



Revised Works Approval

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| Works Approval Number | W6117/2018/1 |
| Works Approval Holder | BHP Billiton Nickel West Pty Ltd |
| ACN | 004 184 598 |
| Registered business address | 125 St Georges Terrace PERTH WA 6000 |
| DWER File Number | DER2018/000072 |
| Duration | 13/07/2018 to 12/07/2023 |
| Date of issue | 13/07/2018 |
| Date of last Amendment | 26/03/2021 |
| Premises details | Kwinana Nickel Refinery 270 Patterson Road KWINANA BEACH WA 6167 Legal description: Lot 89 on Deposited Plan 411084 Certificate of Title Volume 2958 / Folio 292 As shown in the premises map in Schedule 1. |

| Prescribed premises category description (Schedule 1, <i>Environmental Protection Regulations 1987</i>) | Assessed production capacity |
|---|--|
| Category 31: chemical manufacturing | 100,000 tonnes per year annum (nickel sulfate) |

This Revised Works Approval is granted to the Works Approval Holder, subject to the following conditions, on 26 March 2021, by:

Caron Goodbourn
Manager, Process Industries
an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Explanatory notes

These explanatory notes do not form part of this Works Approval.

Defined terms

Definition of terms used in this Works Approval can be found at the start of this Works Approval. Terms which are defined have the first letter of each word capitalised throughout this Works Approval.

Department of Water and Environmental Regulation

The Department of Water and Environmental Regulation (DWER) is established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V, Division 3 of the *Environmental Protection Act 1986* (WA) (EP Act). The Department also monitors and audits compliance with licences and works approvals, takes enforcement action and develops and implements licensing and industry regulation policy.

Works Approval

Section 52 of the EP Act provides that an occupier of any premises commits an offence if any work is undertaken on, or in relation to, the premises which causes the premises to become, or to become capable of being, Prescribed Premises, except in accordance with a works approval.

Section 56 of the EP Act provides that an occupier of Prescribed Premises commits an offence if Emissions are caused or increased or permitted to be caused or increased, or Waste, noise, odour or electromagnetic radiation is altered or permitted to be altered from Prescribed Premises, except in accordance with a works approval or licence.

Categories of Prescribed Premises are defined in Schedule 1 of the *Environment Protection Regulations 1987* (WA) (EP Regulations).

This Works Approval does not authorise any activity which may be a breach of the requirements of another statutory authority including, but not limited to, the following:

- conditions imposed by the Minister for Environment under Part IV of the EP Act;
- conditions imposed by DWER for the clearing of native vegetation under Part V, Division 2 of the EP Act;
- any requirements under the *Waste Avoidance and Resource Recovery Act 2007*;
- any requirements under the *Environmental Protection (Controlled Waste) Regulations 2004*; and
- any other requirements specified through State legislation.

It is the responsibility of the Works Approval Holder to ensure that any action or activity referred to in this Works Approval is permitted by, and is carried out in compliance with, statutory requirements.

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| The Works Approval Holder must comply with the Works Approval. Contravening a Works Approval Condition is an offence under s.55 of the EP Act. |
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Responsibilities of Works Approval Holder

Separate to the requirements of this Works Approval, general obligations of Works Approval Holders are set out in the EP Act and the regulations made under the EP Act. For example, the Works Approval Holder must comply with the following provisions of the EP Act:

- the duties of an occupier under s.61; and
- restrictions on making certain changes to Prescribed Premises unless the changes are in accordance with a Works Approval, Licence, closure notice or environmental protection notice (s.53).

Strict penalties apply for offences under the EP Act.

Reporting of incidents

The Works Approval Holder has a duty to report to the Department all Discharges of Waste that have caused or are likely to cause Pollution, Material Environmental Harm or Serious Environmental Harm, in accordance with s.72 of the EP Act.

