



COMPLIANCE AUDIT REPORT

HUNTER VALLEY OPERATIONS SOUTH – TOPSOIL MANAGEMENT

Hunter Valley Operations Pty Ltd



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Introduction

Background

A condition of all mining leases issued under the *Mining Act 1992* requires that any disturbance resulting from the activities carried out under the lease must be rehabilitated to the satisfaction of the Minister. Management of topsoil, and any cleared vegetation including mulch, is a key component for successful rehabilitation outcomes.

Topsoil must be stripped and salvaged in an appropriate manner to maximise its value for use in rehabilitation. Only the upper soil layer is usually biologically active and of value in rehabilitation activities. The lease holder must understand the soils on the site to ensure that sufficient topsoil can be stripped to provide a suitable growth medium in the rehabilitation phases. It is generally considered best practice for stripped topsoil to be directly respread on rehabilitation areas where land shaping has taken place and the area is ready for final rehabilitation.

Where mining operations have not progressed to the stage of having areas available for topsoil to be directly respread, stockpiling of stripped topsoil may be necessary. Poor handling and stockpiling practices may result in a significant loss of viable seed bank and topsoil quality. Management and maintenance of these stockpiles is essential to prevent erosion and weed infestation, and to retain maximum soil reserves for use during rehabilitation.

As part of the compliance audit program, an audit of the topsoil management activities associated with the mining operations at Hunter Valley Operations South (HVO South) was undertaken on 5 June 2019.

Audit objective

The objective of the audit was to assess the operational performance of HVO South, in relation to the management of topsoil, and the ability of the lease holder to implement management systems and controls to provide for the sustainable management of the mine's topsoil resources.

Audit scope

The scope of the audit included:

- the topsoil management activities across the HVO South operations as described in the approved mining operations plan (MOP) and associated management plans
- a review of documents and records pertaining to the topsoil management activities

the assessment of compliance for the period commencing 5 June 2018 and ending 5 June 2019.

Audit criteria

The audit criteria against which compliance was assessed included:

- commitments made in mining operations plan HVO South (Original MOP dated 25 July 2018 and Amendment A dated 15 January 2019)
- commitments made in the HVO Environmental Procedure EP 5.1

Publishing and disclosure of information

This audit report will be published on the NSW Resources Regulator's website consistent with Section 365 of the *Mining Act 1992*.

This audit report may be publicly disclosed consistent with the *Government Information (Public Access) Act 2009*.



Audit methods

The audit process involved interviewing site personnel and a review of documentation and samples of records provided by the lease holder. A site inspection was undertaken to determine the level of compliance of the operations and assess its operational performance. The audit process and methodology are described in more detail below.

Opening meeting

The opening meeting was held onsite at the HVO mine office on 5 June 2019. The audit team was introduced, and the scope of their responsibilities was conveyed to the auditees to outline the objectives and scope of the audit. The methods used by the team to conduct the audit were explained including interviewing personnel, reviewing documentation, examining records and conducting a site inspection to assess specific compliance requirements.

Site interviews and inspections

Data collection and verification

Where possible, documents and data collected during the audit process were reviewed on site. Several documents were unable to be reviewed on site and were provided following the site visit.

All information obtained during the audit process was verified by the audit team where possible. For example, statements made by site personnel were verified by viewing documentation and/or site inspections where possible. Where suitable verification could not be provided, this has been identified in the audit findings as not determined.

Site inspections

A site inspection was undertaken of the following areas:

- CHE1 Strip 24 mulching of strip 24 before topsoil stripping
- topsoil stockpile 47 Riverview North rehabilitation area stockpile two to three years old
- topsoil stockpile 53 well vegetated
- topsoil stockpile Cheshunt area possibly greater than 10 years old, well vegetated.



Closing meeting

The closing meeting was held onsite at the HVO mine office on 5 June 2019. The objectives of this meeting were to discuss any outstanding matters, present preliminary findings and outline the process for finalising the audit report.

Compliance assessment definitions

The reporting of results from the compliance audit was determined based on the definitions presented below in Table 1.

