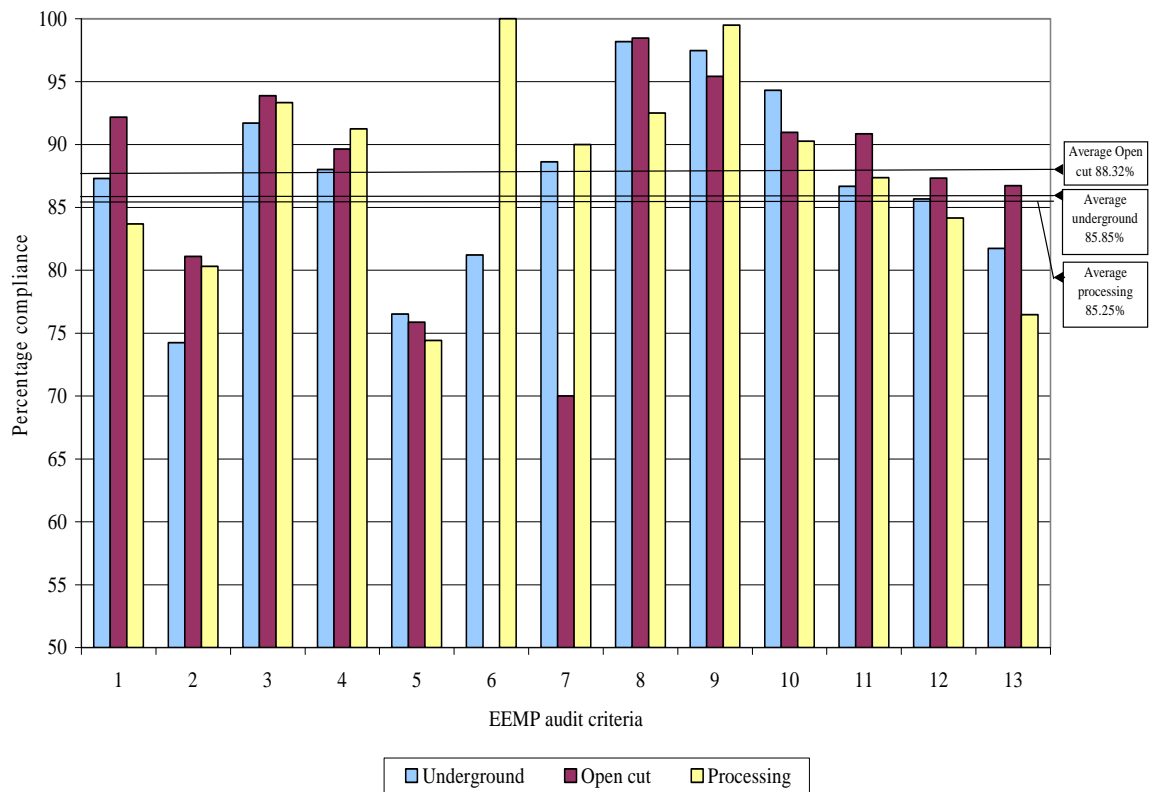


Graphs 6.11a and 6.11b below shows the range and relative score for each criterion by region. Underground operations scored a low of 66.67% for criterion 25 (emergency stops) and a high of 98.18% for criterion 8 (maintenance of plant).

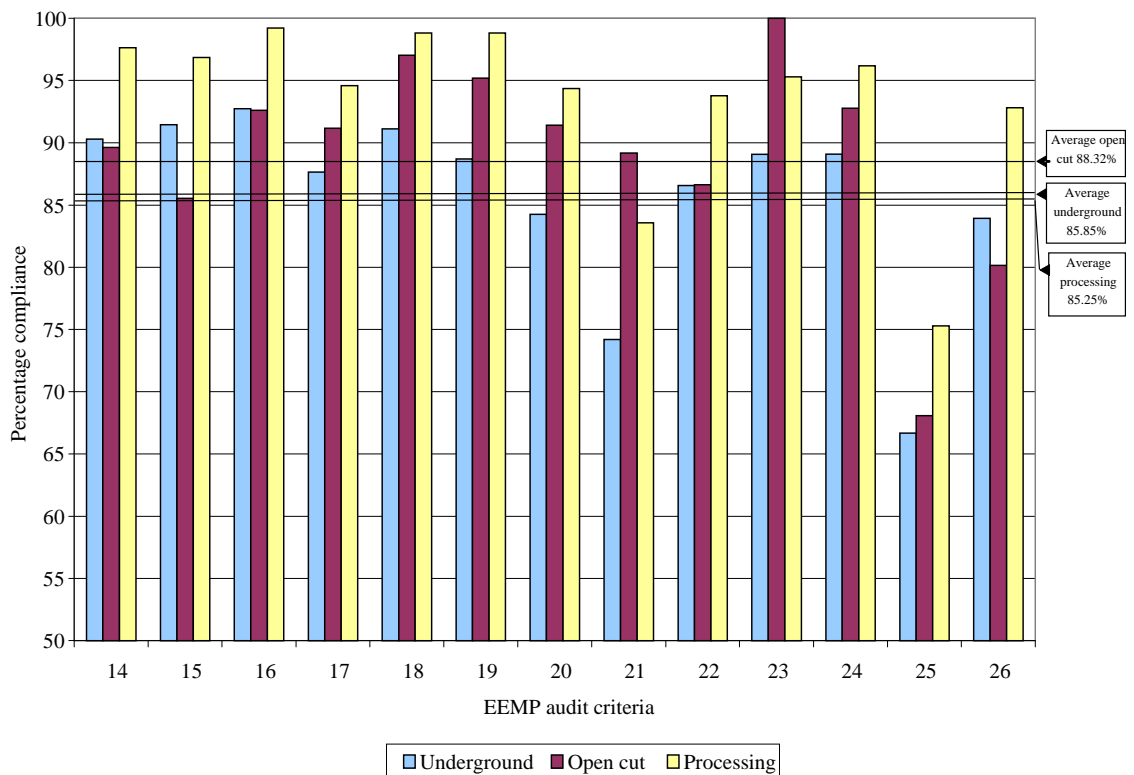
The lowest score for open cut was also for criterion 25, at 68.08%. The highest score for open cut was 100% for main ventilation system failure (criterion 23), which seems to have been assessed for some reclaim tunnels or gas works at these operations. The next highest was 98.46% for criterion 8 (maintenance of plant).

Processing scored a low of 65.50% for criterion 26 (plant) and a high of 100% for main ventilation system failure (criterion 23) and criterion 6 (plant of gazetted type in hazardous zone). These results may need to be analysed further, as both criteria were primarily related to underground operations. It may be that data related to these criteria was included for some processing operations that had reclaim tunnels or where the processing operation was associated with other mining operations (ie) where a mine and processing plant had the same nominated operator. The next highest score for processing operations was 99.50% for criterion 9 (maintenance records).

Graph 6.11a: Average percentage compliance scores for EEMP audit criteria 1 to 13 by operation type.



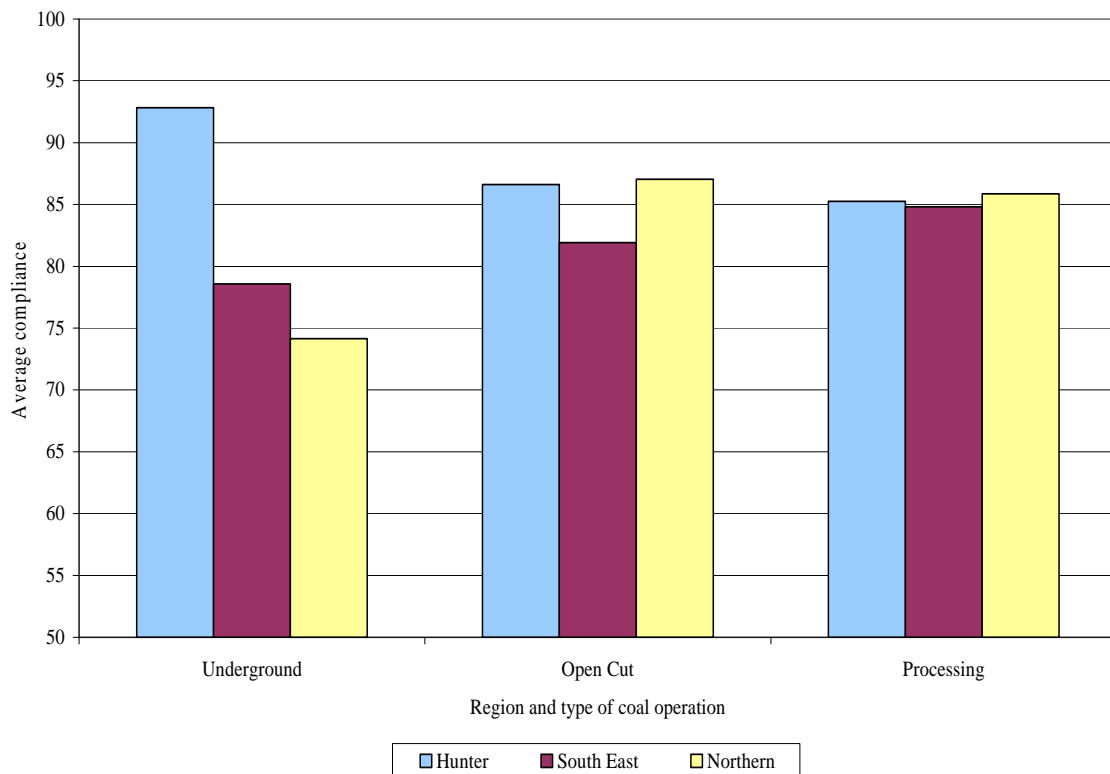
Graph 6.11b: Average percentage compliance scores for EEMP audit criteria 14 to 26 by operation type.