Offences and defences

The EP Act and its regulations set out a number of offences including:

- Offence of emitting an Unreasonable Emission from any Premises under s.49.
- Offence of causing Pollution under s.49.
- Offence of dumping Waste under s.49A.
- Offence of discharging Waste in circumstances likely to cause Pollution under s.50.
- Offence of causing Serious Environmental Harm (s.50A) or Material Environmental Harm (s.50B).
- Offence of causing Emissions which do not comply with prescribed standards (s.51).
- Offences relating to Emissions or Discharges under regulations prescribed under the EP Act, including materials discharged under the *Environmental Protection (Unauthorised Discharges) Regulations 2004 (WA)*.
- Offences relating to noise under the *Environmental Protection (Noise) Regulations 1997 (WA)*.

Section 53 of the EP Act provides that a Works Approval Holder commits an offence if Emissions are caused, or altered, from a Prescribed Premises unless done in accordance with a Works Approval, Licence or the requirements of a closure notice or an environmental protection notice.

Defences to certain offences may be available to a Works Approval Holder and these are set out in the EP Act. Section 74A(b)(iii) provides that it is a defence to an offence for causing Pollution, in respect of an Emission, or for causing Serious Environmental Harm or Material Environmental Harm, or for discharging or abandoning Waste in water to which the public has access, if the Works Approval Holder can prove that an Emission or Discharge occurred in accordance with a Works Approval.

This Works Approval specifies the Emissions and Discharges, and the limits and Conditions which must be satisfied in respect of specified Emissions and Discharges, in order for the defence to offence provision to be available.

Authorised Emissions and Discharges

The specified and general Emissions and Discharges from the Works authorised through this Works Approval are authorised to be conducted in accordance with the Conditions of this Works Approval.

Amendment of Works Approval

The Works Approval Holder can apply to amend the Conditions of this Works Approval under s.59 of the EP Act. An application form for this purpose is available from DWER.

The CEO may also amend the Conditions of this Works Approval at any time on the initiative of the CEO without an application being made.

Duration of Works Approval

The Works Approval will remain in force for the duration set out on the first page of this Works Approval or until it is surrendered, suspended or revoked in accordance with s.59A of the EP Act.

Suspension or revocation

The CEO may suspend or revoke this Works Approval in accordance with s.59A of the EP Act.

Definitions and interpretation

Definitions

In this Works Approval, the terms in Table 1 have the meanings defined.

Table 1: Definitions

| Term | Definition |
|-----------------------|--|
| Books | has the same meaning given to that term under the EP Act. |
| CEO | means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the <i>Environmental Protection Act 1986</i> Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au |
| Condition | means a condition to which this Works Approval is subject under s.62 of the EP Act. |
| Department | means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act. |
| Department Request | means a request for Books or other sources of information to be produced, made by an Inspector or the CEO to the Works Approval Holder in writing and sent to the Works Approval's address for notifications, as described at the front of this Works Approval, in relation to: (a) compliance with the EP Act or this Works Approval; (b) the Books or other sources of information maintained in accordance with this Works Approval; or (c) the Books or other sources of information relating to Emissions from the Premises. |
| DWER | Department of Water and Environmental Regulation |
| EP Act | means the <i>Environmental Protection Act 1986 (WA)</i> . |
| EP Regulations | means the <i>Environmental Protection Regulations 1987 (WA)</i> . |
| Inspector | means an Inspector appointed by the CEO in accordance with s.88 of the EP Act. |
| PLNSP | means the Powder Leach Nickel Sulfate Plant, which is the subject of this works approval. |
| Premises | refers to the premises to which this Works Approval applies, as specified at the front of this Works Approval and as shown on the map in Schedule 1 to this Works Approval. |
| USEPA | means the United States Environmental Protection Agency. |
| Works | refers to the Works described in Schedule 2, at the locations shown in Schedule 1 of this Works Approval to be carried out at the Premises, subject to the Conditions. |
| Works Approval | refers to this document, which evidences the grant of the works approval by the CEO under s.54 of the EP Act, subject to the Conditions. |
| Works Approval Holder | refers to the occupier of the Premises being the person to whom this Works Approval has been granted, as specified at the front of this Works Approval. |

