

GELITA Australia Pty Ltd, which was recently acquired by German private business interests from Goodman Fielder, has now completed EMP No.SR1157 concerned with, ***“Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner”***, which reached full term for completion on 30 September 2003, following a 4.5 year timeframe. A “Final Report”, together with “supporting information” relevant to EMP No.SR1157 was provided to the EPA on 20/11/2003.

Following internal assessment of the “progress” and “final completion” reports, together with “supporting information” provided by GELITA in relation to EMP No.5080001157 (SR1157), originally approved on behalf of the former Leiner Davis Gelatin International Limited, **as suitable** “Compliance / Completion Reports”, in respect of the EMP, the EPA considered that the Company had achieved compliance with the matters dealt with by the program. Outcomes arising from completion of EMP No.SR1157 indicated a need to seriously reassess, amend and delete some or all treated wastewater limits from SR0722. Subsequently, following negotiated discussion of licence changes, between EPA Regional Management (D Brown, K Roberts, D K Shackel) and the Company (C Smeal, Environmental Officer) the EPA approved amendment of SR0722 on 1/06/2004.

In general terms, EMP No.SR1157 outcomes indicated that sustainability of application of treated wastewater to on-site land will be achieved through a mix of options including; pasture / grazing systems (including Vetiver Grass), cropping (cutting & exporting hay products) and agro-forestry, which plant products will / may become a raw material source (green waste) for **on-site compost-making**, utilising all processing wastes generated by gelatine manufacturing (“skutch”, belt-press sludge, boiler ash) for total on-site soil conditioning purposes.

Through restructuring /amendment of the monitoring components of SR0722 approved on 8/06/2004, the environmental control emphasis has been significantly shifted in relation to treated wastewater disposal at “Sunny Hills” from an “end-of-pipe” mentality to a practical, agriculturally oriented “outcomes-based” process, capable of reaction / correction, depending on the influence of prevailing real time conditions.

It is anticipated that adoption of outcomes arising from the recent EMP process will lead, not only to the application of environmentally sustainable / friendly land disposal applications for the industrial treated wastewaters, emanating from gelatine manufacture, but also innovative uses of such a resource in environmentally and economically “best practice” farming procedures. The Company has actively pursued a number of these agricultural initiatives during 2005, viz; agro-forestry and Vetiver Grass plantings (See ‘Compliance Program – Inspection Checklist’ – Attached).

Process Description:

Extraction, purification, drying, milling and packaging of dry gelatine solids, processed from off-site abattoir resource materials (“facepieces”, hide materials), including treatment of liquid gelatine processing effluents / wastewaters prior to irrigation to land, to support a number of on-site farming options, together with composting of gelatine processed solids and associated wastes, to produce a soil-enhancing composted soil additive.

Non-Compliances and/or new identified issues:

NIL

Consultation with Licensee: (including commitments for improvements/required actions)

Since completion of proceedings by the EPA, in the Magistrates Court, in July 1996, against Leiner Davis Gelatin (Australia) Pty Limited, Site Licensing Officer Don Shackel has been closely involved with facilitating environmental improvement on the Josephville site outside Beaudesert.

Compliance Inspection Program

With the recent completion of a 4.5 year duration, complex Environmental Management Plan in 2004 (EMP No.SR1157) concerning, ***“Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner”***, a number of innovative, environmentally sustainable / friendly “best practice” agricultural applications for the effective disposal of the industrial, treated wastewater emanating from the gelatine manufacturing operation, are expected to be further developed and refined on site, over the coming number of years.

RECOMMENDATION:**NIL**

Report Completed by:

Name and Position: Don Shackel, Senior Inspector, Heavy Industry Group

Date:

Report Reviewed by:

Name and Position: Doug Carey, Principal Environmental Officer, Heavy Industry Group

Date:

Attachments:

- **Reports** – GELITA provided / referenced examples of a number of environmental reports, test results, technical and operational procedures, during the formal site audit completed on 18/10/2005, including material earlier provided with the 2005 Company “Annual Return” (Attached).
- **Photographs** – A series of 30 digital photographs taken during the site audit on 18/10/2005 indicate the current environmental status of the site, particularly with regard to land disposal issues and stormwater protection aspects, the composting operation, together with a limited number of records of external processing plant / infrastructure (Attached).
- **Other:** - The ‘Compliance Program – Inspection Checklist’ which accompanies this ‘Compliance Inspection Report’ details information concerning AMMONIA, ASBESTOS and EPA CLU issues relevant to the Josephville operation of GELITA Australia Pty Ltd.

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Checklist

Compliance

Compliance Program — Inspection Checklist

Instructions for use

Where an Agency issue is determined to be relevant, note appropriate detail in the observations section.

Where there is any non-compliance, discuss with the company representative and note any required action.

Where the assessment will include licence conditions, use the licence condition compliance section of the checklist.

This checklist is to be used for all inspections. Refer to the procedural guide for guidance.

Cover Sheet Module:

Company Name: GELITA Australia Pty Limited		Date of Inspection: 18/10/2005
Trading as: GELITA – ASIA PACIFIC AFRICA		RC No.: SR0722
Description of Business Activity: ERA 50(b) – Rendering operation (Gelatine manufacture)		
Site Street Address: Flood Road		
Suburb: Josephville	City/Town: Beaudesert	Post Code: 4285
Registered Office Address:		
"Sunny Hills", Flood Road, JOSEPHVILLE via BEAUDESERT QLD 4285		
Suburb: JOSEPHVILLE	City/Town: BEAUDESERT	Post Code: 4285
Site Representative: Cameron Smeal	Position: Environmental Manager	Contact phone: (07) 5541 9442

Inspection type	☐ Catchment	☐ Industry Sector	☐ Complaint	☒ Compliance
Compliance level	☐ 1	☐ 2	☒ 3	Inspection type
				☐ A
				☐ B
				☒ C
Audit focus is the following relevant Agency interests:				
☒ Water issues ¹	☒ Air issues ¹	☒ Noise issues ¹	☐ National and international	
☒ Land issues ¹	☒ Waste issues ¹	☒ Social issues	☒ Impacts on surrounds	
☐ Coastal issues	☐ Heritage issues	☐ Biodiversity		
☒ Resource allocation	☐ Tenure issues	☐ Other issues		

¹ Main issues to consider for *Environmental Protection Act 1994* focus.

DETAILS OF SCOPE OR PARTICULAR FOCUS**HISTORIC REVIEW:**

GELITA Australia Pty Ltd, previously **Davis Gelatine Australia Pty Limited**, recently acquired by German private business interests from Goodman Fielder (2003), has now completed **EMP No. SR1157** concerned with, ***"Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner"***, which reached full term for completion on 30 September 2003. E-mail advice from the Company at the due date of the reporting period on 30 October 2003, indicated that EMP No. SR1157 was completed and written-up, apart from "two final items from external sources for inclusion in the report", viz; an effluent stream characterisation under the cleaner production section and monitoring schedule from the Company soils consultant. The EPA received the "total" final report relevant to EMP No. SR1157 on 20 November 2003.

Subsequently, licence limits requirements included in **SR0722**, for treated wastewater parameters such as Total Nitrogen and Total Dissolved Solids, previously observed as not always achieving compliance on an historic on-going basis, were addressed by the EMP review process, within a "holistic" context, for the site. The company regularly provided progress reports over the lifetime of EMP No. SR1157 to the EPA, for assessment and information, indicating milestones towards achieving compliance by 30/09/2003.

Following internal assessment of the "progress" and "final completion" reports, together with "supporting information" provided by GELITA in relation to EMP No. 5080001157 (SR1157), originally approved on behalf of the former Leiner Davis Gelatin International Limited, as suitable, "Compliance / Completion Reports", in respect of the EMP, the EPA considered that the Company had achieved compliance with the matters dealt with by the program. Outcomes arising from completion of EMP No. SR1157, indicated a need to seriously reassess, amend and delete some or all treated wastewater limits from SR0722. Subsequently, following negotiated discussion of licence changes, between EPA Regional Management (D Brown, K Roberts, D K Shackel) and the then Company Environmental Officer (Cameron Smeal), the EPA approved amendment of SR0722 on 1/06/2004. See also: *GELITAAustSR1157EMPCompletionMemo.doc*.

EMP No. SR1157 outcomes indicated that sustainability of application of treated wastewater to on-site land will be achieved through a mix of options including; pasture / grazing systems (including Vetiver Grass), cropping (cutting & exporting hay products) and agro-forestry, which plant products will / may become a raw material source (green waste) for **on-site compost-making**, utilising all processing wastes generated by gelatine manufacturing ("skutch", belt-press sludge, boiler ash) for total on-site soil conditioning purposes.

To this end, the EPA approved continuation of composting activities on site late in 2003, following an initial 12 month waste composting project period (September 2002-September 2003) to trial processing methodology and assess outcomes (an 'Odour Control Plan' remains in place), with a view to long term, on-going total waste utilisation / recycling on site. GELITA Australia Pty Limited holds **SR0007DA** (with conditions) and **SR1114** for ERA 53, relevant to "soil conditioner manufacturing". The company contracted part-time consultancy services from Johannes Biala of "The Organic Force", to assist with the composting project. The composting consultant Company has prepared a report dated October 2003, titled ***"Assessing the Suitability of Covered Windrow Composting for On-site Processing of Gelatine By-products"***, for GELITA Australia Pty Ltd, which was also made available to the EPA. See also, *GELITASR0007DAComplianceProgramInspectionChecklist06102004.doc*.

2004/2005 AUDIT OVERVIEW:

2004 was the first period of consolidation for the treated effluent utilisation project following sign-off of EMP No.SR1157. As year one (1) in a seven (7) year establishment / installation program to fully implement the outcomes of the EMP, primarily energies were directed towards establishment of the Agro-forestry tree plantations and Vetiver Grass plantings to utilise irrigated treated wastewater. At the same time, irrigation control tools including, "Permeameter", "FullStop" and "LongStop" equipment have been utilised / installed to monitor critical soil infiltration and hydraulic conductivity parameters. The latter equipment has also begun to be used to provide liquid samples for determining salt and nitrate movement past the root zone to a soil depth of 1.5 metres. Groundwater monitoring recommenced following refurbishment of relevant piezometers (10 metre). Both liquid and solid applications of lime to control low soil pH values remains under investigation, after initial liming trials proved to be inefficient. For additional in-depth detail concerning the above projects, see **"GELITA AUSTRALIA – Farm Management Progress Report: October 2005"**, prepared by Company Soils Consultant Dr B M Schafer (Attached).

Also, a number of proposed site-based farm projects will assess compost incorporation to improve saline and sodic soils, a soil-based reed bed using Vetiver Grass for the treatment of effluent and the use of Vetiver Grass for remediation of herbicide contamination in surface and sub-surface water.

SITE CONTACT:

A review of conditions included in SR0722, followed by a subsequent site inspection were undertaken as part of the formal site audit completed on 18/10/2005, with the Company Environmental Manager, Mr Cameron Smeal. Six (6) personnel constitute the environmental group servicing the "Sunny Hills" Josephville gelatine manufacturing operation of GELITA Australia Pty Ltd.

PHOTOGRAPHS:

A series of 30 digital photographs taken during the site audit on 18/10/2005 indicate the current environmental status of the site, particularly with regard to land disposal issues and stormwater protection aspects, the composting operation, together with a limited number of records of external processing plant / infrastructure.

CHUCKLE / ECOTRACK:

A review of CHUCKLE, ECOTRACK and Company files, STH495 records for 2004/2005, indicated that any complaints received by the Company had been actioned and reports provided to the EPA, in each instance (4 odour complaints on file [Richards] noted for the period between the 2004 and 2005 October site audit dates – See also comments under **Condition G1** below).

Agency Interests Module:

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

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ADMINISTRATIVE:

- **Registration Certificate No. SR0722 (without development approval) (Section 93)**
- **The Company name, the registered business address of the Queensland legal entity and the activity location address were all confirmed as CORRECT.**
- **ASIC search provided a "Current Extract" for Organisation Number ACN 000 010 597 – Section 1274B – See attached printout.**
- **ERA Items – confirmed "no change" for the Josephville operation, at this time [ERAs 50(b), 15(a), 17 & 53].**
- **Real Property Description – confirmed "no change" for the Josephville site, at this time.**
- **Registration Certificate No. SR0722 "Effect Date" – 8/06/2004.**
- **Registration Certificate No. SR0722 "Anniversary Date" – 31 January (Amended from 4 November on 1/06/2004).**
- **CLU advice dated 19/10/2005 (Attached) indicates that historically the previous dairy farm activities of "Sunny Hills" included the operation of a cattle plunge dip and/or spray-race, prior to acquisition by GELITA Australia Pty Ltd. As such, the site remains an Item 22 NOTIFIABLE ACTIVITY, viz; "Livestock dip or spray race operations—operating a livestock dip or spray race facility", as defined in Schedule 2 of the *Environmental Protection Act 1994*. Subsequently, an information request was forwarded by e-mail to GELITA on 19/10/2005 requesting comment concerning the Item 22 EMR listing of the site. GELITA responded by e-mail of 20/10/2005 as follows: "Don, pls refer our correspondence of approximately 26/11/01 on this matter. I had discussions with Tess Dobinson (Registrar Contaminated Land Unit) and with John Taylor (EPA) at the time and advised both of them that the original spray race was under several hundred tonnes of earth (the aeration pond is believed to have been the approximate location of the original race.) I also advised them at the time that I was unable to locate any evidence that the previous owner had notified the company of the registration of the property on the original contaminated sites register. They subsequently forwarded me a copy of the letter send to Biggers in 1993, which stated that the site had only been classified as a PROBABLE site."**
- **AMMONIA status of the site – During e-mail contact with Company audit / inspection personnel on 19/10/2005, the need for development of an Ammonia release emergency response plan for the operation was promoted. GELITA responded by e-mail of 20/10/2005 as follows: "GELITA currently operates a cooling system for the votators that relies on about 120 kg of ammonia. We will in the future (next year probably) be installing an ice machine with a total fill of around 750kg. It will be the responsibility of the site safety personnel to ensure that the appropriate emergency response plans are amended to the required standards. Installation of the new unit will also done in compliance with the standards."**
- **ASBESTOS status of the site – During e-mail contact with Company audit / inspection personnel on 19/10/2005, the matter of Asbestos was canvassed and was indicated by the Company not to be an issue of concern for the site workforce. GELITA responded by e-mail of 20/10/2005 as follows: "Our Engineering Manager has assured me that we do not have asbestos on this site. All boiler lagging is rock wool/fibre and the lagging ropes are composites. We do not have asbestos roofing and the only possible/potential/unconfirmed source of asbestos would be if the old cottage ceiling liner was asbestos cement sheeting."**

NOTE: With regard to ERA 50(b) – Rendering operation, Cameron Smeal requested that his contention that he did not consider gelatine manufacture a rendering process be recorded. These comments were acknowledged by EPA Officer Don Shackel who considered / indicated that wording in the ERA definition including, "processing or extracting substances, including, for example, ----- proteinaceous matter, from animal wastes or by-products", were relevant to the GELITA Australia Pty Limited, Josephville Gelatine operation.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

ASSESSMENTS & OBSERVATIONS:

Schedule A - General Conditions:

A1 – In-Compliance – GELITA operates a standard maintenance card, work request-advice / corrective-action system which is currently being upgraded to a computer-driven MFG-PRO system, with added MLS engineering / preventative maintenance workshop application, together with the current MIS accounting / stores purchasing system, which apart from other duties, is intended to address equipment, plant and building maintenance aspects, to reduce / minimise environmental risk. A proactive, in-house environmental audit process designated 'ENVIRONMENTAL WALK' identifies site deficiencies for remedial action, on a regular basis, using the job cards, work request, corrective action follow-up procedure, to achieve improvement (Sighted).

A2 – In-Compliance – GELITA Registration Certificate (Licence) SR0722 is displayed in the office foyer and the amenity areas on site, while each member of staff has been provided with a copy for personal use, during Company training sessions.

A3, A4 – In-Compliance – The formal audit completed on 18/10/2005, confirmed that Company environmental records are maintained / available as prescribed (Sighted).

A5 – In-Compliance – GELITA indicated that the Company was targeted to achieve a progressive / continuing increase in gelatine yield over recent figures (2500 MT), in the next 2 years (2005/2006), without any "increase in the risk of environmental harm / nuisance" – the current annual gelatine production goal is around 3000 MT. At the same time, processing effluent volumes have shown real reductions in disposals, due to ongoing improved plant water saving procedures.

A6 – In-Compliance - The calibration records file was perused during the formal site audit completed on 18/10/2005 (Sighted).

A7 – In-Compliance – GELITA indicated that four (4) odour complaints had been advised / recorded since the previous site audit completed on 6/10/2004. Odour sources identified included; raw materials receipt area and a power outage-initiated mechanical plant failure.

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A8, A9, A10, A11, A12, A13, A14 – In-Compliance – IEMS - Updating / amendment of the documentation was initially linked to company progress towards ISO 14001 certification [A14], which was achieved on 6/08/2003, prior to the time of a previous formal audit completed on 29/10/2003 (A12, A13, A14). Copies of SGS International Certification Services Pty Ltd documentation, *“Environmental Management Systems Preliminary Audit”* (28/04/2002-1/05/2002) and *“Environmental Management Systems Certification Audit”* (4-6/08/2003) of GELITA Australia Pty Ltd to AS/NZS ISO 14001:1996, were provided to the EPA during the formal audit completed on 29/10/2003. An SGS *“Audit Status and Itinerary”* form listed *“Standard Clauses”* of the *“Document Report Review”* for the ISO 14001 Environmental Management System (IEMS) assessment. SGS Certificate AU03/1818 was issued concerning the management system of GELITA Australia Pty Ltd, Flood Road, Josephville, QLD 4285 Australia, that was assessed and certified as meeting the requirements of ISO 14001:1996, for the following activities, *“Management of environmental effects associated with processing plant operations for manufacture of edible grade gelatins as well as the treatment and disposal of wastes.”* (Certificate valid from 06/08/2003 until 06/08/2006 – Issue 1. Certified since 06/08/2003).

Subsequently, ongoing Company certification assessment under updated AS/NZS ISO 14001:2004 was completed during 2004/2005, when SGS Certificate AU04/1818 dated 23/05/2005 was issued to GELITA Australia Pty Ltd, in respect of the following Josephville activities; *“Management of environmental effects associated with processing plant operations for manufacture of edible grade gelatins as well as the treatment and disposal of wastes”*. (Certificate AU04/1818 is valid from 06/08/2003 to 06/08/2006 – Issue 2. Certified since August 2003 – **Copy attached**).

The Company progressive staff training matrix was confirmed / sighted during the formal site audit completed on 18/10/2005 [A9(iii)].

The availability of prescribed environmental performance (“Annual Return” 2004 includes a GELITA in-house Audit reconciled against SR0722 conditions and *“GELITA Australia – Farm Management Annual Audit”* dated 31 January 2005 by Dr B M Schafer) and energy audits / reviews (See *“Natural Gas Feasibility Study”* Draft Report 3/11/2004 prepared by W Nicolle – 2004 “Annual Return”) were advised to the EPA with the 2004 Annual Return received by the Agency on 31/01/2005 (Material provided 21/09/2005 – previously withheld awaiting call-up by the EPA), [A9(iv), A10, A11].

On-site gelatine processing waste utilisation / composting trials were successfully completed (2003) with a view to achieving total internal recycling of nutrients, in due course (See, *“Development of Composting Operation at ‘Sunny Hills’, Beaudesert – 2004”* compiled by Consultants “The Organic Force” – 2004 “Annual Return”) [A9(v)].

The GELITA “Annual Return” for SR0722 for 2004 was received by the Agency on 31 January 2005, following the recent processing of a Company request for amendment of anniversary date from 4 November to 31 January, when appropriate reporting was provided / reviewed [A9(iv)(a)(b), A9(v), A10(i)(ii) & A11].

Energy auditing requirements called-up under Conditions A9(iv)(c), A10(iii) & A11 were provided as prescribed by SR0722 with the 2004 “Annual Return” (See reference above).

With the approved amendment of the anniversary dates for both SR0722 and SR1114 to 31 January (next due 31/01/2006), Company annual returns will now be received approximately 2-3 months later than previously available.

A15 – In-Compliance – GELITA consults with a local community (residents and Local Government [BSC] representatives) environmental liaison committee (Community Consultative Committee) on a quarterly to six monthly basis regarding complaints received, site environmental performance review and any other environmental / general business issues. An example copy of Minutes of a Community Consultative Committee (CCC) Meeting held during 2004 was provided to the EPA, where on-site project matters were discussed (Attached). During the formal site audit completed on 18/10/2005, Cameron Smeal indicated that difficulty was being experienced by Company Management to have participants attend CCC meetings, due to general satisfaction with the Company’s ongoing performance.

A16 – In-Compliance – GELITA operates an “open transparent approach” in meeting the requirements of this Condition, concerning EPA access to the site.

Schedule B - Air:

B1, B2 – In-Compliance – GELITA has measures in place to minimise the release of contaminants (Boiler emissions, odour and dust controls) to atmosphere (See comments below).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

B3-B5 – In-Compliance – Release Points information included in Schedule B – Table 1 remains relevant and correct, except for the “pre-empted” Co-generation Plant release point, which remains in the planning stage.

B6, B7 – In-Compliance - Boiler Emissions Testing – Previously / historically, C Smeal / R Wearne had provided to the EPA a report of February 2003 titled, “**Stack Emissions Monitoring and Biofilter Odour Assessment**”, prepared by AIR NOISE ENVIRONMENT P/L, which indicated that the Finafire coal-fired, fluidised-bed Boiler had been found on 30/01/2003 to be in NON-COMPLIANCE with Particulates limits included in SR0722 (Limit – 250mg/Nm³ / Test result - 572mg/Nm³). To overcome the ongoing problems associated with the problematic wet-ash removal equipment (“Flosep” system), GELITA proposed replacing this particulate control equipment with a Baghouse to ensure particulate discharge was in compliance with licence conditions. The Company was requested to provide a timeframe for completion of this project, as soon as practicable. Company letter of 9/04/2003 from R C Wearne, General Manager of Davis Gelatine Australia Pty Limited, at that time, committed to the installation of a Baghouse system for the Finafire Boiler, commencing around February 2004. As part of the commissioning phase for replacement of the “Flosep” particulate wet scrubber with the Baghouse dust collection system, and in keeping with requirements of Schedule B, Table 2 (Particulates limit – 250 mg/Nm³) and Schedule H of SR0722, Boiler stack monitoring was undertaken on 9/03/2004. The analysis revealed that particulate discharge levels were 0.40 mg/Nm³, while Nitrogen Oxides were measured at 653 mg/Nm³. Improvement in control of particulate discharges had been outstanding.

However, the failure to meet compliance for NOx emissions during the commissioning phase of the Baghouse installation was unexpected and required complex reconfiguration of operational programs for the Boiler. This process was expedited with due care and consideration for health and safety concerns associated with altering boiler operating control systems. Subsequently, stack monitoring carried out on 8/04/2004 measured NOx levels at 468 mg/Nm³, which result established that the discharge was within compliance limits included in SR0722 (Nitrogen Oxides Limit – 500 mg/Nm³). See also “Oxides of Nitrogen Emissions Monitoring” of April 2004, prepared by AIR NOISE ENVIRONMENT P/L for GELITA Australia Pty Ltd, Beaudesert (Folio 11 filed on STH495/9).

Following the scheduled Boiler stack testing completed in February 2004, stack emissions testing being a biennial requirement of SR0722, falls due early in 2006.

B8 – In-Compliance – GELITA indicated that during the 2004/2005 audit period four (4) odour complaints were received, investigated and reported to the EPA. Odour sources identified included; the raw materials receival area and a power outage-initiated mechanical plant failure. Prior to and following the formal site audit and inspection completed on 18/10/2005, no noxious or offensive or any site odour was detected beyond the boundaries of the licensed place in Sandy Creek, Josephville and Flood Roads. The Company Environmental Manager is currently initiating an “Environmental Odour Identification and Assessment” project, “to determine more precisely and accurately the sources, quantity and nature of site odour components.”

B9, B10, B11 – In-Compliance – Fuels burned in on-site fuel-burning equipment were confirmed as prescribed in SR0722 [B9]. The Co-generation project remains on the “back-burner”, however sufficient biogas can now be collected and held to fuel a trial / short production run. GELITA provided a hardcopy of quality analyses, including coal Total Sulphur levels (0.60-0.63% [A.D.]) for domestic supplies received from Jeebropilly Collieries, with the Company “Annual Return” in January 2005. **Condition B11** is not in force at this time.

B12, B13, B14 – In-Compliance – During the audit inspection, doors servicing the raw materials receival area were observed to be part-open / open as “dumped” raw material was being transferred into the cleaning / de-hairing tank farm area. From the roadway observation point, offensive odour was not considered to be excessive, at the time. A proactive, in-house environmental audit process designated ‘ENVIRONMENTAL WALK’ identifies site deficiencies for remedial action, on a regular basis and particularly assesses the “Raw Materials” area in regard to the maintenance of effective odour control practices. As a further odour control measure, GELITA installed an 8 tonne/hour ice-making machine, during the 2004/2005 plant shutdown period, at a cost of around \$200,000, for chilling bulk raw material stockpiles, awaiting processing. Currently, resiting and reinstallation of this odour control equipment remains to be completed prior to the upcoming high temperature 2005 Summer period. GELITA confirmed that the raw materials building ventilation air volume / changes had been improved / upgraded, with the installation of an additional fan unit (Mounted external eastern wall of plant - 2003) since original plant commissioning (Sighted).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

B15 – In-Compliance – The large Wet Scrubber / Biofilter Unit was reported to be operating effectively (Comments under **Condition B17** apply). The unit media was replaced over March-June 2004, following rebuilding of the internal support infrastructure using "Atlantis Mesh". The water / humidity control system was also upgraded early in 2004 using surface-located "soaker" hoses to maintain required media moisture / humidity levels. A further internal infrastructure upgrade within the unit is scheduled for 2006, when eroded concrete media / airline support blocks are replaced along with media in-fill top-up / replacement.

B16 – In-Compliance – The fan transferring foul air from the Hybractor Technology effluent treatment plant to the "Ferric" Biofilter was replaced with a new unit incorporating sealed housing and improved supply line connections, in December 2003. Reductions in odorous and corrosive air leakage to atmosphere in the immediate vicinity of the unit were acknowledged at the time of the 2004 inspection and the integrity of this equipment was observed to have been maintained during the formal inspection completed on 18/10/2005 (Comments under **Condition B17** apply). Replacement of the media fill of the "Ferric" Biofilter Unit was completed on 13-14/10/2005, while on-going resealing maintenance measures, planned for the media box, will also contributed to further minimising local fugitive odour leakage to atmosphere, compared to previous assessments (Photograph: 18).

B17 – In-Compliance - Biofilter Testing – Following previous comments highlighted by C Smeal, together with Company Consultants AIR NOISE ENVIRONMENT P/L, perceived "shortcomings" with the odour assessment process relevant to the on-site biofilters, have been addressed through tacit amendment of the assessment procedure to account for any background odour levels / impacts apparent at the time of testing. In this regard, EPA should consider clarifying the odour assessment process through possible amendment of **Condition B17** and **H10** included in SR0722, in due course, to take account of / deduct any background "contaminant" odour identified / measured at the time of assessment. Any fugitive odour leakage from the Biofilter units has not caused any impacts beyond the boundaries of the site resulting in nuisance complaints, as unit discharges generally remain totally localised. As an effective, short term odour control measure, a slow, odorous gas leak from the Primary Digester Unit is being attenuated through a temporary, "make-shift" Biofilter arrangement, until repairs requiring a major plant shutdown can be effected (Photograph: 21)

B18 – In-Compliance – Biogas is totally flared / Co-generation project remains "on hold".

B19, B20 – In-Compliance – GELITA indicated that regular system leakage checks and plant shutdown SOPs are in place. The proactive, in-house environmental audit process designated 'ENVIRONMENTAL WALK' identifies site deficiencies for remedial action, on a regular basis. No equipment breakdowns, requiring an enforced plant shutdown were advised. During the formal site inspection carried out on 18/10/2005, a short plant maintenance shutdown was in place, while cleaning of the Boiler Baghouse and bag replacement was completed (Photograph: 16).

Schedule C - Water:

C1 – In-Compliance – GELITA does not directly or indirectly release contaminants to "waters". The effectiveness of measures put in place by the Company is demonstrated by formal, Logan River water monitoring. DNR maintains River monitoring stations above and immediately below the GELITA property boundary, which continuously trace a range of indicator parameters for river water passing these points. Perusal of monitoring data (2004 and YTD 2005 - Sighted) indicated that these plots have not identified any significant deviations from expected ranges. River monitoring data for 2005 will be fully reviewed during the up-coming Company "Annual Return" for 2005, due to be provided to the EPA by 31/01/2006. When fully developed, cultivated Vetiver Grass paddocks / "absorption" wetlands will provide a critical utilisation element in the irrigated disposal of treated wastewater contaminants on site. (Reference Abstract: **"Proposal for a Soil Based Reed Bed Using Vetiver Grass for the Treatment of Effluent at Gelita, Beaudesert, Queensland"** by Cameron Smeal and Paul Turong).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

C2-C8 – In-Compliance - Ponds Conditions – The site inspection confirmed; “free-board” requirements as prescribed, ponds integrity maintained, stormwater impacts minimised (diversion banks / contour drains in place). Leakage of pond contents has not been identified for the Aerobic, BSD or Polishing and Pump-out Ponds on site. The contents of Aerobic Pond 1 were noted to be a “healthy caramel / light chocolate brown colour”, with an acceptable odour profile at the bank (Photographs: 19, 22). The VITOX oxygen delivery system, with pump and motor units replaced during October 2004, is now serving in a “back-up” mode, following the successful installation during 2005, of very effective compressed air injection / sparging technology, at a cost of \$40,000, namely six (6) Stem-Drive Units, which result in highly effective air mixing / injection / aeration of the Aerobic Pond contents (Photographs: 19, 22). At the same time, the new aeration technology change / improvement has resulted in savings estimated around \$165,000 YTD of previous liquid oxygen costs, while taking into account increased electricity charges of approximately \$30,000 YTD to operate the units.