Region and type of operation

Graph 6.12 below shows that processing and open cut operations performed relatively consistently across the regions, but with South East open cut operations not performing quite as well as open cut in other regions. In contrast, underground mines in the Hunter region performed considerably better than those in the other regions.

Graph 6.12: Overall average percentage compliance with EEMP audit criteria across regions by operation type.



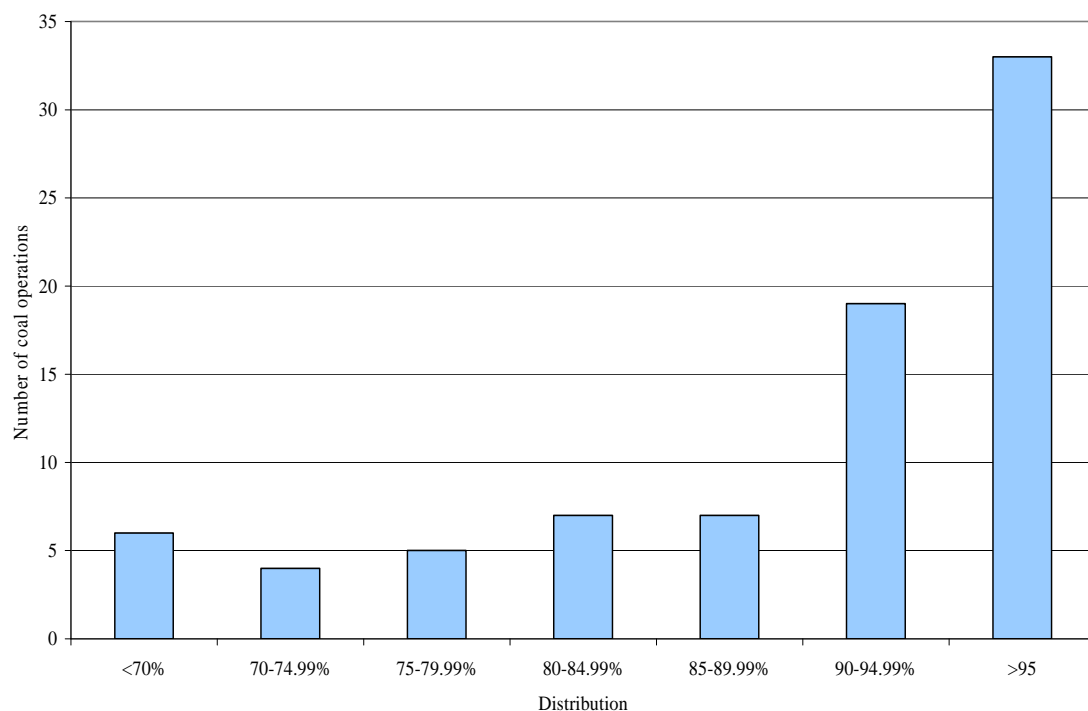
7. Mechanical Engineering Management Plan Audits

7.1 Compliance by coal operation

Overall

The overall percentage compliance across the 81 coal operations included in the audit analysis ranged from 57.88% to 99.79%, with an average of 88.95%. The highest number of operations fell within the over 95% distribution range, as shown in Graph 7.1 below.

Graph 7.1: Distribution of overall percentage compliance scores for MEMP audits across all coal operations

