Chest X-ray screening for the Coal Mine Workers’ Health Scheme

Refined proposal from stakeholder feedback

Position paper

March 2017
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1. Purpose

The purpose of this paper is to outline the Department of Natural Resources and Mines’ (DNRM) refined proposal for a new Queensland-based chest X-ray screening program for the Coal Mine Workers’ Health Scheme (the ‘scheme’).

Feedback from stakeholders and the Coal Mining Safety and Health Advisory Committee (CMSHAC) will be used to assist DNRM finalise a model for consideration by the Queensland Government in its ongoing response to coal workers’ pneumoconiosis (CWP).

2. Summary

In October 2016, the department released the Chest X-ray screening for the Coal Mine Workers’ Health Scheme – next steps in planning reform consultation paper. The paper proposed a new Queensland X-ray screening program to be delivered by the private sector with X-rays dual read to the International Labour Organization International Classification of Radiographs of Pneumoconioses (ILO Classification) by radiologists who have completed an ILO training program.

DNRM received 19 submissions that were generally supportive of the proposal. The main concern raised by stakeholders was the proposed use of a single provider to take and read all X-rays under the scheme. DNRM has revised its proposal based on this feedback and is seeking final stakeholder views.

To maintain regional access to imaging services and to mitigate concerns around engaging a single provider for the entire program – this proposal is refined to engage a provider for the dual-reading component only. This is considered vital to ensure a high quality of reading.

The imaging component will be addressed separately. To ensure quality imaging services are cost efficient, sustainable, reliable and accessible to where workers live and work, a registration process will be established for facilities seeking to take chest X-rays for the scheme.

These refinements closely align with the framework used by the US Department of Health and Human Services Coal Workers’ Health Surveillance Program administered by the National Institute of Occupational Safety and Health (NIOSH). Under this program NIOSH manage a panel of trained X-ray readers and facilities are approved for taking X-rays.
3. Consultation paper proposals

The consultation paper proposed features and a delivery model for a new chest X-ray screening program in Queensland. Guided by the independent Monash University review recommendations and comparison to other screening systems (BreastScreen Queensland, Coal Services New South Wales (NSW) and the NIOSH Coal Workers’ Health Surveillance Program in the United States), the paper proposed:

- Private sector provider selected through a tender to service standards and requirements set by government to take and read all images under the scheme.
- X-rays read by qualified radiologists who have successfully completed a training program in the use of the ILO Classification.
- X-ray screening conducted in accordance with the NIOSH technical guidelines.
- X-rays read to the ILO Classification.
- All X-rays dual read with an option for a third adjudication if necessary.
- System to support both current and retired workers.
- Independent reviews to check quality of chest X-ray screening.
- DNRM maintains worker records.
4. Stakeholder feedback

DNRM received 19 submissions from stakeholders representing the coal mining sector, union, medical and radiology providers. The department also received feedback at subsequent discussions with coal mining, radiology and union stakeholders. In general, feedback was positive and supportive for the proposal. However, some aspects were highlighted as requiring further consideration. A summary of the key issues raised by stakeholder submissions is provided at Annex A.

The main concern raised by stakeholders was the proposal for a single service provider to take and read all worker chest X-rays under the scheme. X-ray frequency, clinical diagnosis and training of radiologists were also key issues. These concerns relate to the following:

1. **Regional access to imaging services**
   - Coal mining and radiology stakeholders emphasised the need for X-ray services to be accessible to workers in regional Queensland and this may not be achievable using a single provider.
   - There were mixed views on the merits of a mobile service. The Queensland Resources Council (QRC) and the Construction, Forestry, Mining and Energy Union (CFMEU) were supportive of a mobile service to ensure services are delivered where mining occurs.
   - However Sonic Healthcare and I-MED Radiology Network (‘Sonic-I-MED’) and the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT) suggested that a quality mobile service was not sustainable. Issues with mobile services include quality, costs, attracting and retaining staff, vast geographical coverage needed and the number of workers needing X-rays.