Schedule D – Stormwater Management:

D1, D2 – In-Compliance – GED Conditions - GELITA has measures in place to minimise the contact / release of contaminants with / to stormwater, viz; bunding, formed drainage lines directed to “catch” dams, contour banks and associated “spoon” drains, variously in place around the site (Photographs: 3, 4, 6, 7, 14, 17). The concrete-sealed “ring road” and associated curbing and channelling surrounding the gelatine processing plant serves as a “first-flush” catchment area, with all runoff directed, in the first instance, to a dual “catch” dam / detention basin holding system for return to and treatment in Aerobic Pond 1 (Photographs: 4, 6) (See additional comments below under **Condition D6**).

D3, D4 – In-Compliance – GED Conditions - GELITA has measures in place to minimise the release of contaminants to stormwater, viz; bunding, formed drainage lines directed to “catch” dams, contour banks and associated “spoon” drains, variously in place around the site (Photographs: 3, 4, 6, 7, 14, 17).

During the formal site inspection completed on 18/10/2005, a “drive-tour” of the site included most of the site bank / property boundary along the Logan River, where the dry winter conditions allowed an effective visual assessment of the River protection measures in place, along the entire length of the property boundary. The site has a well-grassed, tree-lined contour bund and swale drainage system along the entire length of the River, located at a distance from the watercourse, in compliance with the irrigation buffer distances prescribed in **Conditions E10** and **E11** included in SR0722 (Photograph: 7).

A number of the more significant stormwater runoff gullies / waterways / catchments bisecting the site to the Logan River have been fitted with a series of earthen-wall / grassed “catch dams”, the larger drain-ways having up to six (6) detention basins over their length, prior to discharging to the River. A series of such protective “catch” dams serve to trap and minimise much of any storm-generated sediment from reaching the Logan River. (See also comments under **Condition C1** above concerning independent river monitoring carried out by DNR).

D5 – In-Compliance – Vehicle washing is currently carried out on a concrete pad, adjacent to the Belt-Press Shed, which drains to the wastewater treatment system. During 2006, GELITA has scheduled the installation of a dedicated vehicle wash facility, draining to the effluent treatment plant, in a vacant area between the new Hide Store and the present Belt-Press Shed.

D6 – In-Compliance – GELITA has SOPs, together with a number of spill control kits and “fitted” sump / gully trap guard-mats, strategically located in place around the site (Photograph: 15). Staff members are trained to effectively capture / contain / clean-up any spillages to the sealed surrounds of the processing facility. However, any liquid discharges to the formed drainage area / system and roadways located immediately adjacent to all hardstand areas surrounding the production buildings and associated plant installations, drain to a double “trap-dam” system, situated in a gully below the Belt-Press Shed (Photographs: 4, 6). Any material collected in these dams is pumped / returned to the effluent treatment plant for processing. It was noted during the site inspection that the second “catch” dam in the series was effectively empty, while the first detention dam appeared to indicate minimal holding volume.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✖

D7, D8 – In-Compliance – Both bunds servicing the Sulphuric Acid external storage tank were found to be in sound condition following rebuilding works completed during 2003/2004, while the small, above-ground diesel fuel storage tank, previously located in the now demolished “old stables” shed (replaced with a new Workshop building), has now been permanently relocated to a new dedicated bunded area on the eastern side of the “Ferric” Biofilter Unit. Bund installations on site are generally effectively serviced and well maintained (Photographs: 14, 17). During the site inspection on 18/10/2005, delivery vehicle rollover bunds were noted in place at the access points to the raw materials, bulk coal and Hide Store receival areas, whereas a rollover facility contains / safeguards the potential contaminant spill area which services the common Boiler ash and Skutch removal driveway.

D9-D14 – In-Compliance – All external bunded areas inspected during the formal site audit completed on 18/10/2005 and were found to be effectively serviced and well maintained (See further comments under **Conditions D7, D8** above and Photographs: 14, 17).

Schedule E – Land Application:

E1 – In-Compliance – During the formal site audit and inspection completed on 18/10/2005, GELITA confirmed and the EPA verified that only prescribed contaminant releases were irrigated to land.

E2 – In-Compliance – Documentation was previously confirmed concerning “irrigation lands” on Company File 961EA472/1 concerning, “Leiner Davis Gelatin ‘Sunny Hills’ Irrigation Farm”, site plan. Cameron Smeal confirmed on 18/10/2005 that the “defined contaminant release areas” for the site remain essentially as previously documented and will not require updating / amendment, as a result of the recently completed EMP No. SR1157. EMP reference material - Hydro Plan Drawing No.1052-1 of 18/09/2003 remains relevant.

E3, E4 – In-Compliance – GELITA advised that no off-site disposal of treated wastewater had been undertaken or is proposed at this time (“Third party” disposal of treated wastewater Conditions are included in SR0722).

E5 – In-Compliance - While approximately 120 hectares of land comprises the current treated wastewater disposal areas on site, Cameron Smeal indicated that the “defined contaminant release areas” for the site will not require updating / amendment, as an outcome of recently completed EMP No. SR1157, as previously thought (See **Condition E2** above).

E6-E9 – In-Compliance – Current land irrigation practices for treated wastewater applications continue to provide effective controls (Company EM Plan of 1994 and IEMS of 1997 remain relevant – C Smeal), but the site Irrigation Management Plan (IMP) will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157 (See additional comments under **Conditions E17-E22** below), which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, were fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). The visual effectiveness of land irrigation practices (Winter-Spring Rye Grass / Kikuyu Grass managed grazing / hay-making paddocks) were observed / reviewed during a vehicle tour of the on-site disposal areas on 18/10/2005 (Photographs: 2, 5, 25, 26). Significant tree species plantings were completed during 2005 in the agro-forestry soil areas, while Vetiver Grass establishment has been scheduled to assume priority as Summer temperatures / storms provide an ideal growing environment for this species.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

E10, E11 – In-Compliance – With regard to the Logan River, the maintenance of prescribed irrigation buffer distances was confirmed during the formal site inspection completed on 18/10/2005 (defined by contour bank / swale drains which follow the geography of the River bank), by way of a “drive-tour” of the site which included most of the site bank / property boundary along the Logan River, where the dry winter conditions have allowed a good visual assessment of the River protection measures in place, along the entire length of the property boundary. The site has a well-grassed, tree-planted contour bund and swale drainage system along the total length of the River, located at a distance (or more extensive) in compliance with the irrigation buffer distances included in **Conditions E10 and E11**. Unplanted buffer headland strips adjacent to the Interstate Rail corridor, Flood and Tally-Ho Road boundaries were also noted, while the rough and broken nature of the land / drainage gully abutting the eastern fence-line of “Sunny Hills” with a neighbouring farm, precludes boundary irrigation over-spray / drift.

A number of the more significant stormwater runoff gullies / waterways / catchments bisecting the site, which drain to the Logan River, have been fitted with a series of earthen-walled / grassed “catch dams”, the larger / longer drain-ways having a series of up to six (6) detention basins, prior to discharging to the River (detain/solids-drop/overflow principal). A series of such protective “catch” dams serve to trap and minimise much of any storm-generated sediment and irrigation runoff from reaching the Logan River. (See also comments under **Condition C1** above concerning independent river monitoring carried out by DNR).

E12, E13 – In-Compliance – GELITA confirmed that land application and wet weather storage practices are in place (significant BSD “free-board” is consistently maintained for additional wet weather storage purposes), as prescribed in SR0722 and will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157. Current land disposal procedures referenced in documents included in Company EM Plan of 1994 and IEMS of 1997 remain relevant and take account of excessive / prolonged rainfall events. (See also **Conditions E6-E9** above).

E14-E16 – In-Compliance – The sewage effluent disposal area was inspected during the formal site audit completed on 18/10/2005. Restricted access signage and lockable valving were observed to be in place as required by SR0722.

E17-E22 – In-Compliance – Irrigation Management Plan (IMP) - Current land irrigation practices for treated wastewater applications continue to provide effective controls (Company EM Plan of 1994 and IEMS of 1997 remain relevant – C Smeal), but the site Irrigation Management Plan (IMP) will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). MEDLI modelling aspects of EMP No. SR1157 have addressed the 15 requirements included under **Condition E18**, which program included data / project inputs operated / generated by Company project work, UQ Consultancies and DNR advice.

Additional soil and groundwater sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity (“Permeameter” instrumental applications / “FullStop” and “LongStop” sampling and testing data) will be monitored on a needs basis / an annual basis, during the anticipated seven years during / following establishment of the Vetiver Grass and Rye Grass production units, planting for which commenced during late 2004 / during 2005. See also comments under **Conditions H33-H35** below. This data will be used to validate / fine-tune the predictive outcomes of the MEDLI Model, upon which the Vetiver Grass and Rye Grass irrigation programs are based. Documented corrective actions will be taken if values are deemed to be outside sustainability limits. (Reference material: “Wastewater Irrigation Pumping System” [ENV005/B] & “Farm Operator Irrigation Procedure” [ENV006/B] – Attached).

E23, E24 – In-Compliance – Treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). With regard to **Condition E24**, GELITA indicated that the Company was not aware of any likely problems arising concerning environmental nuisance or harm emanating from the microbiological / contamination issues prescribed by this condition.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

Schedule F – Noise:

F1 – In-Compliance – “Complaints-driven” Condition - GELITA indicated that no noise complaints had been received for 2004-2005 and hence no noise assessments had been undertaken by the Company as prescribed by this Condition.

F2, F3 – In-Compliance – GELITA indicated that heavy vehicle curfew hours remain in place, with infrequent non-compliances being policed using on-site cameras, then actioned by a Company warning letter to “breaching” Contractors. No curfew non-compliances were recorded for the 2004/2005 audit period.

Schedule G – Waste Management:

G1 – In-Compliance – GED Condition – During the formal audit and site inspection of the Josephville operation, completed on 18/10/2005, GELITA was observed to be meeting the requirements of this condition, viz; well operated compost-making operation, with fly ash, belt-press sludge and “scutch” transfers from the gelatine plant to the composting area using GED procedures, controlled fly ash dewatering operation (detention ponds and “catch” dam system in place). Soil conditioner manufacturing (composting) operational conditions are prescribed in SR0007DA.

G2 – In-Compliance – GELITA confirmed that the Company does not permit the burning of waste either on site or off site.

G3, G4 – In-Compliance - Appropriate recycling of waste materials is undertaken by GELITA, where practicable, viz; paper and cardboard by local collector “Spotty Bins”, belt-press sludge removed by licensed soil conditioner manufacturer Moreshost P/L [SR1406 – ERAs: 19(b), 20(b), 22(b), 53 - Attached], who maintains a Regulated Waste Transport Licence with the EPA [SR2588 - ERA 83(b)(i)], together with occasionally scrap metal disposal.

G5, G6, G7 – In-Compliance - Regulated waste, viz; belt-press sludge is transported to EPA licensed operator Moreshost P/L for garden mix / soil conditioner manufacturing purposes. Moreshost P/L has Soil conditioner manufacturing and Regulated Waste Transport Licences with the EPA (See comments under **Conditions G3, G4** above). Where appropriate, formal waste tracking procedures are used.

G8 – In-Compliance – GELITA uses EPA licensed operator J J Richards (SR1952 – ERA 83(a) – Attached) for removal of general waste materials (lift-bins) to local landfill. The GELITA waste-tracking database was confirmed to be operational.

Schedule H – Self Monitoring & Reporting:

H1-H8 – In-Compliance – GELITA has a standard data recording format in place which was viewed / confirmed, for complaints, incidents and emergencies. Complaints and incidents are actioned / followed-up as prescribed (**Condition H7**) and reported to the EPA. A complaints summary for 2005 will be included in the company “Annual Return” due for submission to the EPA by 31/01/2006 (Anniversary date of SR0722 was recently changed from 4 November to 31 January, by amendment, which change took effect from 8/06/2004). GELITA indicated at the formal site audit completed on 18/10/2005, that during the 2004/2005 audit period four (4) odour complaints were received (Richards) investigated and reported to the EPA (**Condition H1**). Odour sources identified included; raw materials receipt area and a power outage-initiated mechanical plant failure. The administering authority did not require GELITA to undertake odour monitoring (**Condition H11**), as all odour issues were effectively resolved between the Company and complainant. GELITA has SOPs in place to ensure corrective action / feedback loops are completed for complaints and incidents as prescribed in SR0722.

H9 – In-Compliance – See comments under **Conditions B6** and **B7** above.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

H10, H11 – In-Compliance – The fan transferring foul air from the Hybractor Technology effluent treatment plant to the “Ferric” Biofilter was replaced with a new unit incorporating sealed housing and improved supply line connections, in December 2003, due to continuing odour leakage problems, resulting in local nuisance odour levels in the surrounding work area, but not beyond the boundaries of the site. See further comments concerning Biofilter odour monitoring under **Conditions B15, B16 & B17** above. The administering authority did not require GELITA to undertake odour monitoring (**Condition H11**), as all odour complaints issues were effectively resolved between the Company and complainant.

H12 – In-Compliance – GELITA indicated that both Boiler and Biofilter emissions monitoring were completed over January-March 2004 (see testing “Frequency” in Schedule H, Table 1 – “**Biennially from 2001**”), with relevant records confirmed in storage for the past seven (7) years. See results appraisal comments under **Conditions B6, B7 & B17** above. Following the scheduled Boiler stack testing completed in February 2004, stack emissions testing being a biennial requirement of SR0722, falls due early in 2006.

H13-H17 – In-Compliance – GELITA indicated that as no off-site noise complaints had been received during 2004-2005, the Company had not undertaken plant noise monitoring on site, as a requirement prescribed by SR0722.

H18-H21 – In-Compliance – During the formal site audit completed on 18/10/2005, GELITA provided the EPA with copies of weekly monitoring results for the PP (Pump Pond), POP (Pump-out Pond) and BSD (Balancing Storage Dam) sampling sources for the period 7/07/2004-2/08/2005 - Attached. Treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of “flow-on” recommendations for a number of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). Supporting information for EMP No. SR1157, included data emanating from projects operated / undertaken by the Company, UQ Consultancies, Forestry Research and private Consultants was nearing completion on 30/09/2003, for final submission by 31/10/2003 (See also comments under “Details of Scope or Particular Focus” [above] and the final comment under **Conditions H37, H38** [below]). A number of NATA Registered Laboratories are used by GELITA for monitoring / interpreting sample analyses; Brisbane Water, FALA, QG Health (**Conditions H21, H27 & H31**).

With reference to **Condition E24**, GELITA indicated that the Company was not aware of any likely problems concerning environmental nuisance or harm arising from issues prescribed by this condition.

H22, H23 – In-Compliance - GELITA confirmed that “mag” meter records are maintained of the total quantity of programmed contaminants released to dedicated irrigation areas on any day (Irrigation Records Book sighted), which remains below 3ML of final treated wastewater. GELITA indicated that reprogramming of treated wastewater discharge volumes / treatments, as a result of minor redefinition of contaminant release area utilisation, would be a further consequence of the outcomes of EMP No. SR1157.

H24-H28 – In-Compliance - Logan River Daily Monitoring – Daily monitoring is carried out by DNR automatic recording stations within the River, both above and also immediately below the GELITA downstream boundary at Bromelton. These recordings for 2004/2005 YTD were sighted / reviewed, at the formal site audit completed on 18/10/2005, indicating only inherent variations in parameters assessed at the two (2) river sampling points. This extensive chart data is available for “call-up” for EPA “Annual Return” assessment purposes. Parameters were confirmed as those included in the company EM Plan of 1994, which remains relevant. (Reference material: “Irrigation Management Program” [EP04/A] – Attached). See also comments under **Condition C1** above.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

H29-H32 – In-Compliance - Soils Monitoring - Soil / Agronomy Consultant Dr Brian Schafer has prepared and submitted to GELITA the following, **“GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report – October 2005”**, in which the preliminary soil monitoring data generated over 2004/2005 is presented and reviewed (Attached). Schafer has indicated that, **“These preliminary data are within the acceptable ranges deemed for Soil Salinity and Nutrient Status for the specified soil map units.”** During the formal site audit completed on 18/10/2005, GELITA confirmed that the “FullStop” and “LongStop” Wetting Front Detectors, together with “Permeameter” instrumental assessments had been brought into use during 2005 to monitor irrigation infiltration effects and soil hydraulic conductivity status. (See also **“Gelita Australia – Farm Management Annual Audit”**, prepared by B M Schafer and dated 31/01/2005 and 2005 follow-on, **“GELITA Australia – Farm Management Progress Report: October 2005”** - Attached). Earlier “baseline” soil monitoring (2003/2004), together with ongoing soil assessment, constituted actions emanating from EMP No. SR1157, that included investigative data / projects reaching finality around 30/09/2003 and of which “supporting material” was provided to the EPA with EMP No. SR1157 “Final Report”, for assessment and sign-off. Cropping trials, to ascertain nutrient utilisation in soils irrigated with treated wastewater, formed a number of projects associated with EMP No. SR1157. Following on from this work, planting applications of complimentary soil-type / plant-type agricultural systems, including agro-forestry plantations (“Walloon” soils), Vetiver Grass paddocks (heavy clay-derived soils), while maintaining grazing-based Kikuyu Grass / Rye Grass systems on the Logan River flats (deep drained sandy loams) are becoming a farm priority for 2005/2006. Additional soil and groundwater sampling / monitoring for determining soil behaviour in relation to critical infiltration and hydraulic conductivity effects will be maintained on a needs / annual basis throughout the anticipated 5-7 years, following regular maintenance of the established Rye / Rhodes / Kikuyu grassed areas, establishment of the Vetiver Grass “absorption” paddocks and servicing of the agro-forestry plantation blocks (See also comments under **Condition C1** above). Further proposed soil treatment trials will assess the potential for in-house-generated compost to counter salinity / sodicity in renovating on-site saline / sodic soils (Reference Abstract: **“Use of Compost to Improve Soil Properties and Plant Growth in Saline and Sodic Soils”**, to be undertaken by J Biala, J Raue, C Smeal, B Schafer and P Grace). Both liquid and solid applications of lime to control low soil pH values remains under investigation, after initial liming trials proved to be inefficient. Soil pH adjustment / equilibration using organic systems such as well incorporated compost applications remains a consideration, should inorganic procedures ultimately prove unworkable. (Reference material: **“Irrigation Management Program” [EP04/A]** – Attached). See also comments under **Conditions H33-H35** below.

H33-H35 – In-Compliance - Groundwater Monitoring – In the **“GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report – October 2004”**, Soil / Agronomy Consultant Dr Brian Schafer referred to field problems associated with the groundwater sampling program during 2004 (Attached). Schafer commented as follows, “Ground water analyses obtained from samples in September 2004 have been found to be in error. The piezometer boreholes installed in 1992 have variously deteriorated due to age. Later boreholes to replace some of these earlier boreholes in 2000 have also been damaged by farm operations and stock. Consequently, some of the bores which are strategic to the new monitoring program are unserviceable.” During 2005, GELITA undertook a piezometer borehole refurbishment program resulting in a number of boreholes being returned to service, while a number of “nested” piezometers were rendered unserviceable due to leakage. The **“GELITA Australia – Farm Management Progress Report: October 2005”** by Dr B M Schafer, dated October 2005, reviews groundwater monitoring during 2005 from serviceable boreholes, together with “Irrigation Scheduling Procedure” and “Soil Management Issues”, in regard to “deep drainage”. In some farmed areas of “Sunny Hills”, the shallow topsoil cover, over a deep clay base, precludes transfer of irrigated treated wastewater to groundwater (dedicated to Vetiver Grass “absorption” paddocks). GELITA intends to make use of data generated from recently installed “Full-Stop” and “LongStop” sampling / testing procedures, developed by CSIRO Scientist R Stirzaker (See CSIRO.au) to monitor moisture movement through soil profiles on site, as a practical measure of irrigated treated wastewater penetration / field capacity / percolation effectiveness, particularly in regard to tracking the movement (“wash-through”) of salt(s) to deep drainage soil layers and the need to prevent nitrogen transfer to groundwater (refer Schedule H – Table 3).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✖

H36 – In-Compliance - GELITA seeks expert advice from a variety of sources regarding results emanating from the on-site monitoring programs, viz; Consulting NATA Laboratories, AIR, NOISE ENVIRONMENT P/L, UQ Project Teams Consultancies, Soil / Agronomy Consultant Dr Brian Schafer, DNR personnel advice (soil / plant systems advice [particularly Vetiver Grass applications / hydrology issues], J Biala of "The Organic Force" for composting guidance / reference and Dr Paul Truong, Vetiver Grass cultivation expert (Reference Abstract: **"Proposal for a Soil Based Reed Bed Using Vetiver Grass for the Treatment of Effluent at Gelita, Beaudesert, Queensland"** by Cameron Smeal and Paul Turong). Field trial work to be conducted on site at GELITA Australia will provide much of the research data to be included in this Technical Bulletin. Both authors Truong and Smeal co-presented papers at the Third International Conference on Vetiver Grass in Guangzhou, China in October 2003.

H37, H38 – In-Compliance - Licence limit(s) exceedances arising as a result of the irrigated disposal of treated wastewater to land on site were covered by EMP No. SR1157, for the 4.5 year lifetime of the process, to 30/09/2003 and hence have not been individually advised to the EPA. However, the EPA was always fully aware of results achieved over the course of EMP No. SR1157, following receipt of regular six (6) monthly and annual reviews of progress over the span of the EMP process.

Significant treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of "flow-on" recommendations for a number of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference / "supporting documents" provided with the "Final Report" for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). The only contaminant release quality characteristics now retained in Schedule H – Table 2 of SR0722 include; 5-day BOD (monthly), COD (weekly) and pH (weekly) determinations. GELITA was made aware of the need, in future, for timely reporting of any non-compliance involving these parameters.

Through restructuring /amendment of the monitoring components of SR0722 approved on 8/06/2004, the environmental control emphasis has been significantly shifted in relation to treated wastewater disposal at "Sunny Hills" from an "end-of-pipe" mentality to a practical, agriculturally oriented "outcomes-based" process, capable of reaction / correction, depending on the influences of prevailing real time conditions.

Schedule I – Definitions: NO COMMENT REQUIRED.

REQUIRED ACTIONS: NIL

Licence Conditions Module:

Condition Number(s)	Details of non-compliance(s)
<u>NIL</u>	

RECOMMENDATION:

NO RECOMMENDATIONS ARE OFFERED, AS CONDITIONS CURRENTLY INCLUDED IN SR0722 ARE CONSIDERED ADEQUATE TO ENSURE SUSTAINABILITY OF THE GELATINE MANUFACTURING ACTIVITIES CARRIED OUT ON SITE AND TO SAFEGUARD THE ENVIRONMENTAL INTEGRITY OF THE SURROUNDING SENSITIVE RECEPTORS, viz: adjacent land and any runoff to the nearby Logan River.

Signoff Sheet:

Additional Comments:
<u>NIL</u>
Recommendation:
<u>NIL</u>

Adoption of Report:
This report accurately represents the issues and outcomes of this site inspection and review of SR0722.

Inspecting officer

Don Shackel

Signed

Date

Inspecting officer

N/A

Signed

Date

Comments and Recommendation:

Supervisor

Doug Carey

Signed

Date



26
1 of 2
**Queensland
Government**

Enquiries Don Shackel
Telephone (07) 3225 1040
Your reference
Our reference STH495-10-SR0722&SR0007DA

Ref 9/11/2005
Environmental Protection Agency

Incorporating the
Queensland Parks and Wildlife Service

9 November 2005

Mr R Seach
General Manager
GELITA Australia Pty Ltd
PO Box 409
BEAUDESERT QLD 4285

Attention: Mr Cameron Smeal, Environmental Manager

**Re: Compliance Inspection Report for Registration Certificate No.SR0722 and
Development Approval No.SR0007DA**

I refer to the inspection of GELITA Australia Pty Ltd, Josephville site located at Flood Road, Josephville via Beaudesert, on 18 October 2005 by Environmental Protection Agency (EPA) Officers Don Shackel and Wade Micke.

The purpose of the inspection was to assess site compliance with the conditions of Development Approval No.SR0007DA, issued under the *Integrated Planning Act 1997* and Registration Certificate No.SR0722, issued under the *Environmental Protection Act 1994*, for the site, assess compliance with the general provisions of the *Environmental Protection Act 1994* (the Act) and associated policies, and to develop an action plan to address any potential non-compliances.

I am pleased to report that the Company was in compliance with the conditions of the approval and with the general provisions of the Act, at the time of the inspection.

The EPA thanks you for your co-operation during the inspection and looks forward to your continued co-operation in the environmental management of the site.

Yours sincerely

son4p4(6) Personal in
A.S. Connor

Andrew Connor
Operations Manager
Heavy Industry Group
Southern Region EPA

Don Shackel

From: Don Shackel [don.shackel@epa.qld.gov.au]
Sent: Friday, 11 November 2005 9:30 AM
To: 'wade.micke@epa.qld.gov.au'
Subject: Re: GELITA 2005 ANNUAL AUDIT MATERIAL



GELITASR0722Com GELITASR0007DAC GELITAComplianceI GELITASstandardCo
plianceProgInsp... omplianceProgra... nspectionRepo... mplianceLetter...

WADE,

Please find attached GELITA 2005 annual audit material relevant to our site visit on 18/10/2005.

Regards,

Don Shackel
Senior Inspector
Southern Region - Environmental Operations
Environmental Operations Division
Environmental Protection Agency

Ph: (07) 3225 1040
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Compliance – Inspection Program

Compliance Inspection Report

Inspection Details:

Date of Compliance Inspection: 18/10/2005
Compliance Inspection Reason: Annual Site Compliance Audit
Compliance Inspection Type: C
Compliance Level of Site: 3

Licence Holder / Operator Details:

Licensee and/or Company Name: GELITA Australia Pty Ltd
Site Address: "Sunny Hills", Flood Road, Josephville via
Beaudesert, QLD 4285

Registration Certificate Nos. SR0722 & SR1114 & Development Approval No. SR0007DA:

Environmentally Relevant Activities: ERA 50(b) – Rendering operation; and
ERA 17 – Fuel burning; and
ERA 15(a) – Sewage treatment; and
ERA 53 – Soil conditioner manufacturing

Name and Position of Contact Person during Inspection: Mr Cameron Smeal,
Environmental Manager
(07) 5541 9442

General Description of the Site and Surrounding Environment:

"Sunny Hills" was a former dairy farm, located within the Beaudesert Shire, being defined by the Logan River on the southern boundary, the NSW / QLD interstate rail line / corridor on the western boundary, additional private farming land on the eastern boundary and Flood / Tally-Ho Roads on the northern boundary.

The site consists of alluvial flats adjacent to the Logan River (deep sandy loams), leading upwards via rolling ridges (degraded Walloons) and shallow gullies to a high-point hill ("Sunny Hill") situated in the north-eastern corner of the property.

History of the Activity/ERA at the Site:

Originally, Leiner Davis Gelatin International Limited trading as Leiner Davis Gelatin (Australia) Pty Limited, subsequently Davis Gelatine Australia Pty Limited and currently GELITA Australia Pty Ltd, established Australia's only gelatine processing operation on the "Sunny Hills" homestead dairy farm site in 1992, following relocation of the activity from Botany, NSW.

GELITA Australia Pty Ltd, which was recently acquired by German private business interests from Goodman Fielder, has now completed **EMP No.SR1157** concerned with, ***“Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner”***, which reached full term for completion on 30 September 2003, following a 4.5 year timeframe. A “Final Report”, together with “supporting information” relevant to EMP No.SR1157 was provided to the EPA on 20/11/2003.

Following internal assessment of the “progress” and “final completion” reports, together with “supporting information” provided by GELITA in relation to EMP No.5080001157 (SR1157), originally approved on behalf of the former Leiner Davis Gelatin International Limited, **as suitable** “Compliance / Completion Reports”, in respect of the EMP, the EPA considered that the Company had achieved compliance with the matters dealt with by the program. Outcomes arising from completion of EMP No.SR1157 indicated a need to seriously reassess, amend and delete some or all treated wastewater limits from SR0722. Subsequently, following negotiated discussion of licence changes, between EPA Regional Management (D Brown, K Roberts, D K Shackel) and the Company (C Smeal, Environmental Officer) the EPA approved amendment of SR0722 on 1/06/2004.

In general terms, EMP No.SR1157 outcomes indicated that sustainability of application of treated wastewater to on-site land will be achieved through a mix of options including; pasture / grazing systems (including Vetiver Grass), cropping (cutting & exporting hay products) and agro-forestry, which plant products will / may become a raw material source (green waste) for **on-site compost-making**, utilising all processing wastes generated by gelatine manufacturing (“skutch”, belt-press sludge, boiler ash) for total on-site soil conditioning purposes.

Through restructuring /amendment of the monitoring components of SR0722 approved on 8/06/2004, the environmental control emphasis has been significantly shifted in relation to treated wastewater disposal at “Sunny Hills” from an “end-of-pipe” mentality to a practical, agriculturally oriented “outcomes-based” process, capable of reaction / correction, depending on the influence of prevailing real time conditions.

It is anticipated that adoption of outcomes arising from the recent EMP process will lead, not only to the application of environmentally sustainable / friendly land disposal applications for the industrial treated wastewaters, emanating from gelatine manufacture, but also innovative uses of such a resource in environmentally and economically “best practice” farming procedures. The Company has actively pursued a number of these agricultural initiatives during 2005, viz; agro-forestry and Vetiver Grass plantings (See ‘Compliance Program – Inspection Checklist’ – Attached).

Process Description:

Extraction, purification, drying, milling and packaging of dry gelatine solids, processed from off-site abattoir resource materials (“facepieces”, hide materials), including treatment of liquid gelatine processing effluents / wastewaters prior to irrigation to land, to support a number of on-site farming options, together with composting of gelatine processed solids and associated wastes, to produce a soil-enhancing composted soil additive.

Non-Compliances and/or new identified issues:

NIL

Consultation with Licensee: (including commitments for improvements/required actions)

Since completion of proceedings by the EPA, in the Magistrates Court, in July 1996, against Leiner Davis Gelatin (Australia) Pty Limited, Site Licensing Officer Don Shackel has been closely involved with facilitating environmental improvement on the Josephville site outside Beaudesert.

Compliance Inspection Program

With the recent completion of a 4.5 year duration, complex Environmental Management Plan in 2004 (EMP No.SR1157) concerning, ***“Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner”***, a number of innovative, environmentally sustainable / friendly “best practice” agricultural applications for the effective disposal of the industrial, treated wastewater emanating from the gelatine manufacturing operation, are expected to be further developed and refined on site, over the coming number of years.

