



Appeals Convenor
Environmental Protection Act 1986

**REPORT TO THE
MINISTER FOR ENVIRONMENT**

APPEAL IN OBJECTION TO THE AMENDMENT OF A LICENCE
L5099/1974/14: PORT OF ESPERANCE
ESPERANCE

LICENCE HOLDER: SOUTHERN PORTS AUTHORITY

Appeal Number 024 of 2018

May 2019

Appeal Summary

This is a report on an appeal lodged in objection to the decision of the Department of Water and Environmental Regulation (DWER) to amend Licence L5099/1974/14 applying to the Port of Esperance to allow the bulk handling of, amongst other things, nickel and copper concentrate.

The appellant raised a number of concerns in relation to the health effects of the nickel and silica dioxide, and submitted that the controls on the licence were not sufficient to protect the community. The appellant sought for nickel concentrate to be handled in a fully containerised system and additional controls to manage the health risks associated with nickel.

In response to the appeal, DWER advised that it applied relevant health criteria and sought advice from Department of Health to inform its assessment of risk to public health from dust containing nickel. In relation to the open loading system for the nickel concentrate, DWER advised that it reviewed monitoring data from trial shipments and considered that the emissions were adequately managed to meet the works approval/licence limits and World Health Organization guidelines by the controls which includes moisture limits, operating misting sprays during loading, and monitoring and reporting for nickel concentrations.

The Appeals Convenor noted DWER's advice that the main component of the nickel concentrate (pentlandite) is not a known carcinogen. It was also noted that a low proportion of nickel sulfide (in the form of NiS_2) and nickel hexahydrate are present and NiS_2 has been found to be potentially carcinogenic. Nickel subsulfide is unlikely to be present and is considered to be carcinogenic. Silica dioxide is also a known carcinogen, but the respirable content is present in low quantities.

The conditions set to manage risks for the nickel concentrate requires monitoring of nickel subsulfide. Noting that NiS_2 and respirable silica quartz are potentially carcinogenic and are present within the nickel concentrate (albeit in low percentages), it is recommended that a monitoring condition be applied for these components of the nickel concentrate as a precautionary measure in the same manner for nickel subsulfide.

For the reasons set out in this report, it is considered that DWER had regard to the matters raised by the appellant and that the conditions applied were appropriate to manage the risks of dust emissions from the bulk handling of nickel. However, it is considered that monitoring conditions for nickel concentrate can be strengthened to include NiS_2 and respirable silica quartz.

Recommendation

The Appeals Convenor recommended that the appeal be allowed to the extent that Condition 17 Table 3 be amended to require the following monitoring:

- NiS_2 – annual assays and reporting; and
- Silica – annual assays and reporting.

It is otherwise recommended the appeal be dismissed.