2. **Cost efficient, sustainable and reliable service**
   - Coal mining stakeholders highlighted the value of competition and the disadvantages of creating a monopoly by appointing a single provider. Monopolies can drive up costs and result in service delivery issues such as delays and poor quality. Uptake of a local ILO training course could be discouraged.
   - More than one provider allows for comparison of service and redundancy in the case of quality issues or insolvency.

3. **Number of readers**
   - Many stakeholders identified the use of a small group of readers (i.e. five readers proposed) as a risk, as it may lead to delays if readers are unavailable due to leave or other reasons.
(b) The Royal Australian and New Zealand College of Radiologists (RANZCR) suggested that a single provider would unlikely have and retain five clinical radiologists with a subspecialisation in screening for coal mine dust lung diseases.

4. X-ray frequency and diagnostic pathway

(a) Several stakeholders were of the view that X-rays should be taken more frequently for aboveground workers. 10 years may be too infrequent for some workers e.g. drillers and drag line operators.

(b) The QRC and CFMEU suggested X-ray screening every five years for all coal mine workers, whether working above or below ground. BHP Billiton advocated for national consistency.

(c) Radiology provider Alpenglow suggested that underground workers should receive X-rays more often than every five years.

5. Training of radiologists

(a) The need for radiologist training in the ILO Classification was raised in several submissions. The CFMEU, RANZCR, Alpenglow, BHP Billiton, Rio Tinto (Kestrel mine) and a current Nominated Medical Adviser (NMA) were supportive of ILO training.

(b) Sonic-I-MED pointed out that there are challenges and costs associated with undertaking ILO training as there are no Australian courses. To implement this requirement it was suggested that a transitional arrangement will likely be required to ensure radiologists are trained in a reasonable timeframe.

(c) BHP Billiton suggested ILO training should be delivered under a local competency framework. RANZCR stated its availability to discuss training and maintain skills to cater for a revised Queensland screening program.
5. Refinements to proposed chest X-ray screening program

DNRM has revised its proposal for a Queensland-based X-ray screening program based on stakeholder feedback. The program remains largely as proposed in the consultation paper as there was general support for the features and delivery model. However, refinements have been made to address the main issues raised by stakeholders concerning the number of providers, X-ray frequency and radiologist training.

1. Number of providers

To address the concerns raised about limiting services to one provider, the proposed model is amended as follows:

Contracted dual-reading provider

(a) DNRM will engage a provider for the dual-reading of chest X-rays to the ILO Classification. Limiting the reading of X-rays will not impact on regional accessibility as X-rays can be taken locally and sent to the reader in a digital format.

(b) While concerns about competition, cost and service delivery are acknowledged, the desire to maintain read quality is paramount. DNRM accepts the advice from other screening programs such as NIOSH and BreastScreen that proficiency is maintained through achieving quantity of reads. The size of the current coal mine workforce in Queensland dictates that there would only be enough X-ray reads for 5-10 radiologists to maintain proficiency.

(c) It would be resource intensive for the department to engage multiple radiologists across a spread of providers. The administrative cost to manage, coordinate and audit these multiple readers would be inefficient.

(d) Concerns regarding costs and service delivery can be mitigated through the procurement process and contractual arrangements that could include service delivery standards and conditions addressing cost. The provider will be subject to external independent auditing which will inform the review of the contracted provider on a periodic basis.

(e) Administration of the dual-reading process will require resourcing and IT infrastructure to receive and distribute X-rays to readers, manage adjudication, develop reports, provide performance feedback and respond to external auditing. Establishing this administration would need to be duplicated to an extent, if reading services were extended across many providers.

(f) A provider for X-ray reading has the advantage of allowing all digital images to be held in a single place to enable easy access by doctors, workers and the department for external auditing.
(g) This model compares to the NIOSH Coal Workers’ Health Surveillance Program where a specialist panel of ILO trained ‘B-Readers’ are administered by NIOSH under the US Department of Health and Human Services.