RECOMMENDATION:**NIL****Report Completed by:**

Name and Position:

Don Shackel, Senior Inspector, Heavy Industry Group

Date: 7/11/2005

Report Reviewed by:

Name and Position:

Doug Carey, Principal Environmental Officer, Heavy Industry

Group

Date: 7/11/2005

Attachments:

- **Reports** – GELITA provided / referenced examples of a number of environmental reports, test results, technical and operational procedures, during the formal site audit completed on 18/10/2005, including material earlier provided with the 2005 Company “Annual Return” (Attached).
- **Photographs** – A series of 30 digital photographs taken during the site audit on 18/10/2005 indicate the current environmental status of the site, particularly with regard to land disposal issues and stormwater protection aspects, the composting operation, together with a limited number of records of external processing plant / infrastructure (Attached).
- **Other:** - The ‘Compliance Program – Inspection Checklist’ which accompanies this ‘Compliance Inspection Report’ details information concerning AMMONIA, ASBESTOS and EPA CLU issues relevant to the Josephville operation of GELITA Australia Pty Ltd.

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Checklist

Compliance

Compliance Program — Inspection Checklist

Instructions for use

Where an Agency issue is determined to be relevant, note appropriate detail in the observations section.
Where there is any non-compliance, discuss with the company representative and note any required action.
Where the assessment will include licence conditions, use the licence condition compliance section of the checklist.

This checklist is to be used for all inspections. Refer to the procedural guide for guidance.

Cover Sheet Module:

Company Name: GELITA Australia Pty Limited		Date of Inspection: 18/10/2005
Trading as: GELITA – ASIA PACIFIC AFRICA		RC No.: SR0722
Description of Business Activity: ERA 50(b) – Rendering operation (Gelatine manufacture)		
Site Street Address: Flood Road		
Suburb: Josephville	City/Town: Beaudesert	Post Code: 4285
Registered Office Address: "Sunny Hills", Flood Road, JOSEPHVILLE via BEAUDESERT QLD 4285		
Suburb: JOSEPHVILLE	City/Town: BEAUDESERT	Post Code: 4285
Site Representative: Cameron Smeal	Position: Environmental Manager	Contact phone: (07) 5541 9442

Inspection type	☐ Catchment	☐ Industry Sector	☐ Complaint	☒ Compliance
Compliance level	☐ 1	☐ 2	☒ 3	Inspection type ☐ A ☐ B ☒ C
Audit focus is the following relevant Agency interests:				
☒ Water issues ¹	☒ Air issues ¹	☒ Noise issues ¹	☐ National and international	
☒ Land issues ¹	☒ Waste issues ¹	☒ Social issues	☒ Impacts on surrounds	
☐ Coastal issues	☐ Heritage issues	☐ Biodiversity		
☒ Resource allocation	☐ Tenure issues	☐ Other issues		

¹ Main issues to consider for *Environmental Protection Act 1994* focus.

DETAILS OF SCOPE OR PARTICULAR FOCUS**HISTORIC REVIEW:**

GELITA Australia Pty Ltd, previously **Davis Gelatine Australia Pty Limited**, recently acquired by German private business interests from Goodman Fielder (2003), has now completed **EMP No. SR1157** concerned with, ***"Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner"***, which reached full term for completion on 30 September 2003. E-mail advice from the Company at the due date of the reporting period on 30 October 2003, indicated that EMP No. SR1157 was completed and written-up, apart from "two final items from external sources for inclusion in the report", viz; an effluent stream characterisation under the cleaner production section and monitoring schedule from the Company soils consultant. The EPA received the "total" final report relevant to EMP No. SR1157 on 20 November 2003.

Subsequently, licence limits requirements included in **SR0722**, for treated wastewater parameters such as Total Nitrogen and Total Dissolved Solids, previously observed as not always achieving compliance on an historic on-going basis, were addressed by the EMP review process, within a "holistic" context, for the site. The company regularly provided progress reports over the lifetime of EMP No. SR1157 to the EPA, for assessment and information, indicating milestones towards achieving compliance by 30/09/2003.

Following internal assessment of the "progress" and "final completion" reports, together with "supporting information" provided by GELITA in relation to EMP No. 5080001157 (SR1157), originally approved on behalf of the former Leiner Davis Gelatin International Limited, as suitable, "Compliance / Completion Reports", in respect of the EMP, the EPA considered that the Company had achieved compliance with the matters dealt with by the program. Outcomes arising from completion of EMP No. SR1157, indicated a need to seriously reassess, amend and delete some or all treated wastewater limits from SR0722. Subsequently, following negotiated discussion of licence changes, between EPA Regional Management (D Brown, K Roberts, D K Shackel) and the then Company Environmental Officer (Cameron Smeal), the EPA approved amendment of SR0722 on 1/06/2004. See also: *GELITAAustSR1157EMPCompletionMemo.doc*.

EMP No. SR1157 outcomes indicated that sustainability of application of treated wastewater to on-site land will be achieved through a mix of options including; pasture / grazing systems (including Vetiver Grass), cropping (cutting & exporting hay products) and agro-forestry, which plant products will / may become a raw material source (green waste) for **on-site compost-making**, utilising all processing wastes generated by gelatine manufacturing ("skutch", belt-press sludge, boiler ash) for total on-site soil conditioning purposes.

To this end, the EPA approved continuation of composting activities on site late in 2003, following an initial 12 month waste composting project period (September 2002-September 2003) to trial processing methodology and assess outcomes (an 'Odour Control Plan' remains in place), with a view to long term, on-going total waste utilisation / recycling on site. GELITA Australia Pty Limited holds **SR0007DA** (with conditions) and **SR1114** for ERA 53, relevant to "soil conditioner manufacturing". The company contracted part-time consultancy services from Johannes Biala of "The Organic Force", to assist with the composting project. The composting consultant Company has prepared a report dated October 2003, titled ***"Assessing the Suitability of Covered Windrow Composting for On-site Processing of Gelatine By-products"***, for GELITA Australia Pty Ltd, which was also made available to the EPA. See also, *GELITASR0007DAComplianceProgramInspectionChecklist06102004.doc*.

2004/2005 AUDIT OVERVIEW:

2004 was the first period of consolidation for the treated effluent utilisation project following sign-off of EMP No.SR1157. As year one (1) in a seven (7) year establishment / installation program to fully implement the outcomes of the EMP, primarily energies were directed towards establishment of the Agro-forestry tree plantations and Vetiver Grass plantings to utilise irrigated treated wastewater. At the same time, irrigation control tools including, "Permeameter", "FullStop" and "LongStop" equipment have been utilised / installed to monitor critical soil infiltration and hydraulic conductivity parameters. The latter equipment has also begun to be used to provide liquid samples for determining salt and nitrate movement past the root zone to a soil depth of 1.5 metres. Groundwater monitoring recommenced following refurbishment of relevant piezometers (10 metre). Both liquid and solid applications of lime to control low soil pH values remains under investigation, after initial liming trials proved to be inefficient. For additional in-depth detail concerning the above projects, see **"GELITA AUSTRALIA – Farm Management Progress Report: October 2005"**, prepared by Company Soils Consultant Dr B M Schafer (Attached).

Also, a number of proposed site-based farm projects will assess compost incorporation to improve saline and sodic soils, a soil-based reed bed using Vetiver Grass for the treatment of effluent and the use of Vetiver Grass for remediation of herbicide contamination in surface and sub-surface water.

SITE CONTACT:

A review of conditions included in SR0722, followed by a subsequent site inspection were undertaken as part of the formal site audit completed on 18/10/2005, with the Company Environmental Manager, Mr Cameron Smeal. Six (6) personnel constitute the environmental group servicing the "Sunny Hills" Josephville gelatine manufacturing operation of GELITA Australia Pty Ltd.

PHOTOGRAPHS:

A series of 30 digital photographs taken during the site audit on 18/10/2005 indicate the current environmental status of the site, particularly with regard to land disposal issues and stormwater protection aspects, the composting operation, together with a limited number of records of external processing plant / infrastructure.

CHUCKLE / ECOTRACK:

A review of CHUCKLE, ECOTRACK and Company files, STH495 records for 2004/2005, indicated that any complaints received by the Company had been actioned and reports provided to the EPA, in each instance (4 odour complaints on file **Richards** noted for the period between the 2004 and 2005 October site audit dates – See also comments under **Condition G1** below).

Agency Interests Module:

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✖

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

ADMINISTRATIVE:

- Registration Certificate No. SR0722 (without development approval) (Section 93)
- The Company name, the registered business address of the Queensland legal entity and the activity location address were all confirmed as **CORRECT**.
- ASIC search provided a "Current Extract" for Organisation Number ACN 000 010 597 – Section 1274B – See attached printout.
- ERA Items – confirmed "no change" for the Josephville operation, at this time [ERAs 50(b), 15(a), 17 & 53].
- Real Property Description – confirmed "no change" for the Josephville site, at this time.
- Registration Certificate No. SR0722 "Effect Date" – 8/06/2004.
- Registration Certificate No. SR0722 "Anniversary Date" – 31 January (Amended from 4 November on 1/06/2004).
- CLU advice dated 19/10/2005 (Attached) indicates that historically the previous dairy farm activities of "Sunny Hills" included the operation of a cattle plunge dip and/or spray-race, prior to acquisition by GELITA Australia Pty Ltd. As such, the site remains an Item 22 **NOTIFIABLE ACTIVITY**, viz; "Livestock dip or spray race operations—operating a livestock dip or spray race facility", as defined in Schedule 2 of the *Environmental Protection Act 1994*. Subsequently, an information request was forwarded by e-mail to GELITA on 19/10/2005 requesting comment concerning the Item 22 EMR listing of the site. GELITA responded by e-mail of 20/10/2005 as follows: "Don, pls refer our correspondence of approximately 26/11/01 on this matter. I had discussions with Tess Dobinson (Registrar Contaminated Land Unit) and with John Taylor (EPA) at the time and advised both of them that the original spray race was under several hundred tonnes of earth (the aeration pond is believed to have been the approximate location of the original race.) I also advised them at the time that I was unable to locate any evidence that the previous owner had notified the company of the registration of the property on the original contaminated sites register. They subsequently forwarded me a copy of the letter send to Biggers in 1993, which stated that the site had only been classified as a PROBABLE site."
- **AMMONIA** status of the site – During e-mail contact with Company audit / inspection personnel on 19/10/2005, the need for development of an Ammonia release emergency response plan for the operation was promoted. GELITA responded by e-mail of 20/10/2005 as follows: "GELITA currently operates a cooling system for the votators that relies on about 120 kg of ammonia. We will in the future (next year probably) be installing an ice machine with a total fill of around 750kg. It will be the responsibility of the site safety personnel to ensure that the appropriate emergency response plans are amended to the required standards. Installation of the new unit will also done in compliance with the standards."
- **ASBESTOS** status of the site – During e-mail contact with Company audit / inspection personnel on 19/10/2005, the matter of Asbestos was canvassed and was indicated by the Company not to be an issue of concern for the site workforce. GELITA responded by e-mail of 20/10/2005 as follows: "Our Engineering Manager has assured me that we do not have asbestos on this site. All boiler lagging is rock wool/fibre and the lagging ropes are composites. We do not have asbestos roofing and the only possible/potential/unconfirmed source of asbestos would be if the old cottage ceiling liner was asbestos cement sheeting."

NOTE: With regard to ERA 50(b) – Rendering operation, Cameron Smeal requested that his contention that he did not consider gelatine manufacture a rendering process be recorded. These comments were acknowledged by EPA Officer Don Shackel who considered / indicated that wording in the ERA definition including, "processing or extracting substances, including, for example, ----- proteinaceous matter, from animal wastes or by-products", were relevant to the GELITA Australia Pty Limited, Josephville Gelatine operation.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

ASSESSMENTS & OBSERVATIONS:**Schedule A - General Conditions:**

A1 – In-Compliance – GELITA operates a standard maintenance card, work request-advice / corrective-action system which is currently being upgraded to a computer-driven MFG-PRO system, with added MLS engineering / preventative maintenance workshop application, together with the current MIS accounting / stores purchasing system, which apart from other duties, is intended to address equipment, plant and building maintenance aspects, to reduce / minimise environmental risk. A proactive, in-house environmental audit process designated 'ENVIRONMENTAL WALK' identifies site deficiencies for remedial action, on a regular basis, using the job cards, work request, corrective action follow-up procedure, to achieve improvement (Sighted).

A2 – In-Compliance – GELITA Registration Certificate (Licence) SR0722 is displayed in the office foyer and the amenity areas on site, while each member of staff has been provided with a copy for personal use, during Company training sessions.

A3, A4 – In-Compliance – The formal audit completed on 18/10/2005, confirmed that Company environmental records are maintained / available as prescribed (Sighted).

A5 – In-Compliance – GELITA indicated that the Company was targeted to achieve a progressive / continuing increase in gelatine yield over recent figures (2500 MT), in the next 2 years (2005/2006), without any "increase in the risk of environmental harm / nuisance" – the current annual gelatine production goal is around 3000 MT. At the same time, processing effluent volumes have shown real reductions in disposals, due to ongoing improved plant water saving procedures.

A6 – In-Compliance - The calibration records file was perused during the formal site audit completed on 18/10/2005 (Sighted).

A7 – In-Compliance – GELITA indicated that four (4) odour complaints had been advised / recorded since the previous site audit completed on 6/10/2004. Odour sources identified included; raw materials receipt area and a power outage-initiated mechanical plant failure.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

A8, A9, A10, A11, A12, A13, A14 – In-Compliance – IEMS - Updating / amendment of the documentation was initially linked to company progress towards ISO 14001 certification [A14], which was achieved on 6/08/2003, prior to the time of a previous formal audit completed on 29/10/2003 (A12, A13, A14). Copies of SGS International Certification Services Pty Ltd documentation, **"Environmental Management Systems Preliminary Audit"** (28/04/2002-1/05/2002) and **"Environmental Management Systems Certification Audit"** (4-6/08/2003) of GELITA Australia Pty Ltd to AS/NZS ISO 14001:1996, were provided to the EPA during the formal audit completed on 29/10/2003. An SGS **"Audit Status and Itinerary"** form listed **"Standard Clauses"** of the **"Document Report Review"** for the ISO 14001 Environmental Management System (IEMS) assessment. SGS Certificate AU03/1818 was issued concerning the management system of GELITA Australia Pty Ltd, Flood Road, Josephville, QLD 4285 Australia, that was assessed and certified as meeting the requirements of ISO 14001:1996, for the following activities, **"Management of environmental effects associated with processing plant operations for manufacture of edible grade gelatins as well as the treatment and disposal of wastes."** (Certificate valid from 06/08/2003 until 06/08/2006 – Issue 1. Certified since 06/08/2003).

Subsequently, ongoing Company certification assessment under updated AS/NZS ISO 14001:2004 was completed during 2004/2005, when SGS Certificate AU04/1818 dated 23/05/2005 was issued to GELITA Australia Pty Ltd, in respect of the following Josephville activities; **"Management of environmental effects associated with processing plant operations for manufacture of edible grade gelatins as well as the treatment and disposal of wastes"**. (Certificate AU04/1818 is valid from 06/08/2003 to 06/08/2006 – Issue 2. Certified since August 2003 – Copy attached).

The Company progressive staff training matrix was confirmed / sighted during the formal site audit completed on 18/10/2005 [A9(iii)].

The availability of prescribed environmental performance ("Annual Return" 2004 includes a GELITA in-house Audit reconciled against SR0722 conditions and **"GELITA Australia – Farm Management Annual Audit"** dated 31 January 2005 by Dr B M Schafer) and energy audits / reviews (See **"Natural Gas Feasibility Study"** Draft Report 3/11/2004 prepared by W Nicolle – 2004 "Annual Return") were advised to the EPA with the 2004 Annual Return received by the Agency on 31/01/2005 (Material provided 21/09/2005 – previously withheld awaiting call-up by the EPA), [A9(iv), A10, A11].

On-site gelatine processing waste utilisation / composting trials were successfully completed (2003) with a view to achieving total internal recycling of nutrients, in due course (See, **"Development of Composting Operation at 'Sunny Hills', Beaudesert – 2004"** compiled by Consultants "The Organic Force" – 2004 "Annual Return") [A9(v)].

The GELITA "Annual Return" for SR0722 for 2004 was received by the Agency on 31 January 2005, following the recent processing of a Company request for amendment of anniversary date from 4 November to 31 January, when appropriate reporting was provided / reviewed [A9(iv)(a)(b), A9(v), A10(i)(ii) & A11].

Energy auditing requirements called-up under Conditions A9(iv)(c), A10(iii) & A11 were provided as prescribed by SR0722 with the 2004 "Annual Return" (See reference above).

With the approved amendment of the anniversary dates for both SR0722 and SR1114 to 31 January (next due 31/01/2006), Company annual returns will now be received approximately 2-3 months later than previously available.

A15 – In-Compliance – GELITA consults with a local community (residents and Local Government [BSC] representatives) environmental liaison committee (Community Consultative Committee) on a quarterly to six monthly basis regarding complaints received, site environmental performance review and any other environmental / general business issues. An example copy of Minutes of a Community Consultative Committee (CCC) Meeting held during 2004 was provided to the EPA, where on-site project matters were discussed (Attached). During the formal site audit completed on 18/10/2005, Cameron Smeal indicated that difficulty was being experienced by Company Management to have participants attend CCC meetings, due to general satisfaction with the Company's ongoing performance.

A16 – In-Compliance – GELITA operates an "open transparent approach" in meeting the requirements of this Condition, concerning EPA access to the site.

Schedule B - Air:

B1, B2 – In-Compliance – GELITA has measures in place to minimise the release of contaminants (Boiler emissions, odour and dust controls) to atmosphere (See comments below).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

B3-B5 – In-Compliance – Release Points information included in Schedule B – Table 1 remains relevant and correct, except for the “pre-empted” Co-generation Plant release point, which remains in the planning stage.

B6, B7 – In-Compliance - Boiler Emissions Testing – Previously / historically, C Smeal / R Wearne had provided to the EPA a report of February 2003 titled, “**Stack Emissions Monitoring and Biofilter Odour Assessment**”, prepared by AIR NOISE ENVIRONMENT P/L, which indicated that the Finafire coal-fired, fluidised-bed Boiler had been found on 30/01/2003 to be in NON-COMPLIANCE with Particulates limits included in SR0722 (Limit – 250mg/Nm³ / Test result - 572mg/Nm³). To overcome the ongoing problems associated with the problematic wet-ash removal equipment (“Flosep” system), GELITA proposed replacing this particulate control equipment with a Baghouse to ensure particulate discharge was in compliance with licence conditions. The Company was requested to provide a timeframe for completion of this project, as soon as practicable. Company letter of 9/04/2003 from R C Wearne, General Manager of Davis Gelatine Australia Pty Limited, at that time, committed to the installation of a Baghouse system for the Finafire Boiler, commencing around February 2004. As part of the commissioning phase for replacement of the “Flosep” particulate wet scrubber with the Baghouse dust collection system, and in keeping with requirements of Schedule B, Table 2 (Particulates limit – 250 mg/Nm³) and Schedule H of SR0722, Boiler stack monitoring was undertaken on 9/03/2004. The analysis revealed that particulate discharge levels were 0.40 mg/Nm³, while Nitrogen Oxides were measured at 653 mg/Nm³. Improvement in control of particulate discharges had been outstanding.

However, the failure to meet compliance for NOx emissions during the commissioning phase of the Baghouse installation was unexpected and required complex reconfiguration of operational programs for the Boiler. This process was expedited with due care and consideration for health and safety concerns associated with altering boiler operating control systems. Subsequently, stack monitoring carried out on 8/04/2004 measured NOx levels at 468 mg/Nm³, which result established that the discharge was within compliance limits included in SR0722 (Nitrogen Oxides Limit – 500 mg/Nm³). See also “Oxides of Nitrogen Emissions Monitoring” of April 2004, prepared by AIR NOISE ENVIRONMENT P/L for GELITA Australia Pty Ltd, Beaudesert (Folio 11 filed on STH495/9).

Following the scheduled Boiler stack testing completed in February 2004, stack emissions testing being a biennial requirement of SR0722, falls due early in 2006.

B8 – In-Compliance – GELITA indicated that during the 2004/2005 audit period four (4) odour complaints were received, investigated and reported to the EPA. Odour sources identified included; the raw materials receival area and a power outage-initiated mechanical plant failure. Prior to and following the formal site audit and inspection completed on 18/10/2005, no noxious or offensive or any site odour was detected beyond the boundaries of the licensed place in Sandy Creek, Josephville and Flood Roads. The Company Environmental Manager is currently initiating an “Environmental Odour Identification and Assessment” project, “to determine more precisely and accurately the sources, quantity and nature of site odour components.”

B9, B10, B11 – In-Compliance – Fuels burned in on-site fuel-burning equipment were confirmed as prescribed in SR0722 [B9]. The Co-generation project remains on the “back-burner”, however sufficient biogas can now be collected and held to fuel a trial / short production run. GELITA provided a hardcopy of quality analyses, including coal Total Sulphur levels (0.60-0.63% [A.D.]) for domestic supplies received from Jeebropilly Collieries, with the Company “Annual Return” in January 2005. **Condition B11** is not in force at this time.

B12, B13, B14 – In-Compliance – During the audit inspection, doors servicing the raw materials receival area were observed to be part-open / open as “dumped” raw material was being transferred into the cleaning / de-hairing tank farm area. From the roadway observation point, offensive odour was not considered to be excessive, at the time. A proactive, in-house environmental audit process designated ‘ENVIRONMENTAL WALK’ identifies site deficiencies for remedial action, on a regular basis and particularly assesses the “Raw Materials” area in regard to the maintenance of effective odour control practices. As a further odour control measure, GELITA installed an 8 tonne/hour ice-making machine, during the 2004/2005 plant shutdown period, at a cost of around **\$200,000**, for chilling bulk raw material stockpiles, awaiting processing. Currently, resiting and reinstallation of this odour control equipment remains to be completed prior to the upcoming high temperature 2005 Summer period. GELITA confirmed that the raw materials building ventilation air volume / changes had been improved / upgraded, with the installation of an additional fan unit (Mounted external eastern wall of plant - 2003) since original plant commissioning (Sighted).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

B15 – In-Compliance – The large Wet Scrubber / Biofilter Unit was reported to be operating effectively (Comments under **Condition B17** apply). The unit media was replaced over March-June 2004, following rebuilding of the internal support infrastructure using "Atlantis Mesh". The water / humidity control system was also upgraded early in 2004 using surface-located "soaker" hoses to maintain required media moisture / humidity levels. A further internal infrastructure upgrade within the unit is scheduled for 2006, when eroded concrete media / airline support blocks are replaced along with media in-fill top-up / replacement.

B16 – In-Compliance – The fan transferring foul air from the Hybractor Technology effluent treatment plant to the "Ferric" Biofilter was replaced with a new unit incorporating sealed housing and improved supply line connections, in December 2003. Reductions in odorous and corrosive air leakage to atmosphere in the immediate vicinity of the unit were acknowledged at the time of the 2004 inspection and the integrity of this equipment was observed to have been maintained during the formal inspection completed on 18/10/2005 (Comments under **Condition B17** apply). Replacement of the media fill of the "Ferric" Biofilter Unit was completed on 13-14/10/2005, while on-going resealing maintenance measures, planned for the media box, will also contribute to further minimising local fugitive odour leakage to atmosphere, compared to previous assessments (Photograph: 18).

B17 – In-Compliance - Biofilter Testing – Following previous comments highlighted by C Smeal, together with Company Consultants AIR NOISE ENVIRONMENT P/L, perceived "shortcomings" with the odour assessment process relevant to the on-site biofilters, have been addressed through tacit amendment of the assessment procedure to account for any background odour levels / impacts apparent at the time of testing. In this regard, EPA should consider clarifying the odour assessment process through possible amendment of **Condition B17** and **H10** included in SR0722, in due course, to take account of / deduct any background "contaminant" odour identified / measured at the time of assessment. Any fugitive odour leakage from the Biofilter units has not caused any impacts beyond the boundaries of the site resulting in nuisance complaints, as unit discharges generally remain totally localised. As an effective, short term odour control measure, a slow, odorous gas leak from the Primary Digester Unit is being attenuated through a temporary, "make-shift" Biofilter arrangement, until repairs requiring a major plant shutdown can be effected (Photograph: 21)

B18 – In-Compliance – Biogas is totally flared / Co-generation project remains "on hold".

B19, B20 – In-Compliance – GELITA indicated that regular system leakage checks and plant shutdown SOPs are in place. The proactive, in-house environmental audit process designated 'ENVIRONMENTAL WALK' identifies site deficiencies for remedial action, on a regular basis. No equipment breakdowns, requiring an enforced plant shutdown were advised. During the formal site inspection carried out on 18/10/2005, a short plant maintenance shutdown was in place, while cleaning of the Boiler Baghouse and bag replacement was completed (Photograph: 16).

Schedule C - Water:

C1 – In-Compliance – GELITA does not directly or indirectly release contaminants to "waters". The effectiveness of measures put in place by the Company is demonstrated by formal, Logan River water monitoring. DNR maintains River monitoring stations above and immediately below the GELITA property boundary, which continuously trace a range of indicator parameters for river water passing these points. Perusal of monitoring data (2004 and YTD 2005 - Sighted) indicated that these plots have not identified any significant deviations from expected ranges. River monitoring data for 2005 will be fully reviewed during the up-coming Company "Annual Return" for 2005, due to be provided to the EPA by 31/01/2006. When fully developed, cultivated Vetiver Grass paddocks / "absorption" wetlands will provide a critical utilisation element in the irrigated disposal of treated wastewater contaminants on site. (Reference Abstract: "Proposal for a Soil Based Reed Bed Using Vetiver Grass for the Treatment of Effluent at Gelita, Beaudesert, Queensland" by Cameron Smeal and Paul Turong).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

C2-C8 – In-Compliance – Ponds Conditions – The site inspection confirmed; “free-board” requirements as prescribed, ponds integrity maintained, stormwater impacts minimised (diversion banks / contour drains in place). Leakage of pond contents has not been identified for the Aerobic, BSD or Polishing and Pump-out Ponds on site. The contents of Aerobic Pond 1 were noted to be a “healthy caramel / light chocolate brown colour”, with an acceptable odour profile at the bank (Photographs: 19, 22). The VITOX oxygen delivery system, with pump and motor units replaced during October 2004, is now serving in a “back-up” mode, following the successful installation during 2005, of very effective compressed air injection / sparging technology, at a cost of \$40,000, namely six (6) Stem-Drive Units, which result in highly effective air mixing / injection / aeration of the Aerobic Pond contents (Photographs: 19, 22). At the same time, the new aeration technology change / improvement has resulted in savings estimated around \$165,000 YTD of previous liquid oxygen costs, while taking into account increased electricity charges of approximately \$30,000 YTD to operate the units.

Schedule D – Stormwater Management:

D1, D2 – In-Compliance – GED Conditions - GELITA has measures in place to minimise the contact / release of contaminants with / to stormwater, viz; bunding, formed drainage lines directed to “catch” dams, contour banks and associated “spoon” drains, variously in place around the site (Photographs: 3, 4, 6, 7, 14, 17). The concrete-sealed “ring road” and associated curbing and channelling surrounding the gelatine processing plant serves as a “first-flush” catchment area, with all runoff directed, in the first instance, to a dual “catch” dam / detention basin holding system for return to and treatment in Aerobic Pond 1 (Photographs: 4, 6) (See additional comments below under **Condition D6**).

D3, D4 – In-Compliance – GED Conditions - GELITA has measures in place to minimise the release of contaminants to stormwater, viz; bunding, formed drainage lines directed to “catch” dams, contour banks and associated “spoon” drains, variously in place around the site (Photographs: 3, 4, 6, 7, 14, 17). During the formal site inspection completed on 18/10/2005, a “drive-tour” of the site included most of the site bank / property boundary along the Logan River, where the dry winter conditions allowed an effective visual assessment of the River protection measures in place, along the entire length of the property boundary. The site has a well-grassed, tree-lined contour bund and swale drainage system along the entire length of the River, located at a distance from the watercourse, in compliance with the irrigation buffer distances prescribed in **Conditions E10** and **E11** included in SR0722 (Photograph: 7). A number of the more significant stormwater runoff gullies / waterways / catchments bisecting the site to the Logan River have been fitted with a series of earthen-wall / grassed “catch dams”, the larger drain-ways having up to six (6) detention basins over their length, prior to discharging to the River. A series of such protective “catch” dams serve to trap and minimise much of any storm-generated sediment from reaching the Logan River. (See also comments under **Condition C1** above concerning independent river monitoring carried out by DNR).

D5 – In-Compliance – Vehicle washing is currently carried out on a concrete pad, adjacent to the Belt-Press Shed, which drains to the wastewater treatment system. During 2006, GELITA has scheduled the installation of a dedicated vehicle wash facility, draining to the effluent treatment plant, in a vacant area between the new Hide Store and the present Belt-Press Shed.

D6 – In-Compliance – GELITA has SOPs, together with a number of spill control kits and “fitted” sump / gully trap guard-mats, strategically located in place around the site (Photograph: 15). Staff members are trained to effectively capture / contain / clean-up any spillages to the sealed surrounds of the processing facility. However, any liquid discharges to the formed drainage area / system and roadways located immediately adjacent to all hardstand areas surrounding the production buildings and associated plant installations, drain to a double “trap-dam” system, situated in a gully below the Belt-Press Shed (Photographs: 4, 6). Any material collected in these dams is pumped / returned to the effluent treatment plant for processing. It was noted during the site inspection that the second “catch” dam in the series was effectively empty, while the first detention dam appeared to indicate minimal holding volume.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

D7, D8 – In-Compliance – Both bunds servicing the Sulphuric Acid external storage tank were found to be in sound condition following rebuilding works completed during 2003/2004, while the small, above-ground diesel fuel storage tank, previously located in the now demolished “old stables” shed (replaced with a new Workshop building), has now been permanently relocated to a new dedicated bunded area on the eastern side of the “Ferric” Biofilter Unit. Bund installations on site are generally effectively serviced and well maintained (Photographs: 14, 17). During the site inspection on 18/10/2005, delivery vehicle rollover bunds were noted in place at the access points to the raw materials, bulk coal and Hide Store receival areas, whereas a rollover facility contains / safeguards the potential contaminant spill area which services the common Boiler ash and Skutch removal driveway.