Interpretation

In this Works Approval:

- (a) the words 'including', 'includes' and 'include' will be read as if followed by the words 'without limitation';
- (b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;
- (c) where tables are used in a Condition, each row in a table constitutes a separate Condition;
- (d) any reference to an Australian or other standard, guideline or code of practice in this Works Approval means the version of the standard, guideline or code of practice in force at the time of granting of this Works Approval and includes any amendments to the standard, guideline or code of practice which may occur from time to time during the course of the Works Approval; and
- (e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act.

Conditions

Infrastructure and equipment

1. The Works Approval Holder must install and undertake the Works for the infrastructure and equipment:
 - (a) specified in Column 1; and
 - (b) to the requirements specified in Column 2; of Table 4 in Schedule 2.
2. The Works Approval Holder must not depart from the requirements specified in Column 2 of Table 4 in Schedule 2 except:
 - (a) where such departure does not increase risks to public health, public amenity or the environment; and
 - (b) all other Conditions in this Works Approval are still satisfied.
3. Within 6 weeks of the completion of the Works specified in Column 1 of Table 4 in Schedule 2, the Works Approval Holder must provide to the CEO a report from an Engineer confirming each item of infrastructure or component of infrastructure specified in Column 1 of Table 4 of Schedule 2 has been constructed with no material defects and to the requirements specified in Column 2 of Table 4 in Schedule 2.
4. Where a departure from the requirements specified in Column 2 of Table 4 of Schedule 2 occurs and is of a type allowed by Condition 2, the Works Approval Holder must provide to the CEO a description of, and explanation for, the departure along with the certification required by Condition 3.

Emissions

5. The Works Approval Holder must not cause any Emissions from the Works authorised through this Works Approval except for Specified Emissions and General Emissions described in Column 1 of Table 2, subject to the exclusions, limitations or requirements specified in Column 2, of Table 2.

Table 2: Authorised Emissions table

| Column 1 | Column 2 |
|---|--|
| Emission source & Emission point reference | Exclusions/Limitations/Requirements |
| Specified Emissions | |
| Waste gases emitted to air from the operation of the PLNSP, leach trains 1 to 4 (A3-A6) | <ul style="list-style-type: none"> Waste gases from the leach trains to be treated by a scrubber prior to discharge to atmosphere at all times while the plant is operating; Stack heights to be a minimum of 30m from surface level and more than 3m above the roofline of the closest building; Stack sampling ports to be installed on the stacks in compliance with AS4323.1-1995; and The concentration of NiSO₄ in waste gases through these emission sources individually shall not exceed 8 mg/m³. |
| Waste gases emitted to air from the operation of the PLNSP, Aeration tank (A7) | <ul style="list-style-type: none"> Waste gases to be treated by the scrubber prior to discharge to atmosphere at all times while the plant is operating; Stack height to be a minimum of 15m from surface level and more than 3m above the roofline of the closest building; Stack sampling port to be installed on the stack in compliance with AS4323.1-1995; and The concentration of NiSO₄ in waste gases through this emission source shall not exceed 5 mg/m³. |