INTRODUCTION

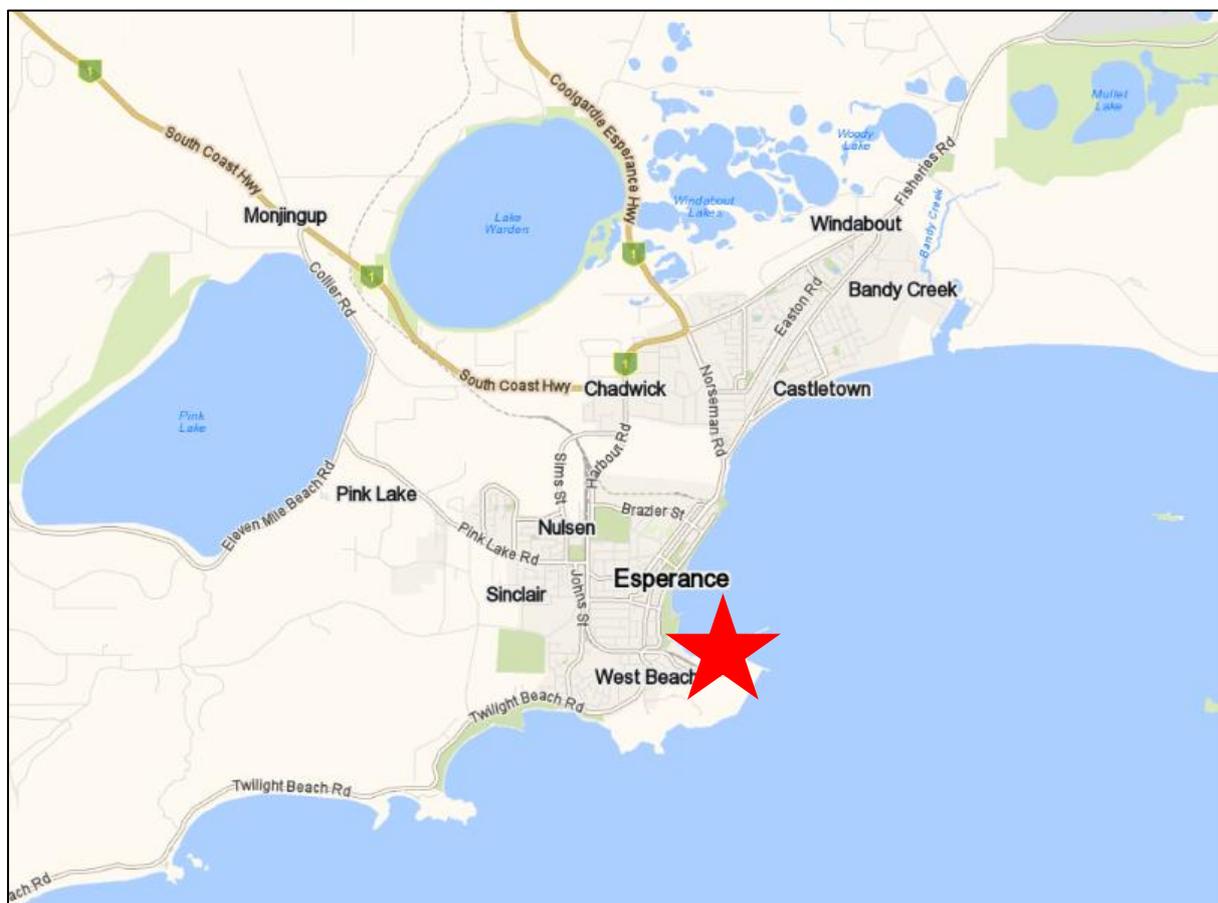
This report relates to an appeal lodged by Ms Michelle Crisp (the appellant) in objection to the amendment of Licence L5099/1974/14 (the licence) issued to the Southern Ports Authority (the licence holder) by the Department of Water and Environmental Regulation (DWER) in respect of the Port of Esperance (the Port).

The premises is licensed under Part V of the *Environmental Protection Act 1986* (EP Act) for Category 58, Category 58A (bulk material loading or unloading), and Category 82 (boat building and maintenance) as defined under Schedule 1 of the *Environmental Protection Regulations 1987*.

The Port is the largest nickel concentrate port in the Southern Hemisphere, exporting over 15 million tonnes per annum of bulk material comprising iron ore, nickel concentrate and grain.

The location and site layout of the premises are shown in Figures 1 and 2, respectively.