D9-D14 – In-Compliance – All external bunded areas inspected during the formal site audit completed on 18/10/2005 and were found to be effectively serviced and well maintained (See further comments under **Conditions D7, D8** above and Photographs: 14, 17).

Schedule E – Land Application:

E1 – In-Compliance – During the formal site audit and inspection completed on 18/10/2005, GELITA confirmed and the EPA verified that only prescribed contaminant releases were irrigated to land.

E2 – In-Compliance – Documentation was previously confirmed concerning “irrigation lands” on Company File 961EA472/1 concerning, “Leiner Davis Gelatin ‘Sunny Hills’ Irrigation Farm”, site plan. Cameron Smeal confirmed on 18/10/2005 that the “defined contaminant release areas” for the site remain essentially as previously documented and will not require updating / amendment, as a result of the recently completed EMP No. SR1157. EMP reference material - Hydro Plan Drawing No.1052-1 of 18/09/2003 remains relevant.

E3, E4 – In-Compliance – GELITA advised that no off-site disposal of treated wastewater had been undertaken or is proposed at this time (“Third party” disposal of treated wastewater Conditions are included in SR0722).

E5 – In-Compliance - While approximately 120 hectares of land comprises the current treated wastewater disposal areas on site, Cameron Smeal indicated that the “defined contaminant release areas” for the site will not require updating / amendment, as an outcome of recently completed EMP No. SR1157, as previously thought (See **Condition E2** above).

E6-E9 – In-Compliance – Current land irrigation practices for treated wastewater applications continue to provide effective controls (Company EM Plan of 1994 and IEMS of 1997 remain relevant – C Smeal), but the site Irrigation Management Plan (IMP) will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157 (See additional comments under **Conditions E17-E22** below), which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, were fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). The visual effectiveness of land irrigation practices (Winter-Spring Rye Grass / Kikuyu Grass managed grazing / hay-making paddocks) were observed / reviewed during a vehicle tour of the on-site disposal areas on 18/10/2005 (Photographs: 2, 5, 25, 26). Significant tree species plantings were completed during 2005 in the agro-forestry soil areas, while Vetiver Grass establishment has been scheduled to assume priority as Summer temperatures / storms provide an ideal growing environment for this species.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

E10, E11 – In-Compliance – With regard to the Logan River, the maintenance of prescribed irrigation buffer distances was confirmed during the formal site inspection completed on 18/10/2005 (defined by contour bank / swale drains which follow the geography of the River bank), by way of a “drive-tour” of the site which included most of the site bank / property boundary along the Logan River, where the dry winter conditions have allowed a good visual assessment of the River protection measures in place, along the entire length of the property boundary. The site has a well-grassed, tree-planted contour bund and swale drainage system along the total length of the River, located at a distance (or more extensive) in compliance with the irrigation buffer distances included in **Conditions E10 and E11**. Unplanted buffer headland strips adjacent to the Interstate Rail corridor, Flood and Tally-Ho Road boundaries were also noted, while the rough and broken nature of the land / drainage gully abutting the eastern fence-line of “Sunny Hills” with a neighbouring farm, precludes boundary irrigation over-spray / drift.

A number of the more significant stormwater runoff gullies / waterways / catchments bisecting the site, which drain to the Logan River, have been fitted with a series of earthen-walled / grassed “catch dams”, the larger / longer drain-ways having a series of up to six (6) detention basins, prior to discharging to the River (detain/solids-drop/overtop principal). A series of such protective “catch” dams serve to trap and minimise much of any storm-generated sediment and irrigation runoff from reaching the Logan River. (See also comments under **Condition C1** above concerning independent river monitoring carried out by DNR).

E12, E13 – In-Compliance – GELITA confirmed that land application and wet weather storage practices are in place (significant BSD “free-board” is consistently maintained for additional wet weather storage purposes), as prescribed in SR0722 and will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157. Current land disposal procedures referenced in documents included in Company EM Plan of 1994 and IEMS of 1997 remain relevant and take account of excessive / prolonged rainfall events. (See also **Conditions E6-E9** above).

E14-E16 – In-Compliance – The sewage effluent disposal area was inspected during the formal site audit completed on 18/10/2005. Restricted access signage and lockable valving were observed to be in place as required by SR0722.

E17-E22 – In-Compliance – Irrigation Management Plan (IMP) - Current land irrigation practices for treated wastewater applications continue to provide effective controls (Company EM Plan of 1994 and IEMS of 1997 remain relevant – C Smeal), but the site Irrigation Management Plan (IMP) will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). MEDLI modelling aspects of EMP No. SR1157 have addressed the 15 requirements included under **Condition E18**, which program included data / project inputs operated / generated by Company project work, UQ Consultancies and DNR advice.

Additional soil and groundwater sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity (“Permeameter” instrumental applications / “FullStop” and “LongStop” sampling and testing data) will be monitored on a needs basis / an annual basis, during the anticipated seven years during / following establishment of the Vetiver Grass and Rye Grass production units, planting for which commenced during late 2004 / during 2005. See also comments under **Conditions H33-H35** below. This data will be used to validate / fine-tune the predictive outcomes of the MEDLI Model, upon which the Vetiver Grass and Rye Grass irrigation programs are based. Documented corrective actions will be taken if values are deemed to be outside sustainability limits. (Reference material: “Wastewater Irrigation Pumping System” [ENV005/B] & “Farm Operator Irrigation Procedure” [ENV006/B] – Attached).

E23, E24 – In-Compliance – Treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). With regard to **Condition E24**, GELITA indicated that the Company was not aware of any likely problems arising concerning environmental nuisance or harm emanating from the microbiological / contamination issues prescribed by this condition.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

Schedule F – Noise:

F1 – In-Compliance – “Complaints-driven” Condition - GELITA indicated that no noise complaints had been received for 2004-2005 and hence no noise assessments had been undertaken by the Company as prescribed by this Condition.

F2, F3 – In-Compliance – GELITA indicated that heavy vehicle curfew hours remain in place, with infrequent non-compliances being policed using on-site cameras, then actioned by a Company warning letter to “breaching” Contractors. No curfew non-compliances were recorded for the 2004/2005 audit period.

Schedule G – Waste Management:

G1 – In-Compliance – GED Condition – During the formal audit and site inspection of the Josephville operation, completed on 18/10/2005, GELITA was observed to be meeting the requirements of this condition, viz; well operated compost-making operation, with fly ash, belt-press sludge and “scutch” transfers from the gelatine plant to the composting area using GED procedures, controlled fly ash dewatering operation (detention ponds and “catch” dam system in place). Soil conditioner manufacturing (composting) operational conditions are prescribed in SR0007DA.

G2 – In-Compliance – GELITA confirmed that the Company does not permit the burning of waste either on site or off site.

G3, G4 – In-Compliance - Appropriate recycling of waste materials is undertaken by GELITA, where practicable, viz; paper and cardboard by local collector “Spotty Bins”, belt-press sludge removed by licensed soil conditioner manufacturer Moreshost P/L [SR1406 – ERAs: 19(b), 20(b), 22(b), 53 - Attached], who maintains a Regulated Waste Transport Licence with the EPA [SR2588 - ERA 83(b)(i)], together with occasionally scrap metal disposal.

G5, G6, G7 – In-Compliance - Regulated waste, viz; belt-press sludge is transported to EPA licensed operator Moreshost P/L for garden mix / soil conditioner manufacturing purposes. Moreshost P/L has Soil conditioner manufacturing and Regulated Waste Transport Licences with the EPA (See comments under **Conditions G3, G4** above). Where appropriate, formal waste tracking procedures are used.

G8 – In-Compliance – GELITA uses EPA licensed operator J J Richards (SR1952 – ERA 83(a) – Attached) for removal of general waste materials (lift-bins) to local landfill. The GELITA waste-tracking database was confirmed to be operational.

Schedule H – Self Monitoring & Reporting:

H1-H8 – In-Compliance – GELITA has a standard data recording format in place which was viewed / confirmed, for complaints, incidents and emergencies. Complaints and incidents are actioned / followed-up as prescribed (**Condition H7**) and reported to the EPA. A complaints summary for 2005 will be included in the company “Annual Return” due for submission to the EPA by 31/01/2006 (Anniversary date of SR0722 was recently changed from 4 November to 31 January, by amendment, which change took effect from 8/06/2004). GELITA indicated at the formal site audit completed on 18/10/2005, that during the 2004/2005 audit period four (4) odour complaints were received (Richards), investigated and reported to the EPA (**Condition H1**). Odour sources identified included; raw materials receipt area and a power outage-initiated mechanical plant failure. The administering authority did not require GELITA to undertake odour monitoring (**Condition H11**), as all odour issues were effectively resolved between the Company and complainant. GELITA has SOPs in place to ensure corrective action / feedback loops are completed for complaints and incidents as prescribed in SR0722.

H9 – In-Compliance – See comments under **Conditions B6 and B7** above.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

H10, H11 – In-Compliance – The fan transferring foul air from the Hybractor Technology effluent treatment plant to the “Ferric” Biofilter was replaced with a new unit incorporating sealed housing and improved supply line connections, in December 2003, due to continuing odour leakage problems, resulting in local nuisance odour levels in the surrounding work area, but not beyond the boundaries of the site. See further comments concerning Biofilter odour monitoring under **Conditions B15, B16 & B17** above. The administering authority did not require GELITA to undertake odour monitoring (**Condition H11**), as all odour complaints issues were effectively resolved between the Company and complainant.

H12 – In-Compliance – GELITA indicated that both Boiler and Biofilter emissions monitoring were completed over January-March 2004 (see testing “Frequency” in Schedule H, Table 1 – **“Biennially from 2001”**), with relevant records confirmed in storage for the past seven (7) years. See results appraisal comments under **Conditions B6, B7 & B17** above. Following the scheduled Boiler stack testing completed in February 2004, stack emissions testing being a biennial requirement of SR0722, falls due early in 2006.

H13-H17 – In-Compliance – GELITA indicated that as no off-site noise complaints had been received during 2004-2005, the Company had not undertaken plant noise monitoring on site, as a requirement prescribed by SR0722.

H18-H21 – In-Compliance – During the formal site audit completed on 18/10/2005, GELITA provided the EPA with copies of weekly monitoring results for the PP (Pump Pond), POP (Pump-out Pond) and BSD (Balancing Storage Dam) sampling sources for the period 7/07/2004-2/08/2005 - Attached. Treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of “flow-on” recommendations for a number of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). Supporting information for EMP No. SR1157, included data emanating from projects operated / undertaken by the Company, UQ Consultancies, Forestry Research and private Consultants was nearing completion on 30/09/2003, for final submission by 31/10/2003 (See also comments under “Details of Scope or Particular Focus” [above] and the final comment under **Conditions H37, H38** [below]). A number of NATA Registered Laboratories are used by GELITA for monitoring / interpreting sample analyses; Brisbane Water, FALA, QG Health (**Conditions H21, H27 & H31**).

With reference to **Condition E24**, GELITA indicated that the Company was not aware of any likely problems concerning environmental nuisance or harm arising from issues prescribed by this condition.

H22, H23 – In-Compliance - GELITA confirmed that “mag” meter records are maintained of the total quantity of programmed contaminants released to dedicated irrigation areas on any day (Irrigation Records Book sighted), which remains below 3ML of final treated wastewater. GELITA indicated that reprogramming of treated wastewater discharge volumes / treatments, as a result of minor redefinition of contaminant release area utilisation, would be a further consequence of the outcomes of EMP No. SR1157.

H24-H28 – In-Compliance - Logan River Daily Monitoring – Daily monitoring is carried out by DNR automatic recording stations within the River, both above and also immediately below the GELITA downstream boundary at Bromelton. These recordings for 2004/2005 YTD were sighted / reviewed, at the formal site audit completed on 18/10/2005, indicating only inherent variations in parameters assessed at the two (2) river sampling points. This extensive chart data is available for “call-up” for EPA “Annual Return” assessment purposes. Parameters were confirmed as those included in the company EM Plan of 1994, which remains relevant. (Reference material: “Irrigation Management Program” [EP04/A] – Attached). See also comments under **Condition C1** above.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant X

H29-H32 – In-Compliance - Soils Monitoring - Soil / Agronomy Consultant Dr Brian Schafer has prepared and submitted to GELITA the following, **"GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report – October 2005"**, in which the preliminary soil monitoring data generated over 2004/2005 is presented and reviewed (Attached). Schafer has indicated that, **"These preliminary data are within the acceptable ranges deemed for Soil Salinity and Nutrient Status for the specified soil map units."** During the formal site audit completed on 18/10/2005, GELITA confirmed that the "FullStop" and "LongStop" Wetting Front Detectors, together with "Permeameter" instrumental assessments had been brought into use during 2005 to monitor irrigation infiltration effects and soil hydraulic conductivity status. (See also **"Gelita Australia – Farm Management Annual Audit"**, prepared by B M Schafer and dated 31/01/2005 and 2005 follow-on, **"GELITA Australia – Farm Management Progress Report: October 2005"** - Attached). Earlier "baseline" soil monitoring (2003/2004), together with ongoing soil assessment, constituted actions emanating from EMP No. SR1157, that included investigative data / projects reaching finality around 30/09/2003 and of which "supporting material" was provided to the EPA with EMP No. SR1157 "Final Report", for assessment and sign-off. Cropping trials, to ascertain nutrient utilisation in soils irrigated with treated wastewater, formed a number of projects associated with EMP No. SR1157. Following on from this work, planting applications of complimentary soil-type / plant-type agricultural systems, including agro-forestry plantations ("Walloon" soils), Vetiver Grass paddocks (heavy clay-derived soils), while maintaining grazing-based Kikuyu Grass / Rye Grass systems on the Logan River flats (deep drained sandy loams) are becoming a farm priority for 2005/2006. Additional soil and groundwater sampling / monitoring for determining soil behaviour in relation to critical infiltration and hydraulic conductivity effects will be maintained on a needs / annual basis throughout the anticipated 5-7 years, following regular maintenance of the established Rye / Rhodes / Kikuyu grassed areas, establishment of the Vetiver Grass "absorption" paddocks and servicing of the agro-forestry plantation blocks (See also comments under **Condition C1** above). Further proposed soil treatment trials will assess the potential for in-house-generated compost to counter salinity / sodicity in renovating on-site saline / sodic soils (Reference Abstract: **"Use of Compost to Improve Soil Properties and Plant Growth in Saline and Sodic Soils"**, to be undertaken by J Biala, J Raue, C Smeal, B Schafer and P Grace). Both liquid and solid applications of lime to control low soil pH values remains under investigation, after initial liming trials proved to be inefficient. Soil pH adjustment / equilibration using organic systems such as well incorporated compost applications remains a consideration, should inorganic procedures ultimately prove unworkable. (Reference material: **"Irrigation Management Program" [EP04/A]** – Attached). See also comments under **Conditions H33-H35** below.

H33-H35 – In-Compliance - Groundwater Monitoring – In the **"GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report – October 2004"**, Soil / Agronomy Consultant Dr Brian Schafer referred to field problems associated with the groundwater sampling program during 2004 (Attached). Schafer commented as follows, "Ground water analyses obtained from samples in September 2004 have been found to be in error. The piezometer boreholes installed in 1992 have variously deteriorated due to age. Later boreholes to replace some of these earlier boreholes in 2000 have also been damaged by farm operations and stock. Consequently, some of the bores which are strategic to the new monitoring program are unserviceable." During 2005, GELITA undertook a piezometer borehole refurbishment program resulting in a number of boreholes being returned to service, while a number of "nested" piezometers were rendered unserviceable due to leakage. The **"GELITA Australia – Farm Management Progress Report: October 2005"** by Dr B M Schafer, dated October 2005, reviews groundwater monitoring during 2005 from serviceable boreholes, together with "Irrigation Scheduling Procedure" and "Soil Management Issues", in regard to "deep drainage". In some farmed areas of "Sunny Hills", the shallow topsoil cover, over a deep clay base, precludes transfer of irrigated treated wastewater to groundwater (dedicated to Vetiver Grass "absorption" paddocks). GELITA intends to make use of data generated from recently installed "Full-Stop" and "LongStop" sampling / testing procedures, developed by CSIRO Scientist R Stirzaker (See CSIRO.au) to monitor moisture movement through soil profiles on site, as a practical measure of irrigated treated wastewater penetration / field capacity / percolation effectiveness, particularly in regard to tracking the movement ("wash-through") of salt(s) to deep drainage soil layers and the need to prevent nitrogen transfer to groundwater (refer Schedule H – Table 3).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

H36 – In-Compliance - GELITA seeks expert advice from a variety of sources regarding results emanating from the on-site monitoring programs, viz; Consulting NATA Laboratories, AIR, NOISE ENVIRONMENT P/L, UQ Project Teams Consultancies, Soil / Agronomy Consultant Dr Brian Schafer, DNR personnel advice (soil / plant systems advice [particularly Vetiver Grass applications / hydrology issues], J Biala of "The Organic Force" for composting guidance / reference and Dr Paul Truong, Vetiver Grass cultivation expert (Reference Abstract: **"Proposal for a Soil Based Reed Bed Using Vetiver Grass for the Treatment of Effluent at Gelita, Beaudesert, Queensland"** by Cameron Smeal and Paul Truong). Field trial work to be conducted on site at GELITA Australia will provide much of the research data to be included in this Technical Bulletin. Both authors Truong and Smeal co-presented papers at the Third International Conference on Vetiver Grass in Guangzhou, China in October 2003.

H37, H38 – In-Compliance - Licence limit(s) exceedances arising as a result of the irrigated disposal of treated wastewater to land on site were covered by EMP No. SR1157, for the 4.5 year lifetime of the process, to 30/09/2003 and hence have not been individually advised to the EPA. However, the EPA was always fully aware of results achieved over the course of EMP No. SR1157, following receipt of regular six (6) monthly and annual reviews of progress over the span of the EMP process.

Significant treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of "flow-on" recommendations for a number of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference / "supporting documents" provided with the "Final Report" for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). The only contaminant release quality characteristics now retained in Schedule H – Table 2 of SR0722 include; 5-day BOD (monthly), COD (weekly) and pH (weekly) determinations. GELITA was made aware of the need, in future, for timely reporting of any non-compliance involving these parameters.

Through restructuring / amendment of the monitoring components of SR0722 approved on 8/06/2004, the environmental control emphasis has been significantly shifted in relation to treated wastewater disposal at "Sunny Hills" from an "end-of-pipe" mentality to a practical, agriculturally oriented "outcomes-based" process, capable of reaction / correction, depending on the influences of prevailing real time conditions.

Schedule I – Definitions: NO COMMENT REQUIRED.

REQUIRED ACTIONS: NIL

Licence Conditions Module:

Condition Number(s)	Details of non-compliance(s)
<u>NIL</u>	

RECOMMENDATION:

NO RECOMMENDATIONS ARE OFFERED, AS CONDITIONS CURRENTLY INCLUDED IN SR0722 ARE CONSIDERED ADEQUATE TO ENSURE SUSTAINABILITY OF THE GELATINE MANUFACTURING ACTIVITIES CARRIED OUT ON SITE AND TO SAFEGUARD THE ENVIRONMENTAL INTEGRITY OF THE SURROUNDING SENSITIVE RECEPTORS, viz: adjacent land and any runoff to the nearby Logan River.

Signoff Sheet:

Additional Comments:
<u>NIL</u>
Recommendation:
<u>NIL</u>

Adoption of Report:
This report accurately represents the issues and outcomes of this site inspection and review of SR0722.

Inspecting officer

sch4p4(6) Personal information

Don Shackel

Signed

Date

Inspecting officer

-

-

N/A

Signed

Date

Comments and Recommendation:

Supervisor

sch4p4(6) Personal information

Doug Carey

Signed

Date

Checklist

Compliance

Compliance Program — Inspection Checklist

Instructions for use

Where an Agency issue is determined to be relevant, note appropriate detail in the observations section.

Where there is any non-compliance, discuss with the company representative and note any required action.

Where the assessment will include licence conditions, use the licence condition compliance section of the checklist.

This checklist is to be used for all inspections. Refer to the procedural guide for guidance.

Cover Sheet Module:

Company Name: GELITA Australia Pty Ltd		Date of Inspection: 18/10/2005
Trading as: GELITA – ASIA PACIFIC AFRICA		DA No.: SR0007DA / RC No.: SR1114
Description of Business Activity: ERA 53 – Soil conditioner manufacturing		
Site Street Address: Flood Road		
Suburb: Josephville	City/Town: Beaudesert	Post Code: 4285
Registered Office Address: "Sunny Hills", Flood Road, JOSEPHVILLE via BEAUDESERT QLD 4285		
Suburb: JOSEPHVILLE	City/Town: BEAUDESERT	Post Code: 4285
Site Representative: Cameron Smeal	Position: Environmental Manager	Contact phone: (07) 5541 9442

Inspection type	☐ Catchment	☐ Industry Sector	☐ Complaint	☒ Compliance
Compliance level	☐ 1	☐ 2	☒ 3	Inspection type ☐ A ☐ B ☒ C
Audit focus is the following relevant Agency interests:				
☒ Water issues ¹	☒ Air issues ¹	☒ Noise issues ¹	☐ National and international	
☒ Land issues ¹	☒ Waste issues ¹	☒ Social issues	☒ Impacts on surrounds	
☐ Coastal issues	☐ Heritage issues	☐ Biodiversity		
☒ Resource allocation	☐ Tenure issues	☐ Other issues		

¹ Main issues to consider for *Environmental Protection Act 1994* focus.

DETAILS OF SCOPE OR PARTICULAR FOCUS:

WASTE COMPOSTING:

The EPA approved continuation of composting activities on site at Josephville late in 2003, following an initial 12 month waste composting project period (September 2002-September 2003) to trial processing methodology and assess outcomes (an "Odour Control Plan" is in place), with a view to long term, on-going total waste utilisation / recycling on site. GELITA Australia Pty Limited holds Development Approval No.SR0007DA (with conditions) and Registration Certificate No.SR1114 for ERA 53, relevant to "soil conditioner manufacturing". The Company previously contracted part-time consultancy services from Johannes Biala of "The Organic Force", to assist with the composting project. The composting consultant Company subsequently prepared a report dated October 2003, titled **"Assessing the Suitability of Covered Windrow Composting for On-site Processing of Gelatine By-products"**, for GELITA Australia Pty Ltd, which was also made available to the EPA. On-site gelatine processing waste utilisation / composting trials were successfully completed (2003) with a view to achieving total internal recycling of nutrients, in due course (See, **"Development of Composting Operation at 'Sunny Hills', Beaudesert – 2004"** compiled by Consultants "The Organic Force" – 2004 "Annual Return").

SITE CONTACT:

A review of conditions included in SR1114 and SR0007DA, followed by an inspection of the Composting operation were undertaken with the Company Environmental Manager, Mr Cameron Smeal.

PHOTOGRAPHS:

A series of 30 digital photographs taken during the site audit on 18/10/2005 indicate the current environmental status of the site, particularly with regard to land disposal issues, stormwater protection aspects, the composting process, together with a limited number of records of external processing plant / operations.

CHUCKLE / ECOTRACK:

A review of CHUCKLE / ECOTRACK and Company files, STH495 records for 2004/2005 indicated that any complaints received by the Company had been actioned and reports provided to the EPA, in each instance (4 odour complaints on file [Richardson] were noted for the period between the 2004 and 2005 site audit dates, none of which were concerned with the on-site Composting operation. See also comments under **Condition G1** below).

ADMINISTRATIVE:

1. Development Approval No. SR0007DA – ERA 53 Soil conditioner manufacturing
2. Registration Certificate (Personal Licence) No. SR1114 (with development approval) (Section 86).
3. The Company name, the registered business address of the Queensland legal entity and the activity location address were all confirmed as CORRECT.
4. ASIC search provided a “Current Extract” for Organisation Number ACN 000 010 597 – Section 1274B – See attached printout.
5. ERA Item – confirmed “no change” for the Josephville operation, at this time [ERA 53].
6. Real Property Description – confirmed “no change” for the Josephville site, at this time.
7. Registration Certificate (Personal Licence) No. SR1114 “Effect Date” – 4/05/2004.
8. Registration Certificate (Personal Licence) No. SR1114 “Anniversary Date” – 31 January (Amended from 14 December on 27/04/2004)
9. Development Approval No. SR0007DA – Amendment Date 17/12/2002.

ASSESSMENTS & OBSERVATIONS:

Agency Interests Module:

SECTION: Compliance Audit : **Agency Interest:** SR0007DA & Site Review : **Non-compliant** ✕

Schedule A – Activity:

A1 – In-Compliance – GELITA has physical (asphalt sealed operating area/pad, a perimeter pad drainage swale directing runoff to sediment basins and a “catch dam”, where accumulated material is returned to the Aerobic Pond of the effluent treatment system for processing, windrow covers to minimise dust and odour nuisance [Photographs: 8, 10], a mechanical windrow turner and cover applicator / remover to effectively aerate, mix and control compost maturation) and procedural (“Odour Management Plan”, IEMS, part-time Odour/Composting Consultant support) measures in place to prevent or minimise environmental nuisance or harm in carrying out the on-site composting operation at Josephville.

A2 – In-Compliance – The GELITA composting operation remains in a “scaling-up” / “learning curve” mode, taking strategic operating advice from a composting consultant, on a part-time basis (“The Organic Force”), as expertise is accumulated at a number of levels of the activity. GELITA maintains updates with the EPA (Annual Returns) concerning progress with optimising the operation to progressively utilise all on-site solid waste resources.

A3 – In-Compliance – GELITA has IEMS (SBMP) documentation in place to manage the evolving composting operation on site.

Schedule B – Air:

B1 – In-Compliance – GELITA confirmed that the composting operation has not recently released “noxious or offensive odours or any other noxious or offensive airborne contaminants resulting from the activity” to cause nuisance complaints, “at any odour sensitive place”. GELITA has an ‘Odour Management Plan’ in place for the composting operation. GELITA maintains extensive open “buffer” areas between the composting operation and the boundaries of the licensed place.

SECTION: Compliance Audit : Agency Interest: SR0007DA & Site Review : Non-compliant ✕
B2, B3 – In-Compliance – GELITA confirmed that the composting operation has not released “dust and / or particulate matter resulting from the activity” to cause nuisance complaints, “at any dust sensitive place”. GELITA maintains extensive open “buffer” areas between the composting operation and the boundaries of the licensed place. Dust monitoring is a “complaints-driven” requirement, which has not been initiated to date.
B4 – In-Compliance – GELITA has made only limited, informal, trial compost deliveries off-site to date, on a non-commercial basis and is aware of vehicle load GED requirements, viz; load covers, load watering – dust suppression as appropriate, tailgate security, loss of material from vehicle superstructure.
B5 – In-Compliance – GELITA has procedures in place to ensure vehicle tailgates are effectively secured prior to leaving both the material loading and unloading points.
B6 – In-Compliance – GELITA has procedures in place to ensure vehicle compost loads leaving from and raw material loads arriving at the Company site are covered and maintained in place after loading at the respective departure points, prior to travel on public roadways.
Schedule C – Water:
C1 – In-Compliance – GELITA has physical measures in place to collect and direct any leachate or stormwater runoff from the composting operation via sediment basins to a “catch dam” located below the composting activity areas. Any accumulated material is pumped to the Aerobic Pond of the effluent treatment system for processing.
C2 – In-Compliance – GELITA has in place formed perimeter collection swale drainage, which directs any stormwater runoff from the composting site via a detention basin, overtopping to a dedicated “catch dam” located below the composting activity area, from where any accumulated material is pumped to the effluent treatment Aerobic Pond for processing.
C3 – In-Compliance – GELITA has in place formal drainage structures which collect any leachate and stormwater runoff, which may have contacted compost or raw waste materials within the activity area, then such material is directed, via detention basins, that overtop to a dedicated “catch dam”, located below the activity area, from where any accumulated material is pumped to the effluent treatment Aerobic Pond for processing.
C4 – In-Compliance – GELITA has in place drainage and storage infrastructure to allow the processing of all leachate and contaminated stormwater collected from the mixing pad of the waste composting facility, through the effluent treatment Aerobic Pond system.
C5 – In-Compliance – GELITA maintains stormwater diversion measures, which direct any overland surface waters away from the designated waste composting facility to adjacent grazing grasslands.
C6 – In-Compliance – GELITA maintains a dedicated, concreted vehicle / equipment washing area adjacent to the Belt Press Shed, which drains to the effluent treatment system. A new dedicated vehicle washing facility, discharging to the effluent treatment plant, is planned for completion in 2006.
C7 – In-Compliance – GELITA employs dry cleaning procedures to control waste and compost spillages within the defined composting preparation and raw waste storage areas.
C8 – In-Compliance – GELITA maintains regular inspection procedures to ensure the integrity of the recently asphalt-sealed compost manufacturing area and raw materials holding pads, together with physical checks of the effectiveness of both the perimeter runoff collection drainage system and the formal overland drainage swale to the accumulation “catch dam”. Stormwater diversion banks/bunds are also inspected and maintained as necessary.
C9 – In-Compliance – GELITA has procedures in place to ensure loading / unloading of bulk materials (wastes / compost) only takes place within the designated, purpose-built waste composting facility.
C10 – In-Compliance – GELITA maintains regular inspection procedures to ensure the effectiveness of perimeter bunding / diversion / drainage measures in place surrounding the asphalt-sealed composting preparation area and raw dry waste storage clay-based pads.
Schedule D – Noise:
D1 – In-Compliance – GELITA confirmed that the composting operation has not resulted in any nuisance noise complaints being received by the Company, since the operation commenced around three (3) years ago.

SECTION: Compliance Audit : Agency Interest: SR0007DA & Site Review : Non-compliant ✕

D2, D3 – In-Compliance – “Complaints-driven” Noise Conditions – As GELITA has not received any nuisance noise complaints concerning the composting operation since commencement, these conditions requirements have not been activated, to date.

D4 – In-Compliance – GELITA supports and maintains the heavy vehicle entry and / or departure curfew (prescribed by Conditions included in SR0722) in regard to the composting operation on site.

Schedule E – Waste:

E1 – In-Compliance – GELITA confirmed that the waste materials documented in this condition, together with “paper-ash”, are used in the composting operation on site.