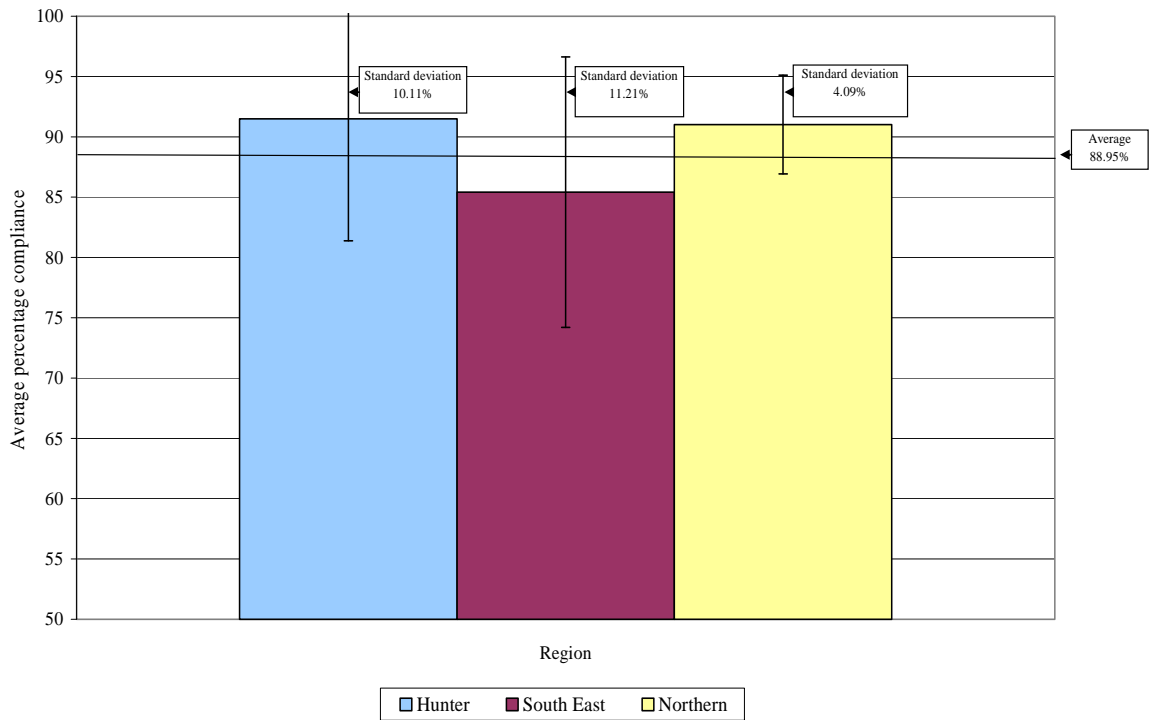


Regions

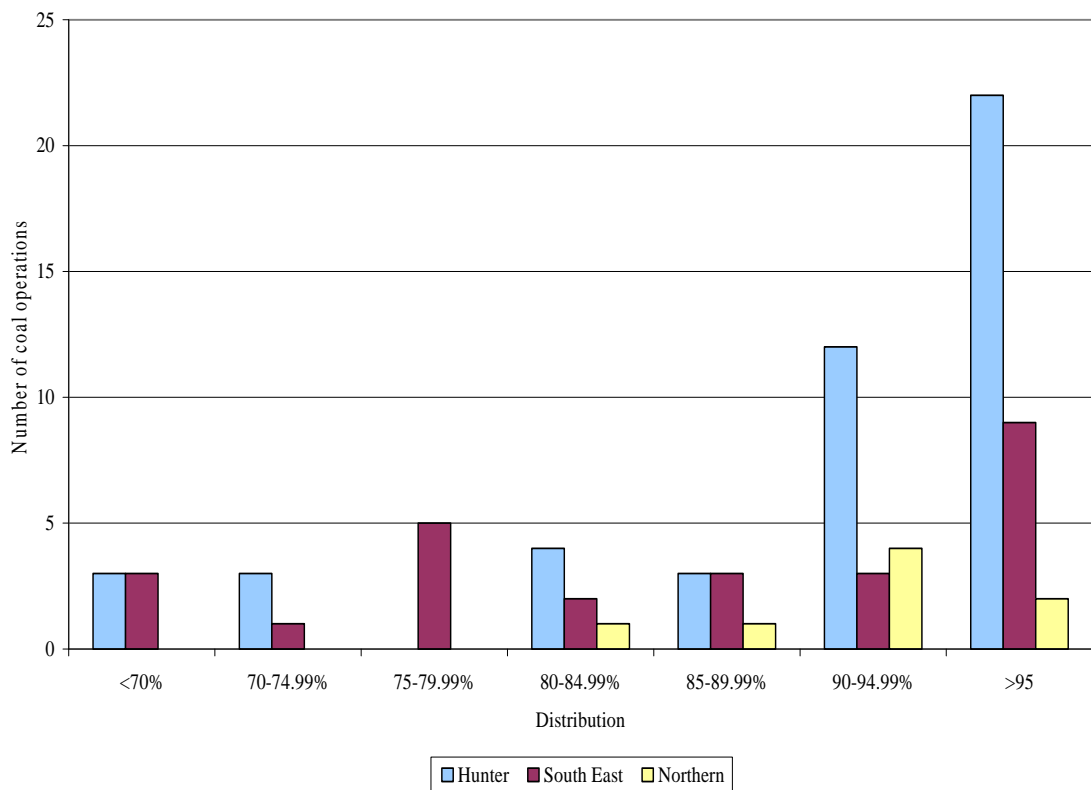
Northern region operations had the highest overall compliance score of 91.05% (standard deviation of 4.09%). This was closely followed by Hunter region operations, which had an overall average of 90.67% (standard deviation 10.11%). South East was less compliant with an average score of 85.30% (standard deviation 11.21%)(Graph 7.2).

The distribution graph (Graph 7.3) below shows that both Hunter and South East regions had the highest frequency of scores in the over 95% distribution range. Hunter region had a median score of 94.89% and South East a median of 86.95%. Northern region had the highest frequency of scores in the 90-94.99% distribution range and a median of 90.58%.

Graph 7.2: Average overall percentage compliance with MEMP audit by region.



Graph 7.3: Distribution of overall percentage compliance with MEMP audit by region.



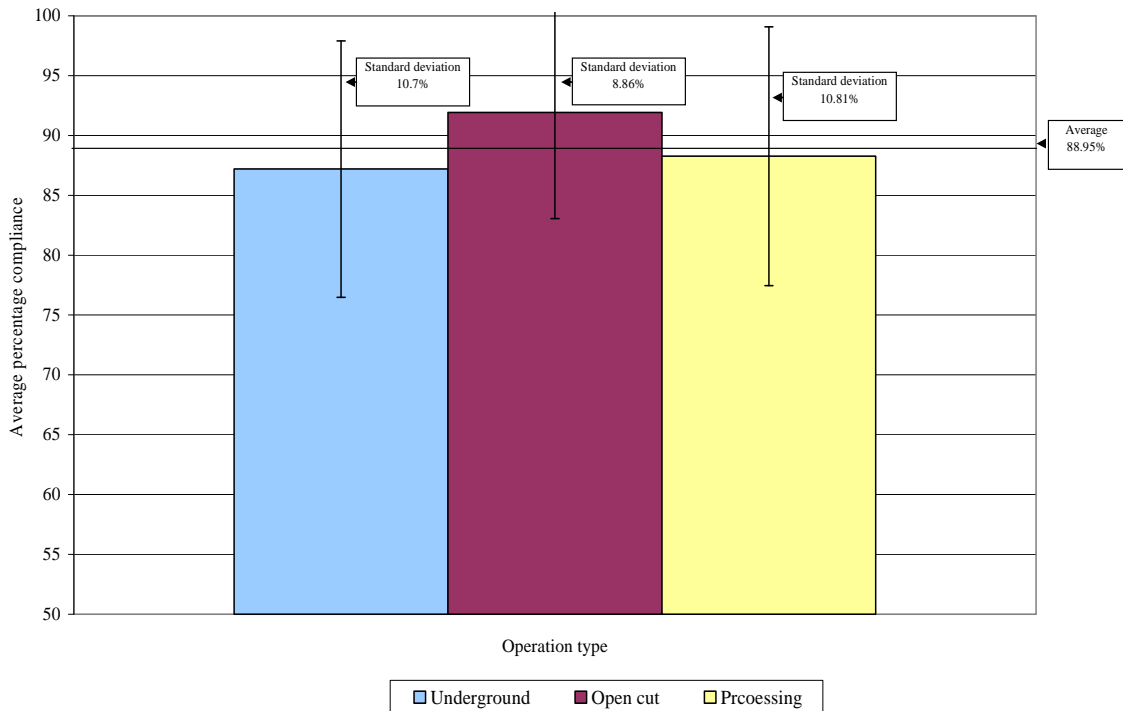
Operation types

Open cut operations achieved the highest overall score by operation type at 91.91% (standard deviation 8.86%)(Graph 7.4). The minimum score was 63.96% and the maximum 99.79%, with a median score of 95.05%. The majority of open cut operations were above 90% compliance, with the highest frequency over 95%, as shown in the distribution graph below (Graph 7.5).

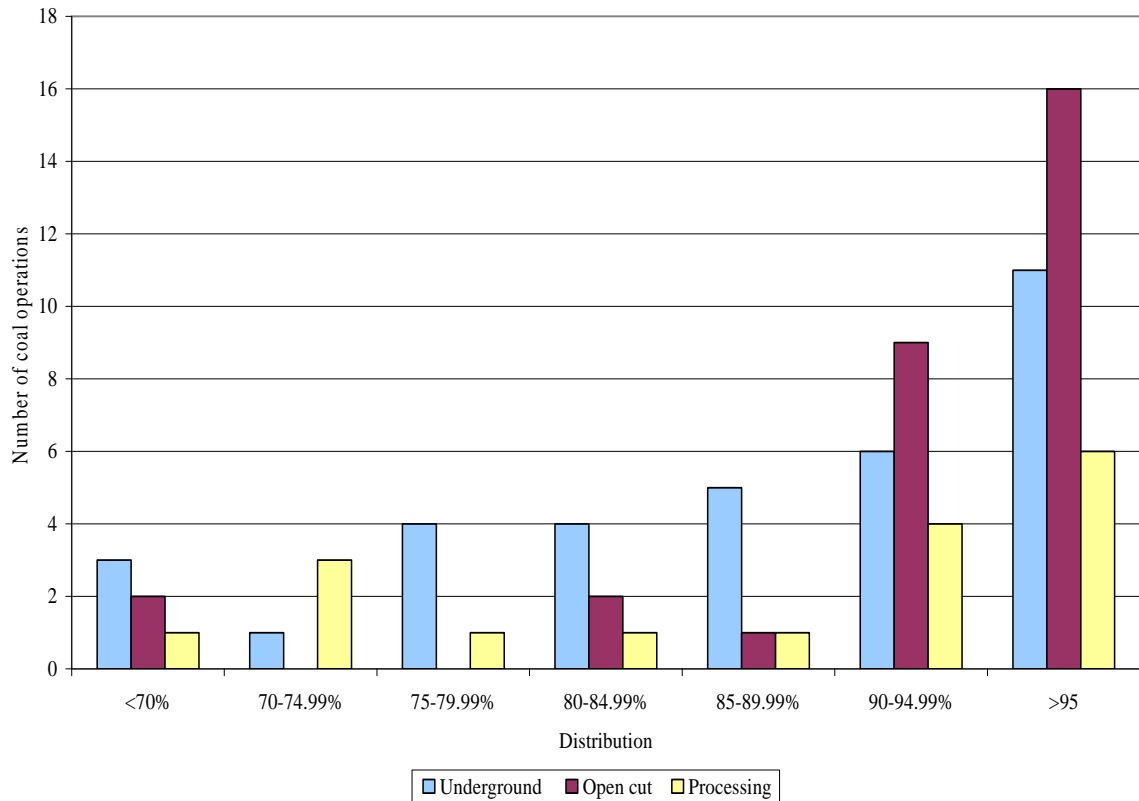
Underground and processing operations achieved similar results. Underground had the lowest average of 87.19%. Underground operations had a minimum overall score of 57.88% and a maximum 99.25%, with a median of 89.66%. Processing operations had an average of 88.27%, with a minimum score of 69.02%, and a high score of 99.29%. The median score was 93.39%.