Table 1 Audit assessment categories

ASSESSMENT	CRITERIA
Compliance	Sufficient and appropriate evidence is available to demonstrate the particular requirement has been complied with.
Non-compliance	Clear evidence has been collected to demonstrate the particular requirement has not been complied with. There are three subcategories of non-compliance reflecting the severity and level of risk associated with the non-compliance:
	NC1 – the absence of planning or implementation of a required operational element which has the potential to result in a significant risk
	NC2 – an isolated lapse or absence of control in the implementation of an operational element which is unlikely to result in a significant risk
	NC3 – an administrative or reporting non-compliance which does not have a direct environmental or safety significance
	Note: The identification of a non-compliance in this audit may or may not constitute a breach of the Mining Act 1992. Non-compliances identified in this audit report may be further investigated by the NSW Resources Regulator
Observation of concern	Where an auditee may be compliant at the time of the audit but there are issues that exist that could result in the potential for future non-compliance if not addressed.
	Observation of concern was also used where an issue may not have particular compliance requirements, but which was not conducive to good management or best practice.



ASSESSMENT	CRITERIA	
Suggestion for improvement	Where changes in processes or activities inspected or evaluated at the time of the audit could deliver improvement in relation to risk minimisation, sustainable outcomes and management practices.	
Not determined	The necessary evidence has not been collected to enable an assessment of compliance to be made within the scope of the audit. Reasons why the audit team could not collect the required information include:	
	insufficient information on the file relating to the period covered by the audit or insufficient evidence collected to reach a conclusion	
	the wording on the criteria (approval condition) meant that no evidence could be gathered, or it was too difficult to gather the evidence.	
	A 'not determined' assessment was also made where the condition was outside of the scope of the audit.	
Not applicable	The circumstances of the authorisation or title holder have changed and are no longer relevant, e.g. no longer mining, mining equipment and plant has been removed, etc.	
	An invoking element in the criteria was not activated within the scope of the audit.	

Reporting

Following completion of the site audit, the audit checklists were completed, and audit notes were reviewed to compile a list of outstanding matters to be noted in the audit report. This report was prepared to provide an overview of the operational performance of the site in relation to the management of topsoil and identify any non-compliances or observations of concern noted by the auditors during the site inspections and interviews.

The draft audit findings were forwarded to HVO for comment. Consideration was given to the representations made during the finalisation of the audit report as discussed in the audit findings.

Audit findings

The approved mining operations plan: HVO South (dated 15 January 2019) (the approved MOP) describes the processes for land preparation in advance of mining operations in section 2.4. This section was noted to include removal of vegetation (section 2.4.1) and topsoil management (section 2.4.2). Generally, the descriptions are very brief and quite generic using language such as 'where possible' or 'if required'. Using a risk-based approach to topsoil management, it would be expected that some form of trigger action response plan (TARP) would be available to provide the triggers for 'when' a particular control might be required. This is raised as **observation of concern no. 1**.

The implementation and effectiveness of the topsoil management processes described in the approved MOP were assessed during the audit as discussed in the following sections.

Topsoil stripping operations

Vegetation clearance and mulching operations were in progress at the time of the audit in advance of topsoil stripping operations on Cheshunt strip 24.

It was observed that grubbing of the area had been completed to remove large trees and shrubs from the site (Figure 1). A mulcher was in operation on the groundcover along the strip for incorporation into the topsoil when stripped. This process was observed to be consistent with the process described in section 2.4.2.3 of the MOP.



Figure 1 Mulcher on Cheshunt strip 24 before topsoil removal

The HVO environmental co-ordinator advised that topsoil stripping depth was generally 100mm, however other than being a 'general industry standard', it was not known what this topsoil stripping depth was based on. Section 2.4.2.2 of the approved MOP provided a summary of soil characteristics in Tables 10 and 11 including a nominal topsoil stripping depth for each soil type. Typically, this topsoil stripping depth was 0-100mm for each soil type except for the alluvial soils where a stripping depth of up to 500mm was identified. The Cheshunt strip 24 was not on alluvial soils being on a ridgeline, so a 100mm stripping depth would be generally consistent with the stripping depth identified in the MOP.

Topsoil stripping operations at HVO were carried out by contractors. HVO was generally relying on the experience of its contractors to undertake effective topsoil stripping and achieve correct stripping depths. Monitoring of the stripping activities was carried out by the mine services supervisor 'once or twice per day' through inspections. These inspections were reported to include visual monitoring of the stripped top soil depth but were not documented. During stripping, topsoil was pushed up into windrows and surveyed to establish topsoil volumes before being loaded into trucks for direct placement or stockpiling.