E2 – In-Compliance – GELITA confirmed that all wastes / raw materials usage records are maintained and reported to the EPA as prescribed by this Condition.

E3, E4 – In-Compliance – GELITA confirmed that the Company undertakes waste tracking procedures with only EPA licensed transport operators and licensed beneficial biosolids treatment/reuse facility operators [Moreshost Pty Ltd – SR1406 / ERA 53 & SR2588 / ERA 83(b)(i)].

Schedule F – Land:

F1 – In-Compliance – GELITA has an asphalt-sealed operating area / pad, perimeter formal drainage structures to collect any leachate and stormwater runoff, which may have contacted compost or raw waste materials within the activity area, directing runoff to sediment basins and a “catch dam”, where accumulated material is pump returned to the effluent treatment system Aerobic Pond for processing. GELITA also maintains stormwater diversion measures, which direct any overland surface waters away from the designated waste composting facility to adjacent grazing grasslands.

F2 – In-Compliance – GELITA is aware of the need to embrace GED considerations in the application / incorporation of composted material to on site land for soil conditioning or fertilising purposes.

Schedule G – Community:

G1 – In-Compliance – GELITA maintains a complaints response process, which fulfils all requirements prescribed by this Condition. Reporting outcomes of complaints investigations to the EPA is standard practice for the Company. At the formal site audit completed on 18/10/2005, GELITA indicated that during the 2004/2005 audit period four (4) odour complaints were received, investigated and reported to the EPA. The Company confirmed that none of the odour complaints were attributable to the on site composting operation.

G2 – In-Compliance – GELITA consults with a local community environmental liaison committee (Community Consultative Committee) on a quarterly to six monthly basis regarding complaints received, site environmental performance reviews and any other environmental / general business issues. An example copy of Minutes of a Community Consultative Committee (CCC) Meeting held during 2004 was provided to the EPA, where on-site project matters were discussed (Attached). During the formal site audit completed on 18/10/2005, Cameron Smeal indicated that difficulty was being experienced by Company Management to have participants attend CCC meetings, due to a general satisfaction with the Company’s ongoing performance.

G3, G4 – In-Compliance – GELITA maintains a complaints records database which addresses the requirements prescribed by these Conditions (Sighted).

G5, G6 – In-Compliance – GELITA maintains an incidents records database, which addresses the requirements prescribed by these Conditions (Sighted).

G7, G8, G9, G10 – In-Compliance – GELITA has a process in place to manage the investigation, corrective actions implementation, monitoring and written reporting of emergencies and incidents to the EPA, taking account of requirements and timelines prescribed by these Conditions

G11 – In-Compliance – GELITA consistently provides to the EPA, all monitoring results, specialist consultant reports and complaints resolution information, with each Company “Annual Return” submitted to the administering authority.

SECTION: Compliance Audit : **Agency Interest:** SR0007DA & Site Review : **Non-compliant** ✖

Schedule H – Definitions: NO COMMENT REQUIRED.

Schedule I – Maps / Plans: THERE ARE NO ATTACHMENTS TO THIS SCHEDULE.

REQUIRED ACTIONS: NIL

Licence Conditions Module:

Condition Number(s)	Details of non-compliance
<u>NIL</u>	<u>NIL</u>

RECOMMENDATION:

NO RECOMMENDATIONS ARE OFFERED, AS CONDITIONS CURRENTLY INCLUDED IN SR0007DA ARE CONSIDERED ADEQUATE TO ENSURE SUSTAINABILITY OF THE WASTE-BASED COMPOST MANUFACTURING ACTIVITY CARRIED OUT ON SITE AND TO SAFEGUARD THE ENVIRONMENTAL INTEGRITY OF THE SURROUNDING SENSITIVE RECEPTORS, viz: adjacent land & any runoff to the nearby Logan River.

Signoff Sheet:

Additional Comments:

NIL

Recommendation:

NIL

Adoption of Report:

This report accurately represents the issues and outcomes of this site inspection and review of SR1114 & SR0007DA.

Adoption of Report:

Inspecting officer

sch4p4(6) Personal in

Don Shackel

7/11/2005

Don Shackel

Signed

Date

Inspecting officer

-

-

N/A

Signed

Date

Comments and Recommendation:

sch4p4(6) Personal in

D. Carey

7/11/2005

Supervisor

Doug Carey

Signed

Date



Photograph 1 – Expansive view of some of the farm irrigated treated wastewater disposal areas including recently established agro-forestry plantations (centre skyline), Rye/Kikuyu Grass paddocks (centre left) and Vetiver Grass planting area (centre right). See also "blown-up" photographs (Attached).



Photograph 2 – Treated wastewater irrigated Kikuyu Grass "shell" on the slopes of "Sunny Hill" showing early summer growth response.



Photograph 3 – One of a number of stormwater/irrigation runoff "catch" dams located on the river "flats" adjacent to the protective contour bank flanking the Logan River (right).



Photograph 4 – Larger "catch" dam of two (2) detention basins (first series dam with rock wall support is on hill above foreground unit) which serve as "first-flush" collectors for the concrete surrounds to the gelatine processing plant (centre skyline). Accumulated material is pump returned to the Aerobic effluent treatment Pond for processing.



Photograph 5 – Treated wastewater irrigated grazing paddocks below the composting area (centre skyline) running down to the Logan River.



Photograph 6 – Second view of the series pair of "catch" dams which serve as "first-flush" accumulation/holding ponds for drainage from the formed concreted/roadway processing plant surrounds, prior to reprocessing through the Aerobic effluent treatment Pond.



Photograph 7 – View of a section of the continuous, tree-planted stabilised contour bank and "spoon" drain system, which flanks the entire property boundary along the Logan River, providing prescribed irrigation buffer distances from the River.



Photograph 8 – Covered and uncovered waste composting windrows set out on the asphalt sealed and drained mixing/maturing pad.



Photograph 9 – Composting raw materials bulk storage area adjacent to the sealed compost mixing/maturing pad, which includes; sawdust, paper-ash, belt-press sludge and mulched green waste stockpiles.



Photograph 10 – Second view of covered and uncovered composting windrows showing the extent of the asphalt sealed mixing/maturing pad.



Photograph 11 – Boiler ash bulk storage area below the composting pad (centre left) showing well-established Vetiver Grass bank stabilisation plantings.



Photograph 12 – Recently constructed bulk hides raw materials storage shed, which has allowed total salted hides storage on site at Josephville, resulting in vacating of the previously long-term rental premises at Redbank.



Photograph 13 – Effects of slow brine seepage from stockpiled salted hide material, through floor/wall junction, sealing of which is to be addressed during the 2005/2006 plant shutdown period.



Photograph 14 – View indicating the integrity of a large exposed bund wall servicing a number of separate bays with dedicated liquid storage tanks.



Photograph 15 – A strategically wall-located spill kit containing a gully trap-sealing mat positioned adjacent to the bunded installation shown in Photograph 14.



Photograph 16 – On the day of the formal site inspection, the gelatine processing plant was temporarily shutdown to allow cleaning of ash from the Finafire Boiler Baghouse and replacement of the filter bag set.



Photograph 17 – New above-ground diesel fuel (farm tractors, mechanical bucket fuel servicing) storage tank containment bund.



Photograph 18 – The Hybractor effluent treatment plant foul gas "Ferric" Biofilter unit showing new media fill, replaced on 13-14/10/2005. Only minor local fugitive odour was noted in the immediate surrounds to this installation and the adjacent supply fan.



Photograph 19 – Aerobic effluent treatment Pond showing a typically desirable caramel/light chocolate brown colour, together with a very low odour profile noted on the bank of the pond during the site inspection. More effective air mixing/incorporation into the pond contents by way of (6) new Stem-Drive Units has contributed to the real improvements noted in pond operational "health".



Photograph 20 – The treated wastewater overtopping the Clarifier Tank weir to the transfer trough to the Balancing Storage Dam was noted to be essentially translucent, light brown in colour and demonstrating a minor odour profile.



Photograph 21 – Temporary "mini make-shift" Biofilter arrangement is in place as an effective, short-term odour control measure for a slow odorous leak from the Primary Digester Unit, until repairs requiring a major plant shutdown can be effected.



Photograph 22 – Overhead view of the Aerobic effluent treatment Pond showing the desirable caramel/light chocolate brown colour of the "healthy" pond contents.



Photograph 23 – Biological digestion tanks for the acid and alkaline sludges emanating from the hides/facepieces cleaning tanks, prior to gelatine extraction operations.



Photograph 24 – Project trial plot recently established on site to assess the potential for Vetiver Grass to remove/take-up Atrazine pre-emergence weed treatment herbicide residues from Logan River "flats" soils.



Photograph 25 – Early summer growth response of Kikuyu / Rye Grass mixed pasture paddocks on the alluvial deep sandy loams of the Logan River "flats" on site.



Photograph 26 – While winter Rye Grass is making slow return growth following grazing, Kikuyu Grass growth has responded to ideal early summer rainfall/temperature conditions with significantly increased dry matter yields boosted by treated wastewater irrigation.



Photograph 27 – View of part of one of the agro-forestry multi-species tree-planting plantations on the Walloon soils adjacent to the Interstate Railway corridor, established during 2005. See also "blown-up" photographs (Attached).



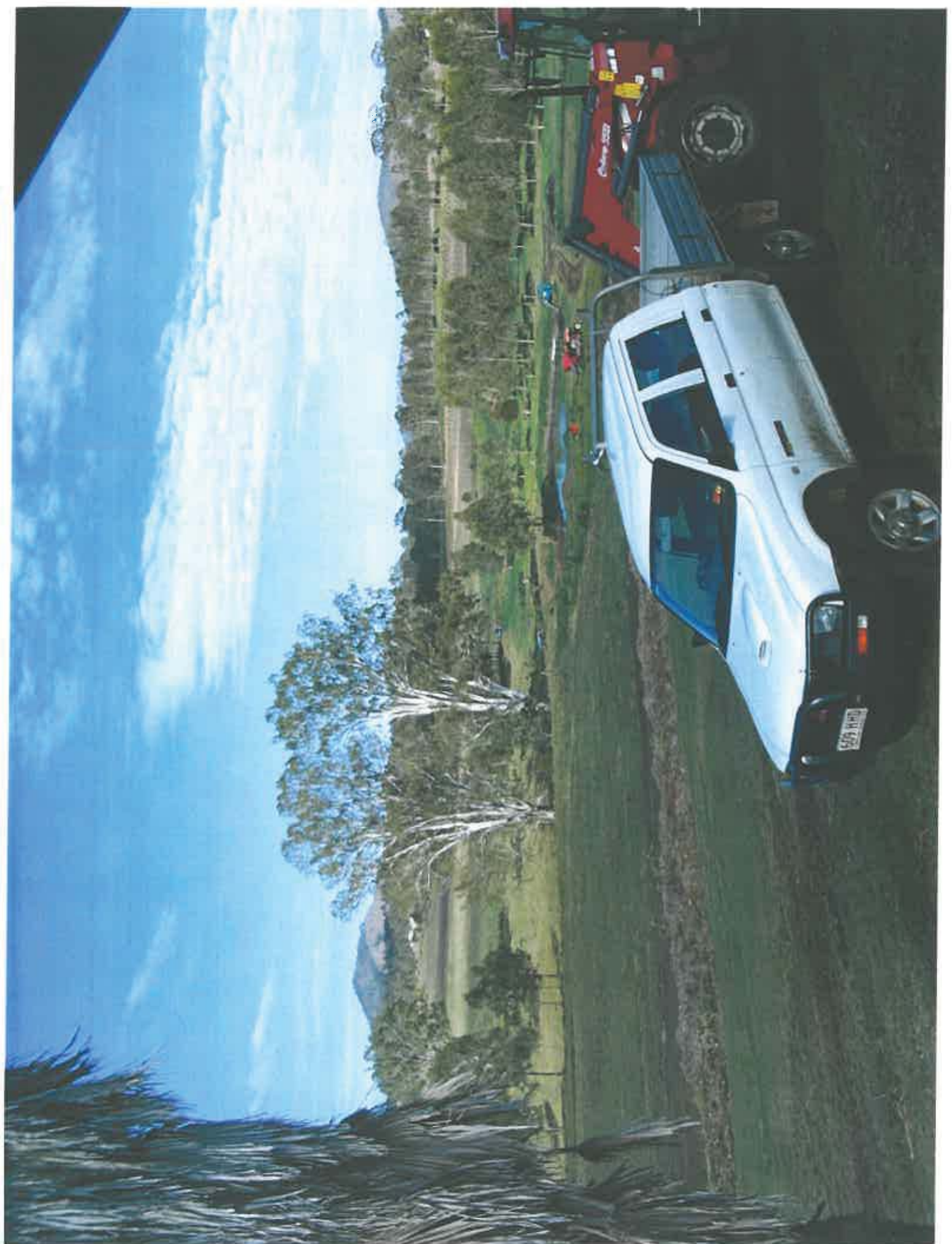
Photograph 28 – Expansive view of part of the agro-forestry multi-species tree establishment plantations on the Walloon soils, adjacent to the Interstate Railway corridor, looking towards the gelatine processing plant (centre) and "Sunny Hill" (left skyline) towards the eastern side of the property. See also "blown-up" photographs (Attached).

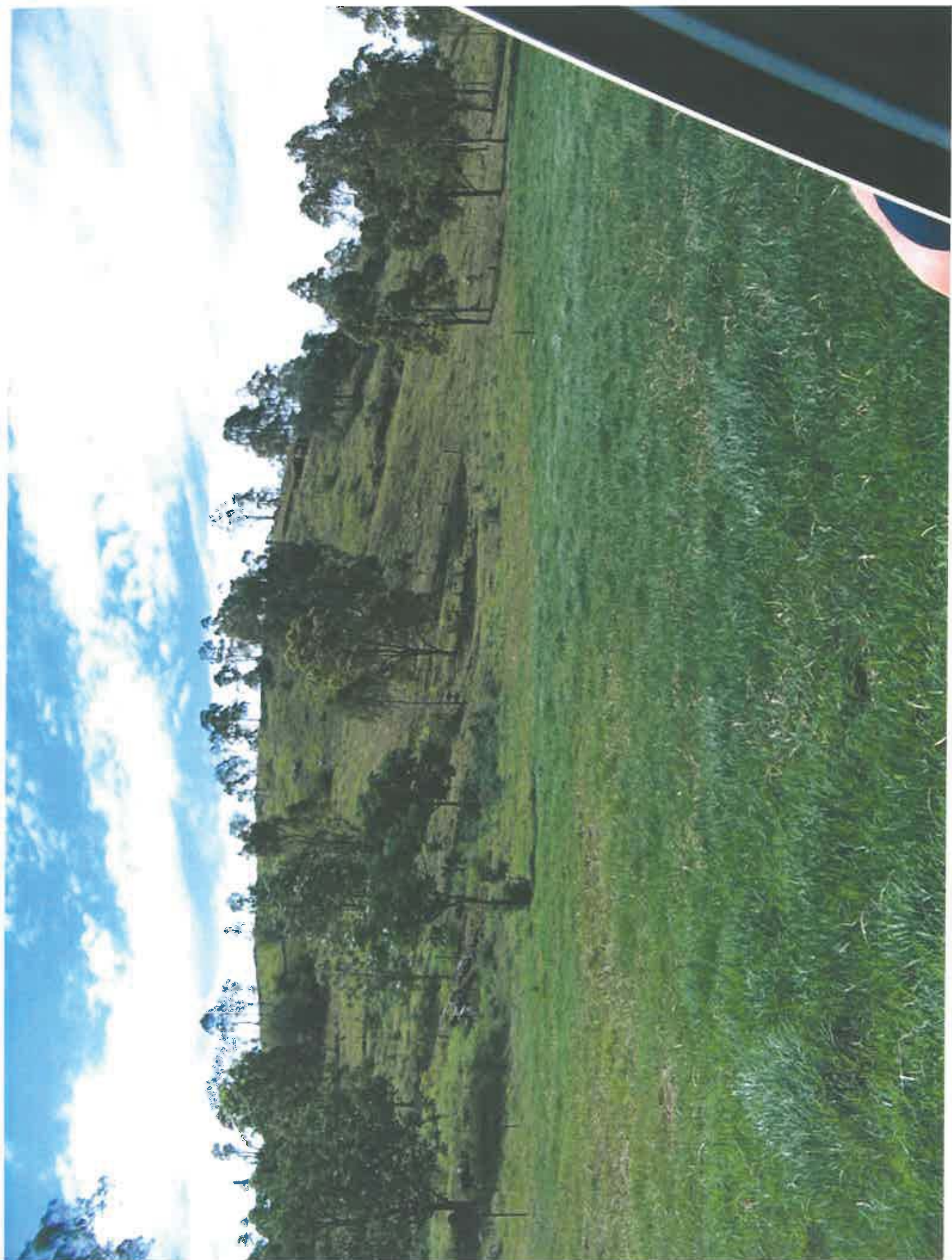


Photograph 29 – Expansive view of part of the agro-forestry multi-species tree planting plantations on the Walloon soils (foreground), adjacent to the Interstate Railway corridor, looking towards the gelatine processing plant (centre right) and the basaltic outcrop of "Sunny Hill" towards the north-eastern corner of the property. See also "blown-up" photographs (Attached).



Photograph 30 – Close-up of vigorous growth of Spotted Gum species within one of the agro-forestry multi-species tree establishment plantations on the Walloon soils, adjacent to the Interstate Railway corridor. The appropriate multi-species groups planted include; eucalypts, casuarina, pine and wattle representatives. See also "blown-up" photographs (Attached).





























































GELITA AUSTRALIA Farm Management Progress Report: October 2005

INTRODUCTION

As a condition of the current license conditions, the environmental management plan includes land application of effluent for plant production and the ability of the system to maintain a level of soil and groundwater nitrogen, salinity and sodicity within specified limits based on individual soil properties and their potential for sustainable management for plant production..

This report is a progress report following from the 2004 Farm Management Annual audit. The final report for 2005 will be submitted by 31 January 2006.

SOIL/EFFLUENT MONITORING

Monitoring of soil and effluent is being undertaken as a means of assessing the best practice management program and the parameters are used to devise suitable irrigation schedule strategies.

Schedule H Table 3 in **ATTACHMENT A** is a summary of the parameters which are being determined for objective assessment of soil and effluent.

Baseline soil sampling to 1.5 metre depth at known sites within soil units will be repeated according to schedule on an annual basis later this year to monitor movement of "salts" and nitrogen through soil profiles. Solution for analysis drawn from FullStop wetting front detectors at 10 and 50 cm for irrigation scheduling and from Longstop wetting front detectors at depths of 1 metre for soil solution extracts have EC values ranging from 3.67 to 6.99 ds/m. Given the absence of substantial (average) rainfall during the past five months, these data show that the current management practises are deemed to be within the compliance range.

IRRIGATION SCHEDULING PROCEDURE

Management of the water balance is the key to the sustainable disposal of the effluent. Irrigation is to be applied to meet plant demand for water and to remove nutrients from soil solution into the plant biomass and to meet the leaching requirement of the soil to remove excess salts to the levels specified above.

Initial estimates of water and nutrient uptake of the proposed Vetiver/ryegrass sward are based on the Medli model (Vieritz 2003). This work reported that minimizing inherent nitrogen levels to 100mg/ kg would reduce the leaching of nitrogen to acceptable levels below the root zone. This would entail growing the vetiver without effluent irrigation to enable the grass to 'mine' the soil nitrogen out of the soil. This would entail cutting and carting the vetiver grass off the soil areas. This practice will be incorporated into the overall management during the establishment phase of the revised program.

Irrigation management to sustain salt levels was found to be exceeded with chloride levels greater than 600 mg/kg. This was exacerbated by the absence of rain for extended periods the extent of which was not anticipated in the initial proposals. Remedial action was taken by shandyng the effluent with bore water.

Since then cleaner production trials have resulted in the use of potassium hydroxide instead of ammonia solution as an alkaline solution used in the ion exchange resin which will reduce the amount of ammonia nitrogen in the effluent. Also potassium chloride is being substituted for sodium chloride in the water softening process which will reduce the sodium concentration in the effluent. Further sampling and monitoring will be undertaken to measure the reduced levels of sodium and ammonia nitrogen in the soil.

The soils mapped at the soil series level (see map below) was deliberate to provide areas of soils with like properties and their use for plant production which can be deemed management units. The operational feasibility of the irrigation schedule is based on management decisions made on past experience of these soils' responses to effluent irrigation. Management constraints due to finite staff and equipment have also been recognized and the areas designated for irrigated plant production are stated in the following Table 2.

The program of rotation of irrigation runs proposed by Hydroplan have been used in part in the first instance of the revised plan. However application rates based on University of Queensland data require confirmation. The infiltration and hydraulic conductivity values which are critical in determining application rates will be rerun on the same sites using a Guelph permeameter which will simultaneously determine field saturated hydraulic conductivity, matric flux potential and soil sorptivity in the field.

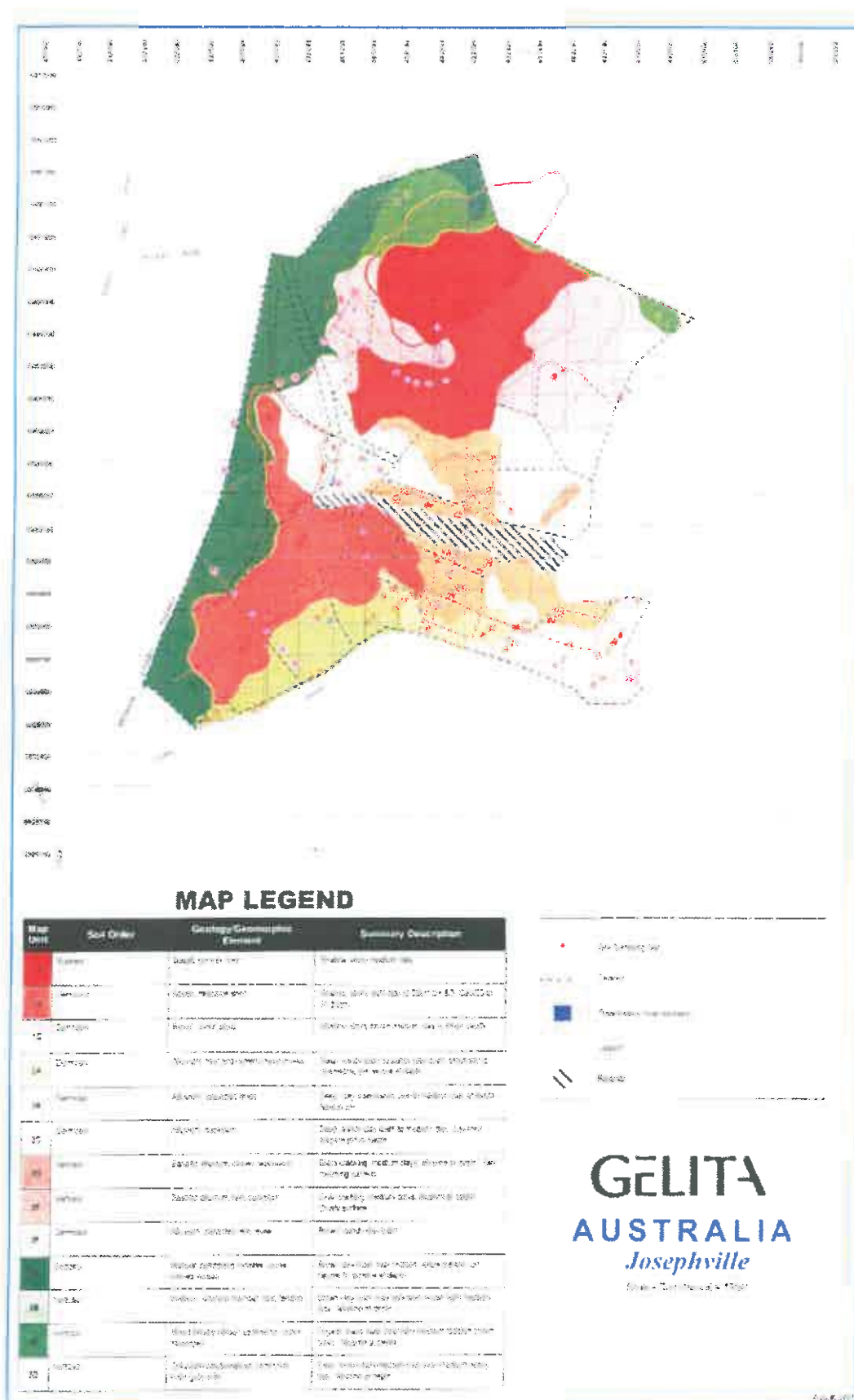
Five benchmark sites will be monitored on a regular basis to measure changes which could result in modification of the initial recommended rates of application. Unknown factors of water requirements of selected trees used in the agroforestry soils area of sodosols (3a soil map unit) and the proposed vetiver pasture areas will require at the most, monthly measurements in relation to climatic variables in the first year. Thereafter annual measurements may be sufficient as recommended in the EPA submission. In combination with the effluent distribution, use of bore water will be necessary to achieve a satisfactory leaching fraction.

On a 12 month basis the average electrical conductivity of the effluent and bore water applied should not be higher than 7 ds/m which will require up to additional 15% (initial reports by RPS and QDPI recommended 12% and 13% respectively) in excess of plant requirement to meet a leaching requirement to sustain soil EC levels as proposed. This will necessitate increasing the water from bores allocated to irrigation by about 80 megalitres per annum. These estimates are based on average annual rainfall of 875 mm and limiting the leaching effect of rainfall resulting in the salts being retained below the root zone in the soil profile in the dermosols soils map units 2a,2b, and 2c and vertosols soil map units 2d,2e, and 3b.

Soil Units and Proposed Use

Soil Order	Description	Soil Unit	Proposed irrigation treatment
Rudwood	Basalt, cinders crest. Shallow stony medium clay. Non-irrigation zone.	1a	This area is not suited to any irrigation. Not monitored.
Durwood	Basalt, cinders crest. Shallow stony light clay pH 8.5 at depth. Irrigation zone.	1b	This area has been subject to irrigation in the past and future efficient irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Durwood	Basalt lower slope. Shallow stony brown medium clay. Irrigation zone.	1c	This area has been subject to irrigation in the past and future efficient irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Durwood	Alfisolite, soft, and porous forest. Deep sandy loam, pH neutral at depth.	2a	This area exhibits higher hydraulic conductivity and will be progressively planted to reflect and receive more efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Durwood	Alfisolite dissected forest. Deep, crumbly loam, pH neutral. Irrigation zone.	2b	This area exhibits higher hydraulic conductivity and will be progressively planted to reflect and receive more efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Durwood	Alfisolite, basaltic. Deep forest. Sandy clay loam. Alkaline pH at depth. Irrigation zone.	2c	This area exhibits higher hydraulic conductivity and will be progressively planted to reflect and receive more efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Wardwood	Basaltic alfisolite, shallow depression. Black cracking clay. Alkaline. Irrigation zone.	3a	This area will be progressively planted to reflect and receive efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Wardwood	Basaltic, crumbly, fine medium. Dark flaking medium clay. Alkaline. Irrigation zone.	3b	This area will be subject to drainage channels and the will be planted to receive more efficient irrigation as the plan is implemented. Over time the area will be excluded from efficient irrigation. Intensive monitoring as per table 3 required.
Durwood	Alfisolite dissected hill lower. Brown sandy clay loam. Irrigation zone.	2d	This area exhibits higher hydraulic conductivity and will be progressively planted to reflect and receive more efficient irrigation as the plan is implemented. Characteristics of this perimeter are typical of the other Durwood areas. This soil type limited in area. Intensive monitoring as per table 3 not required.
Wardwood	Washed alfisolite, soft forest. Upper sandy clay loam. Brown clay loam. Another yellow subsoil, oxidized to yellow. Irrigation zone.	3c	This area will be subject to irrigation systems and the soil treated. It will receive more efficient irrigation as the plan is implemented. Over time the area will be phased out from efficient irrigation. Intensive monitoring as per table 3 required.
Wardwood	Washed alfisolite, soft forest. Brown clay loam. Yellow-brown clay. Alkaline. Irrigation zone.	3d	This area will be phased out from efficient irrigation and receive more efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Wardwood	Mixed basalt/Wallace sediments. Organic black over red brown clay, alkaline.	3e	This area is not suited to any irrigation. Not monitored.
Wardwood	Continued basalt/Wallace sediments. Red gully soils. Brown clay, organic.	3d	This area is not suited for efficient irrigation. It will continue to receive more efficient irrigation as the plan is implemented. Over time the area will be totally excluded from efficient irrigation.

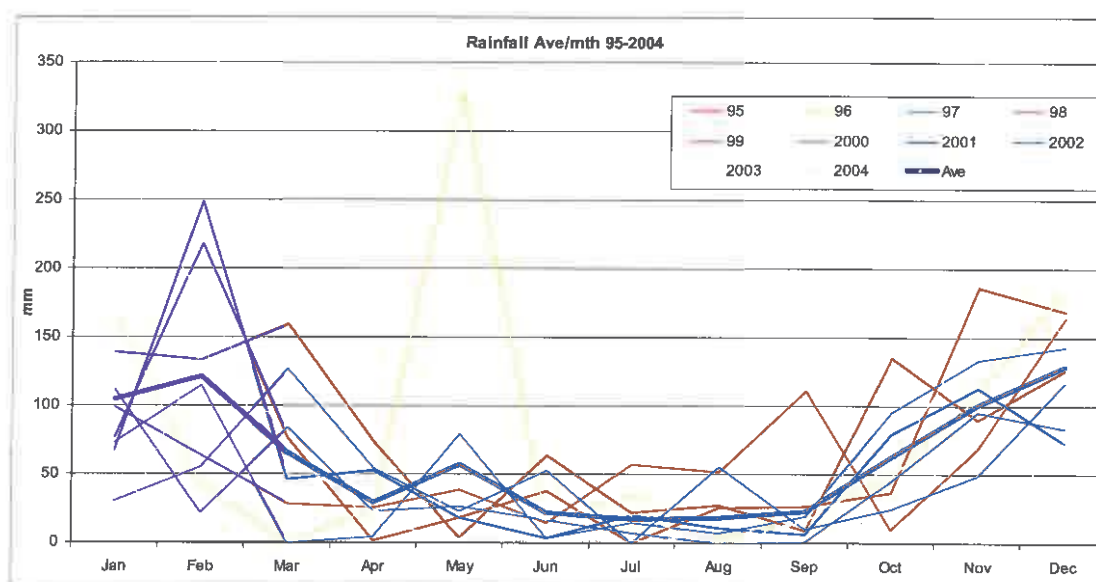
Soil map with hydrants and fence-lines.