Approved X-ray imaging providers

(h) DNRM acknowledges that limiting the taking of X-ray images to one provider would limit the regional accessibility of services. Allowing for multiple providers allows services to be delivered where they are needed, provides competition to drive cost efficiency and better service delivery outcomes. It also gives flexibility to respond to changes in demand based on workforce numbers and where miners live and work.

(i) To ensure quality X-ray imaging is provided under the scheme, radiographic imaging services will be regulated through a registration process. Practices or providers would be required to seek registration to be approved to take X-ray images under the scheme.

(j) X-rays taken by these approved providers will need to be digitally transferred to the dual-reading provider contracted to the department.

(k) The standards and requirements for X-ray imaging under the scheme will be defined by the department that providers will need to demonstrate compliance. These requirements will be based on the NIOSH technical guidelines that will be adapted for use under the scheme.

(l) Independent external auditing will ensure quality is maintained and providers would be removed from the register if compliance with the requirements set by the department are not achieved.

(m) This model compares with the NIOSH Coal Workers’ Health Surveillance Program facilities that are authorised to conduct imaging.

2. X-ray frequency

(a) The regulated frequency of X-rays for aboveground workers is proposed to be reduced to at least once every five years. This aligns with stakeholder feedback and recognises that open-cut workers from both Queensland and NSW have been diagnosed with CWP.

3. Radiologist training

(a) DNRM notes that most stakeholders supported the proposal for radiologists to be trained in the use of the ILO Classification. It is acknowledged that there is currently no course in Australia that delivers this training and that attending training overseas has its challenges.

(b) To support the requirement for ILO training and acknowledge limited training options – the contracted dual-reading provider will need to source ILO training for its readers e.g. NIOSH B-Reader course or Australian-based course if one becomes available.
(c) For the first 12 months, at least one of the dual reads must be conducted by a radiologist trained in the ILO Classification.

(d) If not ILO trained, the other reader will need to be registered with RANZCR for CWP screening. This is similar to the NIOSH Coal Workers' Health Surveillance Program where one reader can be experienced in reading X-rays to the ILO Classification (called the ‘A-Reader’) but the other must be a NIOSH approved ‘B-Reader’ that is ILO trained.

(e) After 12 months, all readers will need to be ILO trained.

(f) Adjudication is to be conducted by an ILO trained radiologist, including during the first 12 months.

Other adjustments to the consultation paper proposals are outlined in Annex B.
6. Summary of refined proposal

The refined Queensland X-ray screening program can be summarised by the following:

(a) A procurement process will be conducted to identify a private sector dual-reading provider.

(b) The provider will read all chest X-rays under the scheme to the ILO Classification.

(c) For the first 12 months, at least one of the dual-readers (and any adjudicator) must be trained in the ILO Classification – the other must be registered with RANZCR for CWP screening if not ILO trained.

(d) After 12 months, all readers must be ILO trained.

(e) All digital X-ray images will be held by the dual-reading provider and must be made available to doctors, workers, and the department for external auditing upon request. If the department engages an alternate provider in the future, the storage of digital X-rays would be transferred to the new provider.

(f) Radiographic imaging service providers will require registration with the department to be approved to take X-ray images under the scheme.

(g) X-rays taken by the registered imaging services must be digitally referred to the dual-reading provider contracted to the department.

(h) The standards and requirements for X-ray imaging and reading under the scheme will be defined by the department. These requirements will be based on the NIOSH technical guidelines that will be adapted for use under the scheme. Providers must demonstrate compliance with these standards and requirements.

(i) Independent external auditing will ensure quality is maintained. Audit reports will inform periodic review of the contracted dual-reader and whether X-ray imaging providers are complying with the requirements set by the department. Imaging providers may be removed from the register if standards are not achieved.

(j) Payment for X-ray imaging and dual-reading will continue to be arranged by employers and/or NMAs in a commercial arrangement that best suits their businesses.
7. Next steps

The department is seeking CMSHAC feedback on this paper.