Underground and processing also had the highest frequency of scores in the over 95% range, but with more even distribution over the other grouped scores.

Graph 7.4: Average overall percentage compliance with MEMP audit by operation type.



Graph 7.5: Distribution of average percentage compliance with MEMP audit by operation type.



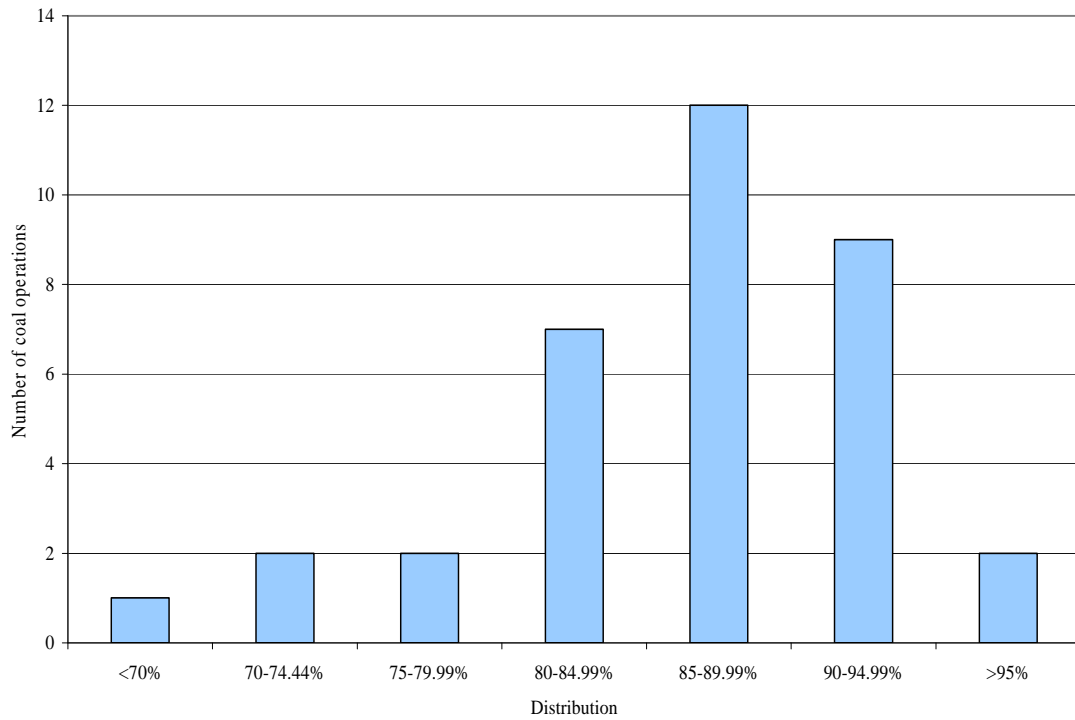
7.2 Compliance by criteria

Overall

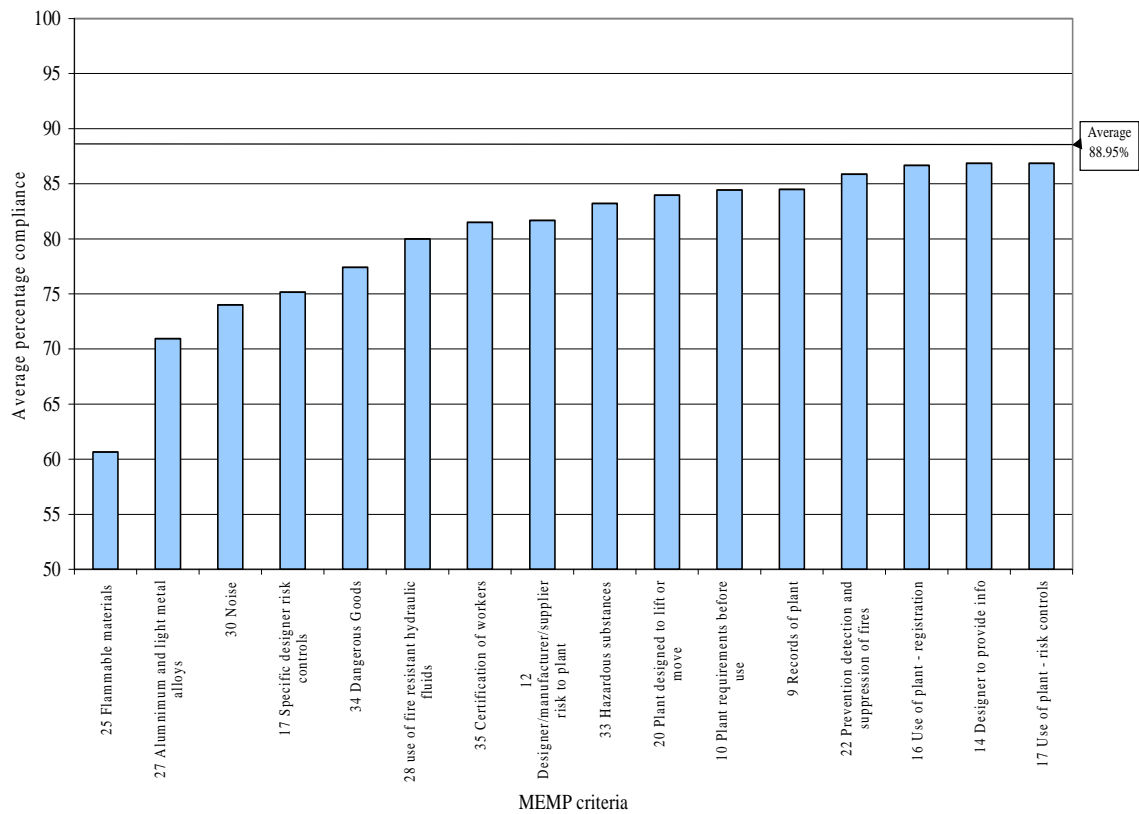
The vast majority of average scores for the 35 MEMP audit criteria were in the 80-95% range, with scores most frequently occurring the 85-89.99% range (Graph 7.6). The median score was 87.18%

As Graphs 7.7a and 7.7b show, the scores ranged from 60.67% for criterion 29 (flammable materials) to a high of 97.07% for criterion 6 (high risk activities). Twenty of the 35 criteria scored below average.

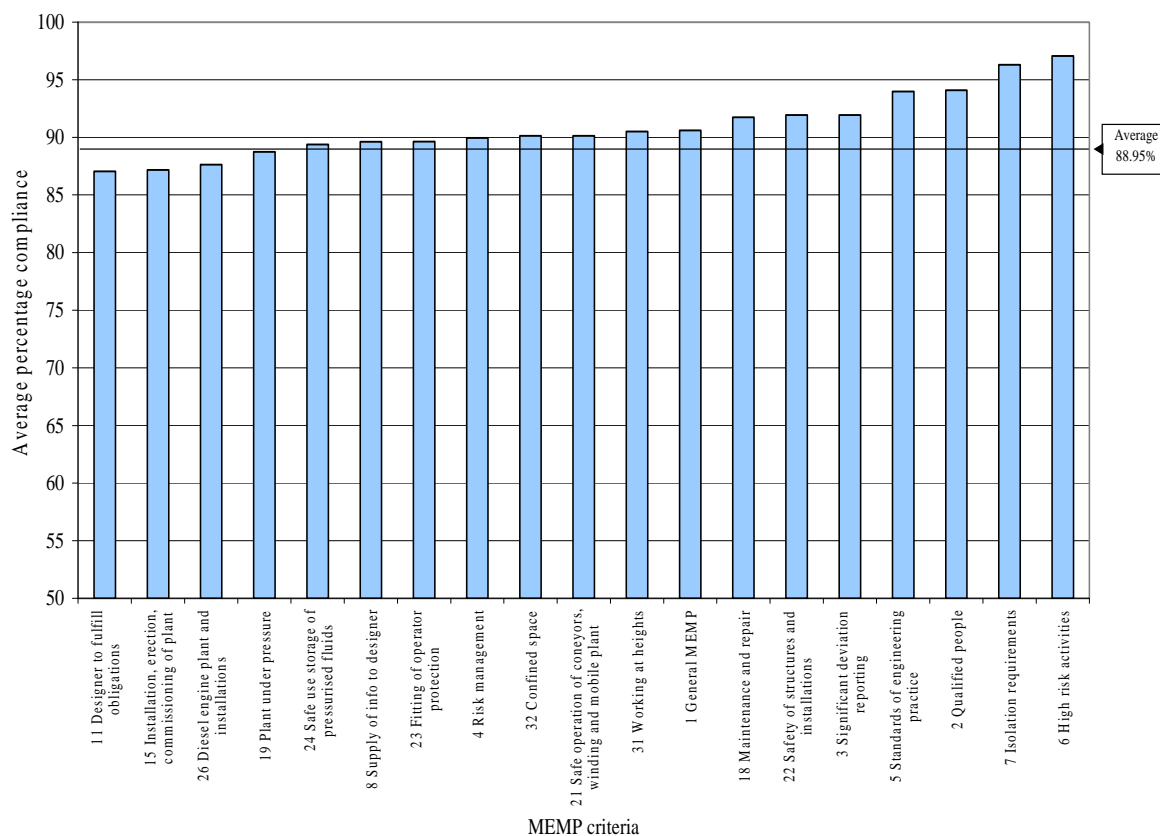
Graph 7.6: Distribution of overall average compliance scores for MEMP audit across coal operations.