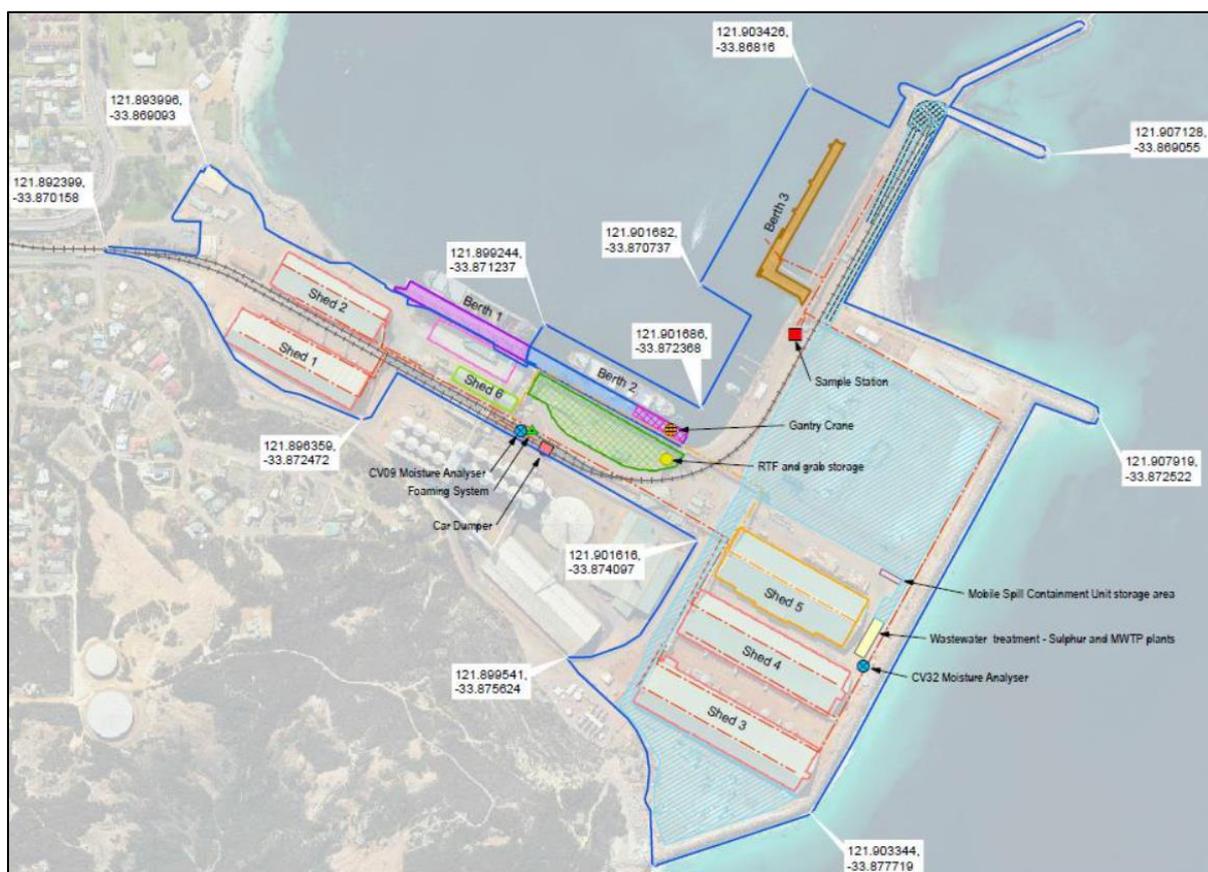
Figure 1 – Location of the premises



(Source: Whereis, 2019)

This document is the Appeals Convenor's formal report to the Minister for Environment under section 109(3) of the EP Act.

Figure 2 – Port of Esperance site layout (prescribed premises boundary in blue)



(Source: DWER, 2018)

Background

The licence holder was granted Works Approval (W5840/2015/1) on 4 January 2016 for trial shipments of copper and nickel concentrates using an open loading system (Rotabox system) through the Port. The works approval was amended by DWER on 5 January 2018 to require at least three trials be conducted during summer months. It is understood this was based on Department of Health (DoH) advice to collect monitoring data to ensure that ambient dust concentrations of copper and nickel concentrations do not exceed limits during onshore winds, as this season has the highest potential to impact residential areas.

DWER undertook a risk-based review of the licence in early 2018 and during this time the licence holder applied for further amendments, which included increased volumes of bulk nickel and copper concentrates.

On 1 October 2018, DWER amended the licence to, among other things, authorise the bulk handling of nickel and copper concentrates. The amendments relevant to the appeal are as follows:

- additional conditions for nickel and copper concentrate acceptance and monitoring;
- additional conditions related to monitoring and reporting for limits applied to nickel and copper concentrations as PM₁₀; and
- transfer of conditions from Works Approval W5840/2015/1 to authorise bulk handling of nickel and copper concentrate using a Rotabox system.

It was against this amendment that the appeal was received.

On 25 September 2018, the licence holder applied for a licence amendment to authorise the operation of a hybrid car dumper for the in-loading of iron ore and other additional amendments. This licence was further amended by DWER on 22 October 2018, however this amendment is not subject to the current appeal.

OVERVIEW OF APPEAL PROCESS

In accordance with section 106 of the EP Act, a report was obtained from DWER in relation to the issues raised in the appeal. The licence holder was also given the opportunity to address the matters raised in the appeal.

During the appeal investigation, the Appeals Convenor consulted the appellant and the licence holder in relation to issues raised in the appeal. The appellant requested a copy of DWER's report on the appeals, and provided additional information in response which was considered during the appeal investigation.

The environmental appeals process is a merits-based process. Appeal rights in relation to an amendment to a licence relate only to the amendment, and not to elements of the licence that are not amended. The Appeals Convenor normally considers consistency with any conditions set under Part IV of the EP Act and previous Ministerial appeal determinations, as well as new information or evidence being presented that was not previously considered. Enforcement and compliance with the conditions of a licence is a matter for DWER as the regulator and issues of this nature are considered to be outside the scope of an appeal against an amendment to a licence.

OUTCOMES SOUGHT BY APPELLANT

The appellant is seeking for the licence conditions to be amended so that bulk handling of nickel concentrate occurs within a fully containerised system and for additional conditions to be included.

GROUND OF APPEAL

The concerns raised by the appellant are summarised under the following broad grounds:

1. Nickel concentrate; and
2. Bulk handling of nickel concentrate.

GROUND 1: NICKEL CONCENTRATE

Referring to the World Health Organization (WHO) International Agency for Research on Cancer's (IARC) report¹ which classified all nickel compounds as human carcinogens by inhalation and an article by Schaumlöffel,² the appellant submitted that condition 15 (which prohibits bulk handling of concentrate containing nickel subsulfide) should be extended to also apply to nickel sulfides (NiS, NiS₂, Ni₂S₃) and nickel sulfate hexahydrate (NiSO₄.6H₂O). The appellant also sought to have the above nickel species included in condition 17 Table 3 which requires the licence holder to assay representative samples and report on results.