Submissions close: **Wednesday 22 March 2017 at 5.00pm**

Email: cwpfeedback@dnrm.qld.gov.au

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PO Box 15216
CITY EAST QLD 4002

Phone: +61 7 3199 7967

Please note that any submission made in response to this paper may be provided to other government agencies, organisations or offices to inform consideration of the proposals. Your feedback may be reported publically in documents that describe the consultation outcomes for these reforms. If you would like your feedback to remain confidential, please let us know in your response.
PROPOSED FEATURES

1. Chest X-ray recipients and frequency

Many stakeholders provided feedback on the frequency that workers should have an X-ray taken. The frequency of X-rays proposed in the consultation paper was aligned with the regulatory amendments that took effect on 1 January 2017, being:

- All new coal mine workers must have a chest X-ray.
- Current and former underground workers at least every five years.
- At least every 10 years for aboveground workers.
- Voluntary X-ray for retiring workers who have not had a chest X-ray in the last three years.

Several stakeholders were of the view that X-rays should be taken more frequently for aboveground workers. Dr Robert Cohen, a NIOSH approved B-reader from the University of Illinois at Chicago (UIC), suggested 10 years may be too infrequent for some workers e.g. drillers and drag line operators. Coal Services NSW were of the view a more frequent X-ray cycle for aboveground workers is required.

Representatives from Anglo American, the Queensland Resources Council (QRC) and the Construction, Forestry, Mining and Energy Union (CFMEU) suggested X-ray screening every five years for all coal mine workers, whether working above or below ground. The Royal Australian and New Zealand College of Radiologists (RANZCR) suggested greater frequency of testing if a miner exhibits symptoms or is concerned about dust exposure.

Radiology provider Alpenglow and Coal Services NSW suggested that underground workers should receive X-rays more often than every five years. The QRC queried whether X-rays should be mandatory on retirement to ensure cases can be identified.

2. How chest X-rays are taken

Mining companies and radiology providers emphasised the need for X-ray services to be accessible to workers in regional Queensland. There were mixed views on the merits of a mobile service.

The QRC, Rio Tinto Coal and the CFMEU were supportive of a mobile service to ensure services are delivered where mining occurs. However, Sonic Healthcare/I-MED Radiology Network (‘Sonic-I-MED’) suggested that a quality mobile service was not sustainable, and that permanent facilities, with accreditation through the Diagnostic Imaging Accreditation Scheme (DIAS), near to mines and the workforce was preferable. In addition, the Australian Society of Medical Imaging and Radiation Therapy (ASMIRT) did not support a mobile service.

Rio Tinto (Kestrel mine) was also concerned that a mobile service would not be workable due to the vast geographical distribution of mines and large number of workers needing imaging.

Sonic-I-MED proposed that radiographers should be registered with the Australian Health Practitioner Regulation Agency (AHPRA) and appropriately licensed with the relevant regulator in the jurisdiction. They supported the use of both Computed Radiography (CR) and Direct Radiography (DR) X-ray machines, while ASMIRT did not support CR equipment being used.

RANZCR proposed that equipment meet DIAS, as well as the RANZCR Standards of Practice for Diagnostic and Interventional Radiology. RANZCR and ASMIRT were supportive of developing local X-ray guidelines for practitioners.
3. X ray reading

The need for radiologist training in the ILO Classification was raised by several submissions. Coal Services NSW queried whether further ILO training was necessary for Australian radiologists, while others were supportive of ILO training, including the CFMEU, RANZCR, Alpenglow, BHP Billiton, Rio Tinto (Kestrel mine) and a current Nominated Medical Adviser (NMA). Sonic-I-MED pointed out that there are challenges and costs associated with undertaking ILO training as there are no Australian courses. To implement this requirement it was suggested that a transitional arrangement will likely be required to ensure radiologists are trained in a reasonable timeframe. BHP Billiton suggested ILO training should be delivered under a local competency framework.

