



3R Sand Limited

**Application to Amend Waste Approval WM068
Seven Persons Area**

August 8, 2006

ALBERTA ENERGY AND UTILITIES BOARD

Decision 2006-082: 3R Sand Limited, Application to Amend Waste Approval WM068, Seven Persons Area

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CONTENTS

1	Decision	1
2	Introduction.....	1
2.1	Application	1
2.2	Intervention.....	2
2.3	Hearing	2
3	Background.....	2
4	Issues.....	3
5	Jurisdiction of the EUB.....	3
5.1	Views of the Applicant.....	3
5.2	Views of the ESG	3
5.3	Views of the Board.....	4
6	Requirements of the EUB	6
6.1	Views of the Applicant.....	6
6.1.1	Amendment Requests.....	6
6.1.2	Additional Requests.....	8
6.2	Views of the ESG	8
6.2.1	Amendment Requests.....	8
6.2.2	Additional Requests.....	10
6.3	Views of the Board.....	11
6.3.1	Amendment Requests.....	11
6.3.2	Additional Requests.....	13
7	Fugitive Sand Releases	14
7.1	Views of 3R Sand.....	14
7.2	Views of the ESG	14
7.3	Views of the Board.....	14
8	Liability Management.....	15
8.1	Views of the Applicant.....	15
8.2	Views of the ESG	15
8.3	Views of the Board.....	15
Appendices		
1	Hearing Participants.....	17
2	Current Approval (Amendment D to Approval WM 068)	18
Figures		
1	Site Plan	24
2	Process Flow Diagram	25

ALBERTA ENERGY AND UTILITIES BOARD

Calgary Alberta

3R SAND LIMITED

APPLICATION TO AMEND WASTE APPROVAL WM068

SEVEN PERSONS AREA

Decision 2006-082

Application No. 1360998

1 DECISION

Having carefully considered all of the evidence, the Alberta Energy and Utilities Board (EUB/Board) hereby approves in part Application No. 1360998. Specifically, the Board denies the request to reduce the scope of the approval. However, the Board directs that amendments be made to the current Approval ([Appendix 2](#)) to reflect the new operating parameters described therein. The amended approval will be issued shortly.

2 INTRODUCTION

2.1 Application

3R Sand Limited (3R Sand) applied pursuant to Section 26 of the *Oil and Gas Conservation Act (OGCA)* for an amendment for its existing oilfield waste management facility to reduce the scope of the existing approval from regulating all of the facility to regulating only the blowback dewatering station and raw material dewatering pad. Refer to [Figure 1](#) for the location of these facilities at the 3R Sand site and [Figure 2](#) for a process flow diagram.

As an alternative, 3R Sand also applied under Section 26 of the *OGCA* to

- amend 11 points of seven conditions associated with its current approval,
- remove two storage buildings and three storm water retention ponds from the current approval, and
- pursuant to Section 16.643(2) of the *Oil and Gas Conservation Regulations (OGCR)*, reduce the amount of the security deposit required to be provided to the Board for the facility.

Further, in addition to the primary or alternative relief sought by 3R Sand, it applied for approval to accept and process spilled unused frac sand and quarried domestic sand material, to sell certain products to non-EUB-regulated industries, and to blend residual clay and fine sand to create alternative daily cover (ADC) for the City of Medicine Hat Landfill.

While 3R Sand did not submit a formal application, it requested approval to use fresh water to leach additional chlorides from the received materials while they are on the raw material dewatering pad.

The facility's current approval from the Board allows it to recycle frac sand and to process and size this sand for a variety of uses, including frac sands.

The facility is located at Legal Subdivision 4, Section 11, Township 11, Range 7, West of the 4th Meridian, about 2.4 kilometres northeast of the Hamlet of Seven Persons.

2.2 Intervention

The EUB's Waste and Storage Section (Waste Section), part of the Compliance and Operations Branch, is responsible for reviewing waste facility applications or proposed amendments to existing approvals. Depending on the nature of the application or proposed amendments, certain staff have been delegated the authority to approve such applications or amendments. In addition to these duties, the staff of the Waste Section may also, often in concert with Field Surveillance, initiate enforcement action if an approval holder is in breach of its approval or other requirements.

In the present case, notwithstanding extensive communication between the parties, the Waste Section could not recommend approval of the proposed amendments as several matters dealt with EUB's jurisdiction or new policy. As a consequence, the matter came before this Board panel for decision.

Certain staff from the Waste Section formed the EUB Staff Group (ESG), pursuant to Section 43 of the *Alberta Energy and Utilities Board Rules of Practice*, in order to participate in the hearing. The ESG objected to any limitation on the scope of the current approval and any reduction in the required security deposit. It sought clarification regarding jurisdiction over 3R Sand's proposed activities for the facility, in particular, the processing of non-frac sands and the disposition of those processed sands, as well as what constituted appropriate methods for the storage, treatment, and disposal of wastes in a manner other than that prescribed by EUB requirements.

2.3 Hearing

The Board held a public hearing in Calgary, Alberta, on May 24-30, 2006, before Board Member J. R. Nichol, P.Eng. (Presiding Member) and Acting Board Members D. A. Larder, Q.C., and W. G. Remmer, P.Eng. A site visit was conducted by some of the panel members and staff assisting the panel on May 2, 2006. Those who appeared at the hearing are listed in [Appendix 1](#).

There were no outstanding undertakings remaining at the close of the oral hearing. Therefore the Board considers the hearing closed as of May 30, 2006.

3 BACKGROUND

The site of the 3R Sand facility, which was an alfalfa processing plant prior to 3R Sand starting operations at the location, had not been constructed specifically for the processing of upstream oil and gas wastes. 3R Sand adapted its operational needs in part to the existing layout and structures and to a large extent to the physical and chemical nature of the frac sand that it received. As a result, four amendments to modify conditions of the initial approval of June 22, 2002, were granted to allow for the processing of the frac sands, the last being granted on February 25, 2004.

4 ISSUES

The Board considers the issues respecting the applications to be

- jurisdiction of the EUB
- requirements of the EUB
- fugitive sand releases
- liability management

5 JURISDICTION OF THE EUB

5.1 Views of the Applicant

3R Sand agreed that the frac sand solids and blowback fluids received at the facility's blowback dewatering station and raw material dewatering pad were oilfield wastes, in the sense that the operator of the well did not want them. However, 3R Sand stated that once these materials were removed from the dewatering pad, they were saleable, inert products in commercial demand. 3R Sand maintained that after the material had been through the raw material station, it was inert because it posed very little or no risk of impacting the environment. For this reason, 3R Sand argued that the sand and clays were not under the EUB's jurisdiction after they left the raw material station for further processing, storage, and disposition.

Further to 3R Sand's request to receive and process domestic sand, it submitted that neither the EUB nor Alberta Environment had jurisdiction over this aspect of its proposed operation. It cited a letter from Alberta Environment in support of its position regarding that government department's jurisdiction.

5.2 Views of the ESG

The ESG submitted that dewatered frac sand was derived from oilfield activities and still contained chlorides, metals, and hydrocarbons. It argued that the material leaving the dewatering pad and entering the wet plant was not inert because the chlorides, metals, and hydrocarbons contained in the material had the potential to cause an adverse effect on the environment. Consequently, it maintained that the processed frac sand, whether a usable product or not, was an oilfield waste and remained so throughout processing, handling, storage, and disposition.