Based on the potential health risks of nickel subsulfide and the variability of nickel concentrate composition, the appellant was of the view that the annual reporting as required under condition 17 Table 3 was insufficient, and should be replaced with a requirement that representative samples be assayed and reported on a monthly basis.

¹ WHO IARC (2012). *IARC monographs on the evaluation of carcinogenic risks to humans, volume 100C. Arsenic, Metals, Fibres and Dusts*. Accessed at: monographs.iarc.fr/wp-content/uploads/2018/06/mono100C-10.pdf.

² Schaumlöffel (2012). *Journal of Trace Elements in Medicine and Biology, Nickel species: Analysis and toxic effects*.

The appellant also submitted that there should be monitoring conditions for respirable silica quartz (SiO₂) in the nickel and copper concentrates, in the same manner as those applied to spodumene in condition 20(k) and Table 4.

Consideration

Nickel speciation

In response to this element of the appeal, DWER noted that the predominant nickel species proposed to be handled at the Port is pentlandite ((NiFe)₉S₈), which is not a carcinogen. DWER also noted that the Schaumlöffel article³, referenced by the appellant, stated that pentlandite is very different from sulfidic nickel species found in refining and has not been shown to be carcinogenic in animal experiments.

In relation to nickel sulfate hexahydrate (NiSO₄.6H₂O), DWER noted that the concentrate to be handled at the Port will only comprise approximately 1% of this compound, and in any event, it has been found to be non-carcinogenic in testing on animals.⁴

In relation to nickel sulfides (NiS, NiS₂, Ni₂S₃), DWER quoted IARC as concluding that:

... while mixtures of nickel compounds will be retained as a group 1 metal (carcinogenic to humans), there is insufficient evidence for carcinogenicity for certain nickel species including nickel sulfide.⁵

The appellant was given the opportunity to respond to DWER's advice. In response, the appellant submitted that DWER quoted the IARC report out of context, as the full statement is:

There is *sufficient evidence* in experimental animals for the carcinogenicity of nickel monoxides, nickel hydroxides, nickel sulfides (including nickel subsulfide), nickel acetate, and nickel metal.

...

There is *inadequate evidence* in experimental animals for the carcinogenicity of nickel titanate, nickel trioxide, and **amorphous** nickel sulfide. [emphasis added in bold]⁶

Referring to the licence holder's Safety Data Sheet which details the composition of the nickel concentrate expected to be handled at the Port, the appellant noted that the product does not contain amorphous nickel sulfide.

Additional information was sought from DWER in regard to this element of the appeal. In its additional advice, DWER acknowledged that nickel sulfide in the form of NiS₂ has been determined through experimental studies on animals to potentially cause cancer. Notwithstanding this, DWER noted that only 1-2% of the nickel concentrate proposed to be handled at the Port is nickel sulfide (in the form of NiS₂) with the balance of the other, non-carcinogenic nickel species. Based on what it described as the 'very low percentage' of NiS₂ in the exported concentrate, DWER advised that:

... controls placed on the licence were adequate for the protection of public health [and] include controls for handling equipment, dust suppression infrastructure, moisture content and speciation limits as well as frequent ambient air quality monitoring and reporting ...

³ Schaumlöffel (2012). *Journal of Trace Elements in Medicine and Biology, Nickel species: Analysis and toxic effects*, p4.

⁴ DWER, Additional advice, 12 March 2019, Attachment, p4.

⁵ DWER, *Response to the appeal*, 5 December 2018, p6.

⁶ WHO IARC (2012). *IARC monographs on the evaluation of carcinogenic risks to humans, volume 100C. Arsenic, Metals, Fibres and Dusts*. p210-211

There are no foreseeable circumstances in which the proportions [of NiS₂] would increase in the nickel concentrate, and therefore no potential for increased risk that warrants ongoing monitoring for [this compound].⁷

Further advice was sought from the licence holder in response to DWER's advice and specifically as to the implications for nickel sulfide (NiS₂) monitoring being required in a similar manner to nickel subsulfide. In response, the licence holder advised that neither nickel sulfide (NiS₂) or nickel sulfate hexahydrate had been detected in recent assays conducted on its behalf, and the majority of the nickel proposed to be handled at the Port is pentlandite, which it submitted is not carcinogenic.