Coal Services NSW and Rio Tinto (Kestrel mine) suggested a second read should be needed only where an abnormality is identified. In relation to adjudication, the CFMEU suggested additional 4th and 5th reads should also be used as per the NIOSH program in the small volume of cases when needed.

Many stakeholders identified the use of a small group of readers (i.e. five readers) as a risk as it may lead to delays if readers are unavailable due to leave or other reasons.

Sonic-I-MED suggested that delayed batch reporting for X-rays often results in poor service delivery, extended turnaround times, higher costs, delayed diagnosis and management, and increased patient anxiety. Instead they proposed the use of a network radiology model, where images are uploaded by the contracted provider for ILO trained radiologists to read promptly from their location, to achieve a more contemporary service. An NMA reported that the current turn-around time is less than 12 hours.

4. Reporting and maintaining records

The use of Computer Tomography (CT) scans was supported in general but not all stakeholders considered them mandatory for diagnosis. For instance, Dr Robert Cohen from UIC proposed that as the quality of reading improves under the scheme, CT scans may not always be necessary for diagnosis. This view was supported by the CFMEU.

Rio Tinto (Kestrel mine), RANZCR, Alpenglow, Anglo American and the QRC supported the need for clarity in the process for CWP diagnosis. In addition, an NMA, Coal Services NSW, and BHP Billiton proposed that before diagnosis is given, the worker should be referred to a respiratory physician, while RANZCR suggested that a multi-disciplinary group could be used to reach a diagnosis.

5. Quality assurance

Stakeholders were supportive of the inclusion of a quality assurance program including auditing. Some specific suggestions were made including the use of a quality assurance panel, ensuring the appropriate assessment of readers’ technical adequacy (i.e. not discouraging false positives), readers receive periodic performance feedback and any existing programs and standards are utilised, such as DIAS.

PROPOSED DELIVERY MODEL

Competitive tender

Stakeholders were supportive of the competitive tender model. The QRC and Rio Tinto Coal identified the ability to deliver the services in regional areas, including through mobile services, as key criteria for the tender. The CFMEU noted their support for the proposed delivery model was contingent on understanding the specific criteria and standards. The CFMEU proposed that readers be appointed by government, and paid for by a levy on industry.
In relation to the contract terms, RANZCR proposed clarifying that the provider would have access to past images, and that any sub-contractors would need to meet the same standards as the provider.

Sonic-I-MED suggested that the potential use of multiple sub-contractors to take and upload images as part of a network model could be associated with quality control issues.

### Number of X ray providers under the scheme

Several stakeholders including Alpenglow, RANZCR, QRC, Anglo American and BHP Billiton raised concerns with the proposed use of a single provider to take and read all worker chest X-rays under the scheme. The main concern was that a single provider may not provide adequate access for regional workers.

RANZCR further suggested that a single provider could not retain five specialist radiologists. BHP Billiton and QRC raised the issue of creating a monopoly which could drive up costs. Anglo American and QRC proposed more than one provider to provide greater access to locations for workers, and provide for comparison and redundancy. BHP Billiton suggested that limiting providers would discourage use of a local ILO training course.

Sonic-I-MED agreed that the imaging provider should provide an end-to-end solution including image acquisition and reporting.

### Independent auditing

The QRC and Anglo American identified the proposed audit and evaluation of the provider after two years as too long, and proposed auditing every six months for the first two years. The CFMEU proposed the UIC for delivering the external audit. Similarly, an NMA proposed continuing to send X-rays to the UIC for reading following the commencement of the new X-ray screening program.

### Electronic records storage

In general, stakeholders were supportive of the provision of images and reports to DNRM for electronic record storage. Sonic-I-MED suggested an online delivery and storage solution. RANZCR suggested the Queensland Government should retain control of the screening program and retention of images and reports rather than delegate to a single provider under contract.