The ESG further asserted that the EUB's jurisdiction applied to all facilities, structures, buildings, and land constituting the 3R Sand facility. This was based on the definition of a "facility" set forth in Section 1(1)(w) of the *OGCA*, which refers to any building, structure, installation, equipment, or appurtenance that is connected to or associated with, among other things, processing, treatment, or disposal of hydrocarbon-based resources or any associated substances or wastes.

With respect to the receipt and processing of domestic sand, the ESG sought guidance from the Board on the appropriateness of an EUB-regulated waste facility manufacturing a product from non-waste materials.

5.3 Views of the Board

In determining whether the Board has jurisdiction over 3R Sand's facility and activities once the frac sand has been transported from the dewatering pad to the wet plant, it is necessary to examine the legislative and regulatory framework applicable to the oilfield waste management sector. The main legislation is the *OGCA* and the *OGCR*. Under this legislation and *Directive 058: Oilfield Waste Management Requirements for the Upstream Petroleum Industry*, the Board is granted the authority to approve waste facilities and to ensure that they are operated in compliance with the EUB's requirements. Some provisions of the legislation include

- Section 4 of the *OGCA* (one of the purposes of the act is the control of pollution arising from oil and gas activities)
- Section 39(1) of the *OGCA* (the EUB's authority to approve schemes for oilfield waste management)
- Section 1.020(2)(12.1) of the *OGCR* (oilfield waste is defined as an unwanted substance or mixture of substances resulting from operation of a well site, pipeline, or other facility)
- Section 1.020(2)(12.2) of the *OGCR* (an oilfield waste management facility means a waste processing, storage, transfer, or any other facility for the processing, treatment, storage, disposal, or recycling of oilfield waste)
- Section 1(1)(w) of the *OGCA* (definition of facility, including an oilfield waste management facility)
- Sections 7.001 and 7.002 of the *OGCR* (the EUB's authority to approve the location and construction of an oilfield waste facility and to impose conditions on the approval)
- Section 8.150(3) of the *OGCR* (operators of a facility receiving oilfield waste shall comply with requirements outlined in *Directive 058*)
- Section 8.152 of the *OGCR* (the Board may approve alternative storage treatment and disposal methods to those contained in *Directive 058*)

The Board is given the express power under the *OGCA* to approve oilfield waste schemes and the licensing of facilities constructed for the purpose of managing oilfield waste. As set out in Section 1.020(2)(12.2) of the *OGCR*, an oilfield waste facility is one that processes, stores, treats, transfers, disposes, or recycles oilfield waste. *Directive 058* contains the requirements that operators of oilfield waste facilities must comply with. These include the characterization, classification, storage, handling, processing, treatment, transport, and disposal of oilfield waste. The legislation and *Directive 058* put in place an oilfield waste management regime for the purpose of preventing or controlling the potential polluting effects that oilfield waste may pose to the environment and public safety if not managed appropriately. It is a comprehensive, all-encompassing regime that is engaged from the initial creation of oilfield waste to its ultimate disposal, including storage, handling, treatment, processing, and transport.

3R Sand argues that because the material leaving the dewatering pad is no longer an "unwanted substance or mixture of substances" resulting from the operation of oil and gas facilities, it ceases to be oilfield waste subject to the EUB's jurisdiction. The Board rejects this view, as the legislative framework clearly contemplates the EUB's authority extending to all aspects of waste management and, in particular, the processing of oilfield waste, whether the processing results in a saleable product or not. The purpose of characterizing oilfield waste in the manner described in

Section 1.020(2)(12.1) is to identify initially what substances are subject to the EUB's regulation. Once identified, the substances do not lose their classification as oilfield waste until disposal.

It would be unworkable if the EUB's jurisdiction over an oilfield waste facility were engaged or disengaged depending on the commercial demand from time to time of the processed intermediate or end product. The uncertainty of what was being regulated and when the regulation was effective would undermine the purpose of the current waste management legislation.

3R Sand also submitted that the material leaving the raw material dewatering pad was inert (not capable of adversely impacting the environment) and that therefore the Board did not have jurisdiction over the material or the facility's operations after that point. The ESG submitted that the material leaving the dewatering pad was not inert, as it contained chlorides, hydrocarbons, and metals, all of which had the potential to adversely affect the environment.

In the Board's view it is not necessary to make a finding of fact as to whether the material is inert or not inert because the legislative framework does not make any distinction between oilfield waste that is inert and waste that is not inert for the purposes of EUB oversight. *Directive 058* does address substances that are "inert," but the context is the containment or storage requirements for such substances, not the EUB's authority over oilfield waste management.

In summary, while the Board acknowledges that 3R Sand may have created a "saleable product" fairly early in the process, the Board finds that the recycled frac sand continues to be an oilfield waste until it leaves the waste management facility and is disposed of in a manner satisfactory to the EUB. The Board also finds that any facility or structure used in the processing, handling, and storage of the incoming frac sands or processed products falls under the jurisdiction of the EUB and should remain within the scope of its waste management approval.

The Board therefore finds that all aspects of the 3R Sand process, including associated buildings (except Storage Building #3, as this has no connection to 3R Sand's recycled frac sand operation) and lands, including drainage ditches and dugout ponds within the site footprint, are subject to the EUB requirements.

The applicant also submitted that the EUB did not have jurisdiction over its processing of domestic sand for resale as frac sand or for other purposes. 3R Sand sought to process domestic sand concurrently with the processing of its supply of recycled frac sand. The Board notes that the memorandum of understanding between the EUB and Alberta Environment (AENV) on harmonization of waste management (MOU)¹ grants the EUB authority to deal with the processing of small amounts of non-oilfield wastes at EUB-regulated waste facilities. Therefore, the Board takes the view that as long as the facility is processing oilfield waste, any non-oilfield waste or non-waste substance processed during the same time at the facility is subject to the

¹ The MOU, introduced by *EUB Interim Directive (ID) 2000-03*, is intended to clarify the jurisdictional roles of the EUB and AENV and communicate fundamental principles to harmonize requirements and promote an equivalent level of protection surrounding the management of oilfield and non-oilfield wastes. The MOU indicates that in situations where an EUB-regulated facility wishes to manage small quantities of non-oilfield wastes, the EUB will review the request with input from AENV on a case-by-case basis. The MOU does not define "small quantities" but 25 per cent has been used in practice as the limit by EUB and AENV staff.

EUB's regulatory oversight. In this case, chlorides will likely be introduced into the domestic sands because the same process water will be used as when recycling used frac sands.

6 REQUIREMENTS OF THE EUB

As outlined in the previous section, the Board determines that the EUB's jurisdiction extends to the entire 3R Sand site and it has decided not to exclude any portion of the site (except Storage Building #3) from the existing approval. This section of the report addresses the alternative relief sought by 3R Sand and its requests to amend aspects of seven conditions currently forming part of its approval. The additional requests submitted by 3R Sand to the panel at the hearing are also addressed in this section.

6.1 Views of the Applicant

6.1.1 Amendment Requests

3R Sand submitted that if the Board determined that the EUB's jurisdiction over 3R Sand's operations continued past the dewatering pad, it sought alternative relief. It applied to have its approval amended with respect to the following conditions.

6.1.1.1 Storage

3R Sand requested amendment of approval condition 8 so that only the blowback dewatering station and the raw material dewatered pad must meet *Directive 055: Storage Requirements for the Upstream Petroleum Industry*. 3R Sand also stated that the blowback/dewatering station was compliant with *Directive 055*, as were the process water pond and the clay storage area.

