

# SUPREME COURT OF QUEENSLAND

CITATION: *Unimin Australia Limited v State of Queensland* [2009] QSC 384

PARTIES: **UNIMIN AUSTRALIA LIMITED**  
(applicant)  
**v**  
**STATE OF QUEENSLAND**  
(respondent)

FILE NO: 9409 of 2009

DIVISION: Trial Division

PROCEEDING: Hearing

ORIGINATING COURT: Supreme Court of Queensland

DELIVERED ON: 30 November 2009

DELIVERED AT: Brisbane

HEARING DATE: 25 September 2009

JUDGE: Applegarth J

ORDER: **1. The parties consult and submit minutes of order within 7 days.**  
**2. Liberty to apply.**

CATCHWORDS: ENERGY AND RESOURCES – MINERALS – MINING FOR MINERALS – TITLES: RIGHTS, PERMITS, LICENCES AND LEASES ETC – EXTRACTION TITLES – NATURE OF INTEREST – where the applicant mines silica sand for use in glass manufacturing – where the applicant’s mining operation also extracts “B Grade” silica sand for use in white mortars and renders – whether B Grade silica sand is a “mineral” as defined in the *Mineral Resources Act* 1989 (Qld) – whether B Grade silica sand is “mined for use for its chemical properties” – whether the B Grade silica sand is merely being supplied for use “as sand” – whether property passes to the applicant in the B Grade silica sand if it is not a “mineral”

*Environmental Protection Act* 1994 (Qld), s 146, s 147  
*Mineral Resources Act* 1989 (Qld), s 1.8, s 6(1), s 6(2), s 6(3), s 6A, s 234, s 235, s 310

*Clark v Ryan* (1960) 103 CLR 486, cited  
*Fletcher v May* [2001] QDC 081, cited  
*Fox v Percy* (2003) 214 CLR 118, applied  
*Hobbs & Anor v Oildrive* [2008] QSC 45, cited  
*Kelly v The Queen* (2004) 218 CLR 216, cited  
*Makita (Australia) Pty Ltd v Sprowles* (2001) 52 NSWLR 705, applied

*Minnesota Mining and Manufacturing Co v Beiersdorf (Australia) Ltd* (1980) 144 CLR 253, applied  
*Project Blue Sky Inc v Australian Broadcasting Authority* (1998) 194 CLR 355, applied  
*Re Clark* [2005] QLRT 118, cited  
*Re Miles v Armstrong* [2001] QLRT 93, cited  
*Re Monto Coal 2 Pty Ltd & Ors v Dredge & Ors* [2003] QLRT 27, cited

COUNSEL: J Murdoch SC and C J Arnold for the applicant  
R J Douglas SC and G D Sheahan for the respondent

SOLICITORS: Sparke Helmore for the applicant  
Crown Law for the respondent

### Introduction

- [1] The applicant conducts sand mining operations on North Stradbroke Island. The principal purpose of mining and treating the sand is to extract silica sand for use in glass manufacturing. It also extracts silica sand of a lower purity, which the applicant refers to as “B Grade” silica sand. It is used in the construction industry in specialty white mortars and white renders. The higher purity “Glass Grade” silica sand is a “mineral” within the meaning of s 6 of the *Mineral Resources Act* 1989 (Qld) (“the *MR Act*”).
- [2] The parties are in dispute over whether the B Grade silica sand can be sold by the applicant for use in white mortar and white renders. The applicant contends, and the respondent disputes, that silica sand that is mined for such a use, or which is a by-product of the mining of Glass Grade silica sand, is a “mineral” within the meaning of the *MR Act*. Section 6 of the *MR Act* is to the effect that silica sand is only a mineral “if it is mined for use for its chemical properties”.
- [3] The applicant’s first contention is that all of the silica sand mined by it – both Glass Grade and B Grade – is mined for use for its chemical properties, and the lower purity B Grade silica sand that is produced as a direct consequence, or by-product, of winning and extracting the higher purity Glass Grade silica sand, is therefore a “mineral”. I shall refer to this as “the by-product issue”.
- [4] The applicant’s alternative argument is that the B Grade silica sand is a “mineral” in its own right because it is “mined for use for its chemical properties”. I shall refer to this as “the chemical properties issue”.
- [5] The respondent disputes these contentions, and further contends that the use of B Grade silica sand as a “colourless inert filler” in white mortar and white render entails its use “as sand” and that s 6(3)(d)(i) of the *MR Act* applies. If this is correct then silica sand is not a mineral, since s 6(3)(d)(i) provides:

“(d) each of the following is not a mineral –

- (i) soil, sand, gravel or rock (other than rock mentioned in subsection (2)(k) if it is to be used, or to be supplied for use, as sand, gravel or rock, whether intact or in broken form; ...”

I shall refer to this as “the sand issue”.

[6] The final issue is as follows:

“Can and does any condition of the leases, or any environmental authority, or any provision of the *MR Act* or any other Act operate such as to pass property to Unimin in respect of anything other than what constitutes ‘a mineral’ for the purposes of s 6 of the *MR Act*?”

I shall refer to this as “the passing of property issue”.

[7] The practical significance of the resolution of these issues is that a determination that B Grade silica sand is a “mineral” within the meaning of s 6 of the *MR Act*, and may be lawfully sold, is that there is no requirement for a permit for extraction or other permits and approvals under the *Integrated Planning Act 1997* (Qld) in respect of the mining, treatment and sale of B Grade silica sand.

[8] I shall first set out the facts that are agreed between the parties before addressing the four issues that I have identified.

**Agreed facts**

[9] The applicant, Unimin Australia Limited (“Unimin”), conducts mining operations on North Stradbroke Island, Moreton Bay, Queensland. The mining operations are conducted under certain mining lease numbers 1108, 1124, 1132 and 7064 (“the leases”). The leases afforded operate under the *MR Act*.

[10] Unimin is the lessee under ML1108, which was:

- originally granted for a term of 10 years commencing 10 November 1973.
- renewed on 25 May 1999 for a term of 21 years commencing 1 November 1983.
- renewed on 23 November 2006 for a terms of 21 years commencing 1 November 2004.
- originally granted for the purpose of “mining for garnet, ilmenite/leucoxene, monazite, platinum, rutile, tin ore and zircon”.
- amended on 26 November 2003 to include “silica sand”.

[11] ACI Operations Pty Ltd (“ACI”) is the lessee of ML1124, ML1132 and ML7064. ACI has contracted for Unimin to conduct mining operations on those leases.

[12] ML1124 was granted for the purpose of “mining for silica sand”. ML1124 was originally granted for a term of 13 years, commencing on 1 May 1975. It was subsequently renewed on 17 March 1988 for a term of 21 years commencing on 1 May 1990.

[13] ML1132 was granted for the purposes of “mining for silica, rutile, zircon and ilmenite”. ML1132 was initially granted for a term of 15 years commencing on 1 May 1975. It was subsequently renewed on 17 March 1998 for a term of 21 years commencing on 1 May 1990.

[14] ML7064 was granted for the purposes of “mining for leucoxene, rutile, silica sand and zircon”. It was granted for a term of 10 years commencing on 1 June 2001.

- [15] Mining is currently undertaken on ML1108 and ML7064. ML1124 and ML1132 are not producing.
- [16] The mining process adopted by Unimin consists of the following:
- topsoil is removed.
  - machines excavate the leached A2 horizon of low iron sand to its base.
  - this sand is generally identified by its high aluminium iron compact form (described as the indurate layer).
  - dry mining operation, no mining occurring below the water table.
  - excavated sand is loaded into a mobile feed hopper via a grizzly to remove large objects such as tree roots.
  - water is added to the sand in a pump box forming slurry.
  - the slurry then enters a trammel where more organic and oversized material is removed.
  - the slurry is then pumped to the processing plant located on ML1124.
  - at the processing plant, the sand undergoes gravity separation through a series of spirals to remove heavy minerals, fine silica and clays.
  - silica sand is then stockpiled by radial stackers.
  - the heavy minerals, primarily ilmenite, rutile and zircon, separated and concentrated as part of this process, are pumped to a heavy metal stockpiling area.
  - the reject material consisting of fine silica sand and clay is pumped away with wash water and settled in a settling dam.
  - once settled, the solids are used as backfill for rehabilitation on ML1108 and ML7064.
- [17] The principal purpose of mining and treating the sand is to extract silica sand for use in glass manufacturing. There is also extracted in the treatment process a by-product or tailing in the form of lower purity silica sand which Unimin refers to as “B Grade” silica sand. B Grade silica sand has always been produced as a direct consequence of the production of Glass Grade silica sand.
- [18] Unimin had sold and wishes to continue selling B Grade silica sand for use in the construction industry in specialty white mortar and white renders.
- [19] The higher purity Glass Grade silica sand is a mineral within the meaning of s 6(1) of the *MR Act*. The Glass Grade silica sand may be lawfully sold.
- [20] There is no requirement for a permit for extraction or other permits and approvals under the *Integrated Planning Act 1997 (Qld)* in respect of the mining, treatment and sale of Glass Grade silica sand.

- [21] Should the Court rule the B Grade silica sand is a “mineral” within the meaning of s 6 of the *MR Act*, and may be lawfully sold, there is no requirement for a permit for extraction or other permits and approvals under the *Integrated Planning Act 1997* (Qld) in respect of the mining, treatment and sale of B Grade silica sand.

**Relevant statutory provisions**

- [22] Section 6 of the *MR Act* relevantly provides:

**“6 Meaning of *mineral***

- (1) A *mineral* is a substance -
- (a) normally occurring naturally as part of the earth’s crust; or
  - (b) dissolved or suspended in water on or within the earth’s crust; or
  - (c) that may be extracted from a substance mentioned in paragraph (a) or (b).
- (2) Subject to subsection (3), each of the following is a *mineral* -
- (a) any type of clay;
  - (b) foundry sand;
  - ...
  - (d) limestone;
  - ...
  - (j) silica, including silica sand;
  - ...
- (3) Despite subsections (1) and (2) -
- (a) clay (other than kaolin and bentonite) is only a mineral if it is mined for use for its ceramic properties; and
- Examples of uses of clay for its ceramic properties—*
- for brick or tile making
  - for pottery making
- (b) **limestone, silica and silica sand is only a mineral if it is mined for use for its chemical properties;** and
  - ...
  - (d) each of the following is not a mineral -

- (i) soil, sand, gravel or rock (other than rock mentioned in subsection (2)(k) if it is to be used, or to be supplied for use, as sand, gravel or rock, whether intact or in broken form; ...” (emphasis added)

In essence, silica sand is only a mineral “if it is mined for use for its chemical properties.”