| Column 1 | Column 2 |
|--|--|
| Emission source & Emission point reference | Exclusions/Limitations/Requirements |
| Waste gases emitted to air from the operation of the PLNSP, dryer (A8) | <ul style="list-style-type: none"> Waste gases to be treated by the scrubber prior to discharge to atmosphere at all times while the plant is operating; Stack height to be a minimum of 17m from surface level and more than 3m above the roofline of the closest building; Stack sampling port to be installed on the stack in compliance with AS4323.1-1995; and The concentration of NiSO₄ in waste gases through this emission source shall not exceed 5 mg/m³. |
| Waste gases emitted to air from the operation of the PLNSP, Nickel powder conveyor and handling system dust collector (A1) | <ul style="list-style-type: none"> Waste gases to be treated by bag houses prior to discharge to atmosphere at all times while the plant is operating; Stack height to be a minimum of 17m from surface level and more than 3m above the roofline of the closest building; Stack sampling port to be installed on the stack in compliance with AS4323.1-1995; and The concentration of Ni in waste gases through this emission source shall not exceed 5 mg/m³. |
| Waste gases emitted to air from the operation of the PLNSP Product Handling Area baghouse (A9) and Product Bagging Area baghouse (A10) | <ul style="list-style-type: none"> Waste gases to be treated by bag house prior to discharge to atmosphere at all times while the plant is operating; Stack heights to be a minimum of 17m from surface level and more than 3m above the roofline of the closest building; Stack sampling port to be installed on the stack in compliance with AS4323.1-1995; and The concentration of NiSO₄ in waste gases through these emission source shall not exceed 10 mg/m³. |
| General Emissions | |
| Emissions which arise from undertaking the Works set out in Schedule 2. | <p>Emissions excluded from General Emissions are:</p> <ul style="list-style-type: none"> Unreasonable Emissions; or Emissions that result in, or are likely to result in, Pollution, Material Environmental Harm or Serious Environmental Harm; or Discharges of Waste in circumstances likely to cause Pollution; or Emissions that result, or are likely to result in, the Discharge or abandonment of Waste in water to which the public has access; or Emissions or Discharges which do not comply with an Approved Policy; or Emissions or Discharges which do not comply with prescribed standard; or Emissions or Discharges which do not comply with the conditions in an Implementation Agreement or Decision; or Emissions or Discharges the subject of offences under regulations prescribed under the EP Act, including materials discharged under the <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>. |

6. Pursuant to Condition 5, the Works Approval Holder may only cause Specified Emissions during commissioning and operation of the Works for a period of time not exceeding 18 months commencing, from when the Works have been completed and until the expiry of this Works Approval.

Record-keeping

7. The Works Approval Holder must maintain accurate Books including information, reports and data in relation to the Works and the Books must:
 - (a) be legible;
 - (b) if amended, be amended in such a way that the original and subsequent amendments remain legible or are capable of retrieval;
 - (c) be retained for at least 3 years from the date the Books were made; and
 - (d) be available to be produced to an Inspector or the CEO.
8. The Works Approval Holder must comply with a Department Request within 14 days from the date of the Department Request or such other period as agreed to by the Inspector or the CEO.

Nickel Monitoring

9. The Works Approval Holder must provide to the CEO within 3 months after commencement of construction of the PLNSP an ambient monitoring plan for monitoring of ground level concentrations of nickel within areas of sensitive receptors.
10. The monitoring plan as required per Condition 9 must include but is not limited to:
 - (a) identification of one monitoring location within the areas specified in Schedule 3 (shaded in blue) at or representative of, nearby residential sensitive receptors;
 - (b) identification of one location within area B or C of the *Environmental Protection (Kwinana) (Atmospheric Wastes) Policy 1999*, this is to be used as a background reference point and must not be impacted by emissions from the premises;
 - (c) each monitoring location must comply with AS/NZS 3580.1.1:2007, as far as reasonably practical;
 - (d) the description and specification of monitoring equipment to be installed;
 - (e) meteorological monitoring equipment having the capability to be operated continuously at monitoring locations;
 - (f) a construction and installation plan for monitoring equipment; and
 - (g) routine and exception reporting of monitoring results (PM₁₀, nickel and meteorological information).
11. The Works Approval Holder must implement the monitoring plan required by Condition 9 by 1 January 2021.