3R Sand expressed the view that the material it handled had a very low risk of contaminating the on- and off-site soil, groundwater, and water in the nearby Seven Persons Creek. Given this low risk, 3R Sand argued that *Directive 055* requirements should be limited to the blowback dewatering station and the raw material dewatering pad and that *Directive 055* requirements did not apply to the asphalt pad and the product storage buildings.

Further, the asphalt pad was accepted in the original application as an alternate storage system, as allowed in *Directive 055*, with the provision that the stored sand material did not exceed prescribed concentration limits for chlorides and certain metals.

The applicant also indicated that sand material stored in the product storage buildings were dry and rendered inert prior to placement in the buildings and therefore not required to meet *Directive 055* requirements.

6.1.1.2 Incoming Waste

3R Sand requested amendment of approval condition 9 so that the chloride criterion limit for the fluid portion of the incoming waste stream would be increased to 20 000 milligrams per litre (mg/l), with the chloride content criterion limit for the solid portion of the incoming waste stream remaining at 1500 milligrams per kilogram (mg/kg). 3R Sand submitted that it was possible to have a chloride concentration of less than 1500 mg/kg for the sand solids when the chloride content of the pore water or liquid portion of the frac sand was up to 20 000 mg/l.

3R Sand stated that the methods used to characterize incoming wastes reflected industry standards, met the intent of *Directive 058*, and were satisfactory to ensure that received frac sand complied with the current approval limit for chlorides.

6.1.1.3 Asphalt Pad

3R Sand requested amendment of approval condition 3 so that the criteria limits for copper and zinc would be the Toxicity Characteristic Leaching Procedure (TLCPL) criterion used by AENV of 100 mg/l for copper and 500 mg/l for zinc. Alternatively, 3R Sand requested a total metals criteria limit of 2000 mg/kg for copper and 4000 mg/kg for zinc.

3R Sand submitted that the limits in condition 3 of the current approval were based on the Canadian Council of Ministers of the Environment (CCME) soil quality guidelines, which it stated were generic criteria to assess contaminated sites for the protection of environmental and human health. 3R Sand stated that these guidelines were being inappropriately used as limits for stored sand material on the asphalt pad. A risk assessment study showed that the copper and zinc metals in the sand blown off the asphalt pad did not pose a risk to the environment.

The applicant further requested amendment of condition 3 so that the criterion limit for chloride in sand material on the asphalt pad would be 1500 mg/kg, with no particle size limit.

3R Sand stated that the chloride content in the sand material on the asphalt pad was directly related to the chloride content in the process pond water. Therefore, it maintained that this amendment was needed to reflect the amendment request to increase the chloride level in the process pond water. 3R Sand also stated that its site cleanup plan would mitigate the potential for sand blown off the asphalt pad to impact surrounding soil.

3R Sand stated that particle size was a product quality parameter derived from agreements with purchasers and was not an EUB requirement.

6.1.1.4 Process Water Pond

3R Sand requested amendment of conditions 7 and 10 so that the chloride criterion limit for the process water pond would be 1500 mg/l, with the capacity increased to 4200 cubic metres (m³), due to modifications of the process water pond in the spring of 2003.

3R Sand submitted that an increase in the process pond water chloride level would allow more complete utilization of the water and that the process water with elevated chloride levels could be successfully used in the sand cleaning system. It argued that forcing 3R Sand to remove process water with lower chloride levels was not an efficient use of water resources. 3R Sand also stated that a risk assessment study indicated no significant additional environmental risk when increasing the chloride levels to 1500 mg/l.

3R Sand requested amendment of condition 11 to state that the existing 30 mil synthetic liner provided primary containment and the existing engineered clay liner provided secondary containment. 3R Sand submitted that a previously installed 15 mil liner was damaged during a previous solids removal event and had been removed and replaced with a new 30 mil liner. It requested that references to the 15 mil liner in the existing approval be removed.

3R Sand further requested amendment of condition 11 so that annual emptying of all process fluid and collected solids from the process water pond would not be required. 3R Sand stated that

it had implemented a hydraulic solids removal system, which satisfied the requirement for annual emptying of all process fluid and solids from the process water pond.

With respect to the groundwater monitoring and electromagnetic survey requirements, 3R Sand indicated that the electromagnetic survey had been offered as an alternative to installing a new liner in the process water pond and installing and sampling groundwater monitoring wells. Because a liner was installed in the process water pond and groundwater monitoring wells had been installed and were being monitored twice a year, 3R Sand argued that the electromagnetic survey was not necessary or fair.

6.1.1.5 Product Disposition

3R Sand requested amendment of conditions 3 and 13 so that it could sell its products to anyone without restriction or conditions being imposed by the EUB on it or its customers.

3R Sand submitted that the product sales conditions were onerous and overly restrictive. It stated that since purchasers did not have specifications for their feedstock sand, 3R Sand had to create a specification for the customer to satisfy the EUB requirement and get signoff by the purchaser. 3R Sand also submitted that the ESG should not be concerned if the customer was willing to accept the recycled frac sand.

6.1.2 Additional Requests

The applicant requested that the Board consider 3R Sand's proposal to leach chlorides out of the recovered sand/clay on the raw material dewatering pad to reduce chloride levels of sand material prior to its entering the wet plant. It maintained that the salt leaching procedure was consistent with the normal function of the pad and was within the operational parameters of its approval.

3R Sand submitted that if the EUB determined that it did have jurisdiction over the processing of domestic sand, the receipt, processing, and ultimate sale of these sands should be approved. 3R Sand also requested approval to accept spilled frac sand for processing and sales of the recycled product. 3R Sand stated that although it used saline water in its process, the products derived from the spilled frac sand and domestic sand would be indistinguishable from the used frac sand products currently approved by the EUB and purchased by industry.

3R Sand stated that it had been mixing the residual clays with the fine sands to create a product referred to as ADC for the City of Medicine Hat's landfill. This process was recently stopped by the Waste Section, and 3R Sand applied to have this process and ADC sanctioned by the Board. ADC was used at the landfill to cover and encapsulate the waste accepted by the landfill on a daily basis. 3R Sand maintained that ADC was a valuable commodity sought out by landfills and that it was working on a deal to sell ADC to the landfill, not pay to have it disposed of or give it to the landfill, as was done in the past.

6.2 Views of the ESG

6.2.1 Amendment Requests

The ESG indicated that it had reviewed 3R Sand's request to have certain conditions in its approval modified and provided recommendations for each element of the request as follows:

6.2.1.1 Storage

The ESG recommended that the request to amend condition 8 to restrict the application of *Directive 055* to the blowback dewatering station and raw material dewatering pad be denied, as 3R Sand had not provided scientific information to demonstrate that the dewatered frac sand leaving the raw material dewatering pad was inert.

The ESG also stated that it had earlier believed that the blowback dewatering station, clay storage area, and process water pond were compliant with *Directive 055*. However, a site inspection on October 13, 2005, raised doubts that appropriate material handling practices and secondary containment at the blowback dewatering station and clay storage area were in place in these areas. During the same inspection, the ESG noted that the process water pond had been modified. As the details of these modifications were not made clear to the ESG, some doubt was raised with respect to the process water pond's compliance with *Directive 055*.