- [23] Three aspects of s 6(3)(b) merit attention. The applicant emphasises the words “if it is mined”, and relies upon the meaning of “mine” in s 6A(1), which provides:

**“6A Meaning of *mine***

- (1) Mine means to carry on an operation with a view to, or for the purpose of -
  - (a) winning mineral from a place where it occurs; or
  - (b) extracting mineral from its natural state; or
  - (c) disposing of mineral in connection with, or waste substances resulting from, the winning or extraction.”

- [24] The second aspect of the words in s 6(3)(b) are “for use”. Prior to 1 May 1995 the comparable definition of “mineral” in s 1.8 of the Act had stated “(j) silica, including silica sand, **when used** for its chemical properties”.<sup>1</sup> The amended definition<sup>2</sup> in using the words “for use” involves a determination of the silica sand’s intended use at the time it is mined, rather than some later time when it is actually used by a purchaser.

- [25] The third aspect of s 6(3)(b) is the phrase “for its chemical properties”, the meaning of which arises in respect of “the chemical properties issue”.

- [26] An issue of statutory construction arises in respect of “the sand issue” concerning the operation of s 6(3)(d). The applicant contends that specific provision having been made in respect of “silica sand” in s 6(3)(b), the general exclusion pertaining to sand in s 6(3)(d)(i) must give way to this specific provision, and that as a consequence s 6(3)(d)(i) has no application to its operations. The respondent contends otherwise.

- [27] Section 310 of the *MR Act* relevantly provides for passing of property to the holder of the mining lease in respect of “all minerals lawfully mined under the authority of a mining lease”.

**The by-product issue**

- [28] The applicant submits that silica sand that is mined for use in glass manufacturing, or which is a by-product of the mining of Glass Grade silica sand for such a use, is a “mineral”. This argument is based upon the agreed facts that:

<sup>1</sup> *Mineral Resources Act* 1989 (Qld) s 1.8 (Reprint No 2) (emphasis added).

<sup>2</sup> See *Mineral Resources Amendment Bill* 1995 cl 5(3); and The Explanatory Note to the Bill, page 6, which stated that the amendment was to clarify that the relevant substances were minerals when “mined for use” rather than merely “used”.

- The principal purpose of mining and treating the sand is to extract silica sand for use in glass manufacturing;
- There is also extracted in the treatment process a by-product or tailing in the form of lower purity silica sand which Unimin refers to as B Grade silica sand;
- B Grade silica sand has always been produced as a direct consequence of the production of Glass Grade silica sand.

The applicant further submits that the purpose of any purchaser of a by-product of lawfully mined silica sand cannot change the purpose for which the silica sand was originally mined. As a consequence, it submits that all silica sand that is mined (i.e. won or extracted) is won and extracted for use for its chemical properties and is a “mineral” within the meaning of the *MR Act*.

[29] Reliance is placed by the applicant upon the fact that there is one mining operation, and it is only at the end of the process that silica sand is graded and separately stockpiled. This is not a case where there is a separate mining operation for Glass Grade silica sand and another mining operation for B Grade silica sand. Section 6(3)(b) looks at the use for which silica sand is mined and the focus is on the use contemplated by the miner at the time of mining, not the use to which some of the sand is put at a later time by a purchaser. The undifferentiated mass of silica sand is mined for the principal purpose of extracting Glass Grade silica sand for use in glass manufacturing, and, as a consequence, the applicant submits that both the Glass Grade silica sand and “the balance of silica sand” is a mineral to which title passes.<sup>3</sup> The consequence of the submission is that the applicant submits that it is entitled to sell the balance of the silica sand, being the B Grade sand for whatever purpose its purchaser wishes to use it. Subject to the possible application of s 6(3)(d)(i) to be considered in connection with “the sand issue”, the applicant submits that it acquires title to and is entitled to sell the B Grade silica sand for any purpose, including use with cement, as sand for a sandpit, as landfill or to create a private beach.<sup>4</sup>

[30] I accept the applicant’s submission that the focus of s 6(3)(b) is on the use for which the silica sand is mined by the applicant, not on the purpose of an eventual purchaser of any by-product of lawfully mined silica sand. However, the lawfulness of the mining operation in which an undifferentiated mass of silica sand is mined with a view to grading the silica sand into a portion that is suitable for use in glass manufacturing, and a portion that is not, does not mean that all of the silica sand that is extracted is a “mineral”. The terms and statutory context of s 6(3)(b) means that silica sand is only a mineral if it is mined for use for its chemical properties. On the agreed facts, not all of the silica sand that is mined is mined for use in glass manufacturing. Only that part of the silica sand that is subsequently graded as Glass Grade silica sand is mined for such a use. The balance, whether described as B Grade silica sand or by-product, is not mined for use in glass manufacture. The fact that the principal purpose of mining and treating all of the silica sand is to extract silica sand that is suitable for use in glass manufacturing does not alter this conclusion.

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<sup>3</sup> Transcript of hearing 1-22 to 1-23.

<sup>4</sup> Ibid at 1-23 ll 5 – 40.

- [31] At the time the silica sand is extracted from its natural state as part of the applicant's mining operation, the applicant knows that part of the silica sand will not be suitable for use in glass manufacturing. The terms of the Act indicate that this sand is not a mineral unless it is mined for use for its chemical properties. The construction of the legislation for which the applicant contends would result in the applicant acquiring title to this "by-product" provided that some small part of the silica sand of which it originally formed part was suitable for use in glass manufacturing. This result would follow even where the Glass Grade silica sand constituted only a tiny fraction of the silica sand that was mined. Neither the terms nor purpose of the Act indicate an intent to define such a by-product as a mineral and for property in it to pass to the holder of the mining lease unless the by-product is mined for use for its chemical properties.
- [32] I conclude that the principal purpose for which the undifferentiated mass of silica sand is mined, namely for use in glass manufacturing, does not mean that all of the silica sand, including the by-product or B Grade silica sand that is not suitable for glass manufacturing, is a mineral. The B Grade silica sand that is stockpiled at the end of the applicant's mining operation will be a "mineral" if it is mined for use for its chemical properties and if s 6(3)(d)(i) does not apply to it. It does not qualify as a mineral because earlier in the mining operation it formed part of an undifferentiated mass of silica sand that included Glass Grade silica sand.

#### **The chemical properties issue**

- [33] The parties are in dispute over the meaning of "chemical properties" in s 6(3)(b). The "chemical properties issue" centres on whether the colour of the B Grade silica sand is a chemical property. An additional issue, though not strongly pressed at the hearing, is whether the sand's lack of chemical reactivity is a chemical property.
- [34] The applicant's Senior Counsel appeared to accept that the use of silica sand simply as a mortar would not be a use that qualified it as a mineral and that "colour is the key factor".<sup>5</sup> Silica sand's colour (or lack of it) is due to its chemical composition. Chemical composition was argued to be a chemical property, with the result that the sand's chemical properties gave it its colour. Although the absence of chemical reactivity in mortar was not pressed as an issue in oral submissions, I will deal with it. The issue of chemical reactivity is linked to the respondent's contention that silica sand is used as an inert filler or, in other words, it is used as a mortar or render because of the absence of any chemical reactivity or chemical change.
- [35] The respondent contends that the sand's colour is a physical, not a chemical property. It acknowledges that colour is a function of chemical composition, but contends that there is a difference between a substance's chemical composition, which determines its colour and many other physical properties, and its chemical properties. "Chemical properties" in s 6(3)(b) was said to mean the characteristics or qualities of a substance that relate to its behaviour when undergoing chemical reactions.<sup>6</sup> In response, the applicant contends that a definition which focuses on chemical reactions is too narrow.

#### *Expert evidence and the meaning of "chemical properties" in its statutory context*

- [36] The parties relied upon numerous reports from experts who debated whether B Grade silica sand is mined for use for its "chemical properties". Such was the debate between experts that the issues in contention between them became the

<sup>5</sup> Transcript 1-41140 – 1-42145.

<sup>6</sup> Report of Dr Wilson filed 1 September 2009 at paragraph 75.



subject of a document<sup>7</sup> titled “Issues in Contention between the Experts” containing extracts from their reports. It runs to 37 pages under headings:

- (a) chemical composition and purity is a chemical property;
- (b) colour is a chemical property;
- (c) chemical property is restricted to chemical reactivity; and
- (d) silica sand is used in white mortars and renders as an inert filler.

The document commences “The issue in contention between the experts is the meaning of the phrase chemical properties in the context of s 6 of the Act”. I do not intend to summarise this document, let alone the reports. I found the expert evidence helpful in understanding matters that are not in dispute, such as the chemical composition of silica, the physical properties of silica sand, the use of silica sand in white mortar and white renders and its use in glass manufacturing. However, the admissibility and utility of a substantial part of the expert reports was limited by two matters. The first was the absence of any suggestion that terms such as “chemical property” and “physical property” have an accepted technical meaning. The second was the inclination of some of the experts to go beyond the proper province of expert opinion and to venture their own conclusions as to the meaning of “chemical properties” in s 6(3)(b), and the issue that I am required to determine, namely whether B Grade silica sand that is mined for use in white mortar and white renders is mined for use for its “chemical properties” within the meaning of s 6(3)(b).

[37] In *Minnesota Mining and Manufacturing Co v Beiersdorf (Australia) Ltd*<sup>8</sup> Aickin J stated:

“The court expert should not be asked questions which can only be decided by the court itself. For example it would be improper to ask a court expert to construe the specification or to state what he understood to be the meaning of particular words, unless they were in the view of the court used in an accepted technical meaning in a particular branch of science. In such a case the court expert if properly qualified would be able to include in his answers what he regarded as the technical meaning.”

The expert reports do not suggest that the term “chemical properties” has an accepted technical meaning in a particular branch of science, or amongst scientists in general. Mr Haig remarked that it is:

“at best technically ambiguous and at worst meaningless. The term has no meaning in science.”<sup>9</sup>

Professor Frost noted:

“... textbook definitions of chemical and physical generally deliberately avoid ambiguous situations such as the one at hand.

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<sup>7</sup> Exhibit 5.

<sup>8</sup> (1980) 144 CLR 253 at 270.

<sup>9</sup> Report of Mr Jim Haig filed 28 August 2009 at 11.