HVO has established a ground disturbance permit (GDP) process that includes a risk assessment and procedures for stripping topsoil and identifies sediment and erosion controls that were required. Site inspection observations included sediment and erosion control fences downslope of the Cheshunt 24 stripping operations to prevent the loss of topsoil.

Direct placement of topsoil

HVO has identified that direct placement of topsoil was the preferred option when undertaking topsoil stripping operations and the site inspection identified several areas of rehabilitation have had direct placement of topsoil, for example, topsoil stripped from Riverview South was direct placed on Riverview North (Figure 2).

Figure 2 An area of Riverview North where topsoil was direct placed



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Topsoil stockpiling operations

Topsoil stockpiling

Section 2.4.2.4 of the approved MOP includes the following procedures for topsoil stockpiling:

- stockpiles will be located away from trafficable or mine areas, trees or watercourses and placed on areas of flat topography or along the contour to prevent erosion
- good quality topsoil, marginal topsoil and subsoils will be stockpiled separately and recorded as such
- soil stockpiles and volumes will be identified and monitored for weed control
- where possible, stockpiles will be limited in height to a maximum of three metres and windrowed to increase surface area
- stockpiles will generally be sown with a multi-species cover crop, including deep rooting, nitrogen fixing species such as lucerne, to help maintain topsoil viability and minimise erosion and weed infestation if not being reused for prolonged periods.

Several topsoil stockpiles of varying ages were inspected during the audit site inspection. In terms of the physical development of the stockpiles, it was noted that the stockpiles inspected were generally no more than three metres in height, located on reasonably flat areas and located away from trafficable and mine areas.

However, one older stockpile (possibly 15+ years old) was observed next to a laydown area for high density polyethylene pipe (HDPE pipe) (Figure 3). Although the stockpile was well vegetated and signposted, there was a risk that vehicles could inadvertently impact the stockpile during placement or retrieval of the pipe sections. The location of the laydown area for the HDPE pipe would not appear to be consistent with the location principles for topsoil stockpiles specified in the MOP. It is acknowledged that this stockpile was established before the existing guidelines for topsoil management, however, the placement of HDPE pipe has occurred after stockpile establishment and the pipes could be moved to a more suitable location. This is raised as **observation of concern no. 2**.



Figure 3 An older topsoil stockpile immediately adjacent to a pipe laydown area



No erosion or sediment controls were observed on any of the stockpiles inspected. Where stockpiles were well vegetated (for example stockpile 53), the erosion risk was low. For unstabilised stockpiles (for example stockpile 47), there was an increased risk of topsoil loss from erosion, although it was acknowledged that there wasn't any significant erosion or riling observed at the time of the audit.

It was noted that Table 10 of the MOP does identify the erosion potential of each soil type but does not provide any guidance on when erosion and sediment controls are required for topsoil stockpiles. This is raised as **observation of concern no. 3**.

The MOP states that stockpiles will generally be sown with a multi-species cover crop, and generally the stockpiles inspected had been sown similar to stockpile 53 (Figure 4). However, the procedure for sowing of stockpiles does not appear to be consistently implemented as stockpile 47 did not appear to have a cover crop sown (Figure 5).

Figure 4 Topsoil stockpile 53, sown and well vegetated



Figure 5 Topsoil stockpile 47, not sown, little vegetation



The key observation from the audit relating to topsoil stockpiling is that topsoil does not appear to be separately stockpiled based on topsoil quality as indicated in section 2.4.2.4 of the MOP. It is possible for topsoil stripped from a pasture area to be stockpiled with topsoil stripped from a native woodland area that may have implications for vegetation establishment when topsoil is reused. Similarly, there does not appear to be any distinction between stockpiling alluvial topsoil and stockpiling gravelly soils or acid topsoils. This issue is raised as **non-compliance no. 1**, ranked NC2, and is further discussed in relation to record keeping below.

Inspection and maintenance of stockpiles

Although HVO staff advised that topsoil stockpiles are inspected, this process appears to be informal and not documented. Issues with stockpiling identified by the auditors may have been identified earlier if a more robust and documented inspection regime was in place. This issue is raised as **observation of concern no. 4.**

HVO did not have a monitoring program for topsoil where it is stockpiled for any length of time. There did not appear to be an understanding of how topsoil health might decline over time. It was reported that soil analysis was undertaken to determine suitable ameliorants once the topsoil was respread on the rehabilitation area, however, no evidence by way of analysis results was provided to verify that this was implemented.