6.2.1.2 Incoming Waste

The ESG recommended that the request to amend condition 9 be denied due to the lack of scientific information to support the contention that the 1500 mg/kg chloride limit for the solid portion of the sand could be achieved if the liquid portion contained 20 000 mg/l chloride. The ESG further recommended that 3R Sand implement a field testing program to ensure that materials placed on the raw material dewatering pad would not exceed the 1500 mg/kg limit.

6.2.1.3 Asphalt Pad

The ESG recommended that the request to amend condition 3 with respect to copper and zinc leachate levels be denied. The ESG stated that it was appropriate to consider alternative storage designs and practices for the asphalt pad; however, 3R Sand had not demonstrated to the ESG's satisfaction that the soil, surface water, and groundwater would not be adversely affected by the sand material on the asphalt pad blown throughout the site and covering the surrounding soils. The copper and zinc material in the sand when blown over the site could become incorporated into the surrounding soils, resulting in elevated copper and zinc levels. The ESG recommended that concentration limits for copper and zinc in the sand on the pad should therefore remain at CCME agricultural soil quality values.

The ESG recommended the request to amend condition 3 so that the criterion limit for chlorides in sand material on the asphalt pad be set at 1500 mg/kg be denied, because the asphalt pad did not meet *Directive 055* design requirements and there were no measures to fully prevent the release of windblown sand to uncontained areas of the site. The ESG agreed with 3R Sand that condition 3 be amended to remove the reference to benzene, toluene, ethylbenzene, and xylene (BTEX) levels, as these parameters do not apply to the frac sand.

The ESG also agreed with 3R Sand to amend condition 3 so that there were no particle size limits.

6.2.1.4 Process Water Pond

The ESG recommended denial of the request to amend conditions 7 and 10 so that the chloride criterion limit for the process water settling pond be set at 1500 mg/l. This was based on the process water pond not meeting the 100 m setback from a water body required by *Directive 058*, as well as on design and operational deficiencies of the pond and its associated process water return system. ESG further recommended that condition 7 be amended to reflect a minimum

freeboard of 0.3 m, but that the process water volume limit be set at 3450 m³, corresponding to the volume used to determine financial security.

The ESG agreed with 3R Sand that condition 11 be amended to reflect that the 15 mil synthetic liner in the process water pond had been replaced by a 30 mil synthetic liner, which now provided the primary containment. The ESG agreed that the secondary containment should be identified as an engineered clay liner.

The ESG acknowledged that 3R Sand implemented a hydraulic solids removals system to reduce the solids content of the process water and that this satisfied the requirement to annually empty the pond. The ESG recommended that condition 11 be amended to reflect the hydraulic solids removal system.

The ESG further recommended that approval condition 14 be amended to reduce the groundwater monitoring frequency to once a year and require an annual electromagnetic survey for the site.

6.2.1.5 Product Disposition

The ESG recommended that the request to amend conditions 3 and 13 allowing 3R Sand to sell its products without restriction imposed on 3R Sand or its customers be denied due to the presence of residual contaminants in the frac sand products. The ESG recommended that condition 13 be amended such that 3R Sand would be required to develop material safety data sheets (MSDSs) that disclose the chemical, physical, and toxicological quality of the recycled frac sand to purchasers. If MSDSs were used, the ESG would not require purchaser confirmation.

The ESG also recommended that condition 3 be amended such that the subpoint related to disposition of sand material be moved and combined with condition 13.

6.2.2 Additional Requests

While the ESG accepted that leaching the material while it is on the raw material dewatering pad could, in theory, address many concerns, it pointed out that it did not have a fully documented application before it to consider the acceptability of this process or any associated impacts. As such, the ESG maintained that it was not in a position to make any recommendation with respect to this request.

The ESG did not object to 3R Sand's application to accept and process spilled frac sand but stated that the application should be approved on the basis that 3R Sand comply with the small quantity limits for non-oilfield waste as set out in the MOU.

The ESG also indicated that it was prepared to recommend a trial approval, subject to conditions, for 3R Sand to process a limited quantity of domestic sand for the purpose of demonstrating the feasibility of the facility to process domestic sand, as well as oilfield wastes, on a permanent basis. ESG expressed concern about contamination of domestic sand during processing due to the saline content in the process water. ESG sought guidance from the Board on the appropriateness of an EUB-regulated waste facility developing a product from non-waste materials.

The ESG acknowledged that the Waste Section had ordered 3R Sand to stop mixing the waste streams to produce ADC, maintaining that this was diluting the contaminants in the clay to make it acceptable for disposal in a municipal landfill, a practice not permitted under *Directive 058*. ESG recommended that this practice should not be allowed.

6.3 Views of the Board

6.3.1 Amendment Requests

The following are the Board's decisions for each of the amendment requests made by 3R Sand. In summary, the Board believes that it is not necessary to specify chloride or other containment limits on multiple components of the facility as long as the requirements outlined in the following sections are adhered to.

6.3.1.1 Storage

Based on the evidence presented at the hearing, the Board believes that the blowback dewatering station, the raw material dewatering pad, and the clay storage area meet the requirements of *Directive 055*. Therefore, the Board does not find it appropriate or necessary to place limiting criteria, such as chloride levels, on the material stored there as long as the chloride limit placed on the asphalt pad (Section 6.3.1.3) is maintained at all times.

6.3.1.2 Incoming Waste

Notwithstanding that the Board is not going to impose physical or chemical limits on materials stored in areas that are compliant with *Directive 055*, the Board finds it necessary to maintain an appropriate record of the characterization of the material accepted by the facility to ensure that material received is in compliance with the approval.

As such, 3R Sand must obtain a third-party laboratory analysis of the waste stream, based on dangerous oilfield waste criteria, for each customer once per project per year. Additional analysis must be conducted if the frac design, the formations, etc., are changed. The Board requires that the project be clearly defined with respect to formations, frac design, wells, etc., and a record kept and made available to EUB staff upon request.

6.3.1.3 Asphalt Pad

The Board notes that all parties are in agreement that the processes that occur on the asphalt pad are in an area that is not compliant with *Directive 055*. In the absence of secondary containment for the asphalt pad, the Board requires that 3R Sand must upgrade the groundwater monitoring network around the asphalt pad, as the pad does not have a leak detection system. The Board expects 3R Sand to employ an appropriate third-party expert to design and install this groundwater monitoring system. The Board directs that the groundwater monitoring be conducted in the spring and fall, as required by the current approval. The groundwater monitoring program must be designed, approved, and in place prior to start-up of operations in 2007.

The Board accepts 3R Sand's testimony that a limit of 1500 mg/kg of chloride in the material placed on the asphalt pad is reasonable and achievable. Therefore, the Board requires 3R Sand to implement an on-site test to monitor and document the chloride concentration of dewatered frac sand on the asphalt pad to demonstrate compliance with the 1500 mg/kg limit. The Board accepts

that there are simple methods to accomplish this and expects 3R Sand to develop and implement such a chloride testing method within 30 days of receipt of the new approval for this facility.

Given the above chloride limits for the material placed on the asphalt pad, the requirement to upgrade the groundwater monitoring system around the pad, and the expert testimony that the metals in the waste stream are not highly mobile, the Board is satisfied that the risk posed by leachate from the processed material beyond the dewatering stage is appropriately addressed through groundwater monitoring, as mentioned above, and that therefore there is no need to specify concentration limits for metals in the material on the asphalt pad due to leachate. Further, the Board accepts the recommendation of both parties to remove the references to BTEX levels and to physical qualities of the sand material on the asphalt pad.