Some will include properties such as heats of combustion while others exclude them.”<sup>10</sup>

Mr Robertson notes Dr Wilson’s observation that “the chemical composition of a substance largely determines both the chemical and physical properties of the substance” and Dr Wilson’s contention that “chemical composition is not one of its chemical properties”. Mr Robertson comments that this is a convenient definition for a student, and states:

“... but I suspect that few practising scientists would recognise such a sharp distinction between chemical composition and properties. Indeed, practising scientists design the chemical composition of substances based upon known chemical properties and process industries rely upon knowledge of chemical composition to predict the chemical properties and activity of substances for the success of their processes.”<sup>11</sup>

- [38] The lack of any accepted technical meaning of what constitutes a chemical property, and the scope for interminable debate about the differences between chemical and physical properties leads me to conclude that much of the debate between the experts is of slight value in resolving the present issue. Their debates about matters such as whether chemical composition is a chemical property are debates that flow from the absence of any accepted scientific meaning of “chemical property”. The expert reports served as vehicles to debate issues that are not the proper province of expert opinion. In *Makita (Australia) Pty Ltd v Sprowles*<sup>12</sup> Heydon JA observed:

“... if evidence tendered as expert opinion evidence is to be admissible, it must be agreed or demonstrated that there is a field of ‘specialised knowledge’; there must be an identified aspect of that field in which the witness demonstrates that by reason of specified training, study or experience, the witness has become an expert; **the opinion proffered must be ‘wholly or substantially based on the witness’s expert knowledge’**; so far as the opinion is based on facts ‘observed’ by the expert, they must be identified and admissibly proved by the expert, and so far as the opinion is based on ‘assumed’ or ‘accepted’ facts, they must be identified and proved in some other way; it must be established that the facts on which the opinion is based form a proper foundation for it; and the opinion of an expert requires demonstration or examination of the scientific or other intellectual basis of the conclusions reached: that is, **the expert’s evidence must explain how the field of ‘specialised knowledge’ in which the witness is expert by reason of ‘training, study or experience’, and on which the opinion is ‘wholly or substantially based’, applies to the facts assumed or observed so as to produce the opinion propounded.** If all these matters are not made explicit, it is not possible to be sure whether the opinion is based wholly or substantially on the expert’s specialised knowledge. If the court cannot be sure of that, the evidence is strictly speaking not admissible, and, so far as it is admissible, of diminished weight.” (emphasis added)

<sup>10</sup> Report of Professor Ray Frost filed 11 September 2009 at paragraph 7(b).

<sup>11</sup> Report of Mr Andrew Robertson filed 11 September 2009 at paragraph 6(a).

<sup>12</sup> (2001) 52 NSWLR 705 at 743 – 744 [85].

[39] Some of the opinions advanced were not based “wholly or substantially on the expert’s specialised knowledge”, or at least I could not be sure that this was the case, with the consequence that the evidence is either inadmissible or, as far as it is admissible, of little value. Other persons lacking the highly specialised knowledge of the experts could equally have debated the meaning of “chemical properties” in s 6(3)(b) and the application of that meaning to the case at hand. What has occurred is that some of the expert witnesses have been used to argue each party’s case. This is not the function of expert evidence.<sup>13</sup>

[40] I am not required to resolve a scientific debate at the end of the proceedings of a symposium in which experts make rival contentions about whether “chemical properties” in an Act should have a narrow or expansive meaning. I am required to interpret a statutory provision, and apply it to facts that are not in dispute, principally that B Grade silica sand is used in white mortar and white render because of its colour. My conclusion should not be based on the opinions of scientists about whether the statutory term has a narrow or expansive meaning. It is worth mentioning, however, that an expansive view of “chemical properties” as including chemical composition has the consequence that a wide range of physical properties, including colour, purity and grain size, are “chemical properties”. A narrow view of “chemical properties” which effectively equates the term with properties that are associated with chemical change has the consequence of excluding a feature such as colour as a chemical property.

[41] Some of the references in the following part of this judgment to the arguments advanced by various experts are a convenient means to identify the competing arguments which the parties have used experts to articulate. I do so with reluctance, lest it encourage parties in other cases to use experts to argue matters that are not the proper subject of expert evidence. A number of pitfalls may be encountered as a result of the indiscriminate reception into evidence of reports purporting to contain expert opinion.<sup>14</sup> I respectfully adopt what was said by Callinan J in *Fox v Percy*:

“In the long run the indiscriminating tender of inadmissible, unreliable or valueless evidence, the acquiescence in its tender by counsel on the other side, and its reception into evidence, will prolong and increase the costs of trials... No court is bound to accept evidence of no probative value and evidence of slight probative value will rarely provide a foundation for any confident finding of fact, particularly if strong contrary evidence is available.”<sup>15</sup>

[42] Mr Haig observes:

“There is no universally agreed definition in the sciences of chemical properties. A chemist would hold that all substances have properties of a mechanical, thermal, electrical, reactive, optical, structural, etc nature due to their chemical composition. Obviously such an all-inclusive definition would not be practical in legislation aimed at limiting the coverage of certain substances.”<sup>16</sup>

[43] He goes on to note:

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<sup>13</sup> *Clark v Ryan* (1960) 103 CLR 486 at 491.

<sup>14</sup> *Hobbs & Anor v Oildrive* [2008] QSC 45 at [50].

<sup>15</sup> *Fox v Percy* (2003) 214 CLR 118 at 167 [150].

<sup>16</sup> Report of Mr Haig filed 28 August 2009 at 7.

“However, a very tight interpretation such as ‘the use of the substance must entail a chemical reaction’ is just as inaccurate and inconsistent.”<sup>17</sup>

Mr Haig states that there is no guiding principle “to be derived from the definitions under the Act which would allow a truly technical consideration of the materials in issue” before discerning in the exclusion of sand extracted for use as a fine aggregate what is said to be an apparent “principal [sic] of technical exclusion”, namely that the use of sand as fine aggregate for its hardness and stability does not involve use of its chemical properties, because chemical properties “are not part of its utility”.<sup>18</sup> With respect, this does not serve to define “chemical properties” in s 6(3)(b), but to illustrate its application. More generally, Mr Haig helpfully notes that the definition of “minerals” in s 6 of the Act does not reflect scientific definitions of “mineral”. As he says after giving a scientific definition of “mineral”, “the boundaries of this scientific definition of a mineral are expanded and contracted, distorted and fragmented at will to suit the needs of governance”.<sup>19</sup> He refers to a variety of substances contained in s 6(2) of the Act including gases and liquids that “gain mineral status under the Mineral Resources Act 1989 when they are not scientifically minerals at all”.<sup>20</sup> I derive from this evidence that the meaning of “chemical properties” in s 6(3)(b) is not illuminated contextually by the inclusion of the disparate list of substances that appear in s 6(2).

- [44] In response to the view that “mined for use for its chemical properties” is concerned with a chemical reaction, Mr Haig presents a table that shows that “Minerals of commerce have been frequently declared by statutes throughout the world without their end use involving a chemical reaction”. The difficulty with this argument is that I am not concerned with statutes throughout the world which define minerals without reference to their end use involving a chemical reaction, but to a specific statutory provision that states that particular substances, namely limestone, silica and silica sands, is only a mineral if it is mined for use for its “chemical properties”. The definition of minerals in other statutes, and even the definition of minerals in other parts of the Queensland statute is of no real assistance, especially in circumstances in which, as Mr Haig notes, the inclusion or exclusion of substances within the definition of “mineral” in ss 6(2) and (3) of the Queensland Act does not accord with a scientific definition of mineral.
- [45] The focus of attention for the purpose of statutory interpretation is on the words that the legislature chose. In construing such a statutory provision a court must strive to give meaning to every word of the provision, and not treat any of the words used as insignificant.<sup>21</sup> The term “chemical properties” was used rather than “chemical composition”, “physical properties” or “properties”. Silica sand is excluded from the statutory definition of mineral unless it is mined for use for its chemical properties. The qualification for inclusion depends on a contemplated end use, not its intrinsic characteristics irrespective of that use. It qualifies for inclusion not simply because of its chemical composition. Something more is required, and the deliberate use of “chemical properties” instead of “chemical composition” is suggestive of some process or chemical behaviour associated with its use.

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<sup>17</sup> Ibid at 7.

<sup>18</sup> Ibid at 7 – 8.

<sup>19</sup> Ibid at 5.

<sup>20</sup> Ibid at 6.

<sup>21</sup> *Project Blue Sky Inc v Australian Broadcasting Authority* (1998) 194 CLR 335 at 382 [71]; D C Pearce and RS Geddes, *Statutory Interpretation in Australia* 6<sup>th</sup> edition 2006 [2.22].

- [46] I do not accept the respondent's contention that the statutory treatment of "foundry sand" adds support to the respondent's contention that "use for its chemical properties" in s 6(3)(b) entails chemical reactivity, not absence of reactivity. The inclusion as a "mineral" of a variety of substances, including foundry sand, in s 6(2) does not reflect any scientific meaning of mineral or discernable principle that governs their inclusion.
- [47] The argument that "use for its chemical properties" connotes chemical reactivity or change has much to commend it. However it does not depend, as the respondent's submissions contend in part, on the "quite different linguistic treatment" adopted for silica sand in s 6, compared to foundry sand. The statutory treatment of foundry sand is simply an illustration of the inclusion within the statutory definition of "mineral" of a substance that is not scientifically a mineral, by reference to its use.
- [48] Contrary to the respondent's submissions, I also do not accept that the interpretation of "chemical properties" in s 6(3)(b) is assisted by regard to the statutory treatment of clay. Subject to subsection (3), subsection 6(2)(a) includes any type of clay as a "mineral". Sub-section 6(3)(a) provides:

“(a) clay (other than kaolin and bentonite) is only a mineral if it is mined for use for its ceramic properties; and

*Examples of uses of clay for its ceramic properties –*

- for brick or tile making
- for pottery making”

Rather than illuminate the meaning of "chemical properties" in s 6(3)(b), this provision poses a different issue, namely the meaning of "ceramic properties".