Noise management

12. The Works Approval Holder must provide to the CEO within 6 months after commencement of construction of the PLNSP, a Noise Monitoring and Validation Plan.
13. The Plan as required by Condition 12 must include:
 - (a) the methodology for conducting noise monitoring to verify noise emissions estimates for the existing refinery (Phase 1 monitoring);
 - (b) the methodology for conducting noise monitoring to verify noise emissions estimates for the works during commissioning (Phase 2 monitoring);
 - (c) a determination as to how the results of the monitoring will be used for the staged model validation to assess noise impacts;
 - (d) proposals for reporting against the plan; and
 - (e) a list of reasonably practical noise elimination, reduction and mitigation works if in the event that the Refinery is identified as a significant contributor to an exceedance of an assigned noise level.

14. The Works Approval Holder must implement the plan as required by Condition 12 within 12 months after commencement of construction of the PLNSP.

Stack monitoring

15. The Works Approval Holder must monitor emissions:
- from the emission point listed in column 1 of Table 3 and as shown in Schedule 1 (Emission points);
 - for the corresponding parameters listed in column 2 and 3;
 - at the corresponding frequency specified in column 4;
 - reported in the corresponding unit specified in column 5; and
 - using the corresponding method specified in column 6, as set out in Table 3.

Table 3: Stack monitoring

| Column 1 | | Column 2 | Column 3 | Column 4 | Column 5 | Column 6 |
|----------------|--|-------------------|--|---|--------------------------|--|
| Emission point | | Parameter sampled | Parameter measured | Frequency | Reporting units | Method |
| A1 | PLNSP Product transfer bag house stack | Particulates | Particulates Total Nickel NiSO ₄ (calculated) | Once within 6 weeks of first day of production of NiSO ₄ and every six months thereafter | mg/m ³ g/s | USEPA Method 5 (sampling) Analysis to occur by a laboratory that is NATA accredited for the parameter to be measured. |
| A3 – A6 | PLNSP off gas scrubber stack 1, 2, 3, or 4 | | | | | |
| A7 | PLNSP Aeration tank scrubber stack | | | | | |
| A8 | PLNSP Dryer scrubber stack | | | | | |
| A9-A10 | Product Handling Area baghouse and Product Bagging Area baghouse | Particulates | Particulates Total Nickel | | | |

16. The Works Approval Holder must provide to the CEO within 3 months after the first day of production of NiSO₄ a report with the results of the stack monitoring as required by condition 15.