Notwithstanding the above, the Board acknowledges that environmental risks associated with the asphalt pad remain. To mitigate risks due to process water drainage, 3R Sand is required to fix the deficiencies identified by the ESG regarding runoff from the asphalt pad into the process water drainage ditch at the south end of the pad. The measures to fix these deficiencies must be approved and in place prior to start-up of operations in 2007. In addition, the Board acknowledges that there is some concern about metals in the sand that blows off the pad or is otherwise released; this matter is discussed in Section 7 of this report.

The Board is satisfied that the storage buildings are acceptable for the storage of the saleable sand products as long as the products are dry when they are placed in the buildings and remain dry while stored there.

6.3.1.4 Process Water Pond

The Board is satisfied that the process water pond is currently compliant with *Directive 055* and that chloride limits need not be placed on the water within the process water pond. Therefore, these limits are to be removed from conditions 7 and 10 of the approval. Nonetheless, the Board expects 3R Sand to meet its commitment to monitor and document the chloride concentration of the process pond water on a monthly basis while the facility is operating.

The Board agrees that the maximum volume of process water stored in the pond should be based on a freeboard of 0.3 m, as agreed to by the parties. The Board finds that it is appropriate to revise the maximum storage capacity of the settling pond in condition 7 to reflect the volume corresponding to a minimum freeboard of 0.3 m. This volume limit is granted under the condition that 3R Sand demonstrates that the surface water runoff controls east of the pond provide protection for Seven Persons Creek in the event of an overflow of the pond. This is a mitigative measure because the pond does not meet the *Directive 058* requirement for a 100 m setback from a water body. If 3R Sand is unable to confirm this additional level of protection or is not prepared to adjust the contouring of the land to meet this requirement, the Board will impose a minimum freeboard of 0.5 m as an additional safety factor. Financial security will have to be adjusted to reflect the change in volume associated with this freeboard limit.

The Board accepts the ESG's recommendation that 3R Sand's implementation of a hydraulic solids removals system to reduce the solids content of the process water satisfies the requirement to annually empty the pond. The Board agrees with the parties that condition 11 be amended to reflect the hydraulic solids removal system.

The Board acknowledges the original 15 mil liner has been removed and replaced with a 30 mil liner and directs that condition 11 be changed to reflect this. The Board directs that the groundwater monitoring frequency continue as stated in the current approval. Annual electromagnetic surveys are not required at this time.

6.3.1.5 Product Disposition

The Board finds that the sale or disposal of the products and waste materials from the 3R Sand facility to a third party is a satisfactory disposal method. This is acceptable provided that the third party clearly understands and accepts the nature and content of the products it is purchasing or accepting for usage in its process or facility. To this end, it is the Board's view that it is critically important that the purchasing party is fully aware of what the "product" is so that it can properly determine whether the product is suitable for the intended purpose. In this regard, the Board is in agreement with the ESG that the Board must ensure that the products and wastes are appropriately characterized and documented prior to transfer to the third party. This will ensure that the Board can determine if the materials have been disposed of in a satisfactory manner and that the receiving parties are fully aware of what they are accepting.

The Board finds that there is an onus on 3R Sand to disclose the product characteristics to purchasers to ensure that a purchaser is fully aware of what is in the product and can handle and use it appropriately. Therefore, 3R Sand must provide to each purchaser a detailed MSDS completed in accordance with content requirements of the federal *Controlled Products Regulations* for each product it sells. In addition to any information otherwise required to be included in an MSDS, the Board requires 3R Sand to include values for chlorides, copper, zinc, and total hydrocarbons. Once the EUB has approved the modified MSDS, no further EUB approval for the sale of these products will be required, provided that the materials are not being used for domestic purposes or any other nonmanufacturing or inappropriate disposal fashion. Conditions 3 and 13 are to be modified to reflect this decision. If 3R Sand wishes to pursue a market or disposal option that falls outside of this description, it must obtain approval from the EUB.

6.3.2 Additional Requests

The Board agrees in principle with the idea that it would be beneficial to use small quantities of water to leach chlorides out of the material while it is on the raw material dewatering pad. However, there is no formal application before the Board for consideration.

The Board accepts 3R Sand's request to accept and process spilled frac sand on the condition that the small quantities limit for non-oilfield waste is met, as set out in the MOU. It is the Board's understanding that, in practice, the EUB and AENV define this limit as no more than 25 per cent of the oilfield waste volume. The Board expects annual reporting of the quantities of the various streams to confirm that the small quantities limit is adhered to.

The Board approves 3R Sand's request to process up to 200 tonnes of domestic sand and produce a usable product on a trial basis. All requirements that apply to the processing and sale of the used frac sand will apply to the domestic sand once the sand enters the EUB-approved waste management facility. While the Board does not believe that any additional conditions should be attached to this process, for recording purposes 3R Sand must report the actual volumes of domestic sand processed to the EUB in the year this trial takes place. In addition, the Board

considers domestic sand to be a non-waste; therefore, the volumes accepted and processed at the 3R Sand facility are not to be included in the small quantities limit for non-oilfield waste, as set out in the MOU.

The Board accepts 3R Sand's argument that mixing the residual clay and the fine sands is not contravening the principle of not adding to the volume of material sent to the landfill. If this practice were not permitted, the residual clays would have to be disposed within the cells of the landfill and the cover material would have to be obtained from other sources. The Board finds that the practice of mixing the residual clays and fine sand is not for the purpose of dilution but for producing a usable product and therefore is acceptable in this case as long as the final product (ADC) meets the requirements of the City of Medicine Hat's landfill. The Board is satisfied that if 3R Sand completes the modified MSDSs, as specified earlier in this report, the City of Medicine Hat will be able to satisfy itself that the product meets its criteria for ADC.

7 FUGITIVE SAND RELEASES

7.1 Views of 3R Sand

As stated previously, 3R Sand submitted that after going through the raw material dewatering pad, the materials in the process of being recycled are essentially inert and pose no or little risk to the environment. It stated that a daily cleanup of sand accumulations in high-traffic areas and an annual cleanup of the site for sand that had blown or otherwise escaped from the process was sufficient to prevent or mitigate against any potential adverse effect on the soil and groundwater. 3R Sand maintained that the land use of the facility should be classified as industrial use and that the criteria to remediate soils with elevated metals, such as the CCME soil quality guidelines, should be based on industrial land-use levels.

7.2 Views of the ESG

The ESG maintained that there was insufficient evidence by 3R Sand to support the conclusion that there were no or only minor impacts associated with the windblown sand and clay. The ESG further maintained that impacts on soil and groundwater due to the continuous deposition of windblown sand and other releases were cumulative and were likely to manifest themselves over time. As such, the ESG stated that concentration limits of metals and chlorides for material on the pad were required in the absence of mitigative measures to fully contain the sand and clay products at surfaces and facilities in compliance with *Directive 055*. The ESG recommended that the CCME agricultural soil criteria be used as the limits to remediate soils with elevated metals so that the contamination would not restrict Public Lands from reverting the site back to its original land use as a grazing lease.

7.3 Views of the Board

The Board finds that it is still appropriate to require a daily cleanup of accumulated piles of fugitive sand and to thoroughly clean the site up on an annual basis prior to closing for the season. In addition, to ensure that there are no long-term cumulative environmental effects, 3R Sand is required to retain a third-party consultant to design and implement an annual program for monitoring the surficial soils on site and off site to track any impacts resulting from the continuous fugitive sand releases. This program is to be reviewed, approved by the EUB, and in

place prior to the start-up of operations in 2007. The off-site components of the monitoring program must be developed in consultation with potentially affected landowners prior to submitting the proposal to the EUB.