- [49] The applicant by its reliance on Mr Haig's evidence acknowledges that an expansive definition of "chemical properties" to include any property that is due to a substance's chemical composition is unsustainable. It might be said that all properties of a substance are a function of its chemistry or chemical composition, and therefore to be amongst its "chemical properties". However, there is a difference between chemical properties and physical properties. Chemical properties may be said to describe characteristics that become observable when the substance reacts with other substances or decomposes under specific conditions.<sup>22</sup> Physical properties may be said to be different in that they are evident and measurable without the substance participating in a chemical reaction. One view is that properties can be divided between chemical properties and physical properties by asking the question: "Are these properties determined without changing the identity of the substance?"<sup>23</sup> Definitions can be found in which a "chemical property" is a property that matter exhibits as it reacts with a different substance or changes composition.<sup>24</sup>
- [50] Mr Haig eschews definitions in dictionaries and texts that are "aimed at the very basic level of the man in the street"<sup>25</sup> but acknowledges that there is no accepted technical definition of "chemical property". Mr Haig says that a chemical property is not restricted to chemical reactivity and says that the term "chemical property"

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<sup>22</sup> Dr Wilson's report filed 1 September 2009 at 4 and the definitions contained in Appendix 2 to it.

<sup>23</sup> Ibid at 5, Figure 1.

<sup>24</sup> Ibid at Appendix 2.

<sup>25</sup> Report filed 11 September 2009 at 4.

can be used to describe properties that can be detected by “totally non-destructive and reactionless means.”<sup>26</sup> I observe that the term “chemical composition” might also describe these characteristics. Mr Haig refers to the use of “chemical property” in different strands of the chemical profession whose work involves “interactions between the atoms and molecules of substances and their environment but without chemical reactions”. He cites its use by the American Society for Testing of Materials to refer to matters such as purity, colour, and water content. In support of his argument that “chemical property is not restricted to chemical reactivity” Mr Haig poses the question “what does chemistry encompass?” and calls in aid the definition of Nobel Laureate Linus Pauling who considered chemistry to be “the science of substances: their structure, their properties, and the reactions that change them into other substances”.<sup>27</sup> However, the issue is not the meaning of chemistry or chemical composition, but the meaning of “chemical properties” in a specific statutory context. The fact that “chemical reaction” is but one of at least 14 “concepts of chemistry” listed by Mr Haig means that chemistry is not restricted to chemical reaction. It does not define “chemical property”. Another definition that Mr Haig cites in answer to the question he poses “what does chemistry encompass?” is “the study of matter and the changes it undergoes”.<sup>28</sup> Arguably, this tends to suggest that “chemical properties” are associated with chemical change.

[51] An expansive interpretation of “chemical properties” so as to include chemical composition, colour and degree of reactivity would come close to making the word “chemical” in s 6(3)(b) redundant, however, it would not, as the respondent submits, make it “otiose or surplusage”. Some uses such as landfill in which the end-user is not concerned about reactivity or any other chemical properties would fall outside the statutory definition and give the word “chemical” some work to do. That work may be unnecessary in the light of the additional ground of exclusion contained in s 6(3)(d)(i) if the silica sand is to be used “as sand”, but that is a different point.

[52] Neither party contends that the term “chemical properties” in s 6(3)(b) should be given such a wide meaning that it covers practically every property of a substance. The issue is whether it should be given what the applicant contends is an excessively narrow meaning, as entailing characteristics that are concerned with chemical reactivity or chemical change. Expressed differently, and by reference to the specific issue requiring resolution, the issue is whether the chemical composition and purity of the B Grade silica sand that gives it a colour that is sought for use in white mortars and white renders are “chemical properties”.

*Chemical composition and purity*

[53] The most commonly found mineral in mortar sands is quartz:

“Quartz is the most stable, inert and long-lasting of the various forms of silica, or silicon dioxide. It usually originates in igneous rocks such as granite, which contain other minerals like feldspar and mica. When exposed at the surface, these rocks weather away and the feldspar and mica are degraded to clay minerals. The quartz is left behind and is often sorted by wind or water into sand deposits of

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<sup>26</sup> Ibid at 6

<sup>27</sup> Ibid at 5, reference 2.1.

<sup>28</sup> Ibid reference 2.1 citing Emeritus Professor Raymond Chang.

various degrees of fineness. The quartz survives the millennia simply because it is so resistant to chemical reactions.”<sup>29</sup>

[54] The chemical composition of the B Grade silica sand, namely its extremely high quartz content, is helpfully described by Professor Frost and Dr Martens in their report dated 11 February 2009. In a later affidavit Professor Frost captures the point of this report as explaining “why the chemical purity of the quartz is so important to the physical property, the colour of the mineral.”<sup>30</sup>

[55] The 11 February report explains the chemical composition of the applicant’s B Grade silica sand as follows:

“Silica (SiO<sub>2</sub>):- currently represents 99.58% of the B grade silica sand produced by Unimin (Appendix 1). It [sic] commonly found in nature as the crystalline phase, quartz. Silica it’s self [sic] is colourless thus if impurities are present they highly colour the silica (allochromatic). This is well know [sic] by the gem industry where, for instance, a contamination of Fe<sup>3+</sup> and A<sup>13+</sup> ions in the silica framework (quartz), cause a purple colour in amethyst. Thus for a silica to be white or colourless, it’s [sic] chemical purity must be high. Further to this, glass, which most of us perceive as clear, has impurities deliberately added to reduce it’s [sic] melting point during processing. These impurities have been refined over the years to ensure the least colour is imparted to the glass but still a faint blue colouration is imparted which is visible when viewed through considerable path length. Quartz glass, being pure SiO<sub>2</sub>, has no such colouration thus appears white in colour when reflection occurs or transparent when reflection does not occurs [sic].”

[56] The report concludes:

“The B grade silica sand produced by Unimin has white colour due it [sic] the chemical composition, namely the chemical purity of the silica, the presence of titania, and the low organic content. The B Grade silica sand is also very low in alkali metal content. These chemical properties of the B Grade silica sand make this material a very suitable choice for use in the production of white mortar cements.”

[57] Mr Haig similarly emphasises the chemical composition and purity of the B Grade silica sand:

“Sand is a material whose final chemical properties depend upon the rock from which it was produced and the geological processes involved in its formation. Some sands are extremely high in heavy minerals and are mined for that purpose. In the case of the Unimin Stradbroke Island Silica Sand the desirable glass-grade sand has a chemical character which is directly attributable to its extremely high quartz mineral content. During the processing of this 'A' Grade Silica Sand a by-product 'B' Grade Silica Sand is produced. Notwithstanding that this 'B' Grade Silica Sand fails to meet all the

<sup>29</sup> Report of Stuart Errey filed 7 September 2009.

<sup>30</sup> Frost Affidavit Report filed 11 September 2009 at paragraph 7(a).

criteria for a glass manufacturing feedstock, the very chemical nature of this by-product is such that its chemical properties can be exploited in the manufacture of white renders and mortars.

It is clear that sand produced by the extractive industries is not suitable for use in white renders and mortars due to its chemical composition. The rock material from which these sands were derived has yielded a chemical composition, expressed in the non-quartz mineral assemblages, which fails to meet the criteria for a specialty silica sand. The corollary is that the Unimin 'B' Grade Silica sand is used in this specialty application because of its **chemical composition**.<sup>31</sup> (emphasis added)

- [58] Mr Haig goes on to explain the processes that are used to remove iron and improve "the chemical composition" of the sand and to enhance its whiteness:

"Various beneficiation processes are employed by Unimin to improve the **chemical composition** of 'B' Grade Silica Sand and enhance its suitability for the specialty market into which it is sold. Specifically, these processes remove iron and increase the silica content. Aggregate sand obtained from the extractive industries cannot be processed to yield a product suitable for specialty white render and mortar applications.

The removal of iron from the 'B' Grade Silica Sand enhances the whiteness of the product and thus its suitability for specialty mortars and renders. It is tempting to think of colour as just a physical property. Rather it is an attribute which is a direct reflection of the chemical composition of the material. Pure silica is white. Silica with traces of ferric iron is coloured violet and is the mineral variety Amethyst. Silica with traces of titanium is coloured rose-red or pink and is the mineral variety Rose Quartz."<sup>32</sup> (emphasis added)

- [59] Mr Haig concludes:

"Unimin 'B' Grade Silica sand is a by-product of mining Unimin 'A' Grade Silica Sand and has a value inextricably linked to its **chemical composition**. Its use in white specialty mortars and renders is a direct function of its **chemical properties** of high quartz content and low levels of non-quartz coloured minerals.

The production of white fine aggregate for cements and mortars cannot be supplied through the usual aggregate sand extractive industries. Only sand of exceptionally high purity can be used and this is satisfied through the chemical purity of B Grade Silica Sand.

...

I am therefore of the opinion that Unimin B Grade Silica sand as mined on Stradbroke Island and supplied for use in specialty white mortars and renders is qualified for classification as a mineral under

<sup>31</sup> Report of Mr Haig filed 28 August 2009 at 8 – 9.

<sup>32</sup> Ibid at 9.



the Act as it meets at least one valid interpretation of ‘use for its chemical properties’.”<sup>33</sup> (emphasis added)

- [60] As can be seen from the words that I have emphasised from these passages, the terms “chemical composition” and “chemical properties” are used by Mr Haig almost interchangeably. At least in the last passage that I have quoted it appears that the words “chemical properties” might be replaced by “chemical composition”. Mr Haig accepts that no chemical reaction is involved, and contends that “chemical properties” can be used to refer to the purity of the sand:

“While it is admitted that the use of B Grade Silica Sand in white mortars and renders involves no chemical reaction of the silica component, that principle is not directly specified in Section 6(3) and the term ‘use for its chemical properties’ is at best technically ambiguous and at worst meaningless. The term has no meaning in science. It may be interpreted as requiring a chemical reaction of the substance in its use. It can equally validly be taken to mean that the use is dependent on the chemical properties, eg. purity, of the mined sand”.<sup>34</sup>

- [61] Mr Robertson helpfully addresses the issue of the colour of sand:

“Sands commonly used for masonry applications range in colour from almost colourless through rich yellows to reds, browns and white. Yellow sands are typically used with Off White cements to generate ‘warm’ limestone colours in Western Australia whilst white sands must be used with white cements to produce ‘clean’ white mortars and renders.

In the same way that cement colour is dictated by its **chemistry**, so too is the colour of sand. Sometimes the colour is dominated by the principal sand mineral and on other occasions it is influenced by the presence of discrete particles of coloured minerals within the sand. The latter case occurs in Unimin’s North Stradbroke Island silica sands deposit and it is this characteristic which allows Unimin to produce white silica sand while separating the dark coloured ‘heavy minerals’.”<sup>35</sup> (emphasis added)

- [62] He explains that white mortars and renders depend upon white Portland cement and white aggregates for their finished colour, and that the white colour of these materials:

“...is a function of their **chemistry** and is achieved by careful selection of materials and control of the manufacturing processes. Unimin’s B grade silica sand is manufactured from naturally occurring silica sands and its chemical and physical (notably particle shape and size) properties are both critical to the success of the resulting white mortars and renders.”<sup>36</sup> (emphasis added)

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<sup>33</sup> Ibid at 10.