Graph 7.7a: Average percentage compliance with MEMP audit criteria across coal operations



Graph 7.7b: Average percentage compliance with MEMP audit criteria across coal operations



The twenty criteria below average were as follows, in ascending order:

- Criterion 29 (60.67%) - Flammable material (CMHS Act). Northern region scored 100% for this criterion. It has to be noted that this score was the result of one audit of an underground operation. Hunter region and South East region scored 57.14% and 61.33% respectively. However, the criterion was aimed at underground operations, but COMET data shows results for processing and open cut operations in the Hunter and open cut in the South East. The average for underground operations across the region was 63.20%.
- Criterion 27 (70.94%) – Aluminium of light metal alloys (CMHS Act). Again, the single audit of an underground operation in Northern region included in this analysis achieved a score of 90%, whereas Hunter and South East region underground mines scored 76.25% and 64% respectively.
- Criterion 30 (74%) – Noise (Chapter 4, Division 4 of OHS Regulation). Hunter and Northern region operations of all types scored reasonably consistently on this criterion, with an average of 76.52% and 82.22% respectively. South East scored the lowest for this criterion at 66.40%, with underground mines performing the worst.
- Criterion 13 (75.17%) - Specific designer risk controls. There was a big discrepancy in scores, with Northern region returning a single result of 100%, which was for processing operations. Hunter region did not return any results for processing operations, but averaged 85.26% for the other operation types. South East scored 65.96%.

- Criterion 34 (77.43%) – Dangerous goods (Chapter 6A of the OHS Regulation). South East scored highest for this criterion at 83.64%, Open cut and processing operations in the Northern region performed the worst at 60% each, with the Northern region underground operation scoring 100%. Hunter region operations scored an average of 76.50%, with processing operations in that region performing the best at 86.67%.
- Criterion 28 (80%) – Fire resistant hydraulic fluids (CMHS Act). Again, Northern region returned one result of 100% the underground operation. Hunter and South East averaged 84.71% and 73.75% respectively.
- Criterion 35 (81.5%) - Certification of workers (Chapter 9 of OHS Regulation). This requirement for certification for high risk work was applied to the mining industry from September 2009. The underground operation in Northern region scored 100%, with the region achieving an average of 88.89% overall. Hunter and South East regions achieved an average of 79.57% and 82.4% respectively.
- Criterion 12 (81.67%) – Designer/ manufacturer/supplier to assess OHS risks (OHS Regulation). Again there was a big range in scores between regions, with Northern region scoring 100%, and South East scoring 63.48%. Hunter region scored well above the average with 97.5% compliance.
- Criterion 33 (83.21%) – Hazardous substances (Chapter 6 of the OHS Regulation). The underground operation in Northern region scored 100%, but the overall average for Northern across all operations was 68.89%. Open cut operations in the South East region also scored 100%, with an average for South East of 93.60%. Hunter region mines scored an average of 80.43%.
- Criterion 20 (83.98%) – Plant designed to move or lift (clause 142 of the OHS Regulation). Scores ranged from a high of 95% for processing operations in the South East to a low of 66.67% for processing operations in the Northern region. Hunter scored the highest of the regions, with an average of 87.21%, followed by South East at 82.53% and Northern at 71.85%.
- Criterion 10 (84.44%) – Plant requirements before use (CMHS Regulation and Gazette). Underground operations in the South East scored the lowest at 66.88%, with South East averaging 76.80% for this criterion. Northern region scored the highest at 92.22%. Hunter region scored 87.02%, with that average dragged down by a score of 70% for processing operations in that region.
- Criterion 9 (84.5%) – Records of plant (CMHS Regulation). Northern region scored 100% across all operation types, with Hunter and South East region scoring 82.61% and 82.40% respectively. Hunter region processing scored the lowest at 62.22%. Hunter and South East underground operations scored 77.65% and 77.50% respectively.
- Criterion 25 (85.87%) – Prevention, detection and suppression of fires (CMHS Act and Regulation). Scores for this criterion were fairly consistent across regions and operation types, with Northern region averaging 92.96%, Hunter region averaging 85.66% and South East averaging 83.67%. The lowest scoring questions in this criterion tended to be related to use of FRAS belts, detection and suppression of fires on conveyor belts (questions 25.2.2 to 25.2.4).
- Criterion 16 (86.67%) – Registration requirements of plant (Clause 136 of the OHS Regulation). The overall average for this criterion was dragged down by the score of

75.67 % for underground operations in the South East region. Northern region and Hunter region averaged 90.08% and 95.56% respectively. South East scored an overall average for this criterion of 78.95%. Average scores for questions within this criterion were fairly consistent.

- Criterion 17 (86.86%) – Particular risk controls for using plant (clause 135A of the OHS Regulation). Again, the overall average for this criterion was dragged down by the score for underground operations in the South East region, which was 74.73%, as well as processing operations in the Hunter region, which scored 74.62%. Northern region and Hunter region averaged 94.53% and 88.77% respectively. South East scored the lowest average by region for this criterion of 80.38%. For lowest score for questions within this criterion was for 17.1.11 relating to guarding of hot and cold parts of plant. Question 17.1.4 relating to use of safety features and warning devices was second lowest at 82.47%.
- Criterion 14 (86.85%) – Designer to provide OHS information (clause 96 of OHS Regulation). The regions and operation types scored reasonably consistently for this criterion, with Hunter region scoring an average of 89.27%, South East an average of 84.17% and Northern scoring an average of 82.5%. The lowest score within this criterion was 80% for processing operations in the Northern region, and the highest 95% for processing operations in the South East.
- Criterion 11 (87.05%) – Designers OHS obligations (clauses 84 to 119A of OHS Regulation). Hunter region mines scored consistently in this criterion, with an average score of 93.87%. Northern region scored an average of 81.82%, with processing operations in that region scoring a low of 75%. Underground operations in the South East scored the lowest over all, at 70.91%, with South East operations averaging 75.63% for this criterion. There was a large difference in the average score for the question within this criterion. Question 11.3 related to the whether the MEMP provided for plant to be imported into NSW scored an average of 79.41%, mainly due to the score of 52.5% for South East region operations. Question 11.1 (MEMP provide for design on site) scored 88.57% and question 11.2 (MEMP provide for alterations of plant to be carried out) scored 91.60%.
- Criterion 15 (87.18%) – Installation, erection and commissioning of plant (clause 135 of OHS Regulation). Again, the overall average for this criterion was dragged down by the score for underground operations in the South East region, which was 72.50%. Northern region and Hunter region averaged 100% and 89.55% respectively. South East scored an overall average for this criterion of 78.40%.
- Criterion 26 (87.63%) – Control of diesel-engine plant and installations (CMHS Act). Hunter achieved the highest average of 92.56%, but did not return any results for processing operations. Northern and South East regions had a large range of scores. Northern scored the lowest at 74.29%, with open cut operations in this region scoring 24%. Processing operations in the South East scored 30%, with a regional average of 83.47%. These results may need further analysis to check their accuracy. Question 26.8, dealing with the MEMP providing for a system minimising exposure of people to diesel particulate matter, scored way below the criterion average at 67.91%. Northern region open cut operations scored only 24% for this question, resulting in an average of 33.33% for this question for Northern region coal operations.
- Criterion 19 (88.75%) – Plant under pressure (clause 140 of the OHS Regulation). Underground operations in the South East scored the lowest at 78.67%, bringing down the average for South East to 82.50%. Hunter and Northern region scored 90.64% and

95.56% respectively, with both open cut and underground operation types in the Northern region scoring 100%.