On the other hand, in the event of excess rainfall causing leaching salts and nitrate into the aquifer there is no evidence that this will transmit to the Logan river. Limited evidence points to the reverse in that the river water recharges the aquifer and water that is constantly released upstream for domestic supply has been regularly tested for salt levels. There is no evidence to indicate that any salt is transmitted into the river by any means from irrigation practices on the Gelita farmlands during the past ten years.

A worst case scenario of below average rainfall say 450 mm will require additional bore water if the irrigated area remains constant. In these circumstances given that the amount of bore water is limited, the leaching requirement may be met by irrigating a smaller area and concentrating on the dermosols (map units, 2a,2b,2c). Thus the variable in the water balance is the volume of bore water applied. This needs to be handled in relation to effluent feed rate and rainfall incidence and amount.

The rainfall data below is for a neighbouring property and indicates the variability of rainfall in the area.



These data show the importance of varying the irrigation regime according to effluent conductivity and plant water use.

Uptake of nutrients, especially nitrogen will also be monitored to establish the utilization by plants and to determine the amounts leached past the root zone.

Of concern is the logistics used to irrigate the farm. Current practice includes farm staff on shifts whom are responsible for moving the traveling irrigators in a program which is not based on soil/plant water deficit but rather to provide an even distribution of effluent over the designated irrigation areas according in part to the Hydroplan program. Records of volumes of effluent distributed are recorded each time the irrigator(s) are operated together with an approximate location of the irrigators in question.

Whilst this method of management has been adequate for the level of management based on cattle grazing it will not be suitable for meeting the guidelines outlined above which include focusing effluent reuse on whole year irrigated vetiver/ryegrass grass production which is designed to utilize water and nutrients (especially nitrogen) for export from the site and utilized as a green stream in the composting of biosolids resulting from gelatine production.

Furthermore the basis for the license conditions is based on soil properties and the limits deemed as suitable for sustainable production. Consequently the method of effluent application needs to be more precise to give credibility to the soil monitoring program proposed. This will entail a change in management which can be achieved by installation of a centre pivot irrigator on the area of soils designated 2b, 2c shown on map above. Most of the effluent is calculated as being utilized by approximately 12 hectares of vetiver which can be accommodated on these areas of soils located on the southwestern portion of the farm. The soils selected have a permeability sufficient to achieve the proposed leaching fraction of 15 %.. Export of nutrients extracted by the vetiver and rye grass derived from the effluent will minimize the input of salts into the aquifers underlying these soils.

Automation by computer and operation by the Environmental Manager will provide reliable irrigation scheduling based on plant water requirements including a satisfactory leaching fraction to meet guidelines. In addition this new operation will relieve farm staff of irrigation duties and free them to undertake management tasks associated with the production and harvesting of the vetiver- ryegrass production and other management tasks required on remaining areas of the farm.

GROUND WATER MONITORING

Piesometers damaged by cattle and machinery have been refurbished. Measurement of groundwater has been conducted and it has been found that shallow piesometers (less than 6 metres deep are continuously dry. A conclusion has been reached that the supposition of a shallow aquifer is incorrect as the shallow piesometers have never yielded any water. Consequently it is proposed that groundwater monitoring is confined to the deep aquifers (greater than 10 metres deep). Purging to remove contaminants has been found to be necessary and the data collected cannot be assumed to truly represent the status of the underground waters. Further work should be completed for the annual audit report due in 31 January 2006.

AGROFORESTRY

The agroforestry enterprise was established in May. The tree growth has been satisfactory given the below average rainfall. The following plates show the growth of the trees that has occurred from tube stock in five months





SOIL MANAGEMENT ISSUES

The soil unit 2e has been found to be poorly drained and preliminary analyses found that continuing effluent irrigation would have a deleterious effect by virtue of salt and nitrogen accumulation in the upper metre of the soil profile. Consequently the area has been precluded from irrigation with effluent and a scheme to install lateral drains to accentuate drainage and discharging into evaporation ponds is proposed. Installation will depend on summer rainfall incidence that will correct the salt imbalance which currently is still within compliance limits. Reduced irrigation practice by the agroforestry area on the sodosol soils (soil unit 3a) above this area will reduce the incidence of lateral salt movement down-slope onto the 2e unit.

The frequency of irrigation of the agroforestry area upslope will be contiguous with the future management of the 2e soil unit.

REFERENCES

Vieritz, Alison. 2003 "Medli Analysis of Using Vetiver for Effluent Irrigation at Gelita Planrt Beaudesert, Queensland"
Department of Natural Resources, Indooroopilly, Qld.

Signed: B.M. Schafer

October 2005

ATTACHMENT A

GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report

October 2004

INTRODUCTION

The current licence conditions include monitoring of soil and effluent to complement a best practice management program. The following statements are taken from the EMP submission to the EPA made in November 2003.

“The parameters to be monitored and the frequency of monitoring in the Contaminant release Area Monitoring Program shall be in accordance with the parameters and monitoring frequency prescribed in schedule H Table 3.

Schedule H Table 3

Element	Sites	Method	Frequency
Soil Salinity	Within soil units 2a, 2b, 2c, 2d, 2e, 3a, 3b,	Soil sampling and analysis for pH (1:5), EC sat, Cl, NO ₃ , SO ₄ , effective CEC, exchangeable Ca, Mg, Na,	annual
Soil infiltration and hydraulic conductivity	Within soil units, 2a, 3b, 2e	Field instrumentation	annual
Nutrient Status	As Above	Soil Sampling and analysis for Total N, NO ₃ -N, NH ₄ -N, Acid extractable P	bi-annual
Groundwater	Relevant bores with water table within soil units listed above	Tape measurement and EC. Water laboratory analysis	bi-annual
Effluent	Pump out pond outlet	Water laboratory analysis,	monthly

The existing licence conditions include soil and water monitoring requirements. The schedules above are proposed as a continuation of the original conditions and have been extended to meet the requirements of the EMP. *The combined table above is based on the following detailed schedules of monitoring and irrigation response as detailed below.*

Soil infiltration and hydraulic conductivity

Soil Map units for monitoring. 2a, 2b, 2c, 2d, 2e, 3a, 3b, 3d	Sampling Methods	Acceptable Range	Irrigation Response	Testing Frequency
Infiltration and hydraulic conductivity	FullStop Monitor time for distribution of measured amount of applied effluent of SAR 12 mmol/L ^{0.5} through soil to 50cm depth at saturation using constant head infiltrometer.	20 mm/ hour at SAR 12 mmol/L ^{0.5} on dermosols, Soil Map Unit 2a , 2b, 2c 1mm/ hour at SAR 12 mmol/L ^{0.5} on vertosols/sodosols Soil MapUnits 2d, 2e, 3b, 3d, 3a	Irrigate to 50% soil water deficit based on Fullstop indicators placed at 10cm and 50 cm depths.	Annual

Nutrient Status

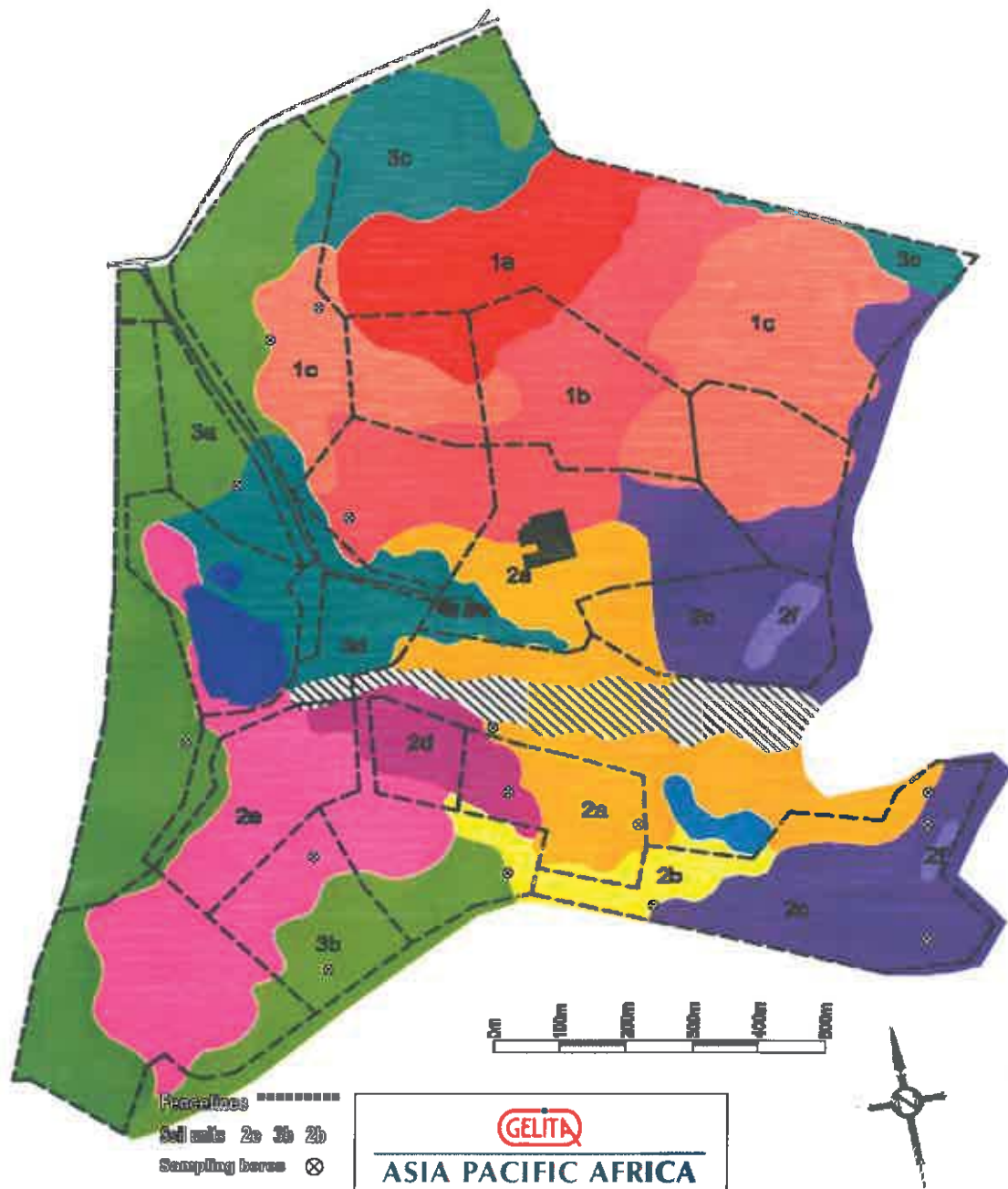
Soil Salinity

Soil units 2a, 2b, 2c, 2d, 3a, 3b, 3d	Soil solution sampling via FullStop Soil core sampling depth 0-120cm.	Acceptable Range at 10cm depth	Acceptable Range at 50cm depth	Acceptable Range at 120cm depth	Irrigation response	Testing Frequency
pH	(1:5) solution soil extract	4.5-7.0	5.5-7.5	6.0-8.5	pH <5.0 add lime/compost. Field pH test response. pH >8.0 stop lime dosing. Flush neutral pH water.	Annual
ESP (% calculated from sodium and cation exchange capacity)	soil	10	15	20	Flush bore water	Annual
SAR (Calculated from calculated from soil solution cations: Ca ⁺⁺ , Mg ⁺⁺ Na ⁺)	solution	15	20	40	Flush bore water	Annual
EC _{sat} (dS/m)	solution	3	4	5	EC >5 on clay flushing water/shandy	Annual
Cl ⁻	solution	0-150 mg/kg	0-450 mg/kg	0-600+ mg/kg	Flushing water/shandy	Annual
NO ₃ ⁺	solution /soil	120mg/kg	100mg/kg	20mg/kg (soil sample)	NO ₃ > 100mg/kg at 50 cm irrigate only flushing water. Monitor to depth 150cm Increase pH irrigation water.	Annual
Total sulphate sulphur	Solution- (includes gypsum precipitate)	4000mg/l	5000mg/l	6000 mg/kg (soil sample)	Calcium amendment	Annual

Nutrient	Acceptable Range for Soil Map Units at 10 cm Depth						
	2a	2b	2c	2d	2e	3a, 3d	3b
Total N (%)	0.1-0.25	0.1-0.25	0.1-0.3	0.2-0.5	0.2-0.5	0.2-0.4	0.2-0.5
NO ₃ -N (mg/Kg)	10-120	10-120	10-120	10-120	10-120	10-120	10-120
NH ₄ -N (mg/Kg)	20-450	20-450	20-450	20-450	20-450	20-450	20-450
Acid Extractable P (mg/Kg)	10-450	10-450	10-450	10-450	10-450	10-450	10-450
Bicarbonate Extractable P (mg/Kg)	10-100	10-100	10-100	10-100	10-100	10-100	10-100

The schedules above are proposed as a continuation of the original licence conditions and have been extended to meet the requirements of the EMP. Soil sampling shall be conducted to 1.5 metre depth across soil units on an annual basis to establish benchmarks and monitor movement of "salts" and nitrogen through soil profiles. Solution for analysis shall be drawn from FullStop wetting front detectors at 10 and

Soil Map units and sampling bore locations



Soil units for monitoring purposes are described in this table and presented in map format above. Fence lines and groundwater monitoring bores are also detailed on this map.

The bores listed for monitoring are detailed in the map above. Therefore Condition H33 should be expanded to include the additional bore monitoring sites proposed by GELITA.

The proposed Schedule H Table 3 does not seek any changes to the parameters within the current licence conditions regarding groundwater quality monitoring other than a reduced frequency from bi-monthly to bi-annual. Condition H34 c would require amendment to reflect this proposed change.

Groundwater monitoring parameters and reporting requirements are further proposed to constitute an integral aspect of the Annual Audit process. This process will comprise an analysis and interpretive report of the monitoring program by an

external consultant; and shall include an annual modeling exercise.. The MEDLI model will be a major predictive tool in long-term management of the site and shall form part of the annual reporting requirement.

GELITA will also continue to regularly monitor the following effluent quality characteristics for irrigation management purposes as required by our ISO 14001 procedures. The proposed changes to the licence are designed to achieve an outcome based reporting format and do not preclude the continuation of the GELITA waste-water monitoring program.

The following parameters are required for data input into the MEDLI model and shall continue to be collected and collated. All such records are maintained on-site indefinitely.

Irrigation Water Quality Monitoring

pH	EC	COD (mg/L)	TSS (mg/L)	BOD (mg/L)	TN (mg/L)	TDS (ppm)	NOx (mg/L)
----	----	------------	------------	------------	-----------	-----------	------------

The initial monitoring program recommended in the Environmental Impact Statement on soil and water monitoring (GHD, 1992) was implemented as policy in the Company (Leiner Davis Gelatin Australia) Environmental Management Plan, 1994.

The revised program of irrigation scheduling (Hydroplan report, September 2003) is aimed to sustain soil conditions for productive growth according to soil properties as determined in the Land Management Study Phase 1, Task A- Soil Sampling and Analysis as reported above.

To meet the requirements of the revised licence proposal more specific sampling will be required to monitor soil conditions according to soil and crop type. The sites for sampling will follow from this report and will be taken from similar locations for comparison over time.

Additional soil and ground water sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity will be monitored on an annual basis during the seven years following establishment of the vetiver/ryegrass production unit.

These data will be used to validate the predictive outcomes of the MEDLI program upon which the vetiver/ryegrass program is based. Corrective actions will be taken if values are deemed to be outside sustainable limits.

This will be effected by:

- a) modifying the leaching fraction and
- b) by reducing salt load in irrigation water by shandying with bore water and
- c) maintaining physical soil properties by mechanical intervention (eg ripping) and
- d) controlling nitrogen loads where necessary by chemical means.

These analyses will be used in conjunction with wastewater treatment data to assess compliance with the relevant licence conditions proposed in this submission. “

SAMPLING PROGRAM 2004

The sampling program to establish preliminary baseline data for the current monitoring program began on 29 January 2003. Samples were taken by hand auger to depth from sites within the mapped soil units which were located with GPS coordinates for future reference. Further sampling will be effected to meet the criteria of depth for future monitoring. The samples were submitted to the accredited analytical laboratory, Food and Agriculture Laboratories Australia for analysis. The data are presented in Table 1. below.

These preliminary data are within the acceptable ranges deemed for Soil Salinity and Nutrient Status for the specified soil map units (see Tables under Schedule H Table 3 above). Field instrumentation (FullStop Wetting Front Detectors) are yet to be installed and so soil infiltration and hydraulic conductivity data are not available at this stage.

Ground water analyses obtained from samples in September 2004 have been found to be in error. The piezometer boreholes installed in 1992 have variously deteriorated due to age. Later boreholes to replace some of these earlier boreholes in 2000 have also been damaged by farm operations and stock. Consequently some of the bores which are strategic to the new monitoring program are unserviceable. (see photographs attached).

The design of the piezometer above ground casing and caps is unsatisfactory because caps have been knocked off by cattle rubbing against them. This has resulted in the ingress of hair and effluent resulting in contamination of the ground water. This was observed in preliminary analyses even after standard purging and sampling procedures. Consequently the data was inconsistent and did not reflect the influence of management on groundwater conditions.

It is recommended that a refurbishment program is implemented to rectify the situation to allow for credible license compliance monitoring .

B.M.Schafer

October 2004





PROJECT TITLE

Remediation of Herbicide Contamination in Surface and Sub-Surface Water Using Vetiver Grass

Cameron Smeal* and Paul Truong**

**TVN and Veticon Consulting*

***Environmental Manager. Gelita APA, Beaudesert, Australia*

November 2005

PROJECT SUMMARY

Research literature has established that herbicides and pesticides have a deleterious effect on the aquatic flora and fauna ecosystem, particularly biodiversity. There is often serious ecological damage even when the levels of pollutant are not high enough to cause direct toxicity.

Research has shown that strips of grasses and/or shrubs are a cost-effective way of reducing sediment, nutrient, herbicide and pesticide movement while providing natural habitat renewal. Vegetative filter strips are widely used to reduce sediment, nutrients, and pesticides in run off water along riparian zone in farmlands.

Vetiver grass with its unique morphological and physiological attributes has been used extensively around the world for erosion and sediment control in farmlands, mine rehabilitation and wastewater treatment.

Recent research both in Australia and Switzerland has shown that vetiver grass is highly tolerant to elevated level of herbicides particularly Atrazine. In addition, these results also indicated that vetiver could sequester and breakdown Atrazine under both dry land and wetland conditions.

This project aims to use the existing well-established vetiver filter strips on farms to measure and evaluate its role in reducing herbicide and pesticide movement into the aquatic environment.

THE PROBLEM

Research has established that pesticides have a deleterious effect on the aquatic ecosystem, particularly biodiversity. There is often serious ecological damage even when the levels of pollutant are not high enough to cause direct toxicity. Nutrient loading from agriculture is not directly toxic to indigenous organisms; however it can produce excessive algal growth resulting in anoxia, hence aquatic ecosystem disturbances. Consequently, fisheries, marine culture, tourism, and recreation can suffer. The impact on water quality needs to be addressed to enhance a sustainable future for the major land users.

Both government and private sectors in Australia have been working with farmers to find possible models for vegetative filter strips, but to date no scientific monitoring has been carried out in this area.

A SOLUTION

This project will address these needs. Research has shown that strips of grasses and shrubs are a cost-effective way of reducing sediment, nutrient herbicide and pesticide movement while providing natural habitat renewal. Vegetative filter strips are widely used to reduce sediment, nutrients, and pesticides in run off water along riparian zone in farmlands.

They are commonly grasses, but can include trees and shrubs, particularly along waterways. Vetiver grass with its unique morphological and physiological attributes has been used extensively around the world for erosion and sediment control in farmlands, mine rehabilitation and wastewater treatment. But more specifically, research in Australia has shown that vetiver grass is not only highly tolerant to elevated levels of herbicides, particularly Atrazine, under wetland environment, vetiver could also been shown to reduce the level of Atrazine in the water.

Micro-organisms associated with the plant root zones (rhizosphere) are an important component in biologically recycling nutrients and degrading pesticides. Vetiver grass, with its enormous root system, can provide a very favourable habitat for these micro-organisms to develop and breaking down pesticides such as Atrazine.

Most recently research conducted at the Laboratory for Environmental Biotechnology, Swiss Federal Institute of Technology Lausanne, Switzerland, has confirmed the Australian results that Vetiver is highly tolerant to elevated Atrazine under the hydroponic system. The Swiss research also found that roots were able to hyper accumulate atrazine and Vetiver resistance toward atrazine was best explained by conjugation in the leaves and sequestration in the roots. Vetiver oil was also found to concentrate atrazine, with a comparable value of atrazine partition into octanol.

This project will demonstrate the benefits of vetiver grass filter strips on farms in Australia in reducing herbicide and pesticide movement into the aquatic environment.

EXPECTED OUTCOMES

- To demonstrate the benefits of vetiver grass filter strips on farms in reducing herbicide movement into the aquatic environment
- To improve water quality
- To be suitable for easy adoption by the farming community.
- To conduct community awareness workshop and field days
- To produce and promote model design and revegetation scheme for agricultural lands

Scorecard

THE POLLUTION INFORMATION SITE

e

ENVIRONMENTAL DEFENSE
finding the ways that work

Investigate Pollution Topics

TOXICS

- ▶ Toxic Chemical Releases
- ▶ Lead Hazards
- ▶ Superfund

AIR

- ▶ Smog and Particulates
- ▶ Hazardous Air Pollutants

WATER

- ▶ Clean Water Act
- ▶ Watershed Indicators

AGRICULTURE

- ▶ Animal Waste

ENVIRONMENTAL JUSTICE

- ▶ Community Center
- ▶ En Español

HEALTH HAZARDS

- ▶ Chemical Profiles
- ▶ Health Effects
- ▶ Regulations

ZIP TO YOUR COMMUNITY

SEARCH SCORECARD

CHEMICAL PROFILES | Chemical Profile

Chemical: ATRAZINE

CAS Number: 1912-24-9

Chemical Profile for ATRAZINE (CAS Number: 1912-24-9)

- [Human Health Hazards](#)
- [Hazard Rankings](#)
- [Chemical Use Profile](#)
- [Rank Chemicals by Reported Environmental Releases in the United States](#)
- [Regulatory Coverage](#)
- [Basic Testing to Identify Chemical Hazards](#)
- [Information Needed for Safety Assessment](#)
- [Links](#)

• [Human Health Hazards](#)

Health Hazard

Recognized: --

Suspected: [Carcinogen](#)

[Endocrine Toxicant](#)

[Gastrointestinal or Liver Toxicant](#)

[Immunotoxicant](#)

[Neurotoxicant](#)

[Reproductive Toxicant](#)

[Skin or Sense Organ Toxicant](#)

Reference(s)

[EPA-TRI NTP-BR OEHHA-TC SCDM](#)

[BKH GUIL IL-EPA JNHS KEJ WWF](#)

[RTECS](#)

[EEC](#)

[DAN](#)

[ATSDR JANK](#)

[EEC HAZMAP](#)

[top]

• [Hazard Rankings](#)

[More hazardous than most chemicals in 4 out of 14 ranking systems.](#)

[top]

- **Chemical Use Profile**

This is a high volume chemical with production exceeding 1 million pounds annually in the U.S.

No data on industrial use in Scorecard.

Used in consumer products, building materials or furnishings that contribute to indoor air pollution.

Used in pesticide products.

[top]

- **Rank Chemicals by Reported Environmental Releases in the United States**

For a list of the geographic areas, facilities, or industrial sectors which report the largest releases or transfers of this chemical to the Toxics Release Inventory, select what you want:

- Rank States
- Rank Counties
- Rank Zip Codes
- Rank Facilities
- Rank Industrial Sectors

[top]

- **Regulatory Coverage**

On at least 3 federal regulatory lists.

[top]

- **Basic Testing to Identify Chemical Hazards**

Eight basic tests to identify chemical hazards have been conducted and are publicly available for this chemical.

Track whether this chemical is being voluntarily tested to provide basic hazard data. Copy its CAS number above and check the HPV Chemical Tracker.

[top]

- **Information Needed for Safety Assessment**

Lacks at least some of the data required for safety assessment.

See risk assessment data for this chemical from U.S. EPA or Scorecard.

[top]

- **Links**

Other web sites specific to this chemical:

- Agency for Toxic Substances and Disease Registry Public Health Statement
- Agency for Toxic Substances and Disease Registry ToxFAQ
- Agency for Toxic Substances and Disease Registry Toxicological

Profile

- [EPA Integrated Risk Information System Report](#)
- [EPA Office of Ground Water and Drinking Water Contaminant Fact Sheet](#)
- [EXTOXNET Pesticide Information Profile](#)
- [IPCS International Chemical Safety Card](#)
- [International Toxicity Estimates for Risk \(ITER\) from Toxicology Excellence for Risk Assessment](#)
- [National Institute for Occupational Safety and Health Pocket Guide to Chemical Hazards](#)
- [New Jersey Fact Sheet](#)
- [USGS National Water Quality Assessment Annual Pesticide Use Map](#)

If none of these sources meet your needs, you can try searching some other chemical database [Web sites](#).

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• Notes

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Don Shackel

From: Cameron.Smeal@gelita.com
Sent: Friday, 28 October 2005 9:53 PM
To: Don Shackel
Subject: Fw: Atrazine



Atrazine Gelita.doc

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(See attached file: Atrazine Gelita.doc)

Use of Compost to Improve Soil Properties and Plant Growth in Saline and Sodic Soils

Johannes Biala, Judith Raue, Cameron Smeal, Brian Schafer, Peter Grace

Background

Soil salinity and sodicity represent major land degradation problems in Australia and many other countries. So far, the use of compost products for countering salinity / sodicity has not been widely investigated and employed.

After employing composting to process its gelatine by-products (12,000t/a), GELITA Australia has recognised the potential compost use has in countering salinity and acidification caused by irrigation with treated effluent. Consequently, GELITA initiated research to determine whether and to what extent the use of compost products can assist in renovating saline / sodic soils.

Material and Methods

A pot trial and two field trials were used for assessing the capacity of two composts to improve soil characteristics (vertisol) and plant growth (sorghum, vetiver, mixed pasture) at different application rates. The effect of irrigation with saline effluent was also assessed.

Results

Only pot trial results are available at present. However, field trial results will be part of the full paper and presentation.

High compost application rates (25% and 50%, v/v) lifted low pH values to levels that are favourable for most agricultural crops. However, increasing compost amendments resulted also in increasing salinity levels, with nutrient rich compost raising $EC_{1.5}$ values by up to 3.2 dS/m. Watering with effluent further increased salinity levels by between 0.7 and 1.4 dS/m. $EC_{1.5}$ levels in soil are classified as 'high' if >0.9 dS/m and 'very high' if >2.0 dS/m. Therefore, most growing media showed high or very high salinity levels.

The use of 10%, 25% and 50% (v/v) low-nutrient compost in soil with medium salinity increased sorghum yield by 39%, 63% and 85%, respectively. Nutrient-rich compost improved yields by 12% and 23% at the two lower application rates, while the highest rate reduced yield by 13%. Compost use resulted in significantly improved plant growth, even in extremely saline conditions ($EC_{1.5}$ 3.1 – 5.4 dS/m). Sorghum yields were identical in moderately saline (0.22 dS/m), un-amended soil and in highly saline soil ($EC_{1.5}$ 3.2 and 3.8 dS/m) that was amended with low-nutrient compost at levels of 25% and 50%.

Conclusions

Preliminary results obtained in pot trials demonstrate that compost use improves plant growth in saline soils. Benefits were particularly visible in highly saline conditions. It appears that the amendment of saline soil with compost raises the threshold at which salinity shows detrimental effects on plant growth. Therefore, in the future the use of compost may be an important tool in improving and reclaiming saline soils.

Don Shackel

From: Cameron.Smeal@gelita.com
Sent: Friday, 28 October 2005 9:51 PM
To: Don Shackel
Subject: Fw: Abstract for ORBIT Conference



Orbit 06 - Abstract
- Biala et...

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(See attached file: Orbit 06 Abstract Biala et al Use of Compost on Saline and Sodic Soils.doc)

Proposal for a Soil Based Reed Bed Using Vetiver grass for the Treatment of Effluent at Gelita, Beaudesert, Queensland

Cameron Smeal* and Paul Truong**

**Environmental Manager, Gelita, Beaudesert, Queensland*

*** Director, Veticon Consulting, Brisbane, Queensland*

Introduction

The development of the use of the reedbed system for the treatment of industrial wastes began in Germany in the 1980's. Over the last twenty years the use of the system has progressed to encompass the installation of full scale plants for the treatment of waste waters from a very wide range of industries, particularly the food producing industry.

Constructed wetlands using surface flow systems and floating aquatics have been used with success in applications such as the treatment of acid mine drainage, effluent polishing and others. The treatment of water in the heavy load range has however, on the whole, been through the use of subsurface flow reed beds.

Using the sub-surface flow system the wastewater comes into contact with the wide range of microorganisms that occur in high densities on the surface of the growing media and around the plant roots. Where fine particle size media are used (soils and fine sands), the number of micro-organisms is very significant. Additionally in the soil based system the inherent reactivity of the clay particles and humic particles within the matrix can be exploited as a measurable contributor to the treatment process

Soil Based Reed Beds (SBRBs)

SBRBs have been used widely throughout the world to effectively treat domestic wastewater, as well as a diverse range of highly contaminated industrial, chemical and agricultural effluents. The reed bed system described here is a soil based plant and micro-biological system in which the effluent moves through the soil fully below the reed bed surface. Prof. Kickuth in Germany originally developed this wastewater treatment approach over 30 years ago. SBRB systems have since been developed and refined through hundreds of successful applications around the world. This includes substantial reduction of nutrients (i.e. total nitrogen and phosphorus) as well as Biological Oxygen Demand (BOD), Suspended Solids (SS) and Faecal Coliforms (FC).

SBRB systems now provide high performance, reliability, long life and very low running costs, as well as an environmentally friendly treatment solution.