Condition 17 (Table 3) of the licence requires monitoring of nickel subsulfide. This substance, although carcinogenic, is not expected to be present within the nickel concentrate.

Notwithstanding the licence holder's advice that nickel sulfide (NiS₂) was not found in recent sampling, based on the potential for this compound to be carcinogenic, and noting that there is a history of concern regarding the impact of the transport of nickel through the Port,⁸ it is considered appropriate that monitoring of this compound be undertaken as a precautionary approach to confirm that if it is present, it is present in very low volume. Ongoing monitoring in this manner will assist in verifying the licence holder's assumptions on the product and the risk assessment for the activities.

Nickel subsulfide monitoring

In response to the appellant's request for the licence to be amended to require monthly assaying and reporting of results for nickel subsulfide, DWER advised it is unlikely:

... nickel subsulfide will be present because the geology and metallurgy of the parent nickel deposit and nickel concentrate processing plant is known and not subject to change to the point where nickel subsulfide will be identified. Therefore DWER considers that the precautionary principle has been applied in requiring representative samples to be monitored and reported annually.⁹

DWER added that the purpose of the current annual assay and reporting requirements was to confirm and record that the nickel subsulfide is not present, consistent with the requirements of condition 15. DWER stated that the requirement was not intended to be a preventative measure to trigger a corrective action if nickel subsulfide is found.¹⁰

During an appeal meeting, the licence holder provided an explanation that nickel subsulfide is formed through the smelting process and therefore the nickel concentrate does not contain nickel subsulfide.

Respirable silica quartz

In regard to the appellant's concerns about silica dioxide (quartz), DWER advised that it is present within the product in concentrations of approximately 3.5-4.5%, with respirable content representing 0.1%. DWER noted that the mine aims to minimise silica quartz content within the nickel concentrate for improved product quality:

The metallurgy and geology of the concentrate is a known constant that is not subject to change to the point where the respirable fraction of crystalline silica could be identified in concentrations significantly greater than 0.1%. There is no measurable increase in risk as

⁷ DWER, *DWER responses to issues raised by the appellant*, 12 March 2019, p4.

⁸ Legislative Assembly, Parliament of Western Australia (2007). Education and Health Standing Committee: *Inquiry into the cause and extent of lead pollution in the Esperance area*. Report No. 8 in the 37th Parliament, p323.

⁹ DWER, *DWER responses to issues raised by the appellant*, 12 March 2019, p5.

¹⁰ DWER, *Response to the appeal*, 5 December 2018, p7.

a result of crystalline silica from the nickel concentrate assessed for handling at the Esperance Port.¹¹

In comparison, condition 21(k) requires the licence holder to ensure that respirable silica quartz content in a representative sample of spodumene does not exceed 1% by weight.

In its response to this element of the appeal, the licence holder advised that:

The quartz content of nickel and sulphide concentrates (up to 5%) is approximately half that of spodumene concentrates (ca. 10%). As the respirable quartz content of IGO Noval Nickel concentrate was measured as 0.123% it was only just above the Safework Australia criteria of 0.1% for classification as carcinogenic on an Australian SDS as well below the DWER/European criteria of 1% for safe handling of bulk materials at ports. Hence such a significant increase is unlikely.

Based on the above, [we do] not consider the replication of condition 20(k) is warranted. However, [we] would accept a quarterly monitoring requirement for silica if considered necessary.

Noting that crystalline silica is considered a Group 1 carcinogen by the IARC and that the licence holder is amenable to undertake quarterly monitoring for this substance, it is considered that condition 17 Table 3 be amended to include respirable silica quartz.

Conclusion

From the above it is noted that the main components of the nickel concentrate to be handled at the Port (pentlandite and nickel hexahydrate) are non-carcinogenic. A low proportion of nickel sulfide (in the form of NiS₂), which is potentially carcinogenic, is present in the material to be handled in the Port, while nickel subsulfide (carcinogenic) is unlikely to be present. Controls applied to the licence to manage dust emissions, which include infrastructure, dust suppression and monitoring requirements, are considered to be appropriate to manage risks to human health.

However, noting that nickel sulfide (NiS₂) and respirable silica quartz have shown to be potentially carcinogenic and are present within the nickel concentrate (albeit in low percentages), it is recommended as a precautionary measure, that condition 17 Table 3 be amended to require the following monitoring type and frequency:

- NiS₂ – annual assays and reporting; and
- Silica – annual assays and reporting.

It is otherwise recommended that this ground of appeal be dismissed.

GROUND 2: BULK HANDLING OF NICKEL CONCENTRATE

The appellant submitted that nickel concentrate has been handled successfully within a fully containerised system since 2012 and that this should continue in order to protect the community from long-term health effects of nickel and comply with the WHO guidelines.