HVO staff reported that there was a maintenance program for topsoil stockpiles that includes:

- establishment of cover crops
- reseeding when required
- weed management.

There were no records provided to verify that this program was documented and consistently implemented. Given that there was no formal inspection program, it was difficult to see how the maintenance program was triggered. If issues are identified during the informal inspections, there did not appear to be a system in place to record those issues, assign actions and verify completion of corrective actions. This is raised as **observation of concern no. 5**. Development of a robust inspection and maintenance program for topsoil stockpiles would be beneficial to achieving more successful rehabilitation outcomes.

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Reuse of stockpiled topsoil

During the audit site inspection, an area was identified where it was clear that the topsoil spread over an area had come from different locations and was of different qualities. The final land use for this area was intended to be pasture and observations of the vegetation establishment concluded that about 80% of the area was consistent with this land use. The remaining 20% differed with the spreading of topsoil from a different stockpile location. Observation of this area showed the vegetation establishment was more consistent with a woodland use, indicating that the topsoil was likely to have been stripped from a native woodland area rather than a pasture area.

This inconsistency in vegetation establishment could have been avoided if better information on the origin and quality of topsoil in each pile was collected and maintained.

Record keeping

HVO staff survey each topsoil stockpile annually to monitor topsoil volumes and undertake a yearly topsoil reconciliation. Records from the 2018 annual topsoil stockpile survey were sighted by the auditors. Surveys are also conducted monthly to monitor disturbance and rehabilitation areas, and to prepare a monthly rehabilitation and disturbance report. Using this information, HVO can assess its topsoil budgeting requirements. It was noted that mine planning and rehabilitation planning do not necessarily interact, indicating that topsoil may not necessarily be seen as a valuable resource.

A topsoil register has been established and is maintained in geographical format using the software system, Mapinfo. The auditors reviewed the Mapinfo system and noted that the system does collect and maintain information on the location of each stockpile and the volume of topsoil stored in each pile. It was also noted that records were maintained when topsoil was respread. For example, the register will record if the topsoil was directly placed and from where, or which stockpile the topsoil came from.

However, because topsoil does not appear to be stockpiled separately based on its origin or quality, this information is not able to be captured by the system. This is a shortcoming of the topsoil management system. Collection of this information would enable more effective rehabilitation planning.

Development of a topsoil management plan

In October 2018, the Regulator issued a notice under Section 240(1)(c) of the Mining Act relating to the unsatisfactory establishment of target vegetation species and the unsatisfactory weed presence at rehabilitation areas across the operations including HVO South.

The notice required HVO to prepare a management plan to address risks to satisfactory rehabilitation progress identified in the 2018 Annual Review that was submitted in March 2018. The management plan response was required by 15 January 2019.

HVO, through its consultant, SLR Consulting Australia Pty Ltd, submitted the proposed management measures in a memorandum dated 15 January 2019. In this document, HVO identified the need to review the existing site topsoil tracking procedures and review the inspection processes which verify compliance with site topsoil management practices. It was also proposed to develop a topsoil management plan that will include:

- type and depth of topsoils to be stripped across the site
- life of mine (LOM topsoil requirements and deficiency mitigations [if any])
- topsoil stripping processes in plain English terms
- processes for handling, placement and stockpiling of topsoils
- processes for maintenance of the site topsoil register.

The topsoil management plan to be developed needs to adequately address the risks associated with topsoil handling, storage and reuse. In addition, site inspection and monitoring processes need to be developed to ensure that the topsoil management plan is effectively implemented. At the time of writing, the topsoil management plan has not been submitted.

Lease holder response to draft audit findings

HVO was provided with a copy of the draft audit report and invited to submit a response to the draft audit findings. A copy of the response is provided in Appendix 1.

The HVO response corrected two minor errors in the text of the report with the corresponding changes made in the final report.

HVO disagreed with the audit findings in relation to the inspection and maintenance of stockpiles, and in relation to record keeping as discussed below.