The Board finds that with the daily and annual cleanups, the fugitive sand releases pose a low risk of contaminating unprotected soils both on and off the 3R Sand site, but believes it is important to monitor soils on a regular basis to detect any trends and potential impacts over time.

8 LIABILITY MANAGEMENT

8.1 Views of the Applicant

3R Sand submitted that it was unfair and impractical to require it to post security to dismantle and abandon the entire site when 3R Sand had agreed to return the site to the landlord in the condition it was received. 3R Sand further argued that the security deposit be adjusted to exclude the product storage buildings and storm water retention ponds and that the Board had the statutory power to waive the requirements for financial security by requiring no security for a structure or restricting the security to only the costs incurred in removing the inventory from the building.

8.2 Views of the ESG

The ESG submitted that Section 9 of the *OGCA* has the effect of overriding any contracts, such as property and equipment leases, and that abandonment requirements refer to permanent dismantlement of a facility, which includes all associated structures, buildings, etc. It argued that the current requirements did not provide discretion to exempt structures or buildings from the ultimate dismantlement of a facility or from the calculation of the security deposit.

8.3 Views of the Board

The Board acknowledges that 3R Sand's facility was approved with pre-existing buildings and that the terms of its lease oblige it to restore the site to its original condition at the end of the lease period. Notwithstanding the terms of the lease, the Board confirms that Board orders, directives, decision reports, and requirements override the terms of any private contract where necessary or appropriate. This is clearly the effect of Section 9 of the *OGCA*.

As previously stated in Section 5.3, Board finds that all aspects of the 3R Sand process, including associated buildings (except Storage Building #3) and lands (including drainage ditches and dugout ponds) within the site footprint, fall under the EUB's jurisdiction and thus are subject to the financial security requirements.

The Board therefore finds that the buildings are sufficiently associated or integrated in 3R Sand's oilfield waste operation that all buildings and structures should be used in the calculation of the security deposit. The panel notes that security deposits may be adjusted in light of site assessment information provided, as required by Section 16.649 of the *OGCA*. This requires a facility operator to put forward arguments as to why it believes it may be appropriate to have reduced financial security for a site.

The Board finds that the security for the pre-existing buildings and structures, including the office, weigh scale, storage buildings 1 and 2, mill building, and maintenance building, should be assessed on the basis of the following cost factors:

- removal of inventory from the buildings and structures,
- cleanup in and around buildings and structures, and
- reclamation of the area adjacent to buildings and structures.

These factors are applicable as long as the purpose or ownership of the buildings does not change. They may be revised during the re-evaluation within the five-year period prescribed in the *OGCR* or if at any time the buildings are modified such that their function has changed from the current usage.

Dated in Calgary, Alberta, on August 8, 2006.

ALBERTA ENERGY AND UTILITIES BOARD

<original signed by>

J. R. Nichol, P.Eng.
Presiding Member

<original signed by>

D. A. Larder, Q.C.
Acting Board Member

<original signed by>

W. G. Remmer, P.Eng.
Acting Board Member

APPENDIX 1 HEARING PARTICIPANTS

Principals and Representatives
(Abbreviations used in report)**Witnesses**

3R Sand Limited (3R Sand)
A. Harvie

K. Murdock, P.Eng.
D. Pritchard, P.Geol.,
of Golder Associates
V. Matthews, P.Geol.,
of Golder Associates
J. Mitton, P.Eng.,
of Golder Associates

EUB Staff Group (ESG)
D. Brezina

S. Halla
B. A. Austin, P.Geol.
D. Williams, Ph.D., P.Eng.,
of Meridian Environmental Inc.
J. Ashworth, Ph.D.,
of Enviro-Test Laboratories

Alberta Energy and Utilities Board staff
G. Perkins, Board Counsel
D. Burke
G. Brosinsky
G. McClenaghan, P.Eng.
J. Schlager

APPENDIX 2 CURRENT APPROVAL (AMENDMENT D TO APPROVAL WM 068)

THE PROVINCE OF ALBERTA
OIL AND GAS CONSERVATION ACT
ALBERTA ENERGY AND UTILITIES BOARD

IN THE MATTER of 3R Sand Limited operating an
oilfield waste management facility for the purpose
of waste processing in the Seven Persons area

AMENDMENT D TO APPROVAL NO. WM 068

WHEREAS 3R Sand Limited applied to the Alberta Energy and Utilities Board on March 20, 2001, (Application No. 2001086) with additional information submitted as per the attached Appendix, for approval to construct and operate an oilfield waste management facility; and

WHEREAS the Alberta Energy and Utilities Board issued Approval No. WM 068 dated June 22, 2001; Amendment A to Approval No. WM 068, dated August 15, 2001; Amendment B (Application No. 1256061) to Approval No. WM 068 dated June 4, 2002; Amendment C to Approval No. WM 068, dated April 16, 2003; and

WHEREAS the EUB has initiated an amendment to the approval to reflect the agreements made in the EUB letter dated May 14, 2003, and updates to tank notation and volumes according to the most recent 3R Sand site plans submitted to the EUB; and

WHEREAS the Alberta Energy and Utilities Board deems it desirable that that Amendment D to Approval No. WM 068 dated February 25, 2004, be issued to replace all previous approvals subject to the terms and conditions herein contained.

THEREFORE the Alberta Energy and Utilities Board (EUB), pursuant to the Oil and Gas Conservation Act, being chapter 0-6 of the Revised Statutes of Alberta, 2000, hereby grants 3R Sand Limited (3R Sand) approval to operate an oilfield waste management facility (facility) for the purpose of waste processing, located in Legal Subdivision 4 of Section 11, Township 11, Range 7 West of the 4th Meridian, subject to the following terms and conditions:

1. The facility is approved to accept and process the non-dangerous oilfield waste streams identified below and originating from the fracturing of shallow gas wells, as described under EUB ID 96-3 and *Guide 58: Oilfield Waste Management Requirements for the Upstream Petroleum Industry*:

Frac Sand – Non-Radioactive [FRCSND]
Well Workover Fluids [WWOFLD]

2. The facility is approved for the following technologies:

tank treatment
mechanical separation and drying

2

3. Processed sand and fines that meets the chemical composition below for storage on the asphalt pad, as well as, the size and shape specifications for reuse as frac sand or for alternate product manufacturing must be:

Chemical Quality:

Total Metals (mg/kg)	
arsenic	12
barium	600
beryllium	5
cadmium	1.4
chromium, total	64
cobalt	20
copper	63
lead	70
mercury	6.6
molybdenum	4
nickel	40
thallium	1
vanadium	130
zinc	200
pH	6.0 – 8.5
Electrical Conductivity	2 dS/m
Chloride content	< 900 mg/kg
Total BTEX (mg/kg)	
Benzene	0.02 mg/kg
Toluene	0.36 mg/kg
Ethylbenzene	0.1 mg/kg
Xylene	3.5 mg/kg

Physical Quality (for 20/40 frac sand) :

Sphericity	0.6 or greater
Turbidity	250 FTU or less
Crush Resistance	14% or less fines
Particle Sizing	90% sand fall into sieve sizes of 20 to 40