Noting that PM₁₀ is a sub-fraction (estimated 40% to 50%) of total suspended particles (TSP) and that the monitoring method has been changed from TSP to PM₁₀, the appellant submitted that the licence limit for nickel ought to have been proportionally reduced from 0.14 µg/m³ to 0.06 µg/m³. In addition, the appellant submitted in any event that a limit of 0.14 µg/m³ or 0.06 µg/m³ would be inadequate to ensure that the WHO guideline of 0.003 µg/m³ is met. The appellant also submitted that the monitoring requirements are ineffectual as there are no conditions that require actions in response to monitoring results.

¹¹ Ibid. p6.

The appellant also submitted that conditions should be added to the licence to require that bulk handling of nickel only occurs when prevailing winds are blowing away from residential properties in Esperance and that all containers should be washed after being emptied in order to manage fugitive dust.

Consideration

TSP and PM₁₀ monitoring

In relation to the appellant's claims about the correct limits on ambient nickel concentrations, it is noted that DWER took into account advice from DoH as part of its consideration of the application to amend the licence:

DoH has established the target health guideline for nickel (as PM₁₀) to be an annual averaged daily exposure level of 0.003 µg/m³ based on a lifetime of continuous exposure (DoH, 2015). This guideline is based on the WHO annual average guideline of 0.003 µg/m³.

A 24-hour guideline of 0.14 µg/m³ has been adopted by DWER on advice from DoH to protect the community against short-term respiratory effects of nickel dust, such as bronchitis, sinusitis and exacerbation of asthma (DoH, 2008; Goetzmann, 2009). This guideline is different to the annualised guideline in that it protects against short-term health effects while the annualised guideline is for the protection of potential long-term effects from specific types of nickel. Regular instances where short-term guidelines are narrowly met, or even exceeded, increase the likelihood of exceedances of annualised guideline levels.¹²

In further advice provided during the appeal investigation, DWER explained the reasoning behind the TSP and PM₁₀ monitoring, and the 0.14 µg/m³ limit:

The origin of the 0.14 µg/m³ limit was originally determined against PM₁₀ (not TSP) by Principal Toxicologist of the DoH, Mirella Goetzmann [who noted] that "Comparing Esperance TSP nickel data with standards based on PM₁₀ nickel data might be problematic for Esperance, because the relevant PM₁₀ concentration can only be assumed in the Esperance data."

On the basis of DoH advice and published monitoring reports, ambient TSP data cannot be accurately used to determine health risks associated with the inhalation of nickel as larger particles are not 'inhalable' in that they do not penetrate deeply into the lungs. Goetzmann determined that the 24-hour value of 0.14 µg/m³ for ambient nickel as PM₁₀ is protective of public health for acute effects with specific reference to the Esperance community. This value has since been recommended by the DoH as an appropriate limit for the purposes of licensing.

The appellant was provided with an opportunity to consider DWER's advice, and in response noted that larger particle sizes can also impact on public health. In additional advice on this issue, DWER agreed that:

... short-term exposure to nickel may result in allergic dermatitis. However, current 24-hour exposure limits for the protection of human health are considered to also protect against these dermatological effects. These effects are not considered by the ... WHO "to be critically linked to ambient air levels", which are more commonly the result of ingestion and direct contact with manufactured products such as coinage and household appliances ...¹³

In relation to the appellant's concerns regarding the actions required from monitoring results, DWER noted that exceedances of the PM₁₀ 24-hour licence limit for ambient nickel must be reported to DWER within 24 hours. Furthermore, DWER advised that it has the ability to amend the licence, issue orders or notices, and this may be done where the bulk handling of nickel is identified to present an unacceptable risk to the Esperance community.

¹² DWER, Decision Report: L5099/1974/14, 1 October 2018, p37.

¹³ Ibid.

Bulk handling of nickel concentrate in an open loading system (Rotabox)

In its Decision Report for the licence amendment, DWER considered the hazards associated with nickel being handled at the premises and stated:

Nickel and copper concentrates that are loaded in bulk using an open-materials handling method are delivered to the Premises in closed containers. It is not until the containers are placed below the vessel's hold that the lid of the containers are removed and the contents emptied using a Rotabox.¹⁴

In further advice provided during the investigation, DWER noted that previous incidents of nickel being detected in the Esperance community were found in part due to the poor conditions of the containers during fully containerised loading. Schedule 3 Table 11 of the licence lists the infrastructure and equipment operational requirements, with item 14 requiring the licence holder to:

... ensure that all containers used for the transport of nickel or copper concentrate remain closed at all times when outside of the vessel's hold, with the exception of containers opened for the purposes of sampling product.