<sup>34</sup> Ibid at page 11.

<sup>35</sup> Report of Mr Robertson dated 14 February 2009 at 11 of 14.

<sup>36</sup> Ibid at 12 of 14.

- [63] Understandably, Mr Robertson did not venture a definition of “chemical properties” or seek to distinguish that term from “chemical composition” or the word “chemistry”. The terms “chemical properties”, “chemical composition” and “chemistry” are used in various reports in reference to the colour and purity of the B Grade silica sand. The essential point made by them is that the purity or chemical purity of the silica sand is important to its colour. Professor Frost states that “chemical purity” is important to “the physical property, the colour of the mineral”.<sup>37</sup> His description of “chemical purity” assumes some importance. He says:

“Chemical purity is both a physical and chemical property depending on the context and is a:

Physical property when a physical mixture exists (i.e. particles of A mixed with B) and can be separated physically without the need for a reaction.

Chemical property when chemical bond exists between the materials in question. In the current case for example, only bonds exist between Si and O.”<sup>38</sup>

- [64] In simple terms, the evidence is that the B Grade silica sand is used because of its colour, and its colour is a function of its chemical composition and purity. This, however, does not necessarily lead to the conclusion that the sand’s chemical composition and purity, and the colour they produce are “chemical properties” within the meaning of s 6(3)(b). The experts’ discussion on the issue of purity is to the effect that the sand is used for white mortar and white render because the sand in its natural state has a very high percentage of silica, and impurities are also removed as part of the applicant’s processing operation.
- [65] It is difficult to regard the sand’s purity as a “chemical property” for the purpose of s 6(3)(b). The minerals or other substances that might be described as impurities, and which may affect its colour if present in large quantities, are capable of being separated physically from the silica without the need for a reaction. Their presence affects the purity of the silica sand, or what Professor Frost refers to as its “chemical purity”. According to his definition of “chemical purity”, the presence (or absence) of these impurities is a physical property. This would also seem to accord with ordinary usage of such terms.
- [66] It seems improbable that whether or not silica sand is a mineral should depend on the purity or chemical purity of the sand. Such an approach begs questions such as whether a sand deposit that is mined and found to have a 98% purity qualifies as a mineral, whereas one with 95% would not. Purity in this context is a relative concept, and it is unlikely that the classification of silica sand as a mineral should depend on its having a certain percentage purity. The statute contains no such quantitative qualification, and whether or not silica sand qualifies as a mineral under s 6(3)(b) should not depend on whether a particular deposit, once mined, or after processing, has a certain percentage purity.
- [67] In circumstances in which the chemical composition of silica sand can be altered by the removal of minerals through “benefication processes”, its chemical composition

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<sup>37</sup> Affidavit filed 11 September 2009 at paragraph 7 a.

<sup>38</sup> Ibid at paragraph 7 c.

is related to its chemical purity. For the same reasons that silica sand with a certain purity does not thereby qualify as a mineral, silica sand with a certain “chemical composition” should not thereby qualify as a mineral, whether it consists of 99% silica or some lesser percentage. Qualification as a mineral depends on use for its chemical properties, not the possession of a certain level of purity.

- [68] The terms “chemical composition”, “chemical purity” or “chemistry” in the expert reports variously describe the high silica content of the B Grade sand and the minimal presence of impurities. Whichever term is used, these characteristics bear upon the colour of the sand. The critical issue is whether the sand’s use because of its colour involves use for its “chemical properties”. In short, the issue is whether colour is one of the substance’s “chemical properties” within the meaning of s 6(3)(b).

*Colour as a chemical property*

- [69] The chemical composition of a substance largely determines both its chemical and physical properties. The chemical properties of a substance are said by Dr Wilson to describe “characteristics that become observable when the substance reacts with other substances or decomposes under specific conditions”.<sup>39</sup> Physical properties are said by him to be different from chemical properties in that the physical properties are evident and measurable without the substance participating in a chemical reaction.
- [70] The physical properties of quartz include its grain size distribution, its angularity, its colour and the amount of internal fracturing in grains.<sup>40</sup> Quartz is usually colourless or white. According to Dr Wilson, the B Grade silica sand mined from North Stradbroke Island, when used to make white mortar, is used because of its colour, being a physical property. The colour of sand does not describe how sand will behave in a chemical reaction. In fact, the silica in the sand that is added to the mortar does not engage in any chemical reaction and according to Dr Wilson’s definition could not be said to have been used because of its chemical properties.
- [71] Colour is a function of the chemistry of a substance. At the simplest level, a substance appears coloured as it absorbs electromagnetic radiation within the visible range of wavelengths. The individual atoms contained in the substance absorb fixed amounts of energy from light and the energy change corresponds to the characteristic colour.<sup>41</sup> In this way, the colour of sand is dictated by its chemical composition. Its colour may be influenced by the presence of discrete particles of coloured minerals. The white colour of white mortars is a function of their chemistry. There is a clear relationship between the chemical composition of silica sand and its colour. However, this does not mean that its colour is one of its “chemical properties” within the meaning of s 6(3)(b). In the present context the colour of silica sand may just as easily be described as a physical property, based upon its chemical composition.
- [72] If the definition of chemical properties advanced by Dr Wilson is accepted then the colour of silica sand is not a chemical property because it has nothing to do with chemical reactions. The competing argument is that a substance’s chemical

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<sup>39</sup> Report filed 1 September 2009 at paragraph 11.

<sup>40</sup> Ibid at paragraph 17.

<sup>41</sup> Report of Andrew Robertson filed 11 September 2009 at 10 – 11. See also page 2 of the report of Professor Frost and Dr Martens dated 11 February 2009 for a helpful account of light and colour. The complexity of colour mechanisms is shown in Table 1, page 8 of Mr Haig’s report filed 11 September 2009.

properties are not limited to chemical reactivity, that the B Grade silica sand produced by the applicant has its white colour due to its “chemical composition, namely the chemical purity of the silica, the presence of titania and the low organic content”. The properties which give the sand its colour are said to be chemical properties.

- [73] I consider that the better view is that the features of chemical composition and chemical purity are not themselves “chemical properties” within the meaning of s 6(3)(b). In any case, B Grade silica sand is not mined for use for these properties, but for the property they produce, namely colour.
- [74] Section 6(3)(b) uses the term “chemical properties” rather than “chemical composition” or the even broad term “physical properties”. A meaning of “chemical properties” which extends to any aspect of chemical composition, and consequential features such as colour, should not be adopted in the context of s 6(3)(b). The term “chemical composition” should not be used interchangeably with the statutory term “chemical properties”, otherwise practically any physical property which is the result of the silica sand’s chemical composition, including its grain size, would qualify as a chemical property. The phrase “chemical properties” means something different to chemical composition and I consider that there is much to commend the view that in its statutory context the “chemical properties” of a substance describe characteristics that may be observed when the substance reacts with other substances or alters its composition under specific conditions. It is this aspect of chemical change that qualifies silica sand that is mined for use in glass manufacturing as a mineral. Dr Wilson explains:

“It is the use because of a chemical property of the sand that allows a silica sand to be classified as a mineral when used in glass making. In glass making the silica exhibits the behaviour of an acidic oxide (a chemical property) and through a chemical reaction, the silica combines with soda ash and similar compounds to form sodium silicate or other silicates, which on cooling become the common form of glass. The sand is a mineral because the silica in the sand is required for its chemical property as an acidic oxide for the chemical reaction with basic substances to form a different chemical compound.”<sup>42</sup>

- [75] The absence of any chemical reaction or chemical change when B Grade silica sand is used in white mortars or white renders is a significant factor in concluding that such a use does not involve “use for its chemical properties”. The B Grade silica sand that is mined by the applicant for use in white mortars and white renders is used for its colour, or more precisely, its lack of colour. Its colour is a function of its chemical composition. However, a property that a substance possesses because of its chemical composition is not necessarily a “chemical property” within the meaning of s 6(3)(b). Otherwise practically any physical property that the substance possesses would qualify as a chemical property, making the term “chemical properties” in s 6(3)(b) practically equivalent to “physical properties”. In its statutory context the term “chemical properties” is intended to confine the properties of silica sand to a more limited class than physical properties that exist by reason of chemical composition, otherwise the term “chemical composition” might have been used. I consider that the term “chemical properties” in this context connotes a characteristic associated with a chemical reaction or chemical change

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<sup>42</sup>

Dr Wilson’s report at paragraph 38.

under certain conditions. It does not relate to physical properties such as colour that exist as a result of a substance's chemical composition.

[76] Whilst an expansive definition of “chemical properties” might include silica sand's colour as a “chemical property” because colour is a function of chemical composition and purity, the better view in the present statutory context is that colour, being a function of the chemical composition of, and the level of impurities in, silica sand, is a physical property. In simple terms, the substance's colour is a function of the physical mixture of silica and small quantities of minerals. This physical mixture gives the sand its colour, being a physical property. The sand is used in white mortars and white renders because of this physical property.

[77] I conclude that the colour of B Grade silica sand is not one of its “chemical properties” within the meaning of “chemical properties” in the context of s 6(3)(b) of the *MR Act*.

*Chemical reactivity or the absence of chemical reactivity – use as an inert filler*

[78] The opinions expressed by the experts are to the general effect that reactivity is an important manifestation of the chemical properties of a substance. One point of view is that a substance's chemical properties are not restricted to chemical reactivity. The present issue, however, relates to reactivity, or, more precisely, the absence of chemical reactivity. The absence of chemical reactivity of silica sand when used for white mortars and white renders is helpfully explained by Mr Robertson as follows:

“In paragraph 72, Dr Wilson concludes his discussion of my February 2009 opinion and states that ‘it would appear that colour and particle size are the main attributes that make Unimin's sand suitable for white mortar’. These properties are indeed critical attributes but the absence of chemical activity in a cementitious system is also critical. This chemical property is apparently taken for granted. The chemical stability of any substance is relative to the physicochemical system in which it is used. **The North Stradbroke Island silica sand is chemically reactive in glass making and chemically unreactive in cement based white mortars. In my view the unreactive nature in the latter system is a critical criterion for its selection and suitability for white mortars and renders.**”<sup>43</sup> (emphasis added)

There was some evidence to the effect that the use of B Grade silica sand involved some surface chemistry effects,<sup>44</sup> however, the essential point that emerges from the expert evidence relates to the lack of chemical reactivity of B Grade silica sand when used in mortar. As Mr Robertson notes:

“... it is fair to say that sand containing reactive silica should be avoided for mortars and renders. ... in my opinion, **the absence of these chemical properties** is an important factor in the selection and suitability of the sand (B Grade silica sand) for mortars and renders.”<sup>45</sup> (emphasis added)

<sup>43</sup> Affidavit of Mr Andrew Robertson filed 11 September 2009 at paragraph 6(f).