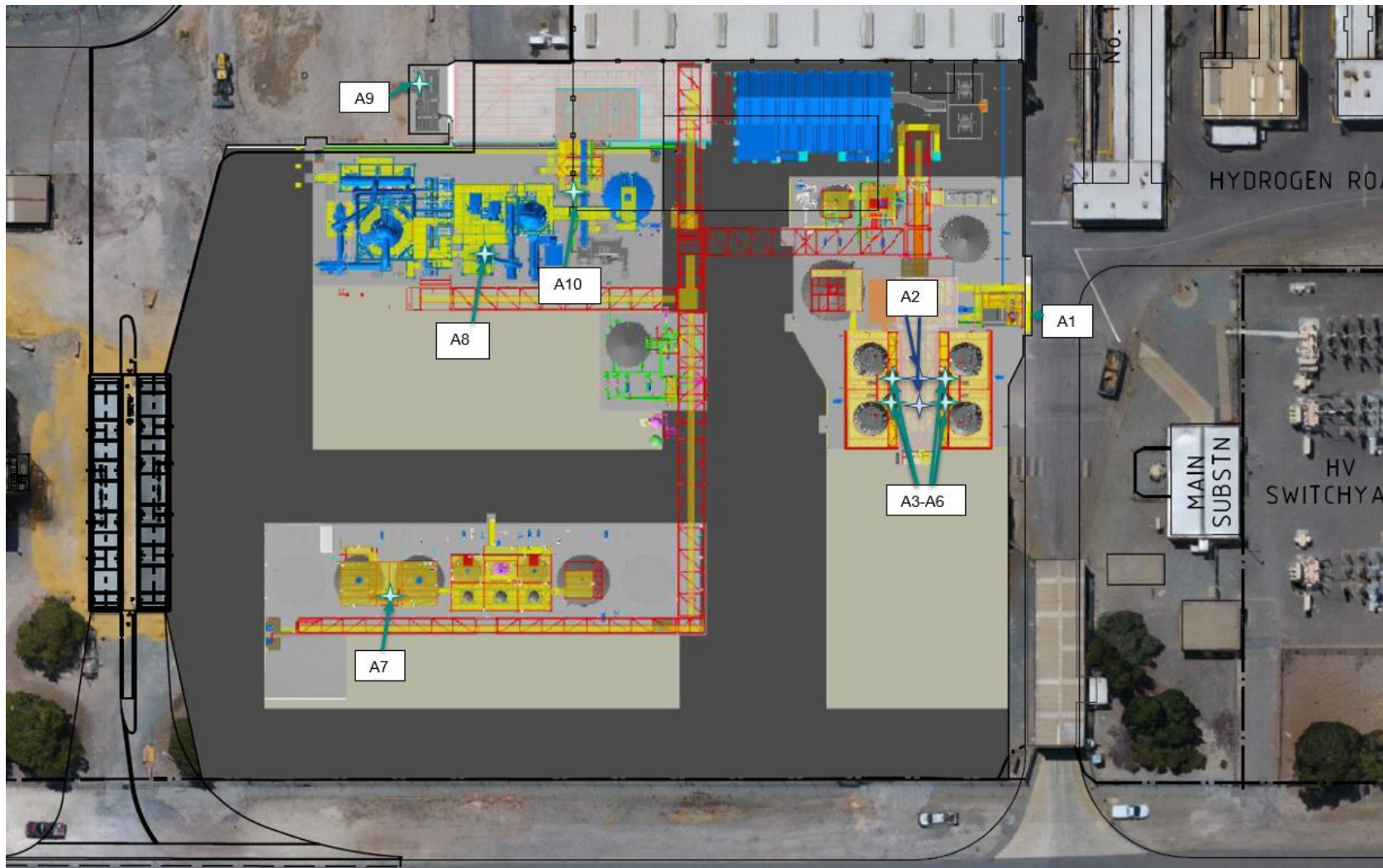
Schedule 1: Premises Map and Emission points

Premises map

The Premises are shown in the map below.



Authorised Emission Points



Schedule 2: Works

At the time of assessment, Emissions and Discharges from the installation and operation of the Works listed in Table 4 were considered in the determination of the risk and related Conditions for the Works Approval.

Table 4: Authorised Works

| Column 1 | Column 2 |
|--|---|
| Works | Specifications |
| Nickel Powder Conveyor and Handling System | <ul style="list-style-type: none"> - Transfer conveyors, storage and feed system to be fully enclosed, designed and constructed to prevent ingress of contaminants and to fully contain nickel powder dust - Design is such that during operation no nickel powder dust will be emitted beyond the premises boundary - A reverse pulse insertable filter dust collector installed onto conveyor and bin system - Baghouse to be fitted with continuous differential pressure sensors reporting to the plant DCS with low and high pressure alarms - Dust collector exhaust air discharged to atmosphere via a minimum 17 m high stack - Stack to be fitted with sampling access ports that comply with AS4323.1 |
| Leach Trains 1 to 4 | <ul style="list-style-type: none"> - Sulfuric acid mixing tank, with overflow containment and associated pumps and flow meters - Four sealed batch leach reactor vessels each with a nominal total capacity of 150 m³ - Leach tanks fitted with overflow barometric seal pots - Tanks to be fitted with level sensors - All vessels and transfer equipment to be fully enclosed - Leach tank off gas to be directed to a venturi wet scrubber with mist eliminator - Scrubber storage tank and water recirculation pumps to maintain required level and pH specification with bleed stream returned to nickel refinery - Pressure sensors fitted to monitor scrubber performance and pH sensor for control of scrubber bleed and make up - Stand-by pumps and diverter valves to be fitted in case of recirculation pump failure (connected to alarmed DCS) - Exhaust gases from scrubbers discharged to atmosphere via a minimum 30.6 m high stack - Stack to be fitted with sampling access ports that comply with AS4323.1 |
| Aeration, Filtration, and Crystalliser | <p>(i) Aeration</p> <ul style="list-style-type: none"> - Two fully sealed and enclosed aeration tanks each with a nominal capacity of 490 m³ (live tank volume 380 m³) |