The integrity of the loading containers must be maintained so that they are fit for the purpose of transporting nickel or copper concentrates into a vessel's hold without emissions, spillage or loss of nickel concentrate or copper concentrate whilst in transit or storage.

The Licence Holder must operate misting/fogging sprays at the top of the vessel's hold at all times during the loading of nickel and copper concentrates.¹⁵

Schedule 2 Table 10, item 4 of the licence similarly requires metal concentrates (nickel and copper) to be transported to and stored on the premises within enclosed containers, and loaded onto the ship using a rotating tipping frame.

DWER advised that it conducts routine compliance inspections of the Port and a recent inspection (February 2019) showed that the containers were compliant with the licence conditions and that the storage area for the containers is now located 300 metres further from the nearest residential receptor.

In response to the appellant's concern regarding the open loading system, DWER advised that:

A total of seven trial shipments of nickel concentrates using the Rotabox bulk handling system were conducted during the period June 2017 to March 2018 under Works Approval W5840/2015/1. During shiploading, PM₁₀ nickel concentrations at ambient air quality monitoring sites ranged from below detectable levels (0.00066 µg/m³) to 0.02 µg/m³. These data indicate some variability of concentrations but do not mean that the WHO Guideline will be exceeded when derived as an annual average value.

...

In relation to the Appellant's request for container wash down requirements, the Department notes that water misting sprays are in operation when containers are emptied into the ship's hull thereby suppressing dust particles that could otherwise be liberated and adhere to the surface of containers potentially leading to fugitive emissions when the containers are moved.¹⁶

The first three trials of ship loading with the Rotabox system were undertaken between 24 June 2017 and 6 October 2017. Across the three trials, the maximum concentrations of

¹⁴ DWER, Decision Report: L5099/1974/14, 1 October 2018, p36.

¹⁵ DWER, Licence L5099/1974/14, 1 October 2018, p25.

¹⁶ DWER, Response to the appeal, 5 December 2018, pp 3-5.

PM₁₀ nickel were 0.002 µg/m³ to 0.0021 µg/m³ and were not attributed to ship loading activities but construction at the Port and house demolition.¹⁷

A further three trials (two involving nickel concentrate) were conducted during the 2017/18 summer months when onshore winds (towards residential areas) were prevalent. The maximum 24-hour PM₁₀ nickel concentration was 0.02 µg/m³ during the loading on 3 February 2018 at Site 4 and the maximum concentrations for the other shipment on 4 October 2017 was 0.0014 µg/m³. The report noted that the maximum boundary PM₁₀ nickel concentration of 0.02 µg/m³ is seven times lower than the limit of 0.14 µg/m³ in the works approval.¹⁸

The six-monthly summer average (October 2017 to March 2018) of nickel in PM₁₀ during ship loading was 0.0009 µg/m³ at Site 5 and 0.0022 µg/m³ to 0.0024 µg/m³ at Sites 1 to 4, and the yearly average was 0.0008 µg/m³ at Site 5 and 0.0019 µg/m³ to 0.0021 µg/m³ at Sites 1 to 4.¹⁹ Sites 1 to 4 are at the boundary of the premises, while Site 5 is a community reference site approximately 1 km northwest of the Port.

Figure 3 – Air quality monitoring locations



(Source: MBS Environmental, 2018)

¹⁷ MBS Environmental (November 2017). *Nova Project: Port of Esperance Air Quality Assessment Copper and Nickel Concentrate Shipping*, p21.

¹⁸ MBS Environmental (May 2018). *Nova Project: Port of Esperance Air Quality Assessment Works Approval Compliance Copper and Nickel Concentrate Shipping*, pp29-20.

¹⁹ Ibid. p32.

Wind direction and washing of containers

In relation to the appellant's requests for conditions related to wind direction the licence holder responded that at the request of DoH:

... monitoring of the ship loading trial was extended to capture the most extreme summer weather conditions for onshore winds (towards housing) and dry conditions. Although trace influence at the [Southern Ports] boundary was seen on one particular loading day (maximum of 0.023 $\mu\text{g}/\text{m}^3$ PM₁₀ nickel versus licence 0.14 $\mu\text{g}/\text{m}^3$), results on all other days and overall during onshore winds demonstrated the effectiveness of controls. Based on measured risk and the prohibitive cost and disruptive effect on ... commercial activity of not shipping during onshore winds, implementation of loading only during offshore winds is not at all warranted based on the risk profile ...²⁰

As mentioned above, on the advice of DoH the trial ship loading events in 2017 and 2018 were required to be during the summer months with onshore winds. The monitoring results for these trials were below the 0.14 $\mu\text{g}/\text{m}^3$ limit in the works approval and the calculated annual average 24-hour PM₁₀ nickel concentration was under the WHO guideline of 0.003 $\mu\text{g}/\text{m}^3$.