<sup>44</sup> Report of Mr Haig filed 11 September 2009 at 7; Affidavit of Mr Robertson filed 11 September 2009 at paragraph 6(c).

<sup>45</sup> Ibid at paragraph 6(c).

[79] Mr Errey states that “there are no significant chemical reactions occurring between sand and any other ingredient of mortar”.<sup>46</sup> Mr Haig’s evidence is to the effect that

- use of the B Grade silica sand in white mortars and renders involves no chemical reaction of the silica component;<sup>47</sup>
- B Grade silica sand behaves in common mortars and renders with the same lack of chemical reactivity as sand extracted by the sand and gravel industry.<sup>48</sup>

[80] The lack of chemical reactivity of the silica sand is a feature that it shares in common with other sand and fine aggregates that are used as mortars and renders. As Mr Robinson explains:

“Fine aggregates are generally thought of as being chemically inert and simply contributing to the compaction of the mixture through graded particle sizing and rounded particle shape. Likewise, the hardness of the fine aggregate particles will influence the final strength of the hardened mixture by ensuring that the aggregates meet to exceed the strength of the hardened reaction products (paste). These and a number of other *physical* properties are, indeed, critical to the performance of mortars and renders and Australian and International Standards set specifications and testing methods to ensure these properties are achieved.”<sup>49</sup> (emphasis in original)

[81] Mr Errey’s report is to like effect, noting that mortar used in masonry is essentially composed of cement, sand and water and when the ingredients are mixed together the cement reacts with the water to form a complex mixture of reaction products which eventually sets in a solid mass. The sand is only present as “an inert filler”. Other reports are to like effect in stating that fine aggregates are generally thought of as being chemically inert and that there is nothing chemically unique about fine aggregate sand other than its size.<sup>50</sup>

[82] The essential point is that the B Grade silica sand mined by the applicant behaves with the same lack of chemical reactivity as sand extracted by the sand and gravel industry and which is used in common mortars and renders. This common lack of chemical reactivity serves to explain the particular reliance placed by the applicant upon colour as the relevant chemical property. However, it is appropriate to deal with any remaining contention that the silica sand’s lack of chemical reactivity constitutes a chemical property for present purposes.

[83] There are substantial reasons to conclude that a substance’s lack of chemical reactivity is not a chemical property for the purposes of s 6(3)(b). The contrary argument that relies on the *absence* of a chemical property, such as chemical reactivity, would qualify silica sand as a mineral whenever it is used as an inert filler, subject to possible exclusion under s 6(3)(d)(i). This argument could be used to argue that the *absence* of radioactive isotopes is amongst the chemical properties for which the silica sand is used.

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<sup>46</sup> Report of Mr Stuart Errey filed 7 September 2009 at 3.

<sup>47</sup> “JH-1” to Haig No 1 (Doc No. 8) report dated 21 August 2009 at 11.

<sup>48</sup> “JH-001” to Haig No 2 (Doc No. 21) report dated 10 September 2009 at 7.

<sup>49</sup> Report of Mr Andrew Robertson filed 11 September 2009 at 5.

<sup>50</sup> Report of Mr Andrew Robertson filed 11 September 2009; see also the Report of Mr Jim Haig filed 28 August 2009 at 7.

- [84] If a lack of chemical reactivity qualifies the silica sand to be a mineral, then the silica sand is chemically indistinguishable from any other inert filler. It is difficult to discern the legislative purpose that would be served by permitting the use of silica sand as an inert filler to qualify it as a mineral, and subject to a different legislative regime to other types of sand and fine aggregate particles that might be used for the same application due to their lack of chemical reactivity. It might be said that this explains the inclusion of s 6(3)(d)(i). However, s 6(3)(d)(i) is concerned with more than silica sand, and does not have a direct bearing on the meaning of “chemical properties” in s 6(3)(b). Even when regard is had to s 6(3)(d)(i), I do not consider that the absence of certain features, including impurities, contaminants or a chemical composition that makes the sand react, qualify as “chemical properties” for the purpose of s 6(3)(b). The sand’s lack of chemical reactivity when used in mortars and renders may explain why it is used in white mortars and white renders. Its lack of chemical reactivity does not make this a chemical property for the purpose of s 6(3)(b). Otherwise the use of silica sand in a wide range of applications in which it might be used for its colour or lack of reactivity would mean that it was being used for its chemical properties. A private beach, a garden feature and an architectural feature in the foyer of a building are a few examples. Another example is use as a fine aggregate in mortar where it is used for its lack of chemical reactivity.
- [85] I conclude that the lack of chemical reactivity of the silica sand in its intended use as a mortar or a render is not a chemical property for the purpose of s 6(3)(b).

*Summary – the chemical properties issue*

- [86] B Grade silica sand is mined by the applicant for use as white mortar and white render because of a number of its features, including its colour and its lack of chemical reactivity. However, these features do not mean that it is being “mined for use for its chemical properties”. The legislature’s deliberate use of the words “chemical properties” rather than “chemical composition” or “properties” means that a property like colour, grain size or hardness should not be treated as being one of silica sand’s “chemical properties” within the meaning of s 6(3)(b) simply because it is the result of a substance’s chemical composition. The inclusion of these and other physical properties would make the qualification in s 6(3)(b) practically all-encompassing, and it is difficult to discern any legislative purpose in making practically any use that involves a physical property that exists because of a substance’s chemical composition a chemical property.
- [87] Interpreting “chemical properties” in its statutory context as connoting something more than chemical composition, and suggestive of properties associated with reactivity and chemical change accords with usage of that term.<sup>51</sup> That is not to say that the term is not used in scientific and other discourse in a sense that does not involve reactivity.<sup>52</sup> However, in circumstances in which the term is not used in accordance with a technical meaning,<sup>53</sup> and, it appears that it does not have an accepted technical meaning amongst scientists, I consider that the word “chemical properties” in s 6(3)(b) should be understood as connoting properties associated with chemical reactivity or chemical change. Such a meaning is used in scientific and ordinary discourse. Such an interpretation avoids the problem of over-inclusion of properties that would make the word “chemical” in “chemical properties” practically redundant. If Parliament intended such an all-encompassing

<sup>51</sup> See the usages and definitions referred to Appendix 2 to Dr. Wilson’s report filed 1 September 2009.

<sup>52</sup> See the report of Mr Haig 11 September 2009 at 5 – 6.

<sup>53</sup> Pearce & Geddes *Statutory Interpretation in Australia*, 6<sup>th</sup> ed, [4.15] – [4.16].

qualification it would have used “chemical composition” or some other expression instead of “chemical properties”. An expansive interpretation of “chemical properties” in s 6(3)(b) is not required in order to achieve the purposes of the Act. There is no reason to suppose that the legislature intended the term “chemical properties” to have such an expansive meaning that a wide range of physical properties, including grain size, constituted a chemical property.

- [88] In its statutory context the term should be understood as connoting properties that are characterised by chemical reactivity and chemical change under certain conditions.
- [89] Despite scope for debate between scientists about whether colour is a physical property, a chemical property, or both, in the statutory context of s 6(3)(b) the colour of silica sand is better regarded as a physical property, and not a chemical property. The fact that silica sand’s colour is a direct function of a chemical composition of high quartz content and a low level of non-quartz materials is not sufficient to qualify its colour as a chemical property for the purposes of s 6(3)(b). In its statutory context, a chemical property does not simply mean a substance’s chemical composition or a physical property that exists because of a substance’s chemical composition or the purity of a physical mixture.
- [90] Because the term “chemical properties” in s 6(3)(b) connotes properties that are characterised by chemical reactivity and chemical change under certain conditions, physical properties such as grain size and shape, hardness, density and colour do not constitute chemical properties for the purpose of s 6(3)(b).
- [91] The term “chemical properties” in s 6(3)(b) should not be taken to include silica sand’s lack of reactivity. It is hard to discern anything in the text, scheme or purpose of the statute that justifies the conclusion that silica sand should qualify as a mineral when mined for a use that involves an absence of reactivity, or, expressed differently, its use as an inert filler. The B Grade silica sand that is the subject of the present proceedings is not mined for use simply as non-reactive landfill or simply because of its non-reactive properties. However, the meaning of “chemical properties” in s 6(3)(b) does not depend on the facts of the present case. The statutory qualification of “use for its chemical properties” is not established simply by an absence of reactivity when silica sand is used in mortar, being a quality it shares with other sand and fine aggregate. It is hard to see why silica sand should qualify as a mineral because of a lack of reactivity whilst other sand and other substances that are used because of their lack of reactivity do not.
- [92] I conclude that the B Grade silica sand that is mined by the applicant for use in white mortars and white renders is not a “mineral” because it is not “mined for use for its chemical properties”.

**The Sand Issue: Does use of B Grade silica sand entail use or supply for use as “as sand, gravel or rock?”**

- [93] As set out above, subsection 6(3)(d)(i) of the *MR Act* provides:

- “(d) each of the following is not a mineral –
- (i) soil, sand, gravel or rock (other than rock mentioned in subsection (2)(k) if it is to be used, or to be supplied for use, as sand, gravel or rock, whether intact or in broken form; ...”