However, CFMEU did not support NMAs providing the X-ray reports to DNRM if they are linked to the coal mine operator, and proposed DNRM control and maintain these records.
Annex B - Refined chest X-ray screening program

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<tr>
<th>#</th>
<th>Consultation paper proposed features</th>
<th>Position paper refined features &amp; clarifications</th>
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<tbody>
<tr>
<td>1</td>
<td>Chest X-ray recipients and frequency</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>All new coal mine workers (other than low risk) on entry to the coal mining industry.¹</td>
<td>For clarity, this requirement relates to workers that require a health assessment. Section 44 of the Coal Mining Safety and Health Regulation 2001 requires health assessments for coal mine workers, other than a coal mine worker employed to carry out a low risk task at a coal mine. Schedule 9 defines low risk task as a task shown by a risk assessment to create a risk that is so minimal it can be managed effectively without requiring the worker to undergo a health assessment.</td>
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<td>1.2</td>
<td>At least once every five years for underground workers and former underground workers working aboveground. ¹</td>
<td>Unchanged.</td>
</tr>
<tr>
<td>1.3</td>
<td>At least once every 10 years for aboveground workers. ¹</td>
<td>Aboveground workers will require a chest X-ray at least once every five years.</td>
</tr>
<tr>
<td>1.4</td>
<td>Voluntary on retirement if the miner has worked in the industry for more than three years and has not already had a chest X-ray in the past three years. ¹</td>
<td>Unchanged.</td>
</tr>
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<td>1.5</td>
<td>The current scheme does not apply to retired or former workers. A new program could include screens for retired or former coal mine workers residing in Queensland at a period aligned with 1.2 &amp; 1.3 above. Costs for this type of service would need to be determined.</td>
<td>There would be no barrier for retired or former workers to have an X-ray taken by a registered imaging provider and sent to the contracted dual-reader. A funding and administrative model remains to be determined.</td>
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<tr>
<td>2</td>
<td>How chest X-rays are taken</td>
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<tr>
<td>2.1</td>
<td>Imaging, or the taking of X-rays, could occur regionally and near the workforce, but considerations should be given to a reduced number of approved centres to ensure the required image quality is delivered. Consideration could also be given to a mobile service.</td>
<td>DNRM acknowledges that limiting the taking of X-ray images to one provider would limit the regional accessibility of services. Allowing for multiple providers allows services to be delivered where they are needed, provides competition to drive cost efficiency and</td>
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¹ Mandatory as at 1 January 2017 through changes to the Coal Mining Safety and Health Regulation 2001.
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<td>better service delivery outcomes. It also gives flexibility to respond to changes in demand based on workforce numbers and where miners live and work. To ensure only quality X-ray imaging is provided under the scheme, radiographic imaging services will be regulated through a registration process. Practices or providers would be required to seek registration to be approved to take X-ray images under the scheme.</td>
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<td>2.2</td>
<td>Chest X-rays taken in a digital format by qualified radiographers.</td>
<td>Unchanged.</td>
</tr>
<tr>
<td>2.3</td>
<td>Technical aspects of taking X-rays (e.g. equipment types and settings) to be in accordance with Australian requirements and the <em>NIOSH Guideline – Application of Digital Radiography for the Detection and Classification of Pneumoconiosis</em>.</td>
<td>NIOSH guidelines adapted for use in Queensland.</td>
</tr>
<tr>
<td>3</td>
<td>X-ray readings</td>
<td>X-rays taken by approved imaging providers will be digitally transferred to the dual-reading provider contracted to the department. The dual-reading provider will be required to establish a PACS to receive X-rays from approved imaging facilities and ensure the undertaking of dual-reading to the ILO Classification. It will also need to coordinate and issue reports to referring doctors.</td>
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<tr>
<td>3.1</td>
<td>X-rays sent from radiographers to a central hub for distribution to readers via an appropriate Picture Archiving and Communication System (PACS).</td>
<td>DNRM notes that most stakeholders supported the proposal for radiologists to be trained in the use of the ILO Classification. It is acknowledged that there is currently no course in Australia that delivers this training and that attending training overseas has its challenges. To support the requirement for ILO training and acknowledge the limited training options – the contracted dual-reading provider will need to source ILO training for its readers e.g. NIOSH B-Reader course. For the first 12 months, at least one of the dual reads must be conducted by a radiologist trained in the ILO Classification.</td>
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<td>3.2</td>
<td>All readers are qualified radiologists who have successfully completed an ILO training program (e.g. the NIOSH B Reader program) (Recommendation 11.2 of the Monash report).</td>
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<td>If not ILO trained, the other reader will need to be registered with RANZCR for CWP screening.</td>
<td>This is similar to the NIOSH Coal Workers’ Health Surveillance Program where at least one of the dual-readers must be a NIOSH approved B-Reader and the other has to be experienced in reading X-rays to the ILO Classification (A-Reader). Adjudication is to be conducted by an ILO trained radiologist and after 12 months all readers must be ILO trained.</td>
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<td>3.3</td>
<td>Chest X-rays independently dual read, with a possible third read for adjudication purposes.</td>
<td>Unchanged.</td>
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<td>While the NIOSH Coal Workers’ Health Surveillance Program includes up to three levels of adjudication (i.e. 3rd, 4th and 5th read) – it is proposed that up to three reads by qualified Australian radiologists is sufficient for a screening process.</td>
<td>Unlike the NIOSH Program, this proposal limits participation to radiologists whereas NIOSH has readers from other medical specialties. Multiple levels of adjudication also increases the time before a result can be returned to the worker. If three radiologists cannot agree, then further investigation would seem warranted. Development of the clinical diagnostic pathway will also clarify this process.</td>
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<tr>
<td>3.4</td>
<td>All X-rays read and reported in accordance with the Guideline for the use of the ILO International Classification of Radiographs of Pneumoconioses.</td>
<td>Unchanged.</td>
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<td>3.5</td>
<td>Examinations include comparative assessment with previous results where available.</td>
<td>Unchanged.</td>
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<td>The engagement of a dual-reading provider that is required to keep copies of previous digital X-rays of coal mine workers will mean that previous X-rays are readily available for reference to detect long-term changes.</td>
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<td>3.6</td>
<td>Technical aspects of reading X-rays (e.g. image display) to be in accordance with Australian requirements and the NIOSH Guideline – Application of Digital Radiography for the Detection and Classification of Pneumoconiosis.</td>
<td>NIOSH guidelines adapted for use in Queensland.</td>
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<td>3.7</td>
<td>Given the number of X-rays that may be taken and read under the Queensland Scheme (estimated at 800 X-rays per month) – the assessment of X-rays should be limited to a small group of readers. Based on an average of 20,000 reads per year (assuming each X-ray is read twice with a five per cent adjudication rate), this small group of readers could comprise of about five radiologists. This allows for independent reading by two radiologists, and a third if adjudication is required with some flexibility and redundancy. Each reader would be assessing approximately 4,000 X-rays per year which is above the minimum amount suggested by BreastScreen Queensland to maintain proficiency (2,000 per year). This would mean each reader would read a batch of 80 X-rays per week.</td>
<td>Maintaining read quality is paramount. DNRM accepts the advice from other screening programs such as NIOSH and BreastScreen that proficiency is maintained through achieving quantity of reads. The size of the current coal mine workforce in Queensland means that there would only be enough X-rays reads for 5-10 radiologists. 2,000 reads per year is considered the target volume of reads to maintain proficiency. Quality control will focus on volume of reads per year and read accuracy rather than whether X-rays are read in batches or when they are distributed.</td>
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### 4 Reporting results and maintaining records