Inspection and maintenance of stockpiles – based on observations made on site and interview with site personnel, the audit team identified that there did not appear to be an understanding of how topsoil health might decline over time. HVO disagreed with this statement stating that site procedures and practices were designed to maintain topsoil health by prompt reuse and, where it was necessary to stockpile, maintain stockpile health within the constraints of operation.

- Record keeping the auditors noted that mine planning and
 - Record keeping the auditors noted that mine planning and rehabilitation planning do not necessarily interact, indicating that topsoil may not necessarily be seen as a valuable resource. HVO considers that mine planning and rehabilitation are directly linked. To state that the topsoil resource is not valued is in conflict with the established site processes such as the annual plan, GDP process, monthly rehabilitation/disturbance reporting and others.

It is acknowledged that HVO does have procedures and practices for topsoil management in place but there was limited evidence to confirm that those procedures are consistently implemented, nor any monitoring to assess the effectiveness of those procedures. Issues of concern identified during the audit may be addressed with the development of a revised topsoil management plan. Development and implementation of this plan will be monitored during future inspections by the Regulator.

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Audit conclusions

From the evidence reviewed and observations made on site during the audit, it is concluded that HVO has established procedures and processes for the stripping, handling, and management of topsoil from its mining operations. Several issues of concern were noted by the audit team that may indicate that these procedures and processes may not be effective in managing the risks associated with the management of topsoil resources on the site.

One non-compliance ranked NC2 and five observations of concern were noted by the auditor as summarised in Table 2 and Table 3 below.

Table 2 Summary of non-compliances identified

NON- COMPLIANCE NO.	DESCRIPTION OF ISSUE	RECOMMENDATION
1	The key observation from the audit relating to topsoil stockpiling was that topsoil did not appear to be separately stockpiled based on topsoil quality as indicated in section 2.4.2.4 of the MOP. It is possible for topsoil stripped from a pasture area to be stockpiled with topsoil stripped from a native woodland area that may have implications for vegetation establishment when topsoil is reused. Similarly, there does not appear to be any distinction between stockpiling alluvial topsoil and stockpiling gravelly soils or acid topsoils.	This should be addressed during the development of the topsoil management plan being prepared in response to the Section 240 direction issued in October 2018.

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Table 3 Summary of observations of concern identified

OBSERVATION OF CONCERN NO.	DESCRIPTION OF ISSUE	RECOMMENDATION
1	Generally, the descriptions in the MOP relating to topsoil management are very brief and quite generic using language such as 'where possible' or 'if required'. Using a risk-based approach to topsoil management, it would be expected that some form of trigger action response plan (TARP) would be available to provide the triggers for 'when' a particular control might be required.	This should be addressed during the development of the topsoil management plan being prepared in response to the Section 240 direction issued in October 2018.
2	One older stockpile (possibly 15+ years old) was observed to be located next to a laydown area for high density polyethylene pipe (HDPE pipe). Although the stockpile was well vegetated and signposted, there was a risk that vehicles could inadvertently impact the stockpile during placement or retrieval of the pipe sections. The location of the laydown area for the HDPE pipe would not appear to be consistent with the location principles for topsoil stockpiles specified in the MOP.	HVO should review the risks associated with the pipe laydown area adjacent to the topsoil stockpile and implement controls as required.
3	It was noted that Table 10 of the MOP does identify the erosion potential of each soil type but does not provide any guidance on when erosion and sediment controls are required for topsoil stockpiles.	This should be addressed during the development of the topsoil management plan being prepared in response to the Section 240 direction issued in October 2018.

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OBSERVATION OF CONCERN NO.	DESCRIPTION OF ISSUE	RECOMMENDATION
4	Although HVO staff advised that topsoil stockpiles were inspected, this process appears to be informal and not documented. Issues with stockpiling identified by the auditors may have been identified earlier if a more robust and documented inspection regime was in place.	This should be addressed during the development of the topsoil management plan being prepared in response to the Section 240 direction issued in October 2018.
5	A maintenance program for the topsoil stockpiles was reported to be implemented. There were no records provided to verify that this program is documented and is consistently implemented. Given that there was no formal inspection program, it was difficult to see how the maintenance program was triggered. If issues are identified during the informal inspections, there does not appear to be a system in place to record those issues, assign actions and verify completion of corrective actions.	Development of a robust inspection and maintenance program for topsoil stockpiles would be beneficial to achieving more successful rehabilitation outcomes.