In response to the appellant's suggested condition requiring containers to be washed down after being emptied, the licence holder responded that:

During the trial shipments, the containers are fully rotated 180 degrees inside the ships hold to empty all the product. However, if the product is overly damp a very small amount can lodge on the leading edge corners of the container. This was identified during the trial and was addressed by inspecting each container after it has been emptied on the berth and any lodged material being vacuumed into a filter bag. The filter bags are then manually emptied into the ships hold or into a sealed container and the contained product returned to the mine site for reprocessing. It is also noted that vacuuming is preferred and used in place of washing as it has proven effective but does not create the large amounts of water which must then be filtered/treated prior to disposal.

This process was put into place voluntarily and captured in the EMP. Commercial terms with the stevedores ensure Qube continue this practice ... and [makes] a statutory requirement unnecessary.²¹

DWER similarly was of the view that additional controls were not required and advised that:

... [it] has mandated appropriate infrastructure, operational and monitoring controls relating to product specifications including moisture and speciation limits, handling methods (Rotabox), dust mitigation controls during loading (eg misting sprays) and monitoring and reporting requirements for nickel and copper concentrations as PM₁₀. The Department has also reviewed monitoring data collected during the trial shipments and found that emissions were adequately mitigated by the controls currently in place.²²

Conclusion

From the above it is noted that the:

- 24-hour average concentration of nickel in PM₁₀ of 0.14 $\mu\text{g}/\text{m}^3$ was considered by DoH to be the appropriate fraction to monitor for health effects;
- monitoring results from the trial shipments showed that the nickel concentrations in PM₁₀ were under the works approval/licence limit of 0.14 $\mu\text{g}/\text{m}^3$ and included trial shipments during prevailing winds towards residential areas in summer;
- six monthly (October to March) and annual average 24-hour PM₁₀ nickel concentrations across all monitoring sites were under the annual WHO guideline of 0.003 $\mu\text{g}/\text{m}^3$;

²⁰ Southern Ports, *Response to the appeal*, 19 November 2018, p3.

²¹ Ibid. p5.

²² DWER, *Response to the appeal*, 18 December 2018, p4.

- the licence requires a range of infrastructure, operational and monitoring controls to control dust emissions from the loading of nickel concentrate; and
- the licence holder has a procedure to ensure that nickel dust remaining in emptied containers is collected.

On the basis of the above, it is considered that DWER had regard to the matters raised by the appellant and the conditions applied were appropriate to manage the risks of dust emissions from the bulk handling of nickel. It is recommended that this ground of appeal be dismissed.

OTHER MATTERS

The appellant also provided submissions in relation to matters that do not refer to the amended licence and are therefore, beyond the scope of the appeal. Specifically, the appellant submitted that:

- additional conditions should be imposed to require trucks and containers be washed prior to leaving the mine site to manage fugitive dust (nickel and copper emissions); and
- the nickel subsulfide formula in the licence is incorrect and is actually the formula for nickel sulfide.

In regard to the washing of trucks and containers leaving the mine site, the licence holder advised that Licence L8880/2015/1 for the Nova Nickel Project contains conditions to that effect.

As for the nickel subsulfide formula used in the licence, DWER advised that the appellant correctly identified that the chemical formula for nickel subsulfide is Ni_3S_2 and acknowledged that the use of the formula of Ni_2S_3 in the licence was an administrative error that will be corrected to Ni_3S_2 through the next amendment.

CONCLUSION AND RECOMMENDATION

Following the consideration of the issues raised in the appeal, advice from DWER and the information provided by the licence holder it is considered that DWER had regard to the matters raised by the appellant and the conditions applied were appropriate to manage the risks of dust emissions from the bulk handling of nickel.

Notwithstanding this conclusion, noting that nickel sulfide (NiS_2) and respirable silica quartz have shown to be potentially carcinogenic and are present within the nickel concentrate (albeit in low percentages), it is recommended as a precautionary measure, that condition 17 Table 3 be amended to require the following monitoring type and frequency:

- NiS_2 – annual assays and reporting; and
- Silica – annual assays and reporting.

It is otherwise recommended the appeal be dismissed.

Any changes to the conditions made by the Minister will be given effect by DWER in accordance with section 110 of the EP Act.

Emma Gaunt
APPEALS CONVENOR

Investigating Officers:

Cassie Chew, A/Senior Appeals Officer
Tonya Carter, Senior Appeals Officer