<p>| 4.1 | A report of the screening outcome including a copy of the X-ray provided to the NMA for consideration and discussion with the worker.                                                                                                           | Unchanged. It should be noted that the department will be consulting separately on the NMA framework.                                                                                                           |
| 4.2 | A standardised letter provides advice of the outcome of the test to the worker. This advice should include general information and be designed in accordance with best practice ‘no harm’ screening protocols (similar to those used by BreastScreen) to ensure that a worker’s wellbeing is not impacted by the screening process. | Unchanged.                                                                                                                                                                                                   |
| 4.3 | Service standard of five to seven working days from date X-ray is taken before notification (allowing for adjudication if required).                                                                                                                                                             | Unchanged.                                                                                                                                                                                                   |
| 4.4 | If a potential case is identified, a computed tomography (CT) scan or other diagnostic procedure is undertaken before a diagnosis is given to provide greater assurance.                                                            | A clinical pathway for diagnosis will be developed separately that will consider what other information may be needed.                                                                                         |
| 4.5 | A copy of X-rays and assessment reports retained by the screening program for future reference (and submitted to DNRM by the NMA).                                                                                                                                                      | Having one read provider has the advantage of allowing all digital X-ray images to be held in a single place to enable easy access by doctors, workers, and the department for external auditing. All digital X-ray images will be held by the dual-reader and must provide access to previous images to doctors, workers, and the department for external auditing. If the |</p>
<table>
<thead>
<tr>
<th>#</th>
<th>Consultation paper proposed features</th>
<th>Position paper refined features &amp; clarifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td><strong>Quality assurance</strong></td>
<td></td>
</tr>
<tr>
<td>5.1</td>
<td>Internal auditing of procedure, practices and equipment including evaluation of image quality and read accuracy. Similar to the BreastScreen process, readers to be provided regular feedback on performance in correctly identifying anomalies.</td>
<td>Unchanged.</td>
</tr>
<tr>
<td>5.2</td>
<td>Periodic external auditing of training, procedure, practices, equipment and evaluation of read volumes and accuracy.</td>
<td>Unchanged.</td>
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</tbody>
</table>
Annex C - Acronyms used in this paper