- (a) marketed to companies as recycled frac sand for use in gas operations,
- (b) marketed to product manufacturers provided the receiving company confirms that the 3R Sand material meets all chemical and physical requirements,
- (b) transferred to an EUB or Alberta Environment (AENV) approved facility to be landfilled or cavern disposed, or

3

- (c) disposed in an alternative method approved by the EUB Operations Group.
- 4. All processed material may be stored in the buildings identified as part of the 3R Sand lease (buildings #1 and #2) provided all stored materials are dry prior to entering the building and remain dry while in storage.
- 5. Residual solids, including non-spec clean frac sand, resulting from the facility's processes must be:
 - (a) properly characterized and classified, in order to assess the appropriate handling, treatment, and disposal methods required, and
 - (b) transferred to the City of Medicine Hat landfill for use as daily cover material (providing the landfill is approved for such a receipt) or general disposal, or
 - (c) transferred to an EUB or AENV approved facility to be landfilled, incinerated, or cavern disposed, or
 - (d) disposed or treated in an alternative method approved by the EUB Operations Group.
- 6. Wastewaters from the facility's processes must be:
 - (a) recycled and reused as much as practical,
 - (b) transferred to the Newalta Hays Class 1b disposal well located at 5-19-13-14W 4M, or
 - (c) injected down an EUB approved Class 1b or 1a disposal well in accordance with the requirements of the approvals granted by the EUB Resource Applications Group, or
 - (d) disposed or treated in an alternative method approved by the EUB Operations Group.
- 7. The maximum storage capacity at the facility shall consist of:

Swabbing Fluid Station

- RT1: Rig tank used for receiving and dewatering swabbing fluid
(70 m³)
- ST1: Sand tank used to store dewatered clay
(50 m³)
- ST2: Sand tank used to store dewatered clay
(44 m³)

4

Outdoor Dewatering Station

- ST3: Open end sand tank for receiving wet sand (40 m³)
- ST4: Open end sand tank for receiving wet sand (43 m³)
- RT2: Water tank for receiving vac truck fluid and fluid decanted from ST3 and ST4 (72 m³)

Raw Material Dewatering Pad: 22.1 m x 23.6 m (800 m³)

Settling Pond: Storage of process water containing less than 900 mg/L chlorides (4000 m³)

Asphalt pad: Storage of material meeting the criteria identified in Clause 3.

Asphalt pad tank

ST5: Open end tank for clay fines (20 m³)

8. All storage must meet EUB *Guide 55: Storage Requirements for the Upstream Petroleum Industry*. In addition:
- (a) the storage of oilfield wastes off-site or in any area other than described in Clause 7 of this approval is prohibited,
 - (b) approval for any temporary storage of materials must be granted by the EUB Operations Group, and
 - (c) approval to modify the storage capacity of the facility must be granted by the EUB Operations Group.
9. All incoming oilfield waste streams must be accounted for from receipt to disposition of all products including:
- (a) verifying the composition and volume of incoming streams, as well as verifying that received oilfield waste streams are non-dangerous and meet the following criteria:

Chloride	< 1500 mg/kg
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 - (b) completing and submitting EUB S-25 Monthly Waste Plant Statements/ Monthly Reports.
10. The chloride content of the settling pond must not exceed 900 mg/L, must be tested monthly, and the results documented. The EUB must be immediately notified of any results exceeding

5

900 mg/L. Exceedances will result in an EUB request for 3R Sand to remove the fluids stored in the pond and dispose of them appropriately.

11. The 30 mil synthetic liner installed in the settling pond will provide primary containment for the pond, the existing 15 mil liner will provide secondary containment, and the subsequent compacted clay liner, tertiary containment. The addition of the 30 mil synthetic liner to the settling pond eliminates the need for bi-annual removal of the primary containment liner, provided the settling pond is emptied on an annual basis, removing both fluids and any settled solids.
12. In the event that either synthetic liner is breached to the extent that appropriate routine repair is not possible, 3R Sand will be required to replace the liner, regardless of the useful lifetime of the liner. The EUB Operations Group must be notified should a liner breach occur.
13. 3R Sand may ship processed non-spec frac sand marketed to manufacturing companies for use as an ingredient in the development of their products, provided documentation from each individual client is submitted to the EUB prior to the shipment of any material from the 3R Sand facility. This documentation must confirm that the client accepts 3R Sand's material, it is appropriate for its intended use, and meets all chemical and physical criteria required by the client.
14. The groundwater at this site shall be monitored in the spring and fall of each year and the appropriate documentation shall be maintained and made available to the EUB upon request as outlined in *Guide 58*, Appendix 4.0. If it is determined that the site has been impacted the EUB Operations Group must be notified in writing within 60 days of the sampling date.
15. The groundwater samples must be analyzed for the following parameters in addition to those described in *Guide 58*, Appendix 4.0:
 - phenols
 - dissolved metals (instead of total metals)
 - dissolved organic carbon (instead of total organic carbon)
 - total dissolved solids
 - benzene, toluene, ethylbenzene, xylene and F1, F2 hydrocarbon fractions (instead of oil and grease or total extractable hydrocarbons)
 - phenols
16. The leak detection systems for the settling pond and the receiving/dewatering pad must be sampled monthly, testing for the following parameters:
 - pH
 - Electrical conductivity
 - Oily sheen
 - Chloride content

The visual leak detection systems for the dewatering pad tanks, swabbing fluid station and outdoor dewatering station must also be monitored monthly.

Should a leak be detected, clean up must be initiated immediately and the EUB Operations Group must be notified in writing within 60 days of the sampling date.

17. With respect to operational safety procedures, the EUB requires that the following documents be kept on site and accessible at all times:
 - facility approval
 - completed application
 - safety procedures handbook
 - operational procedures manual
 - emergency contingency plan
18. The operation of the facility must meet all requirements outlined in EUB *Guide 58*, Part D, Section 11.0.
19. 3R Sand is responsible for a planned or unplanned closure for the facility in accordance with EUB *Guide 58*.
20. The EUB may:
 - (a) enter the facility to inspect, investigate, or sample any records, equipment, inventory, or fugitive releases and may request, coordinate, or conduct remedial operations,
 - (b) suspend operations, close the facility, request approved methods be adopted, or request remedial measures be taken for failure of 3R Sand to comply with any provision of the EUB *Oil and Gas Conservation Act and Regulations* or the terms and conditions set out herein, or
 - (c) upon its own motion or upon the application of an interested person, rescind or amend this approval at any time.
21. This approval may not be transferred to a new owner without prior approval from the EUB Operations Group.
22. The oilfield waste processing facility code is ABWP0000563.
23. 3R Sand has posted appropriate stage 1 financial security for the abovementioned facility, as outlined in *ID 2001-4: Financial Security for Oilfield Waste Management Facilities*. This approval is subject to 3R Sand's response to subsequent stages of financial security as they are required under *ID 2001-4* or any other subsequent EUB direction on this matter.

MADE at the City of Calgary, in the Province of Alberta, on February 25, 2004.