| Column 1 | Column 2 |
|---|---|
| Works | Specifications |
| | <ul style="list-style-type: none"> - Tanks are to be fitted with level sensors - All aeration off gases to be directed to a wet scrubber with mesh screens and mist eliminator - Scrubber storage tank and water recirculation and makeup pumps to maintain required level and pH specification, with bleed stream returned to aeration tanks or nickel refinery - Pump flow sensors and pH sensor installed for control of scrubbing rate, scrubber bleed and make up - Stand-by pumps and diverter valves to be fitted in case of recirculation pump failure (connected to alarmed DCS) - Stack to be fitted with stack sampling ports that comply with AS4323.1 <p style="text-align: center;">(ii) Filtration</p> <ul style="list-style-type: none"> - Filtration vessels and sludge transfer pump to return sludge to the nickel refinery - Filtrate storage tank (ion exchange feed tank) of nominal 250 m³ capacity with level control <p style="text-align: center;">(iii) Crystalliser</p> <ul style="list-style-type: none"> - Production capacity of 13.5 tonnes per hour (tph) of nickel sulfate hexahydrate - Single draft tube baffle crystalliser vessel, feed system, heater, vapour surface condenser and condenser vacuum pump, product slurry pump - Feed and recycle liquor recirculation tank and pumps. |
| Centrifuge and Dryer | <ul style="list-style-type: none"> - Maximum throughput of 13.5 tph - Fully enclosed product discharge conveyor - Fluid bed dryer heated with hot air from steam air heater - Dryer off gases report to off-gas cyclone with overflow directed to a venturi wet scrubber fitted mesh screens with mist eliminator prior to discharge to atmosphere via a minimum 17 m high stack - Scrubber storage tank and water recirculation pumps to maintain required level and pH specification with bleed stream returned to nickel refinery - Pump flow sensors fitted to monitor scrubber performance and pH sensor installed for control of scrubber rate, scrubber bleed and make up - Stand-by pumps and diverter valves to be fitted in case of recirculation pump failure (connected to alarmed DCS). Cyclone underflow returned to crystalliser - Stack to be fitted with sampling access ports that comply with AS4323.1 |
| Product Handling and Bagging Facilities | <ul style="list-style-type: none"> - Product storage silos with nominal total capacity of 200m³ - One baghouse for product handling area and one baghouse for product bagging area; both discharging via stacks that have a |

| Column 1 | Column 2 |
|-------------|--|
| Works | Specifications |
| | <p>minimum height of 17m</p> <ul style="list-style-type: none"> - All product handling to occur in fully enclosed conveyors and product handling buildings such that during operation no nickel sulfate dust will be emitted beyond the premises boundary. - Product handling and bagging areas vented via reverse pulse insertable dust collectors prior to discharge via stacks that have a minimum height of 17m - Baghouses to be fitted with continuous differential pressure sensors with low and high pressure alarms - Stack to be fitted with sampling access ports that comply with AS4323.1 |
| Containment | <ul style="list-style-type: none"> - All process tanks to be fitted with secondary containment system capable of holding 110% of the maximum capacity of the tank/s stored - Secondary containment system(s) to be fitted with dedicated sump/s and pump/s to recover spills, blowdown and wash waters. |

Schedule 3 – Ambient Nickel Monitoring areas (Condition 10(a))