Criterion 1 scored over the average at 90.62%, however, question 1.9.8 scored well below that average at 61.39%. Question 1.9.8 tested whether a risk assessment has been carried out to provide safeguards with a probability of failure appropriate to the degree of risk posed by mechanical plant and installations. Northern region operations averaged just 35% for this criterion, South East 54.29% and Hunter region 66.81%.

Question 1.9.3 also scored well below the criterion average at 79.25%. Question 1.9.3 deals with whether a risk assessment has been carried out to prevent catastrophic failure of mechanical plant or installations. Open cut operations in the Northern region scored only 48% on this question, with Northern region operations averaging 57.78%.

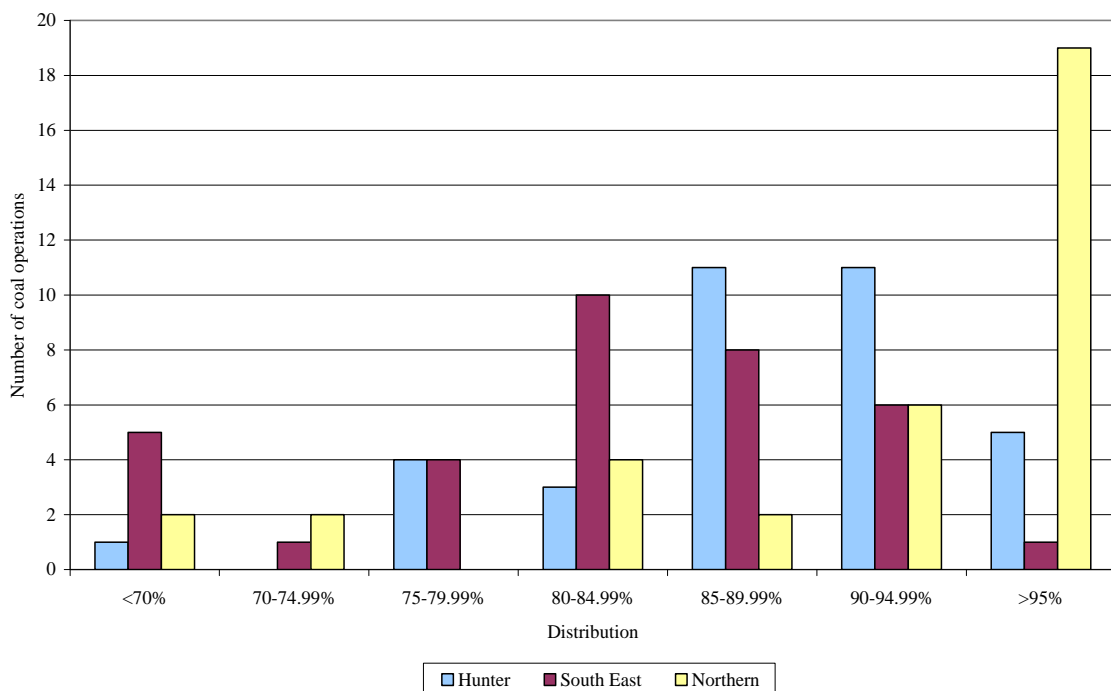
Regions

Compliance scores for MEMP criteria for Northern region operations most frequently fell in the over 95% distribution range (Graph 7.8). The range was from 65% for criterion 34 (dangerous goods) to 100% for criterion 7 (isolation requirements), criterion 12 (designer/ manufacturer /supplier to assess and control risks), criterion 13 (specific designer risk controls), criterion 15 (installation, erection, commissioning of plant), criterion 28 (use of fire resistant hydraulic fluid) and criteria 29 (flammable materials)(Graphs 7.9a and 7.9b). The median score was 95.55%.

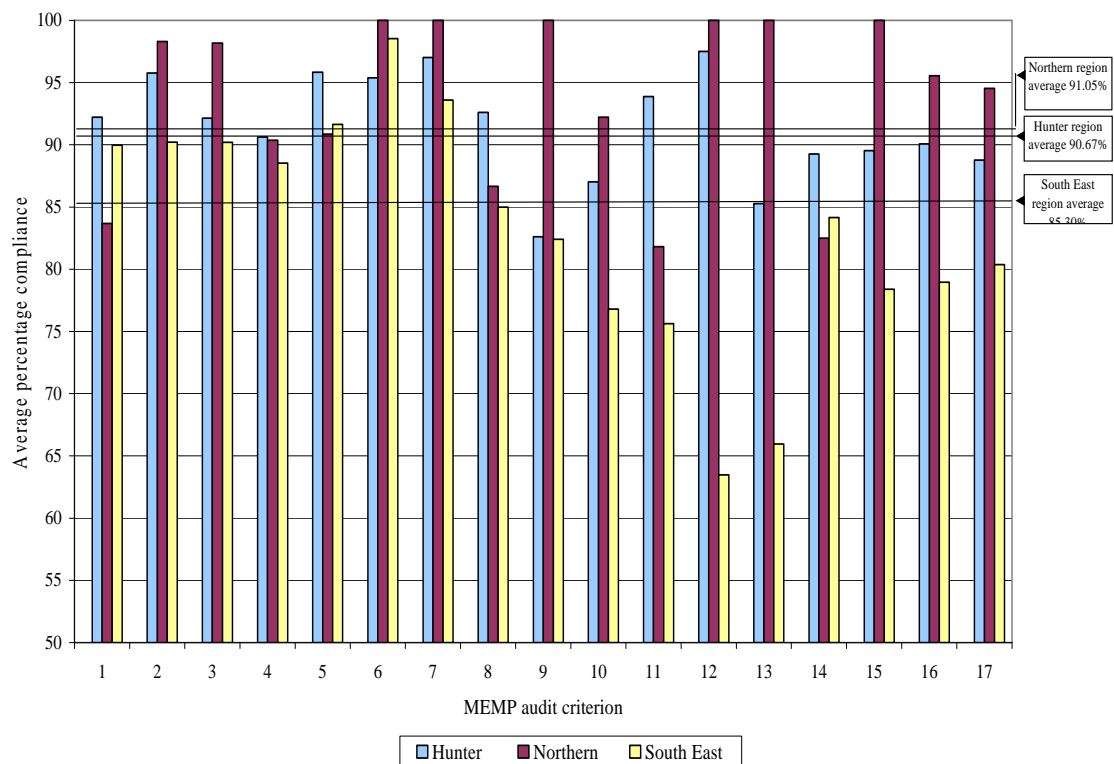
Scores in the Hunter region most commonly fell in the 85-89.99% and 90-94.99% distribution range. Scores ranged from 57.14% for criterion 29 (flammable materials) to 97.5% for criterion 12 (designer/manufacturer/supplier to identify hazards). The median score was 89.55%.

South East operations scores were most frequently in the 80-84.99% distribution range. The range of criteria averages in the South East was from 61.33% (criterion 29) to 98.54%. The median was 83.64%.

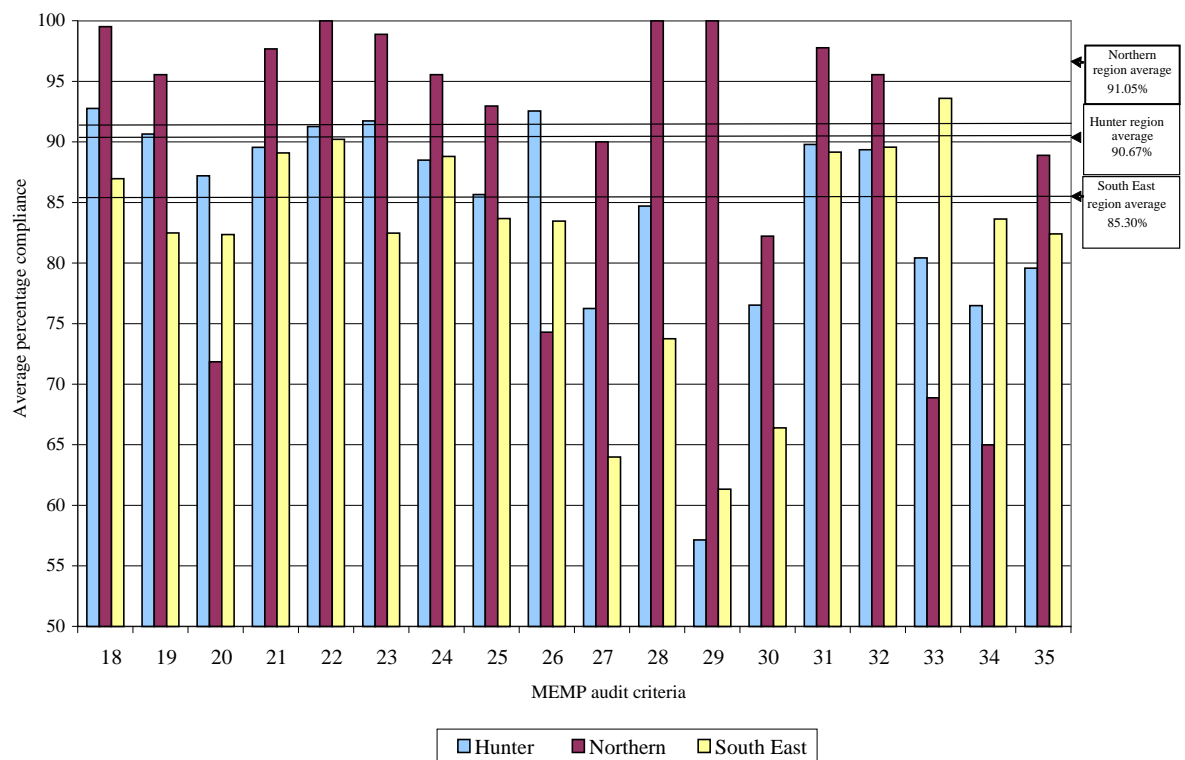
Graph 7.8: Distribution of average compliance scores with MEMP criteria by region