DOC19/640118

Mr Andrew Speechly Manager Environment & Community Hunter Valley Operations PO Box 315 Singleton NSW 2330 By email: andrew.speechly@hvo.com.au

Dear Mr Speechly

Subject: Compliance Audit – Hunter Valley Operations South

An audit of the topsoil management activities associated with the Hunter Valley Operations South was undertaken on 5 June 2019 as part of the compliance audit program undertaken by the Department of Planning, Industry & Environment (DPIE) – Resources Regulator (the Regulator).

We now offer you the opportunity to review the draft compliance audit report and submit any comments you may have regarding the content of the report to Jenny Ehmsen by 9 August 2019 so that they may be considered in finalising the report. We further advise that any comments provided by you will be attached to the final report as an Appendix. If, however, we have not received a response by the above date, we will assume that you are satisfied with the report and it will then be finalised. A copy of the final report will then be forwarded to you.

You should note that the Regulator will be publishing the final audit report on its website, which will include any response you provide to the draft audit report.

If you require further information or clarification on any matters regarding this audit, please do not hesitate to contact Jenny Ehmsen on 02 4063 6443.

Yours sincerely

Jeenif Elizen

Jenny Ehmsen Principal Compliance Auditor

29 July 2019

HUNTER VALLEY OPERATIONS

Friday 9 August 2019

Jenny Ehmsen Principal Compliance Auditor NSW Resources Regulator PO Box 344 HRMC NSW 2310

Dear Jenny,

Draft Compliance Audit Report – Topsoil HVO South

Thank-you for the opportunity to provide comment on the draft audit report received 29 July 2019. The following comments are made for your consideration.

Page 5, Audit Criteria

The following dot point references an internal procedure and should not reference Audit Methods

- commitments made in the HVO Environmental Procedure EP 5.1 Audit Methods

Page 10, para 2:

Inspections of work areas by the Mine Services Supervisor are a formal requirement of their role, reference made to informal inspections should be deleted.

Topsoil stripping operations at HVO are carried out by contractors. HVO is generally relying on the experience of its contractors to undertake effective topsoil stripping and achieve correct stripping depths. Monitoring of the stripping activities is carried out by the mine services supervisor 'once or twice per day' through informal-inspections. These inspections are reported to include visual monitoring of the stripped top soil depth but are not documented. During stripping, topsoil is pushed up into windrows and surveyed to establish topsoil volumes before being loaded into trucks for direct placement or stockpiling.

Page 13, Inspection and maintenance of stockpiles:

There does not appear to be an understanding of how topsoil health might decline over time.

HVO disagrees with the statement. Site procedures and practices are designed to maintain topsoil health by prompt re-use and, where it is necessary to stockpile, maintain stockpile health within the constraints of operations. Audit observations confirm that site stockpiles are consistently constructed to not more than 3m height - the industry standard to balance stockpile health decline with stockpile volume. Examples of stockpiles sown to native cover to assist in the maintenance of stockpile health were also observed, and there was information provided during the audit as to a range of corrective

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actions which may be utilised to reactivate soil microbiology in long term (life of mine) stockpiles ahead of reuse.

Page 14, Record Keeping

It was noted that mine planning and rehabilitation planning do not necessarily interact, indicating that topsoil may not necessarily be seen as a valuable resource.

HVO considers that mine planning and rehabilitation are directly linked. Rehabilitation progression is planned in the context of mine progression and submitted during the MOP process. Areas for rehabilitation establishment are reviewed and re-confirmed as a component of the annual planning process, including checks to ensure ongoing compliance with MOP and Approval commitments. Topsoil is a highly valued resource as demonstrated by the existing site procedures which serve to ensure it is not disturbed, either initially or from rehabilitation areas, without appropriate controls and tracking, and is not wasted. To state that the topsoil resource is not valued is in conflict with the established site processes such as the Annual Plan, GDP process, monthly rehabilitation/disturbance reporting supported by survey, stockpiling procedures and use of incident processes when unapproved disturbance occurs, These processes were validated by the audit as present and in effect.

Should you have any queries in relation to these comments please do not hesitate to contact me.

Yours Sincerely

Andrew Speechly Manager Environment and Community