The SBRB Technology

The SBRB system has three simple components, which interact in a complex manner to provide an ideal medium for wastewater treatment. The treatment involves:

- **A shallow bed of soil** (between 0.5 and 1.5 metres deep) in which reeds are planted, contained by a waterproof membrane to prevent the wastewater leakage.
- **A suitable plant** which ideally should thrive under water logged conditions, tolerate high level of pollutants, high capacity of absorbing these pollutant and has high biomass production under these extremely adverse conditions.
- **Micro-organisms** (fungi and bacteria) in the planted soil and provide most of the treatment. The “reeds” root and rhizome systems bring air into the soil immediately surrounding them. Further away, the environment is anaerobic. These aerobic and anaerobic zones host an appropriate range of micro-organisms responsible for the impressive performance of SBRB systems.

A sub-surface flow soil based reed bed is a combination of three interdependent elements – the soil, the plants and the micro-organisms. Systems constructed correctly from these three components offer sustainable long term treatment capabilities.

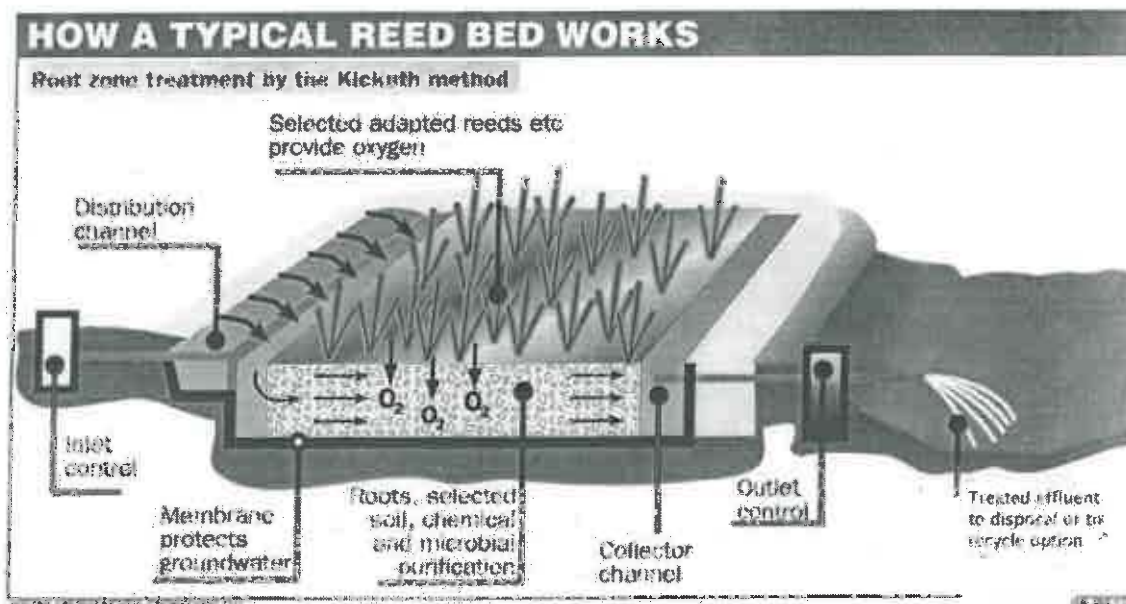


Photo Credit: *OceansESU Ltd, Bradford, UK*

Why Vetiver Grass Instead of Phragmites

Phragmites australis

The most common plant used in Australia for SBRB is *Phragmites australis*, a common wetland plant, which is also a major weedy pest in all wetland and waterways in Queensland due to its prolific seeding habit. In addition *Phragmites australis*:

- Has a relatively shallow root system, typical of wetland plants.
- Slow recovery growth after cutting as it rely on th growth of new rhizomes instead of the old shoots.

Vetiveria zizanioides

Commonly know as vetiver grass, which has been used globally for land stabilisation and environmental protection, it has the following attributes:

- Thrive under water logged conditions,
- Tolerate high level of pollutants, including heavy metals and nutrients particularly N and P (1).
- High capacity of absorbing these pollutants: 1 140kgN/ha/year; 150kgP/ha/year (2), as compared with Rhodes grass 600kg/ha/year and 90kg/ha/year, Kikuyu 500kg/ha/year and 90kg/ha/year, forage sorghum 360kg/ha/year and 70kg/ha/year, respectively (3).
- High biomass production under extremely adverse conditions such high salinity, high acidity and alkalinity and sodicity (4).
- Prolific and deep root system with Shoot- Root ratio of about 1:1, reaching 4m deep under dry land conditions (5).
- High potential biomass production under nutrient rich condition such as effluent, 132tons/ha/year with 3 monthly harvests (5)..
- Higher water use rate than Phragmites, 7.5 times higher under wetland conditions (6).
- Sterile and producing no seeds therefore no weed potential
- Approved by QEPA for environmental protection use

Objectives

- To demonstrate the suitability of vetiver grass for use in the SBRB system
- To develop a SBRB system, based on the data obtained, suitable for Gelita at Beaudesert and elsewhere.
- To develop a SBRB system using vetiver grass suitable for Brisbane and Queensland

Proposed Design

The actual degree of removal depends substantially on the design of the system and location of the system. A high discharge standard can often be achieved by designing the

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system for enhanced performance or for the special circumstances of the site. However, cost factors will provide limitations in practice for clients.

- Number of cell needed: 2
- Cell size: 40mL x 6mW X 1.5 m deep
- Fully lined with best quality dam liner geofabric
- Reed Bed gradient 2%
- Use of local soil for base soil
- Compact as much as possible

Treatments and Monitoring

- *Treatments:* Application of various effluent volume and frequency with appropriate seasonal change
- *Monitoring:* Start 6 months after planting of N, P, EC, Cation and Sulphate
- *Duration:* 2 years

Estimated costs

- *Reed bed establishment:*
 - Land shaping and soil compaction; ??
 - Geofabric liner ??
 - Collecting channel and sump; \$1 500 ??
 - Vetiver grass planting: \$5 000 for 2 cells
- *Operating and Monitoring:*
 - Consultant fees: \$15 000 over 2 years ??
 - Student support: \$5 000 over 2 years ??
 - Chemical analyses: \$15 000 over 2 years ??

Participants

- **GELITA Australia**
- **Veticon Consulting**
- **Environmental Engineering Department**, Queensland University of Technology, a post graduate student project (Honours or Master level)

References

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BUDGET ????

Gelita APA:

- In kind support: land preparation, maintenance and monitoring over 2-3 year period \$10 000
- Chemical analyses \$ 5 000 ???

Veticon Consulting

- In kind support: maintenance, monitoring and evaluation over 2-3 year period \$ 7 000

Total \$22 000

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Reedbed Prop2.doc

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(See attached file: Reedbed Prop2.doc)

GELITA AUSTRALIA FARM MANAGEMENT ANNUAL AUDIT

EXECUTIVE SUMMARY

This report assesses the progress of the implementation of new farm technologies recommended in the license application submitted in November 2003. The new work was initiated after approval of the license in June 2004 and therefore this report is for the first 6 months... However the annual audit date is deemed to fall on January 31 of each year.

Work has substantially commenced on the agro-forestry enterprise with establishment of trees to be completed by the end of April 2005. This work is being completed by TreeCorp, a commercial arm of CSIRO.

Vetiver establishment and concurrent composting trials are progressing. Further areas of vetiver are to be planted in February 2005. Future plantings will be made as time permits over the next few years after other farm procedures including irrigation scheduling are put in place.

Chemical treatment of effluent to control the low soil pH values is being investigated further after initial liming trials proved to be inefficient.

Monitoring equipment has been progressively installed to provide data for effluent management according to soil and climatic variables. Regular measuring over time will provide ranges of values which will be used to vary irrigation rates to meet crop requirements and the maintenance of a robust sustainable farming system.

Full Stop and Longstop equipment have been installed to monitor soil infiltration and hydraulic conductivity. The latter equipment is also intended to be used to provide samples for determining salt and nitrate movement past the root zone to a depth of 1.5 metres.

Groundwater monitoring will recommence following refurbishment of selected piezometers. The bore holes have been purged of contaminants and will be repetitively sampled to provide reliable data.

The compliance report submitted in October 2004 (see attachment) showed that the soil data are within the limits set. Further sampling and analysis will continue to provide a reliable data set over the following year.

Actual daily water output variability is another parameter which will be addressed in the ongoing farm management revision.

BACKGROUND

The irrigation farming system originally proposed by Gutteridge Haskins and Daveys Pty Ltd (EIS Report, 1992) was based on treated waste water from the Gelatine plant being applied as

- irrigation via border check system of forage crops on the flatter lands along the Logan River which are comprised of deep sandy clay soils on slopes of less than 0.75%.
- spray irrigation of the higher lands on the property. These areas comprise moderately deep to deep clay soils derived from basalt and/or sandstone on slopes of 5 to 20%.

This water was to be applied to 105 hectares of land and was aimed at maximizing water and nutrient use by the crops with some to be applied to a proposed re-afforestation area (40 hectares) on the northern slopes of Sunny Hill.

Crops were to be harvested using green chop method and sold locally. Crop establishment was aimed to ensure continuous harvesting and removal of forage and hence nutrients (salts) from the farm.

No attempt was made in the initial plan to specify water requirements for crop use or for any contingencies to account for soil and climatic variability.

After production commenced in 1996 the whole farm cropping area was however irrigated by travelling irrigators based on an opportunistic approach rather than by using irrigation scheduling procedures according to soil conditions and crop requirements. No attempt was made to develop the proposed border check system.

Neutron moisture meter monitoring equipment was intended to be used to monitor irrigation scheduling but the technique was never employed.

Subsequent management of the effluent was based on irrigated pasture species comprised of mainly Rhodes Grass, Kikuyu and Couch Grass and cut for hay production. This was deemed to be uneconomical and production management was changed to cattle grazing of pastures until the proposed changes to EPA license conditions approved in June 2004.

INTRODUCTION

Current Irrigation Management Procedures

The revised land management approach mooted in the approved license has been devised to allow for a robust response to the soil capacities for effluent over a range of climatic conditions. The proposed management scheme is being implemented in graduated phases over a seven year period.

These are

- agro forestry on an area of approximately 27 hectares on hill slope soils developed on mainly Walloon Sediments (soil units 3a,2e, 3c)
- Vetiver cropping on the alluvial soils along the Logan River (soil units 2a, 2b, 2c, 2d, 3b).
- Drainage of heavy clay soil (soil unit 2e) to prevent salt accumulation at depth in the soil profile by lateral drains discharging into evaporation ponds.
- Chemical control by raising the pH of the effluent with liquid lime and thus promoting the volatilization of ammoniacal nitrogen.
(refer map and description of soil units in report, ATTACHMENT A)

Agro forestry

The area designated for agro forestry has been treated to remove vegetative growth by spraying with glyphosate herbicide and deep ripped on the contour to prepare beds for planting. Irrigation tracks have been formed to control the movement of travelling irrigators and ensure uniformity of watering over the whole area. The frequency of irrigation will be determined by the use of Full Stop equipment after establishment in March-April 2005.



Photo 1: Deep ripped agro forestry area. Irrigation track to right hand side of picture

Vetiver Establishment

Vetiver grass has been established on approximately 2 hectares of the 2e soil unit. The technique used involves the use of transplants using a special machine towed behind a tractor. Row spacing of approximately 50 cm allows for the establishment of ryegrass during the winter months when vetiver growth is minimal. In the picture below, the ryegrass can be seen as providing green growth during the winter period of 2004.

Further experimentation using compost manufactured from the bio-solids and using vetiver as a green waste source is currently being conducted on site. See picture below.

Results from this work are expected to be at hand in 18 months time.

Vetiver- Ryegrass pasture. Note ryegrass actively growing between rows during the winter months.

FOTO in here

Experimental Plots: Vetiver and Compost trials

Drainage of Soil Unit 2d

Work on establishing drainage channels to enhance movement of salts by lateral drainage has not commenced. This work will be undertaken following implementation of the revised irrigation scheduling program proposed by HYDROPLAN.

Chemical Control

Initial trialling of the use of liquid lime in the pump out pond proved to be inefficient. Agricultural lime applications to pastures have also proved to be costly. Further investigations are being made as to alternative means of maintaining soil pH values within the accepted range for plant growth.

In spite of the low pH values encountered in the soil surface, there does not appear to be any observed deleterious effects on plant growth.

Monitoring Equipment

Full Stop and Longstop equipment have been installed on the major soil types used for forage production. Sampling has commenced and will continue on a weekly basis to

provide a data set on soil water status for irrigation scheduling and also samples for conductivity and nitrate measurements at depths of more than a metre.



Full Stop Moisture monitoring equipment showing red button up when soil water profile is full at 50 cm



Longstop equipment used for extraction of soil solution for nitrate and salt status below the root zone.

These data will be complemented with further infiltration measurements using double ring infiltrometers and used to rerun the MEDLI model. The University of Queensland data used in the first instance was found to be limited.

Refurbishment of selected piezometers and the removal of contaminants is being undertaken by repetitive purging. The process is time consuming and a new pump is being purchased from the United States for this purpose.

It is intended that more comprehensive data for the MEDLI model will be available by December 2005.

Analytical data are being determined by Queensland Department of Health Laboratories and a private firm FALA. This provide cross checks on the accuracy of data used for compliance purposes.

Irrigation Management Plan

Reduced irrigation area used for the vetiver/ agro forestry enterprises has necessitated revision of the irrigation management. In the past irrigation procedures have been left to farm staff. Currently they are being trained to use the program provided by HYDROPLAN. However this program will require further modification due to the reduced irrigation areas and change of crop types and as further analytical data becomes available from the analytical soil and effluent monitoring program.

Irrigation data from June 2004 to December is to be analysed to provide data on the variability of daily effluent output from gelatine production.

REFERENCE

Gutteridge Haskins and Daveys Pty Ltd. Brisbane.
Gelatine Manufacturing Plant and Irrigation System Sunny Hills, Josephville, Beaudesert Shire. Environmental Impact Statement. February 1992.

Signed: Dr B.M.Schafer

31 January 2005

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		PP				
		pH	TSS (mg/L)	COD (mg/L)	NOx (mg/L)	TN (mg/L)
7/7/04	Wed	7.81	20	172	2.4	500
13/7/04	Tue	7.84	30	207	4.2	508
20/7/04	Tue	7.83	20	162	3.7	496
27/7/04	Tue	7.71	9	187	3.9	508
3/8/04	Tue	7.44	30	229	8.9	480
10/8/04	Tue	7.31	20	284	15	512
17/8/04	Tue	7.51	111	266	16	512
24/8/04	Tue	7.29		250		
27/8/04	Fri	7.68	80		10.4	524
31/8/04	Tue	7.56	40	243	13	576
8/9/04	Wed	7.43		259	16	568
14/9/04	Tue	7.36	90	278	21.4	576
21/9/04	Tue	7.34	70	293	18.4	532
28/9/04	Tue	7.25	90	258		504
5/10/04	Tue	7.16	50	299	25.5	524
12/10/04	Tue	7.52	60	239	18.2	520
19/10/04	Tue	7.6	70	223	10.5	496
26/10/04	Tue	7.59	100	277	6.4	480
29/10/04	Fri	7.38		584		516
2/11/04	Tue	7.29	140	423	9.6	524
9/11/04	Tue	7.11	60	278	18.5	496
16/11/04	Tue	6.41	40	285	35	460
23/11/04	Tue	7.27	40	254	14.7	460
30/11/04	Tue	7.21	9	238	17.3	528
7/12/04	Tue	7.28	70	244	10.5	452
14/12/04	Tue	7.05		356		504
30/12/04	Thu	7.23	20	233	23.9	552
5/1/05	Wed	6.61	40	263	23.4	436
11/1/05	Tue	5.7	15	286	22.8	376
18/1/05	Tue	6.27	30	273	15.7	220
25/1/05	Tue	6.89	9	189	6	260
1/2/05	Tue	6.83	40	172	6.1	220
8/2/05	Tue	7.31	9	177	2.9	284
15/2/05	Tue	7.73	9	218	3.5	392
22/2/05	Tue	7.49	30	193	2.3	344
1/3/05	Tue	7.6	30	163	2.2	332
8/3/05	Tue	7.65	40	205	2.8	348
15/3/05	Tue	7.51	9	193	5.5	364
22/3/05	Tue	7.53	30	212	7	388
29/3/05	Tue	7.63	30	214	8.9	412
5/4/05	Tue	7.67	9	211	6.9	392
12/4/05	Tue	7.8	40	192	7.4	344
19/4/05	Tue	7.81	40	319	4.5	340
26/4/05	Tue	7.6	40	264	5.8	464
3/5/05	Tue	7.57	60	223	7.2	488
17/5/05	Tue	7.61		194	10	496
24/5/05	Tue	7.61	40	213	8.6	492
31/5/05	Tue	7.66		233	11.1	480
7/6/05	Tue	7.66	20	199	10.5	464
14/6/05	Tue	7.7	9	155	11.4	508
21/6/05	Tue	7.57	9	167	7.8	464
28/6/05	Tue	7.5	9	264	13.9	476
5/7/05	Tue	7.54	30	202	6.7	476
12/7/05	Tue	7.55		178	6.6	548
19/7/05	Tue	7.51		180	9.2	540
26/7/05	Tue	7.54	30	184	8.9	532
2/8/05	Tue	7.54	40	152	10.1	544

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POP

		pH	EC	COD (mg/L)	TSS (mg/L)	PO4 (mg/L)	Total P (mg/L)	BOD (mg/L)	TN (mg/L)	EX-TN (mg/L)	TDS (ppm)	NOx (mg/L)	S2- T (mg/L)	S2- F (mg/L)	Ca (mg/L)	Na (mg/L)
7/7/04	Wed	7.83		201	40	2.4			492		3178	3.6	0	0		
13/7/04	Tue	7.86	7940	198	40	2.2	1.2	14	496	540	3160	4.5	0	0		
20/7/04	Tue	7.83	7890	170	20	2.6			496		3261	3.9	0	0		
27/7/04	Tue	7.73	7960	171	9	2.6			488		3212	4.1	0	0		
3/8/04	Tue	7.46	7860	209	10	1.6			488		3225	10	0	0		
10/8/04	Tue	7.33	8000	275	60	3.2	2.3	29	496	470	3266	16	0	0		
17/8/04	Tue	7.54	7880	247	60	3.8			512		4572	15	0	0		
24/8/04	Tue	7.31	8520	232									0	0		
27/8/04	Fri	7.66			50	3.4			520		4688	10.9				
31/8/04	Tue	7.53	8170	248	30	3.8			560		4754	13.5				
8/9/04	Wed	7.41	8360	250		3.7	2.3	34	564	630	3108	15.4			320	500
14/9/04	Tue	7.39	8270	286	90	3.1			588		3586	22.1				
21/9/04	Tue	7.41	8050	304	70	3.5			532		3338	19.2	0	0		
28/9/04	Tue	7.33	7910	272	90	2			516		3262	20	0	0		
5/10/04	Tue	7.18	7920	283	110	3.9	2	29	524	270	3212	26.1	0	0	300	530
12/10/04	Tue	7.52	7920	231	70	3.4			512		3116	18	0	0		
19/10/04	Tue	7.63	7730	214	60	2.9			496		3160	10	0	0		
26/10/04	Tue	7.61		277	90	1.5			492		3180	6.3	0	0		
29/10/04	Fri	7.62		495					500							
2/11/04	Tue	7.52	7750	321	60	9			532		3046	7.9	0	0		
9/11/04	Tue	7.37	7450	220	40	3.3	1.2	26	476	270	2946	13.4	0	0	260	520
16/11/04	Tue	6.87	7450	273	50	2.5			456		3114	35	0	0		
23/11/04	Tue	7.46	7880	238	40	1.7			464		3180	11.6	0	0		
30/11/04	Tue	7.46	8200	218	50	2.7	1.2	19	492	360	3348	14.2	0	0	310	590
7/12/04	Tue	7.3	7510	249	50	3.9			432		3104	9.9	0	0		
14/12/04	Tue	7.33	7430	277	115	4.5			512		3612					
30/12/04	Thu	7.51	7670	182	30	2.6			540		2682	17.3	0	0		
5/1/05	Wed	6.7	7180	266	40	3.3			456		2896	28.6	0	0		
11/1/05	Tue	7.45	7130	309	20	1.8			416			16.4	0	0		
18/1/05	Tue	6.71	6410	256	50	2.5	1.1	16	256	170	3606	19.7	0	0	440	570
25/1/05	Tue	6.86	6740	199	30	2.5			260		3500	5.7	0	0		
1/2/05	Tue	7.18	6560	200	20	0.8			224		3660	0	0	0		
8/2/05	Tue	7.32	6900	183	30	1.6			292		3452	2.9	0	0		
15/2/05	Tue	7.77	7560	240	60	1.4			380		3370	3.6	0	0		
22/2/05	Tue	7.51	7200	195	30	2			336		3422	2.2	1	0		
1/3/05	Tue	7.55	7290	165	10	2.3	1.2	16	348	380	3234	1.9	0	0	330	650
8/3/05	Tue	7.67	7080	193	9	2.4			372		3234	2.4	0	0		
15/3/05	Tue	7.51	7130	225	9	1.6			368		3276	4.2	0	0		
22/3/05	Tue	7.52	7170	209	30	1.8			396		3220	6.2	0	0		
29/3/05	Tue	7.62	7090	225	30	2.2			412		2342	7.2	0	0		
5/4/05	Tue	7.68	7060	201	9	1.7			456		3070	6.6	2	0		
12/4/05	Tue	7.72	6940	175	9	1.2	0.75	20	336	490	3086	6.3	3	0	260	570
19/4/05	Tue	7.79	6740	319	40	1.9			348		2820	4.5	0	0		
26/4/05	Tue	7.65	6910	235	10	1.8			452		3012	6	0	0		
3/5/05	Tue	7.59	7080	203	9	1.6			472		3012	7.3	0	0		
17/5/05	Tue	7.62		178	40	1.3	0.65	22	488	560	2926	10.5			220	550
24/5/05	Tue	7.56	7520	220	50	1.5			300		3068	8.6	0	0		
31/5/05	Tue	7.65	7600	245		0.8			488		2970	10.9	0	0		
7/6/05	Tue	7.68	7360	186	60	1.1			484		3030	10.4	0	0		
14/6/05	Tue	7.69	7490	206	30	1.4	0.45	17	508	570	2926	11.3	0	0	220	560
21/6/05	Tue	7.59	7600	147	9	1.1			492		2974	9	0	0		
28/6/05	Tue	7.5	7270	184	9	1.2			504		3144	13				
5/7/05	Tue	7.66	7360	158	9	2.1	1.1	20	472	550	2764	5.9	0	0	210	490
12/7/05	Tue	7.65	7450	168		2.2			544		2694	6.2				
19/7/05	Tue	7.59	7400	143		1.3			552		2788	9	0	0		
26/7/05	Tue	7.6	7290	169	20	0.7			496			9.7	0	0		
2/8/05	Tue	7.58	7540	150	9	0.9			556			10.1	0	0		

EX-TN
TN

BSD

		pH	EC	TDS (ppm)	TSS (mg/L)	COD (mg/L)	BOD (mg/L)	Total P (mg/L)	BSD DEPTH	PO4 (mg/L)	NOx (mg/L)	TN (mg/L)	EX-TN (mg/L)	S2- T (mg/L)	S2- F (mg/L)	Na (mg/L)	Ca (mg/L)
7/7/04	Wed	7.84	7780	3244	40	211			3	2.6	3.7	492		0	0		
13/7/04	Tue	7.89	7940	3252	9	193	9	1.2		2.4	4.4	480	530	0	0		
20/7/04	Tue	7.84	7940	3244	10	183				2.5	4.4	496		0	0		
27/7/04	Tue	7.78	7960	3227	9	194				3	4.2	500		0	0		
3/8/04	Tue	7.43	7910	3326	40	214				2.1	11.2	488		0	0		
10/8/04	Tue	7.29	7910	3307	100	396	24	1.5		2.6	22	488	430	0	0		
17/8/04	Tue	7.51	7870	3222	80	283				3.2	25			0	0		
24/8/04	Tue	7.26	8480			258								0	0		
27/8/04	Fri	7.66		4700	60					4.5	12.9	496					
31/8/04	Tue																
8/9/04	Wed	7.4	8210	3132		287	28	2.4		4.3	20.5	552	600			495	330
14/9/04	Tue	7.3	8320	3596	80	319				3.7	25	552					
21/9/04	Tue	7.32	8060	3522	100	300				4.2	25.7	528		0	0		
28/9/04	Tue	7.3	7960	3292	60	281				2.8	26.8	520		0	0		
5/10/04	Tue	7.11	7890	3240	120	296	31	1.6		2.9	34.2	532	310	0	0	530	310
12/10/04	Tue	7.41	7960	3522	70	232				3.9	26.8	512		0	0		
19/10/04	Tue	7.57	7770	3250	30	207				5	15.4	492		0	0		
26/10/04	Tue	7.57		3212	60					6	11.5	472		0	0		
29/10/04	Fri																
2/11/04	Tue	7.31	7750	3262	60	271				7.4	13.1	500		0	0		
9/11/04	Tue	7.36	7150	3038	60	254	23	2.2		6.8	11.4	448	270	0	0	510	290
16/11/04	Tue	7.05	7200	3066	60	267			3.6	5.4	17.5	416		0	0		
23/11/04	Tue	7.31	7040	3072	60	228			3.8	5.6	13.6	372		0	0		
30/11/04	Tue	7.53	7310	3154	30	233	9	1.5	3.8	5.6	13.4	404	320	0	0	540	290
7/12/04	Tue	7.2	7360	3162	30	230			3.8	4.4	12.6	420		0	0		
14/12/04	Tue	7.43	7170	3586	100	354			3.9	3.4		436					
30/12/04	Thu	7.27	7050	3062	30	181			3.7	4.3	8.1	412		0	0		
5/1/05	Wed	7.18	7080	3194	60	260			3.6	4	9.8	380		0	0		
11/1/05	Tue								3.5								
18/1/05	Tue	7.2	7080	3270	50	244	19	1.3	3	3	9.5	356	200	0	0	560	290
25/1/05	Tue	6.82	6860	3362	50	215			2.7	2.9	6.2	300		0	0		
1/2/05	Tue	7.13	6720	3447	30	197			2.4	2.4	2.2	290		0	0		
8/2/05	Tue																
15/2/05	Tue	7.39	7030	3560	40	196	24	1.1		1.4	1.5	300	330	0	0	600	370
22/2/05	Tue	7.47	7150	3508	40	196				2	1.8	304		2	0		
1/3/05	Tue	7.51	7220	3460	30	170	9	1.2		2.2	1.4	308	370	0	0	660	350
8/3/05	Tue	7.62	7130	3388	9	175				1.8	1.6	375		0	0		
15/3/05	Tue	7.43	7190	3408	80	210				2	6.1	368		0	0		
22/3/05	Tue	7.36	7010	3322	60	235				1.8	7	364		0	0		
29/3/05	Tue	7.59	7060	2472	40	244				2.1	9.1	384		0	0		
5/4/05	Tue	7.58	7040	3172	9	184				1.6	9.4	392		6	0		
12/4/05	Tue	7.7	6890	3194	40	180	21	0.77		1.4	9.9	312	460	0	0	600	270
19/4/05	Tue	7.75	6650	3280	40	248				2	6.7	324		0	0		
26/4/05	Tue	7.61	6850	3146	30	162				1.9	5.1	428		0	0		
3/5/05	Tue	7.51	7130	3128	10	189			2.5	1.7	6.6	456		0	0		
17/5/05	Tue	7.62		2970	20	197	14	0.58	3.1	1.2	11.2	452	500			560	230
24/5/05	Tue	7.45	7280	3120	60	209			3.2	1.4	11.5	472		0	0		
31/5/05	Tue	7.52	7400	2972		241			3.2	0.8	14	464		0	0		
7/6/05	Tue	7.51	7360	3000	40	235			3.2	1.2	12.4	460		0	0		
14/6/05	Tue	7.6	7410	3010	9	176	8	0.43	3.4	1.3	13.1	484	540	0	0	570	230
21/6/05	Tue	7.42	7420	3010	9	177			3.6	0.9	14.4	468		0	0		
28/6/05	Tue	7.36	7310	3250	30	282			3.4	1.6	16.1	468					
5/7/05	Tue	7.53	7150	2822		169	14	0.56		1	13.2	456	500	0	0	510	210
12/7/05	Tue	7.5	7100	2762		136				1.3	14.7	464					
19/7/05	Tue	7.46	7140	2866		182				1.1	14	496		0	0		
26/7/05	Tue	7.52	7110		9	172				0.9	13.8	460		0	0		
2/8/05	Tue	7.47	7140		9	172				1.2	13.5	472		0	0		

18/10/2005

Title:	Environmental Odour Identification and Assessment
Objectives:	<p><i>Follow up initial data from gas chromatography study 1998, 2004 to determine more precisely and accurately the sources, quantity and nature of site odour components.</i></p> <p><i>Undertake Pareto analysis to prioritise odour remediation options based on outcomes of analysis.</i></p> <p><i>Undertake dispersion modelling utilising this data in order to assess potential odour impacts.</i></p>
Scope:	<p>Sampling of four points across site for chemical speciation of gases for analysis using Gas Chromatography-Fourier Transform Infrared Spectroscopy (FTIR) Mass Spectrometry-fitted with long path gas cell to improve detection limits.</p> <p>Alternate methodologies to FTIR MS GC should be considered if this process is not available.</p> <p>Sample sites to include process/raw materials, compost, waste water (biofilter/belt press).</p> <p>Method selected to match earlier data from 1998. The analysis is intended to identify and quantify odorous and otherwise significant compounds which are of concern to waste water treatment facilities.</p> <p>Odour thresholds to be listed as per Air Pollution Engineering Manual (Buonicore & Davis).</p> <p>Odour dispersion modelling to incorporate point sources and release points including aeration pond, general waste water treatment facility, compost operation, process/raw materials, and boiler stack.</p>
Reason:	<p><i>This project is a priority for assessment and control of odour based environmental hazards on the Sunny Hills site.</i></p> <p><i>The information is critical to the implementation of Environmental Improvement Plan EIP 001.</i></p> <p><i>Licence conditions stipulate limits to permissible odour generation. The site environmental management system requires continuous improvement.</i></p>
Priority:	High
Responsible Officer:	Cameron Smeal: Environmental Manager
Output(s):	<p><i>A comprehensive analytical benchmark of odorous compounds for each significant point source will be established.</i></p>

Distribution modelling will deliver predictive impacts beyond the boundary in breach of licence under current operational conditions.