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AHPRA</td>
<td>Australian Health Practitioner Regulation Agency</td>
</tr>
<tr>
<td>ASMIRT</td>
<td>Australian Society of Medical Imaging and Radiation Therapy</td>
</tr>
<tr>
<td>BHP</td>
<td>Broken Hill Proprietary</td>
</tr>
<tr>
<td>CFMEU</td>
<td>Construction, Forestry, Mining and Energy Union</td>
</tr>
<tr>
<td>CMSHAC</td>
<td>Coal Mining Safety and Health Advisory Committee</td>
</tr>
<tr>
<td>CWP</td>
<td>Coal Workers' Pneumoconiosis</td>
</tr>
<tr>
<td>CR</td>
<td>Computed Radiography</td>
</tr>
<tr>
<td>CT</td>
<td>Computed Tomography</td>
</tr>
<tr>
<td>DIAS</td>
<td>Diagnostic Imaging Accreditation Scheme</td>
</tr>
<tr>
<td>DNRM</td>
<td>Department of Natural Resources and Mines</td>
</tr>
<tr>
<td>DR</td>
<td>Direct Radiography</td>
</tr>
<tr>
<td>ILO</td>
<td>International Labour Organization</td>
</tr>
<tr>
<td>NMA</td>
<td>Nominated Medical Adviser</td>
</tr>
<tr>
<td>NIOSH</td>
<td>National Institute for Occupational Safety and Health</td>
</tr>
<tr>
<td>NSW</td>
<td>New South Wales</td>
</tr>
<tr>
<td>PACS</td>
<td>Picture Archiving and Communication System</td>
</tr>
<tr>
<td>QRC</td>
<td>Queensland Resources Council</td>
</tr>
<tr>
<td>RANZCR</td>
<td>The Royal Australian and New Zealand College of Radiologists</td>
</tr>
<tr>
<td>UIC</td>
<td>University of Illinois at Chicago</td>
</tr>
<tr>
<td>US</td>
<td>United States</td>
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