- [94] The respondent submits that the requirements of s 6(3)(b) and s 6(3)(d)(i) are cumulative, and that the use of silica sand in mortar, as a fine aggregate or as a “colourless inert filler” entails its use “as sand” so as to exclude it from the definition of “mineral” by virtue of s 6(3)(d)(i). Its submission is at odds with the position communicated by an Environmental Compliance Assessment Report dated 4 May 2000, but the respondent’s apparent acceptance of a contrary position in the past cannot govern the interpretation of legislation.
- [95] A rule of statutory interpretation exists that provisions of general application give way to specific provisions when in conflict, and the rule should be observed more strictly in the interpretation of provisions of a particular Act than in the case of separate enactments.<sup>54</sup> The applicant submits that in the context of the definition of “*mineral*” within section 6 of the *Mineral Resources Act* 1989, the general exclusion pertaining to “*sand*” in section 6(3)(d)(i) must give way to the specific exclusion dealing with “*silica sand*” in section 6(3)(b). It submits that, as a consequence, s 6(3)(d)(i) of the *MR Act* has no application to its operations.
- [96] The applicant submits that to treat s 6(3)(d)(i) as an additional ground of exclusion, so that the use of silica sand as sand would preclude it being a mineral even when it is mined for use for its chemical properties, is at odds with the scheme of the section and the apparent intention of the legislature. It submits that the respondent’s interpretation would “neuter the legitimate use of silica sands”, including its use for glass manufacture.<sup>55</sup>
- [97] Section 6(3)(d)(i) may be said to reflect the broad divide between the regulation of mining and the regulation of extractive industries. A provision in similar form was introduced into the *MR Act* as s 1.8. The Explanatory Memorandum to the legislation<sup>56</sup> stated:
- “There has been no provision made to declare any other substance such as sand, gravel etc to be minerals. However, the legislation provides that the holder of a mining lease is entitled to utilise any sand, gravel or rock occurring in or on the mining lease for purposes associated with the mining operation. It cannot be sold or disposed of. **The extraction and disposal of other materials such as sand, gravel and rock on mining leases is a matter requiring the necessary permit from the relevant authority as would be the case if the material was being extracted from other land ...**”  
(emphasis added)
- [98] In *Re Clark*<sup>57</sup> Kingham DP stated:
- “As for approval under the MRA, that Act provides for a mining lease to be granted for the purpose of mining minerals (s 234). Minerals are defined to include ‘(2)(k) rock mined in block or slab form for building or monumental purposes’ but to exclude rock ‘other than rock mentioned in subsection (2)(k)) if it is to be used or to be supplied for use, as sand, gravel or rock, whether intact or in broken form’ (s 6). A mining lease could not be granted, therefore, to mine rock in any way other than in block or slab form and for

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<sup>54</sup> D C Pearce and RS Geddes, *Statutory Interpretation in Australia* 6<sup>th</sup> edition 2006 [4.32].

<sup>55</sup> Transcript 1-73 ll 51 – 55.

<sup>56</sup> Appendix 4 to the report of Dr Wilson filed 1 September 2009.

<sup>57</sup> [2005] QLRT 118 at [8].

building or monumental purposes. There is, however, limited authority conferred on the holder of a mining lease to use sand, gravel or rock on the mining lease area and for a purpose authorised by the mining lease (s 236). This authorisation specifically exempts the holder from a requirement under any Act, other than the EP Act, to obtain approval for that use. Clearly, any other use of such resource, such as to remove it from the mining lease and sell it, is not authorised by the MRA and is not so exempt.”

- [99] An indiscriminate application of s 6(3)(d)(i) to exclude silica sand as being a mineral whenever it is supplied as silica sand would undermine the clear intent that certain kinds of sand are *prima facie* to be treated as minerals, for example, foundry sand<sup>58</sup> and silica sand that is mined for use for its chemical properties.<sup>59</sup> Such an interpretation would undermine the purpose of the provision by giving with the one hand and immediately taking away with the other. It would mean that silica sand that was mined for use in glass manufacturing was not a mineral because it was to be used as sand. However, this is not to say that whether or not silica sand is a mineral is determined simply by s 6(2)(b) and that s 6(3)(d)(i) has no potential application to silica sand. For example, the use of silica sand as landfill would preclude the sand being a mineral by virtue of s 6(3)(d)(i) because it was to be used, or to be supplied to be used, as sand. However, as the applicant submits, this has nothing to do with the “legitimate production of silica sand in terms of s 6(3)(b)”.<sup>60</sup> The provisions of s 6(3)(b) in relation to silica sand and the provisions of s 6(3)(d)(i) in relation to sand should be construed so as work together.
- [100] I do not accept that s 6(3)(d)(i) creates an additional ground of exclusion for silica sand that is mined for use for its chemical properties and is in fact used in that way. Nor do I accept that s 6(3)(d)(i) has no possible application to silica sand. It has a possible application to silica sand that is mined for use for its chemical properties, and which thereby qualifies as a mineral by virtue of s 6(3)(b), but which in fact is put to a different use, or which is supplied for a different use, for example for use as sand in countering beach erosion.
- [101] In this case there is no dispute that the silica sand that is mined for use in glass manufacturing is a mineral, despite the fact that, on a literal interpretation of s 6(3)(d)(i), it is to be used as sand. If I had concluded that the B Grade silica sand was being mined for use for its chemical properties in circumstances in which it was mined for use in white mortar and white renders, then s 6(3)(d)(i) would not necessarily operate to disqualify it as being a mineral. The qualification of silica sand as a mineral in such a situation would follow not simply from the fact that s 6(3)(b) makes specific provision for silica sand, whereas s 6(3)(d)(i) is a general provision about sand. It would follow from the operation of the specific provision in relation to silica sand in s 6(3)(b) and the fact that in a case in which the silica sand was being mined for use for its chemical properties, and was being used for those chemical properties, the exclusion in s 6(3)(d)(i) would not be engaged.
- [102] In a case in which silica sand was not to be used *for its chemical properties as silica sand*, but simply as sand for mortar, fine aggregate, bedding, landfill or for some other use *as sand* the exclusion in s 6(3)(d)(i) would be engaged.

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<sup>58</sup> Section 6(2)(b).

<sup>59</sup> Section 6(2)(j) and s 6(3)(b).

<sup>60</sup> Transcript 1-28 ll 1 – 11.

- [103] In summary, the mining of silica sand for use for its chemical properties does not entail sand that is to be used, or to be supplied for use, “as sand, gravel or rock”, so as to engage s 6(3)(d)(i). However, I have not found that the B Grade silica sand is mined for use for its chemical properties. Therefore it is not a “mineral”. If I had found that the B Grade silica sand is mined for use for its chemical properties, and is a “mineral” by virtue of s 6(3)(b), then, contrary to the respondent’s submission, s 6(3)(d)(i) would not necessarily have provided a ground in the present circumstances to conclude that it is not a mineral.

**The passing of property issue: Can any condition of the leases or environmental authorities or legislation authorise the sale of anything other than a “mineral”?**

- [104] The applicant submits that if the B Grade silica sand is not a “mineral” within the meaning of the *MR Act*, then the authority granted under the leases to mine silica sand entitles it to dispose of “waste substances” or tailings in the form of B Grade silica sand. It also submits that the respondent has approved its sale of B Grade silica sand by reason of the provision of leases, accepting royalties for its sale, accepting plans of operation and environmental strategies that contemplated its sale and granting environmental authorities in respect of its mining activities.

- [105] The parties are agreed that the issue for my determination is:

“Can and does any condition of the leases, or any environmental authority, or any provision of the *MR Act* or any other Act operate such as to pass property to Unimin in respect of anything other than what constitutes ‘a mineral’ for the purposes of s 6 of the *MR Act*?”

- [106] The respondent submits that the applicant must identify in legislation, or in the lease granted thereunder, a passing of property such as to grant the respondent title to the B Grade silica sand. It further submits that whereas s 310 of the *MR Act* provides for property in minerals, nothing in the lease conditions are effective to pass property and that nothing in any authority or plan issued in respect of environmental protection does, nor could, confer title in respect of the material that is mined.

- [107] The purposes for which a mining lease may be granted under s 234 of the *MR Act* are:

- (a) to mine the mineral or minerals specified in the lease and for all purposes necessary to effectually carry on that mining;
- (b) such purposes, other than mining, as are specified in the mining lease and that are associated with, arising from or promoting the activity of mining.

- [108] Section 235 governs the general entitlements of the holder of a mining lease, and provides that the holder of the mining lease may do “all such things as are permitted or required under the lease or by this Act”.<sup>61</sup> It does not address title to material that is mined.

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<sup>61</sup> *MR Act* s 235(1)(b). Subject to certain conditions, section 236 provides an entitlement, subject to payment of royalty to “the person having the property in any sand, gravel or rock” to utilise it upon the land comprised in the mining lease. The parties are agreed that s 236 does not govern any entitlement to B Grade silica sand in the present case. However, s 236 contemplates a third party having property in sand, gravel or rock.

- [109] Subject to the payment of royalties, under s 310 of the *MR Act* lawfully mined “minerals” become the property of the holder of the mining lease:

**“310 Minerals taken become property of holder of mining claim**

All minerals lawfully mined under the authority of a mining claim cease to be the property of the Crown or person who had property therein and become the property of the holder of the mining lease subject however to the rights to royalty payments under this Act of the Crown or any other person.”

- [110] The applicant relies on the definition of “mine” in s 6A of the *MR Act* as supporting the conclusion that it may dispose of “waste substances”, and that such substances may be disposed of by sale to customers. Section 6A provides:

**“6A Meaning of mine**

- (1) Mine means to carry on an operation with a view to, or for the purpose of –

(a) winning mineral from a place where it occurs; or

(b) extracting mineral from its natural state; or

(c) **disposing of mineral in connection with, or waste substances resulting from, the winning or extraction.**

... [subsections (2), (3) and (4) define extracting]...

- (5) For subsection (1), **disposing includes, for example, the disposal of tailings and waste rock.**

(6) ...” (emphasis added)

- [111] Its argument is that the definition of “mine” envisages the sale of “waste substances” that result from the winning or extraction of mineral, and that the conditions of the mining leases do not restrict that ability.

- [112] I do not accept that the definition of “mine” operates so as to confer title upon the applicant to waste substances. First, the provision is a definition, and should not be read in isolation from the substantive provision to which it applies.<sup>62</sup> Second, there is no free-standing statutory provision governing property in waste substances. The absence of any provision comparable to s 310 that addresses passing of property in waste substances is telling. The Act does not expressly confer title to waste substances, and the specific provision in s 310 in relation to the passing of property in minerals is at odds with any suggestion that the Act impliedly passes title to minerals, or to waste substances that result from their winning or extraction.

- [113] Subject to the terms and conditions of the mining lease, other provisions of the *ML Act* and other applicable legislation, the authority to mine under a mining lease, in combination the statutory definition of “mine”, contemplates that the holder of a mining lease will dispose of mineral in connection with, or waste substances

<sup>62</sup> *Kelly v The Queen* (2004) 218 CLR 216 at 253 [103].

resulting from, the winning and extraction of minerals. The Act specifically addresses the passing of property in minerals. It does not address the passing of property in other substances. The terms and scheme of the legislation are inconsistent with the passing of property in substances other than minerals. In its statutory context, any authority granted by a mining lease to dispose of waste substances does not confer property upon the holder of the lease to those substances.