ALBERTA ENERGY AND UTILITIES BOARD

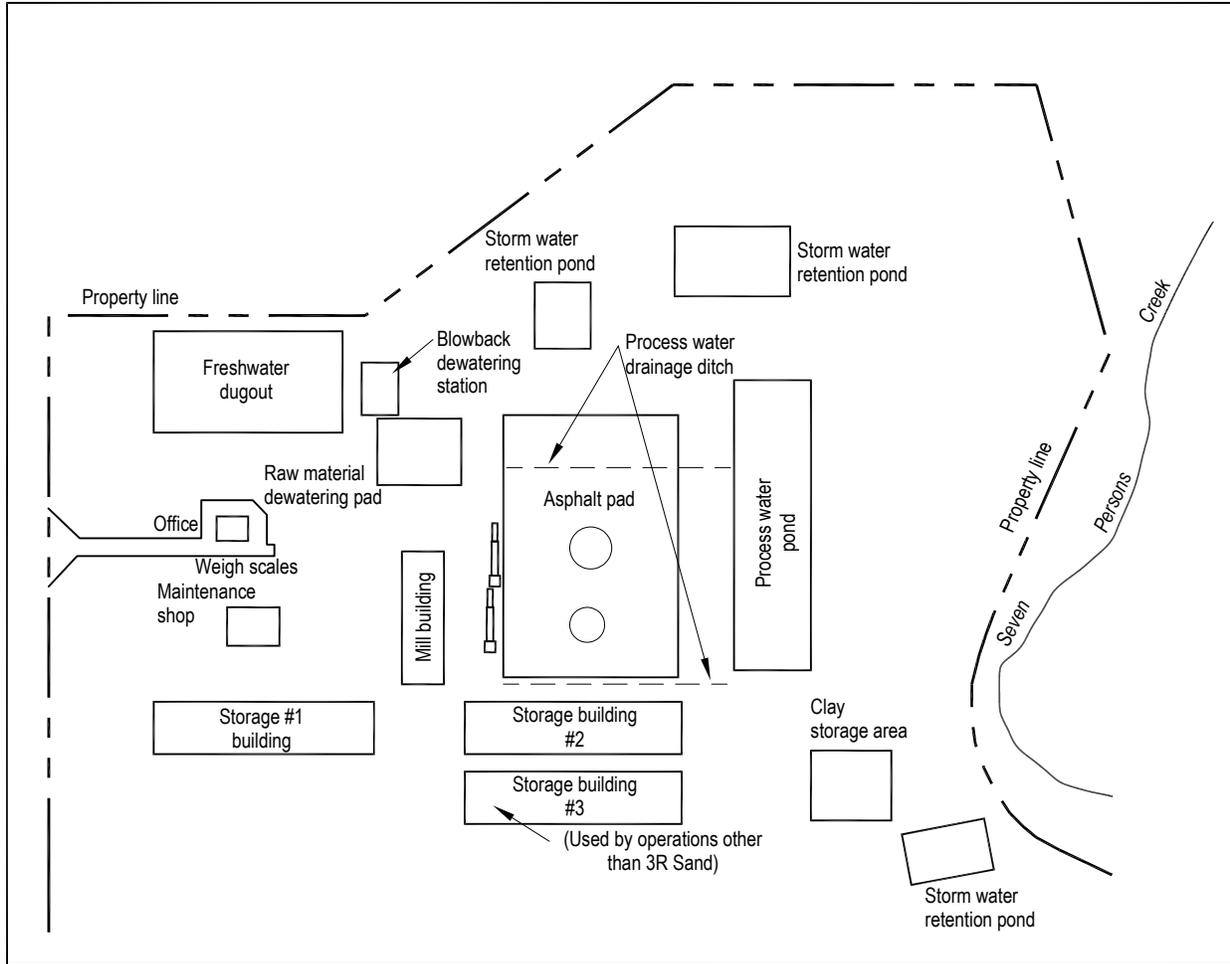


Figure 1. Site plan

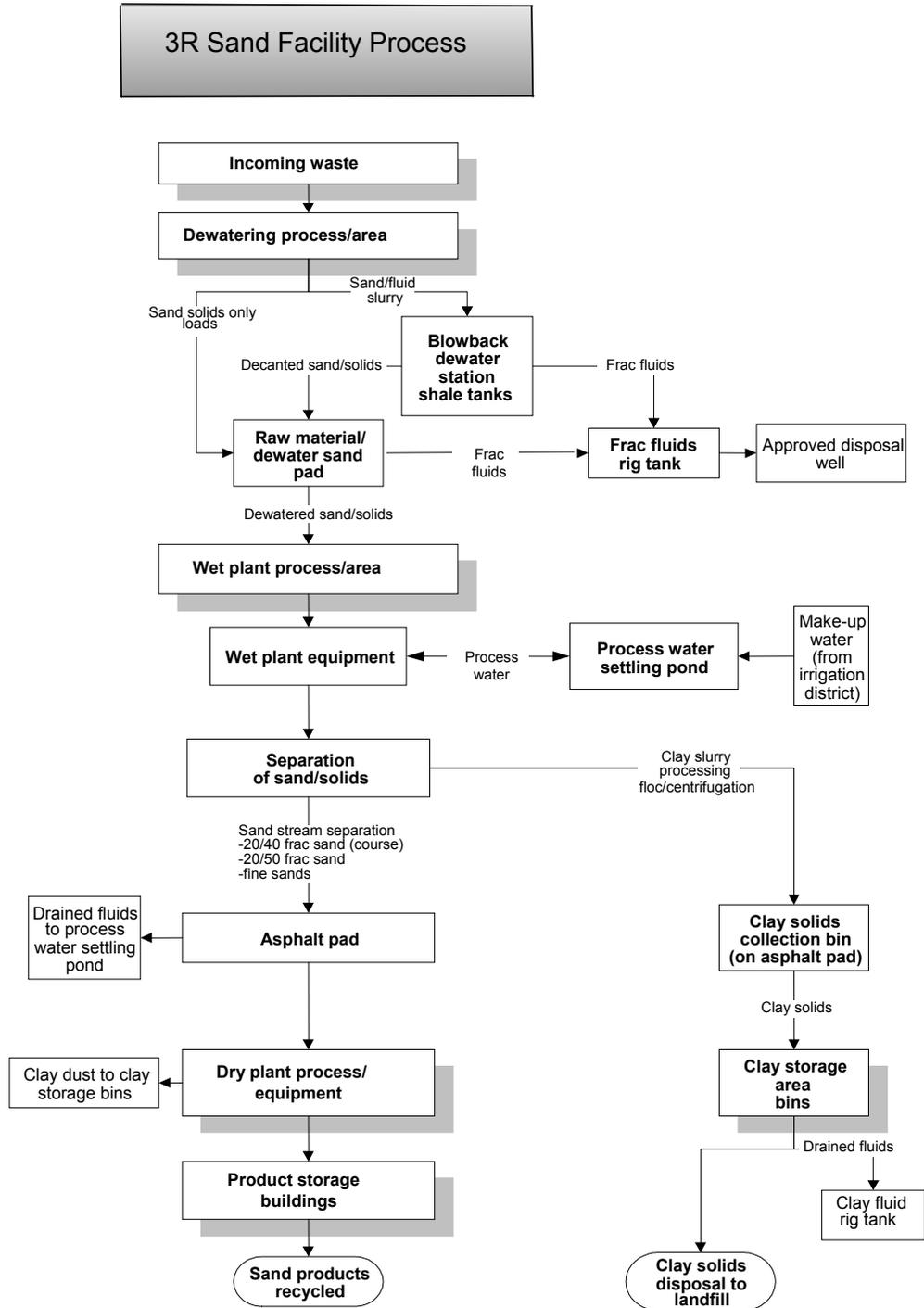


Figure 2. Process flow diagram