Graph 7.9a: Average percentage compliance with MEMP audit criteria 1 to 17 by region.



Graph 7.9b: Percentage compliance with MEMP audit criteria 18 to 35 by region.

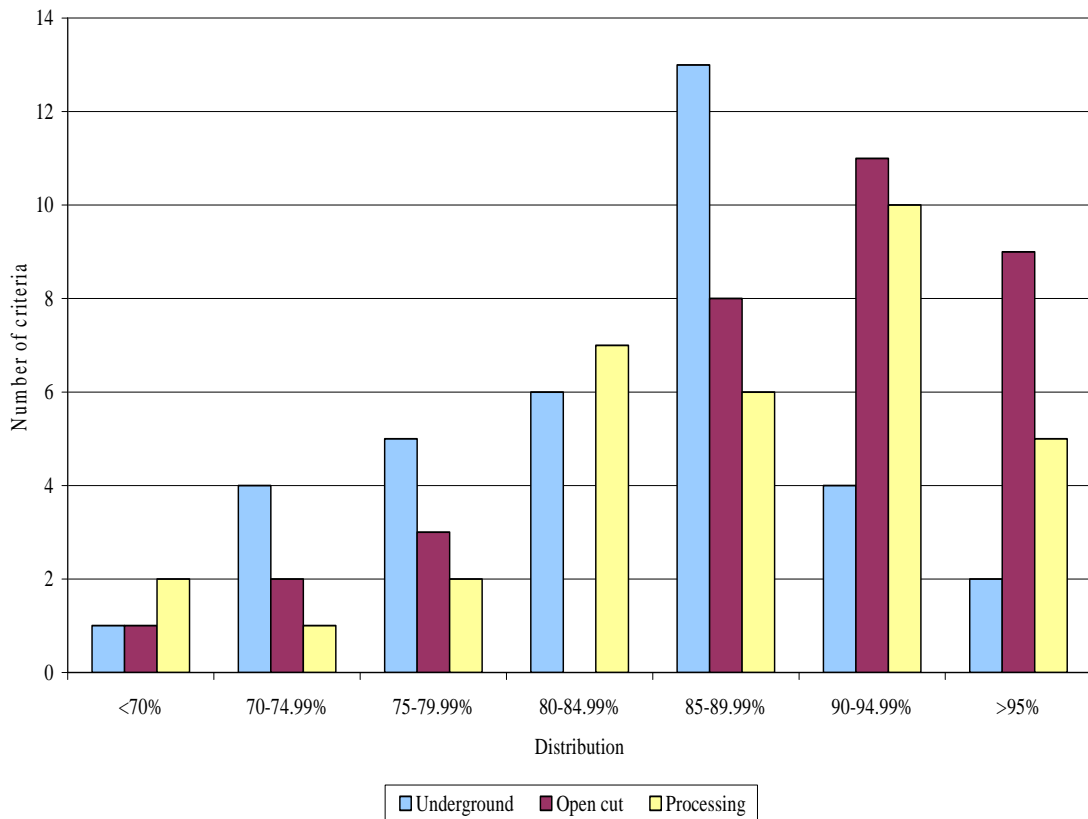


Operation types

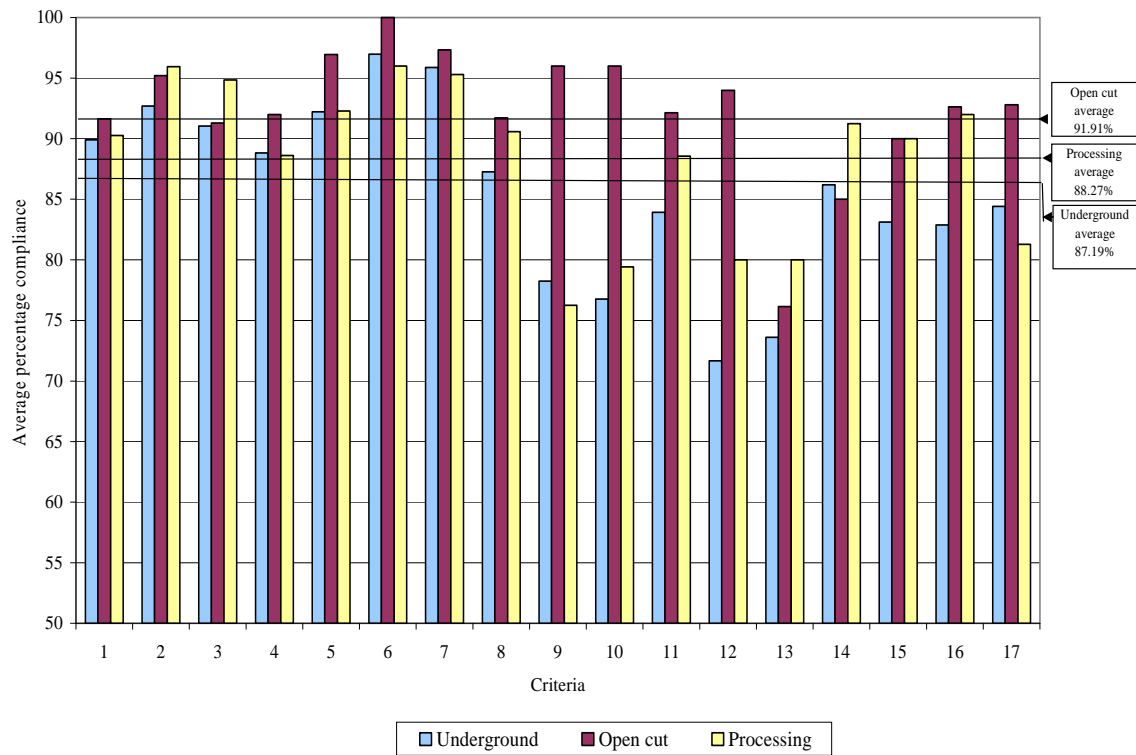
The highest frequency of scores for underground operations was in the 85-89.99% range (Graph 7.10), with a median of 86.21%. Open cut operations had a more even distribution over the 85-95% range, with the highest frequency in the 90-94.99% range. Processing operations had a fairly even distribution in the 80% to above 95% range, with the highest frequency also in the 90-94.99% range.

Graphs 7.9a and 7.9b show the range and relative scores for the MEMP audit criteria by operation type. Underground operations scored a range of 71.67% (criterion 12 – designers/manufacturers/suppliers to identify, assess and control risks) to a high of 96.97% for criterion 6 (high risk activities). Open cut scored a high of 100% for high risk activities and a low of 73.33% for criterion 34 (dangerous goods). Processing operations scored a low of 76.25% for criterion 9 (records of plant) and a high of 96% for criterion 6 (high risk activities).