- [114] The applicant’s argument depends upon the notion that B Grade silica sand is a waste substance, a proposition that is not obvious in the light of the ordinary meaning of “waste” and the commercial value of the silica sand in question. The reference in s 6A(1)(c) is to “waste substances resulting from, the winning or extraction”, not all substances resulting from the winning or extraction. In any event, substances that result from the winning<sup>63</sup> or extraction<sup>64</sup> of the mineral, including soil, sand and gravel, may be assumed to be someone else’s property, and clear words would be required in the statute before it would be construed as transferring title to such property.
- [115] The applicant contends that conditions of the lease authorise the passing of property in the B Grade silica sand. One immediate difficulty with this contention is that the Act’s provisions in relation to mining leases do not contemplate the passing of title in waste substances. A stream cannot rise above its source. A mining lease that purported to vest property in substances that were not minerals and that were the property of a third party would be ineffective in the absence of clear legislative authority for the lease to have this effect. In any case, the terms of the leases do not make provision for the passing of property in such substances, or for the disposal of B Grade silica sand, by-product or waste materials by way of sale. It is unnecessary to dwell upon the provisions of certain leases that provide for the applicant to deposit all tailings and sludge within the boundaries of the lease. Such a condition was included as clause 16 of ML1108, but not upon its renewal. However, the obligation to “deposit” tailings and sludge within the lease boundaries unless otherwise approved is concerned with the physical placement or accumulation of such substances, not title to them.
- [116] The applicant notes that in the past the respondent was aware of the sale of B Grade silica sand from the leases, and received royalties in respect of such sand. An Environmental Management Overview Strategy for ML1132 and 1124 dated March 1995 and amended in October 2000 stated that ACI’s operations supplied “silica sand to Queensland Glass manufacturers, foundries and the construction industry...”.<sup>65</sup> The respondent audited the applicant’s predecessor, ACI, and produced an Environmental Compliance Assessment Report dated 4 May 2000 relating to ML1124.<sup>66</sup> The report included the following:

“ACI produces some silica sand for specialised cement manufacture in the construction industry. This material is regarded as a mineral under the *Mineral Resources Act* and ACI does not require an extractive industry permit (from Redland Shire Council) or Environmental Authority (*Environmental Protection Act*) for production and sale of this material.”

<sup>63</sup> The excavation of material to recover minerals is “winning mineral from a place where it occurs”: *Miles v Armstrong and Armstrong* [2001] QLRT 93.

<sup>64</sup> “Extracting includes the physical, chemical, electric, magnetic or other way of separation of a mineral”: s 6A(2) of the *MR Act* 1989. See also ss 6A(3) and (4).

<sup>65</sup> Affidavit of Greg Watkins filed 28 August 2009 at paragraph 32 and GW-005 at 225.

<sup>66</sup> *Ibid* at paragraph 32 and GW-013 at 644.

[117] A Compliance Inspection Report dated 23 May 2003<sup>67</sup> relating to Environmental Authority M2884, ML7064, ML1132 and ML1124 records:

“Process Description

The resource targeted by Unimin is silica, which is predominantly used in the glass manufacturing industry. By-products from the winning of silica are heavy metals and building sand, both of which are also sold by Unimin.”

[118] This leads to the inference that the respondent has known of the sale of lower purity B Grade silica sand. The applicant submits that there has been approval of the disposal by sale of the B Grade silica sand arising from:

- (a) the renewal of ML1108 in November 2003 in the face of the Compliance Inspection Report dated 23 May 2003;
- (b) the course of conduct in accepting royalties for the sale of all types of silica sand, including the applicant’s lower purity B Grade silica sand that is recorded in the royalty return as “*building sand*”;<sup>68</sup>
- (c) accepting various Plans of Operation including the current Plan of Operations (July 2006-June 2011), which states:

“*Mining activities:*

*The operation will primarily mine and process silica sand for sale to the glass manufacturing industry. Mineral sand, a by-product of the operation, will also be stockpiled and sold...*”<sup>69</sup>

- (d) accepting the Environmental Management Overview Strategies<sup>70</sup> in a form which provided for the production of B Grade silica sand for sale.

[119] The respondent’s past knowledge and apparent approval of the sale of B Grade silica sand does not dictate the passage of title. The respondent may have lacked any authority to approve such sales, and its apparent approval of sales may have been ineffective to pass property in the sand. I am not asked to determine property rights in the B Grade silica sand that was sold over the years. The respondent does not contend that any past approval to sell B Grade silica sand could not be withdrawn. Since December 2008 the respondent has made its position clear that it disputes the applicant’s entitlement to sell the B Grade silica sand.

[120] The issue that I am ask to determine is whether any condition of the leases operates such as to pass property to the applicant in respect of anything other than what constitutes a “mineral” for the purposes of the Act. I do not consider that the leases do. They do not address the issue of title to such property, and the B Grade silica sand in particular. The *MR Act* makes no specific provision for the passing of title in waste substances. Subject to the specific provisions of the lease concerning the disposal of waste substances, such as the depositing of tailings and sludge within the boundaries of the lease, the authority conferred by a mining lease to “mine” may generally authorise “the disposing of mineral in connection with, or waste substances resulting from, the winning or extraction” of specified minerals by virtue

<sup>67</sup> Affidavit of Alan Girle filed 24 September 2009 at ARG-001.

<sup>68</sup> Affidavit of Greg Watkins filed 28 August 2009 at paragraph 30 and Exhibit GW-012.

<sup>69</sup> Ibid at paragraph 27.

<sup>70</sup> Ibid at paragraph 28.

of the definition of “mine”. However, any such authority to dispose of waste substances should not be taken as operating to pass property in the substance. Provision for the disposal of waste substances is consistent with the safe disposal of waste substances in accordance with the objects of the *MR Act*, the terms of the mining lease and applicable environmental authorities.

[121] The activities carried on by the applicant involve multiple environmental authorities, including Environmental Authority No. MIM900220203 for mining lease ML1108. Environmental Authority No. MIM900220203 took effect from 28 November 2008 and permits:

“12(c) Mining activities, other than a standard mining activity, carried out using equipment and plant having a mineral ore throughput of 500 000t or more a year or if the mineral ores mined are chemically processed to produce concentrates.”

“Mining activity” is defined in s 147 of the *Environmental Protection Act 1994* (Qld):

**“147 What is a mining activity**

(1) A mining activity means an activity mentioned in subsection (2) that, under the Mineral Resources Act, is authorised to take place on—

(a) land to which a mining tenement relates; ...”

(2) For subsection (1), the activities are as follows—

- (a) prospecting, exploring or mining under the Mineral Resources Act or another Act relating to mining;
- (b) processing a mineral won or extracted by an activity under paragraph (a); ...”

[122] Chapter 5 of the *Environmental Protection Act 1994* complements Part 7 of the *Mineral Resources Act 1989* and regulates the grant of environmental authorities<sup>71</sup> for “*mining activities*”.<sup>72</sup> The structure of the *Environmental Protection Act 1994* is such that, if the activity is a *mining activity*, then an environmental authority pursuant to Chapter 5 is required.<sup>73</sup> The environmental authority is the regulatory document.<sup>74</sup>

[123] These environmental authorities do not purport to address title to property in minerals or waste substances. They authorise and regulate mining activities.

<sup>71</sup> “... an environmental authority authorises a person to carry out environmentally relevant activity which would be prohibited but for that authority, and that what is relevant in determining the scope of the approval is the content of the approval. An approval may be subject to conditions, and therefore conditions which restrict the way in which the relevant activity may be carried out”: *Fletcher v May* [2001] QDC 081 at [8].

<sup>72</sup> *Environmental Protection Act 1994* (Qld) s 146.

<sup>73</sup> If the activity is not “*mining activity*”, however, it is extractive activity or mineral processing under Schedule 2 of the *Environmental Protection Regulation 2008*.

<sup>74</sup> *Monto Coal 2 Pty Ltd & Ors v Dredge & Ors* [2003] QLRT 27 at [38].

[124] I conclude that neither the conditions of the relevant leases, any environmental authority, the provisions of the *MR Act* nor the provisions any other Act operate to pass property to the applicant in respect of anything other than what constitutes a “mineral” for the purposes of section 6 of the *MR Act*.

**Conclusion**

[125] The parties proposed that the final form of declarations await the provision of my reasons. For the reasons given by me, I decline to make declarations in the form proposed by the applicant.

[126] Subject to further submissions, it seems appropriate to determine the dispute between the parties by making declarations to the effect that:

1. On the proper construction of section 6 of the *Mineral Resources Act* 1989, the lower purity B Grade silica sand by-product, that is obtained by the applicant in the course of winning and extracting higher purity A Grade silica sand, is not a “*mineral*” within the meaning of s 6 of the *Mineral Resources Act* 1989;
2. On the proper construction of s 6(3)(b) of the *Mineral Resources Act* 1989, the lower purity B Grade silica sand by-product that is mined for use in white mortars and white renders is not mined “for use for its chemical properties” within the meaning of s 6(3)(b) of the *Mineral Resources Act* 1989.

[127] As presently advised, I do not consider that it is appropriate to make a negative declaration in relation to “the sand issue”. The matter may depend upon agreement or specific findings about whether the use of silica sand that is not a mineral involves its use “as sand”. For example, there is evidence of the use of sand supplied by the applicant for “erosion repairs”,<sup>75</sup> and this would appear to involve a supply for use “as sand”. In other circumstances, not presently in evidence, a contemplated use may entail use of silica sand for its chemical properties. A declaration that refers in general terms to “use of B Grade silica sand” seems inappropriate, and may create future uncertainty. It may be sufficient to dispose of the issue in dispute if I decline to make the positive declaration sought in paragraph 79(c) of the applicant’s submissions.

[128] I decline to make the declaration sought in paragraph 79(d) of the applicant’s submissions. The parties can consider the appropriateness and utility of making a negative declaration in relation to the passing of property issue. It is inappropriate that any declaration might be thought to determine rights and liabilities in respect of the past supply of sand made with the knowledge of the respondent and in respect of which it received royalties.

[129] I will hear the parties as to costs. The only order that I will make is that the parties consult and submit minutes of order within 7 days. I will also provide for liberty to apply.

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Affidavit of Nerida Cooley filed 2 September 2009 paragraph 3.