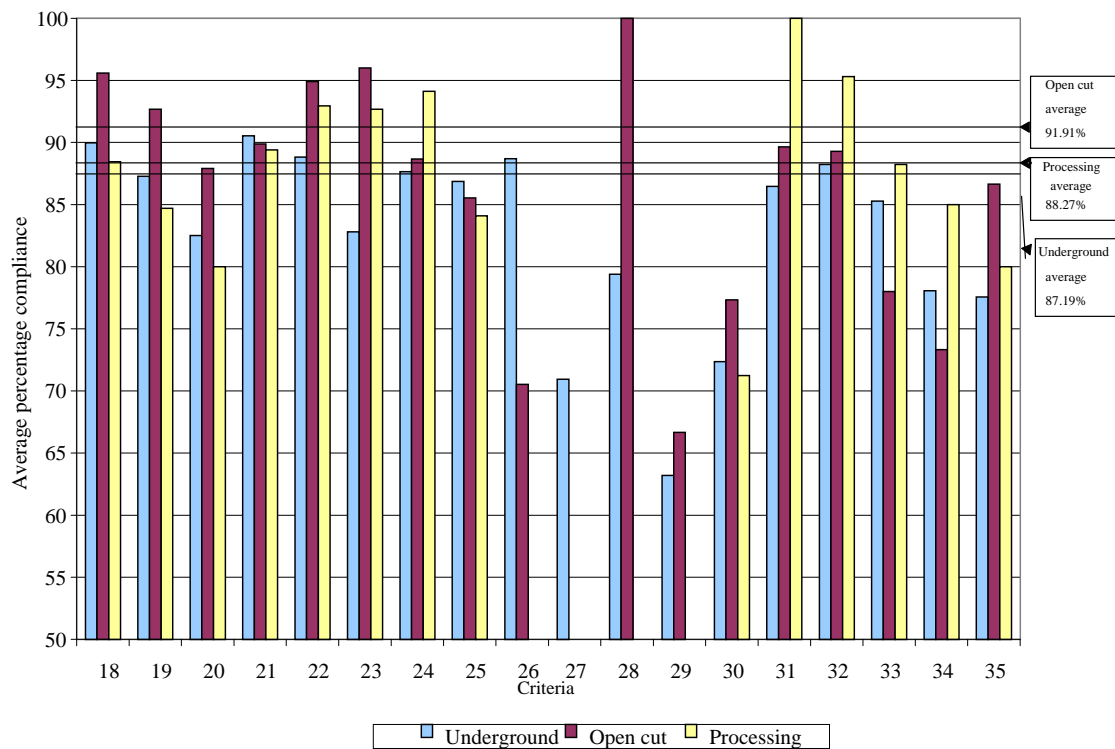
Graph 7.10: Distribution of average percentage compliance scores for MEMP criteria by operation type.



Graph 7.11a: Average percentage compliance with MEMP audit criteria 1 to 17 by operation type.



Graph 7.11b: Average percentage compliance with MEMP audit criteria 18 to 35 by operation type.

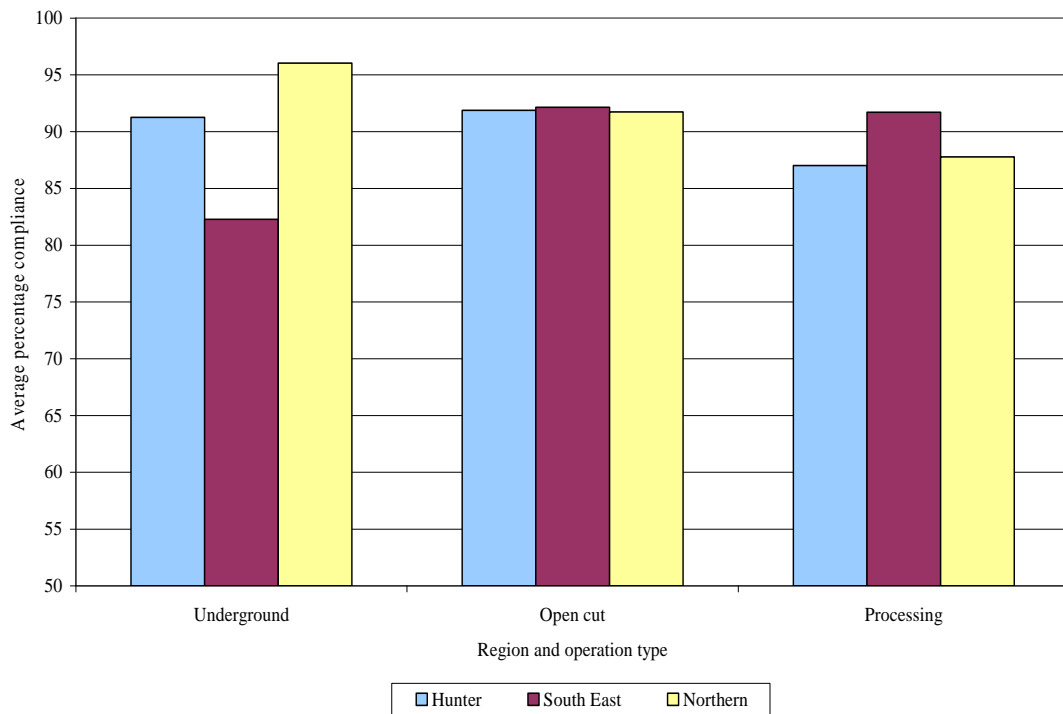


Region and type of operation

Graph 7.12 shows that open cut operations performed consistently across regions. Underground operations performed best in the Northern region, however, only one underground operation in this region was included in the analysis. Hunter region underground operations were more compliant than those in the South East.

Processing operations performed relatively consistently in the Northern and Hunter regions, but performed best in the South East.

Graph 7.12: Overall average percentage compliance with MEMP audit criteria across regions by operation.



8. Comparison of audit types

Table 8 below summarises the results across all audits. It is difficult to make direct comparison between the audit types, however, it is worth noting that the HSMS and CMP criteria achieved higher overall compliance scores than the MEMP and EEMP audits. This may be because the HSMS and CMP deal with risk management and OHS systems more broadly, whereas the MEMP and EEMP require much greater technical detail and knowledge of the legislation.

The results may indicate that coal operations have a good understanding of the general OHS risk management, but some are yet to achieve a comprehensive knowledge of the more detailed legislative requirements or how these should be reflected in their systems. However, considerably fewer operations were included in the HSMS and CMP audit analysis, which may also have affected overall results. Further analysis of data is required once more HSMS and CMP audits are entered into COMET.

Table 8: Summary of coal mine safety audit results across audit types.

Average Percentage Compliance	HSMS audit	CMP audit	EEMP audit	MEMP audit
Overall	95.65	95.03	86.53	88.95
Region				
- Hunter	96.49	97.16	90.17	90.67
- South East	94.43	90.91	79.95	85.30
- Northern	95.86	98.13	85.00	91.05
Operation type				
- Underground	95.15	92.44	85.85	87.19
- Open cut	96.49	96.57	88.32	91.91
- Processing	95.03	97.67	85.25	88.27

9. Conclusion

The audit program objectives have been achieved.

The audit results identified individual mines and areas within the various safety management systems where Departmental resources could be channelled to increase industry understanding of risk management and compliance with statutory requirements.

The level of overall compliance across regions and operation types was excellent for HSMS and CMPs. Compliance with EEMP and MEMP requirements was also good, but lower overall than HSMS and CMPs. As already discussed, this may be the result of some operations not fully understanding or integrating the more detailed and technical requirements of the EEMP and MEMP into their safety systems. There are some areas, particularly in the EEMP and MEMP, on which industry and the Department need to work to achieve improved compliance with the legislative requirements.

Generally, operations in the South East region did not perform quite as well as Hunter and Northern region operations. This could be because the operations in the South East, particularly underground mines, tend to have been operating for a longer time than those in the other regions. Further analysis of the results to assess whether there is a broader trend for length of operation to effect compliance rate may be useful. Mines that have been operating for a longer time may need more assistance in adjusting to the new legislation.

Open cut operations also tended to perform better than underground operations. Again, this may be because there are more regulatory requirements for underground operations and these tend to be more detailed and technical in nature.

The audits also identified mines that are achieving high compliance, which is useful for MSO inspectors and mine safety officers to continually assess and determine industry best practice and assist low scoring mines to implement better systems.

The audit program assisted the coal mining industry to understand the statutory requirements and areas for improvement in implementation of risk management principles. Coal operations undertaking the audits had to make a comprehensive assessment of their own safety management systems and identify areas where further work was required. MSO inspectors and mine safety officers provided immediate feedback during the audits, and will continue to provide feedback assistance where needed.

The data gathered through these audits provides important baseline information. This information can be used now to assist in identifying practices and operations where enforcement actions or advice may be required to improve legislative compliance, and also for comparison with future audits.