This will allow quantification of improvements or deterioration of odour management program on the site.

How will the success of the initiative be measured: *Comparative analysis over longer term will demonstrate status of outcome. Numbers of external odour complaints and internal reporting will demonstrate effectiveness of initiative.*

Resources: *External consultants will be required to undertake the sampling and analysis via GC/MS/FTIR (whichever method is available).*

External expertise will also be required to undertake modelling.

Project supervision from on-site resources.

Estimated Expenditure: *Estimated expenditure required for the initiative is based on verbal quotation of approximately :*

\$6 000 for the modelling component,

(NB: FTIR MS does not appear to be currently available in Australia.)

\$13,000 for compound sampling onto adsorbents specific to each group of compounds and analysing using GC/MS.

\$7 000 for the other analysis.

Key Stakeholders: *Area President*
General Manager
Production Manager/Factory Manager
Environmental Manager
EPA/Community

Major Risks: *Barriers to achieving project success include difficulty in sourcing competent expert consultants, availability of technology, resource allocation, and climatic variables delivering inconsistent or misleading results.*

For the project to succeed the sampling must take place under worst case scenarios ie when odour is present.

The consequences if the project is not undertaken constitute a failure to implement requirements of Environmental Management System.

Minimising the Risks: *In order to minimise risks to the success of the project, project manager must be assured and confident of capabilities of external consultant's ability to deliver services as required by scope.*

Costing and quotations shall be presented and approved prior to undertaking analysis and/or modelling.

Related Projects: *Are there any projects which are dependant on this initiative, or projects that are interdependent on this initiative, or projects upon which this initiative is dependent?*

Guidelines/Standards: *What guidelines, standards or methodologies will be applied to the work undertaken in the initiative?*

Project Size: Small

Governance: *Describe any special management arrangements that will be put in place to govern the initiative.*

Sponsor: *Roger Seach will be the 'champion' for the initiative?*

Project Milestones

List the major milestones, scheduled start, scheduled finish and who has been assigned accountability.

<i>Description</i>	<i>Who</i>	<i>Scheduled Start</i>	<i>Scheduled Finish</i>

Recommendation

The next step for which authorisation is being sought is authorisation to complete the activities as per this proposal.

Endorsement

Responsible Officer:

Cameron Smeal, Environmental Manager

Date: ____ / ____ / ____

Project Sponsor:

Roger Seach, General Manager

Date: ____ / ____ / ____

Cameron,

Attached is the Ausplume met file that I developed for F class stability.

I also had versions for A class and D class stability but can't find them.

Simply replace the column of Fs with As or Ds.

I now have a meteorological program from CSIRO called TAPM that I use to generate more useful data including Ausplume met files.

Let me know if you are interested in this.

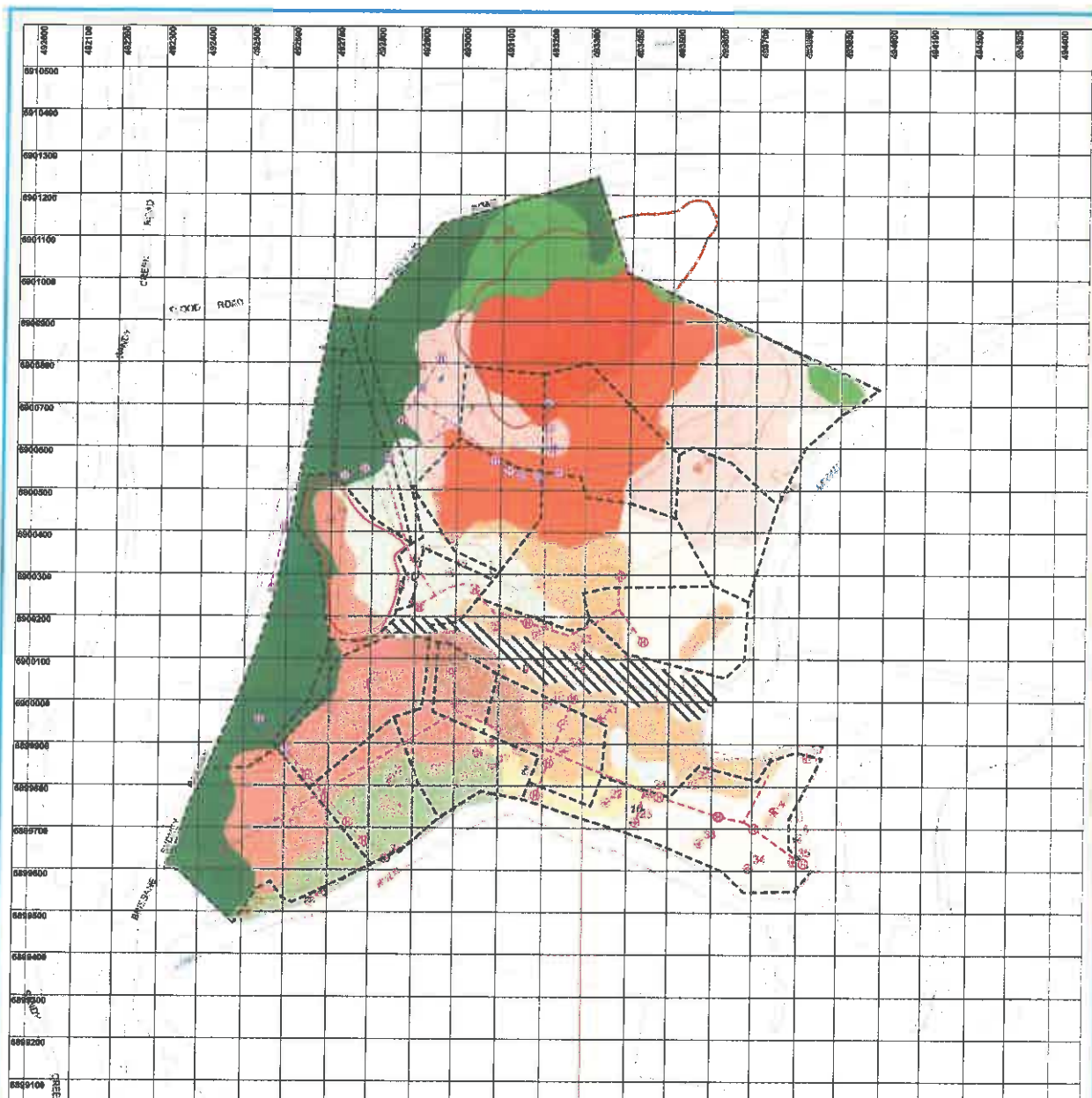
One of my team members, Ryan Kathage, has almost completed a quote for stack testing, odour sampling and anaerobic digester sampling. He will shoot this through today.

There are three options for odour signature measurement. (I do not believe that there are any GC-IR-MS combination instruments available in Australia.

1. The bag sample previously taken for you was analysed using an FTIR instrument at The University of Queensland that is no longer functioning.

I am making some enquiries to see if it can be re-activated.

18/10/2005



MAP LEGEND

Map Unit	Soil Order	Geology/Geomorphic Element	Summary Description
1A	Dermosol	Basalt, convex crest	Shallow, stony medium clay.
1B	Dermosol	Basalt, midslope shelf	Shallow, stony, light clay to 52cm pH 8.5, CaCO ₃ at 31-52cm.
1C	Dermosol	Basalt, lower slope	Shallow, stony brown medium clay to 80cm depth.
2A	Dermosol	Alluvium, relic and current major levees	Deep, sandy loam to sandy clay loam, prismatic to polyhedral, pH neutral at depth.
2B	Dermosol	Alluvium, dissected levee	Deep, clay loam/sandy clay to medium clay at depth. Neutral pH.
2C	Dermosol	Alluvium, backplain	Deep, sandy clay loam to medium clay. Layered. Alkaline pH at depth.
2D	Vertosol	Basaltic alluvium, closed depression	Black cracking, medium clays, alkaline at depth. Self mulching surface.
2E	Vertosol	Basaltic alluvium, relic backplain	Dark cracking, medium clays, alkaline at depth. Crusty surface.
2F	Dermosol	Alluvium, dissected relic levee	Brown, sandy clay loam.
3A	Sodosol	Walloon sandstone member, upper convex slopes	Brown clay loam over mottled yellow subsoil, pH neutral to alkaline at depth.
3B	Vertosol	Walloon siltstone member, relic terrace	Brown clay loam over yellowish brown light medium clay. Alkaline at depth.
3C	Vertosol	Mixed basalt/walloon sediments, upper/midslopes	Organic black layer over light-medium reddish brown clays. Alkaline at depth.
3D	Vertosol	Colluvium basalt/walloon sediments. Relic gully infill.	Deep, brown light-medium clay over medium heavy clay. Alkaline at depth.

- Soil Sampling Site
- Fences
- Picosimeters (blue numbers)
- Lagoon
- Riparian

GELITA
AUSTRALIA
Josephville

Scale - Grid Interval = 100m

August 2005

18/10/2005

GELITA ASIA PACIFIC AFRICA GELITA AUSTRALIA ENVIRONMENTAL PROCEDURE	Authorised by:	Document No./Revision: ENV007/C
	Page Number: 1 of 4	Date Effective: 26/09/05

FARM NUTRIENT, SALINITY AND WATER MANAGEMENT SYSTEM – (FARM ENVIRONMENT MONITORING)

1.0 INTRODUCTION

The environmental sustainability of the irrigation disposal area is based on consumption and export of nutrient, salts and water so that excessive accumulations of these substances do not occur in the soils or groundwater. The EMS for the wastewater pumping and irrigation system provides data on the quantities of water salt and nutrients applied via the irrigation system to the irrigation area. The EMS for nutrients salts and ground water provides information as to the fate of these substances.

This EMS aims to provide data which is of a mass balance type (nutrients) as well as data that can be used to assess whether excessive accumulation of salt, nutrients or ground water is occurring.

Contaminants must not be directly or indirectly released from the site to any waters or the bed or banks of any waters (permitted exceptions^{5.1}).

There are no licence requirements for any aspect of water quality except for the water applied to the lands surface. All internal control requirements for the various waste streams can be found in the relevant procedures.

2.0 OBJECTIVE

This procedure is intended to establish a water irrigation program, provide a periodic evaluation of compliance to EPA licence requirements regarding farm nutrients, salinity and water management.

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**FARM NUTRIENT, SALINITY AND GROUND WATER MANAGEMENT SYSTEM –
(FARM ENVIRONMENT MONITORING)**

3.0 PROCEDURE

3.1 Monitoring System

The monitoring system is summarised below and shows the outputs, timelines and performance indicators

	Sample Source	Analysis	Indicators	Frequency	Responsibility
Wastewater Irrigation Licence Requirements. (EXTERNAL)	At Irrigation Ponds	5day Biochemical Oxygen demand 400 (max)	mg/l	Monthly	B
		Chemical Oxygen demand 800 (max)	mg/l	Weekly	B
		pH 6.5-11	pH units	Weekly	B
Wastewater Irrigation INTERNAL Controls (Only used as indicators to prevent possible future problems, associated with the outer limits of the internal controls being reached.)	At Irrigation Ponds	Conductivity 7000 (max)	us/cm	Weekly	B
		Total Salts 12	tonnes/ha/annum	Weekly	B
		Sodium 600	mg/l	Monthly	B
		Total Nitrogen 0.38	tonnes/ha/annum	Weekly	B
		Sulphide 0	mg/l	Weekly	B
		Dissolved Oxygen >1.0	mg/l	Randomly	B
		Total Suspended Solids 100 (max)	mg/l	Weekly	B
		Flow 1.0 -1.3	ml/day	Daily	B
Hay Crop	Hay	Weight N content P content	Tnes	Each Harvest	A
Grain Crop	Stubble		Kgs	Each Crop	B
	Grain		Kgs	Each Crop	B
Livestock	Herd Returns	Livestock Grazing Days	Use published N and P export Rates for adult equivalents		A B
Agroforestry	Use published N and P export Rates for adult equivalents - augmented by strategic biomass samplings				B

ENV007/B

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Page 2 of 4

**FARM NUTRIENT, SALINITY AND GROUND WATER MANAGEMENT SYSTEM –
(FARM ENVIRONMENT MONITORING)**

Soil salinity	Sample source	Analysis			Indicators	Frequency	
	At soil points	Acceptable limits at depths					
		10cm	50cm	120cm			
		pH					
		4.5-7.0	5.5-7.5	6.0-8.5			
		ESP					
		10	15	20			
		SAR					
		15	20	40			
		EC sat					
		3	4	5			
		Cl					
		0-150	0-450	0-600			
		NO3					
		120	100	20			
Total sulphate Sulphur							
4000	5000	6000					
Groundwater	Each Piezometer	EC pH Cl Na Ca Mg S NO ₃ , TN, TP, SO ₄ carbonic acid. TDS.			Seasonal and annual persistent rises in EC, N or water levels	6 Monthly	B

A: Share farmer

B: GELITA Aust.

The above data sets should be reported on a crop season basis (Feb March and July/Sept) so that appropriate reports can be prepared and submitted to the licensing authorities.

These data sets normally require a two month turn around for results to become available from the laboratories.

3.1 Corrective Action

3.3.1 Excessive Soil N levels

Elevated soil N levels in the top 20 to 50 cm of soils are common under commercial cropping conditions. However, where N levels do not decline by 100 cm, this is evidence of deep leaching of N below the root zone of the crop. Piezometers in these areas should be checked to determine whether consistently high TN levels in ground water are occurring below this depth. If this is the case, the wastewater loading on these areas should be decreased, N content of wastewater stream decreased and the rate of hay or grain cropping on these blocks increased until soil N level declines.

ENV007/B

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Page 3 of 4

FARM NUTRIENT, SALINITY AND GROUND WATER MANAGEMENT SYSTEM – (FARM ENVIRONMENT MONITORING)

3.3.2 Excessive Ground Water N levels

This may occur with or without a rise in soil N levels. The elevated N levels should be monitored over one full rainfall/river flow recharge season and the changes in N monitored to determine whether there is a flux of rainfall or river water induced leaching which lowers the N level. Management procedures are similar to the soil N level approach - augmented in extreme cases by pumping of the bore to induce flushing of the aquifer where hydrogeological conditions permit.

3.3.3 Excessive Salinity

Soil salinity levels will rise under the project as predicted in the EIS. This is measured by Ec, ESP and SAR. Concerns exist only when this rise presents as areas of affected crop, salinised soils or persistently wet areas associated with high ground water levels.

In these situations, wastewater loadings should be reduced. An irrigation cycle with bore or river water to flush soluble salts should be undertaken and the condition monitored. Deep ripping and application of lime may be necessary. Where appropriate, subsoil drainage may need to be installed.

3.3.4 Excessive Soil ESP (Exchangeable Sodium Percentage)

Soil ESP levels will also rise under the project. Where this results in surface sealing and excessive runoff, the areas should be deep ripped and amended by gypsum.

3.0 RECORDS

- 3.1 ENVF 012 Weekly analytical,
data shall be kept by the Environmental Officer on site for a period of 5 years
and then archived.
- 3.2 Results also kept on: J:/enviro/WasteWaterResults/wwdailyresults.xls.
- 3.3 Soil Analysis records (External Testing) are recorded on:
J:/enviro/Reports/Soilsreport/Soilsdata/2005.
- 3.4 Soil Analysis records are also kept in Soil Analysis Folder,
data shall be kept by the Environmental Officer on site for a period of 5 years
and then archived.

4.0 REFERENCES

- 4.1 Soil management report for Farm Environment and Eco Sustainability
Cooperative project (Shafer 2002)
- 4.2 Soil sampling instructions of the Qld Department of Primary Industries

5.0 ATTACHMENTS

5.1 Map of sampling sites

Certificate AU04/1818

18/10/2005
SGS

The management system of

GELITA Australia Pty Ltd

Flood Road, Josephville, QLD 4285
Australia



has been assessed and certified as meeting the requirements of

AS/NZS ISO 14001:2004

For the following activities

**Management of environmental effects
associated with processing plant operations for
manufacture of edible grade gelatins as well as
the treatment and disposal of wastes.**

This certificate is valid from 06/08/2003 to 06/08/2006
Issue 2. Certified since August 2003

Authorised by

IAS-ANZ



Accredited by the
Joint Accreditation System of
Australia and New Zealand
Acc. No. S1370763AS (CMS)
E1530196NA (EMS)
H1731097AS (IACCP)
O1850239AS (OHS&S)

THIS IS TO CERTIFY THAT THIS IS A TRUE
AND CORRECT COPY OF THE ORIGINAL
DOCUMENT WHICH I HAVE SIGHTED.
DATED AT BEAUCHEBERT ON 23/05/05

Page 1 of 1

sch4p4(0) personal informa

SGSSGS

SGS Systems & Services Certification Pty Ltd
1 Summit Road Noble Park Vic 3174 Australia
t+61 3 9790 8700 f+61 3 9790 8701 www.au.sgs.com



18/10/2005



ASIA PACIFIC AFRICA

The next meeting of the Community Consultation Committee is set down for the 25th August 2005 at 4 pm.

The proposed agenda of this meeting is as follows:

1. GELITA welcome
2. Chairman's opening remarks
3. Previous meetings minutes and action items
4. Environmental performance review
 - a: Trees
 - b: Vetiver
 - c: New members
 - d: Water
5. Complaints received
6. GELITA action re: complaints received
7. General Business
8. Date and time of next meeting

Please contact Cameron Smeal 55419442 or Karen Brown 55419432 if you are unable to attend.



ASIA PACIFIC AFRICA

Davis Gelatine Australia
ACN 000 010 597
"Sunny Hills" Flood Road
Josephville via Beaudesert
QLD 4285 Australia
PO Box 409 Beaudesert
QLD 4285 Australia

Minutes-Community Consultative Committee Meeting

Date:

Chairman: Cr David Coburn– Councillor Beaudesert Shire Council

Attendees: Mr Alan Bermingham
Mr Andrew Grodecki - LARCA, LACA, DNR
Mr Dale Farmers
Mr Ed Youll

Mr Cameron Smeal - Environmental Officer

Minutes: Mr Cameron Smeal - Environmental Officer

Apologies: Mr Roger Seach GELITA General Manager
Mrs Anne Farmers
Mrs Mavis Rostedt - Beaudesert Landcare
Ms Karen Brown - Environmental Technician
Mr & Mrs Hyland

Venue: GELITA meeting room

Agenda as follows:

1. GELITA welcome
2. Chairman's opening remarks & welcome
3. Previous meetings minutes and action items
4. Environmental performance review
 - Complaints received
 - GELITA: action re: complaints received
7. General Business
8. Date and time of next meeting

Welcome

- Cameron Smeal welcomed everyone to the site and put forward Roger Seach's apologies.
- Meeting was passed to Chair

Chairman's opening remarks

- Cr Coburn thanked everyone for attending
- Noted that the current circumstances reflected that all was well.
- Put forward a motion that the minutes be accepted as true and accurate record of the previous meetings business.
- Motion was seconded by C.Smeal and passed by all present.
- Cr Coburn called for GELITA to proceed with agenda items.

Environmental performance review

GELITA advised attendees of the following items:

Complaints received

- One complaint regarding odour reported to the EPA.
- One complaint regarding curfew breach reported to the EPA
- One self monitored NOx discharge breach reported to EPA

GELITA action re: complaints received

- EPA was advised of all complaints received since last meeting.
- All incidents were investigated and remedial actions implemented as required.
- The odour complaint was attributed to temperatures affecting hide quality.
- Transport operators counselled driver and set conditions for all drivers for that company were to leave site 2 hours prior to curfew requirements in future to avoid repetition of breach in future.
- Documents pertaining to these items were tabled for CCC members and included copies of reports to EPA, written correspondence and technical analysis reports.
- Cr Coburn asked for, and was provided with a copy of Licence SR0722. The licence for ERA 53 is linked to a DA and documentation for same already resides with council. No copy of this licence SR1114 was requested.

Environmental Performance

- EPA undertook the annual site audit on 6th October.
- The audit went from 9:30am until 4pm.
- The audit consisted of a site and desktop audit by two officers of EPA.
- The audit covered
 - Last years audit was 19 November 2003
 - No breaches of compliance were noted during audit.
 - NPI reporting overdue. Must submit before 22 October
 - GELITAs next ISO 14001 audit due in February 2005

General Business

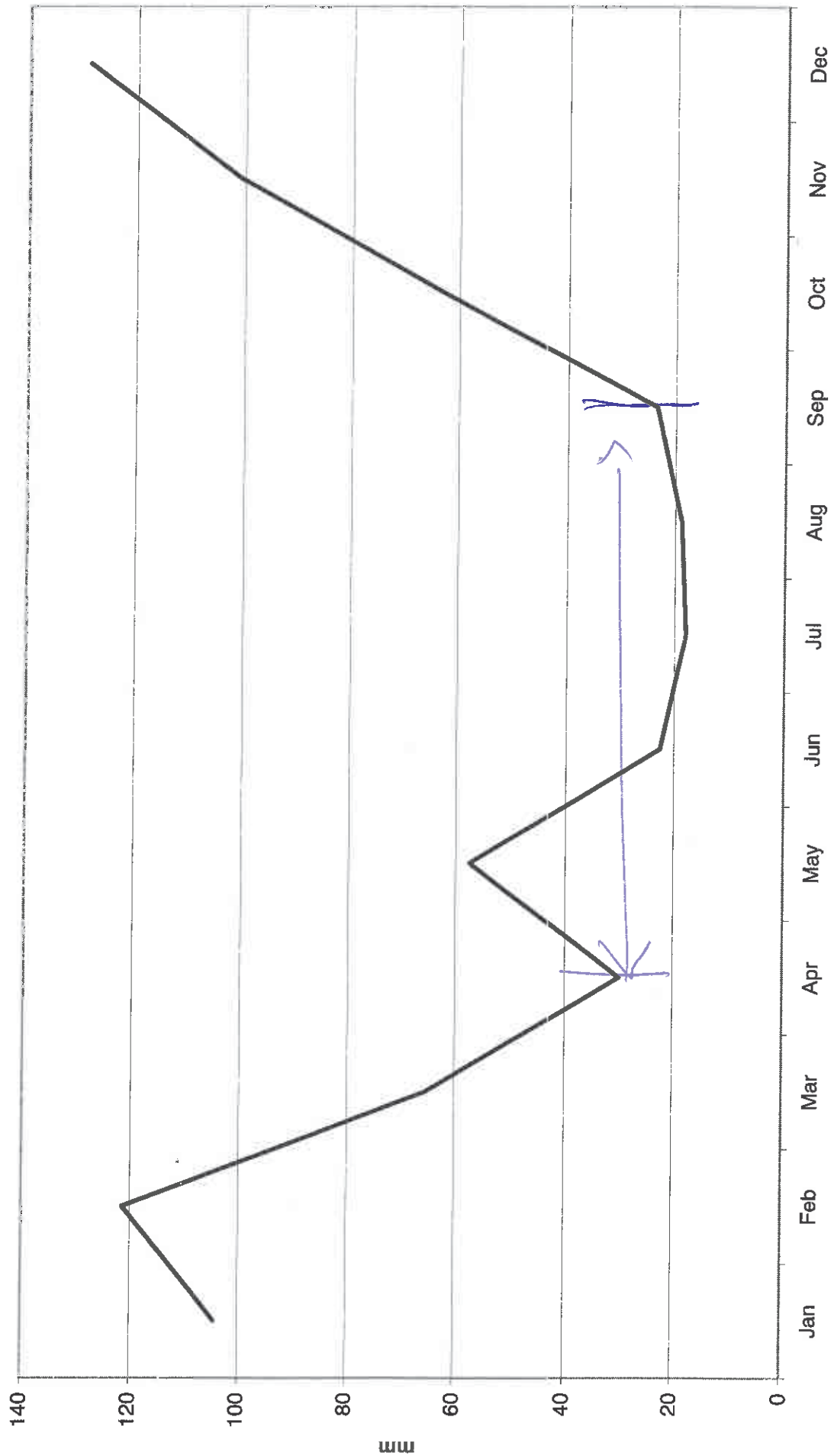
- GELITA was to investigate off-stream storage potential of damming centre gully. This investigation has been completed.
The project will not progress further at this stage as hydro-geological studies indicate limited storage capacity and cost in excess of \$1 million dollars is no practical.
- Agro-Forestry project management contract signed off with CSIRO and Treecorp and site work to start within 2 months.
- Vetiver planting for site to commence end of October
- General discussion and review of the water supply situation and implications for the shire was undertaken
- Cr Coburn agreed to supply update of BSC meeting with Minister regarding water situation.

Next Meeting

Action Item: Cr Coburn to provide GELITA with update of BSC meeting with Minister.

The date for the next Community Consultative Meeting was set down as 4 pm on 25th August 2005

Rainfall Ave/mth 95-2004



18/10/2005

GELITA ASIA PACIFIC AFRICA GELITA AUSTRALIA ENVIRONMENTAL MGT PROGRAM	Authorised by:	Document No./Revision: EP04/A
	Page Number: 1 of 6	Date Effective:

IRRIGATION MANAGEMENT PROGRAM

1.0 INTRODUCTION

Contaminants must not be directly or indirectly released from the site to any waters or the bed or banks of any waters (permitted exceptions ^{5.1}).

2.0 OBJECTIVE

To maintain soil salinity at a level conducive to optimum plant growth.

To maintain soil nutrient status at a level conducive to optimum plant growth without causing an undesirable increase in the nutrient level of the shallow ground water.

To maintain soil structure for optimum plant growth without increasing the leaching rate of nutrients to the groundwater

To irrigate wastewater in a controlled system in a manner that is not harmful to the environment

Control development of perched water table

To monitor groundwater levels to prevent rising water table and to determine the groundwater flow pattern

To control upland seepage

To minimize the impact on river water quality in the Logan River

To minimize runoff of diluted wastewater

To protect the river banks from seepage caused erosion and to minimize the effects of river flow erosion

IRRIGATION MANAGEMENT PROGRAM

3.0 MONITORING AND CONTROL

Soil Salinity

Responsibility: Environmental Officer

Time Frame: continual

Target	Monitoring and Control	Corrective Action	References
To reduce the amount of soil salinity.	Annual soil core analysis of individual irrigation areas to a depth of 1.5 metres to test for EC, Cl, NO ₃ , SO ₄ , soluble and exchangeable Ca, Mg, Na.	<p>Modify leaching fraction</p> <p>Reduce salt load in irrigation water by increasing internal recycling</p> <p>Reduce salt load in irrigation water by changing/replacing inorganic inputs</p>	

Soil Nutrient Status

Responsibility: Environmental Officer

Time Frame: continual

To sustain and obtain the optimum nutrients in the soil.	Annual soil core analysis of individual irrigation areas to a depth of 1.5 metres to test for EC, Cl, NO ₃ , SO ₄ , soluble and exchangeable Ca, Mg, Na	<p>Add manufactured fertiliser in consultation with the agricultural adviser</p> <p>Improve crop growth and performance by close proactive farm management and sound agricultural practice</p> <p>Modify upstream practices such that N onto farm is reduced</p>	
--	---	--	--

EP04/A

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IRRIGATION MANAGEMENT PROGRAM

Perched Water

Responsibility: Environmental Officer

Time Frame: continual

Target	Monitoring and Control	Corrective Action	Time Frame	References
Water table height >2m below surface	Monthly height and EC of water in appropriately installed shallow wells and piezometers	Reduction or cessation of irrigation to that area Incorporation of strategic tree planting as part of the overall farm scheme		

Groundwater

Responsibility: Environmental Officer

Time Frame: continual

Groundwater table at least >2m below surface	As per the university study, monthly height of water and testing for contaminants in piezometers	If ground water level <4m below surface commence corrective action Install bores and irrigate Reduce irrigation load Incorporation of trees into cropping system		
--	--	---	--	--

Upland Irrigation Seepage

Responsibility: Environmental Officer

Time Frame: continual

To irrigate on uplands to minimize seepage	Quarterly height and EC of water in shallow wells and piezometers in potential seepage areas Visual assessment of surface waterlogging	Construct drainage to collect and recycle seepage to balancing storage Reduce quantity of wastewater irrigated on upland areas Change irrigation management strategy Change crop type on upland areas		
--	---	--	--	--

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IRRIGATION MANAGEMENT PROGRAM

Runoff

Responsibility: Environmental Officer

Time Frame: continual

Target	Monitoring and Control	Corrective Action	References
Max TDS of runoff = 1000 mg/l	After severe storms measure EC of runoff in central gully Visual assessment of irrigation area	Increase size of runoff dams Modify design of irrigation area Rebuild contours	

River Water Quality

Responsibility: Environmental Officer

Time Frame: continual

River TDS – For 100% of river flow time TDS <1000 mg/l at downstream boundary	Data from QDNR gauging stations at Round Mountain, Bromelton Weir, and below Bromelton Weir	Use QDPI Water Resources water allocation for river dilution at low flows as a means of controlling TDS in the Logan River Install bores on southern boundary to intercept aquifer and pump water to balancing storage. Dilute and reapply Reduce Total N by increased sludge removal and increased denitrification in wastewater treatment system Stop wastewater irrigation until monitoring allows resumption of irrigation Reduce outlet BOD of aerated pond if groundwater BOD starts to increase	
River TDS – For 95% of river flow time TDS <500 mg/l over any three year period at downstream boundary N-NO3 <5mg/l at downstream boundary			

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4.0 RESPONSIBILITY

Environmental Office.

5.0 REFERENCES

- 5.1 Queensland Government, Environmental Protection Agency Licence No. SR0722
- 5.2 *Irrigation procedures*
- 5.3 Legal and Voluntary Register

6.0 REPORTING

7.0 RECORDS

Form ENVF 023/C shows when such samples are to be taken. When the samples have been taken, to sampler is sign and date ENVF 023/C.

All monitoring records are to be kept for a period not less than 5 years or as otherwise specified by the Licence.

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Re Leas

18/10/2005

GELITA ASIA PACIFIC AFRICA GELITA AUSTRALIA ENVIRONMENTAL PROCEDURE	Authorised by:	Document No./Revision: ENV005/B
	Page Number: 1 of 8	Date Effective: 04/10/05

WASTEWATER IRRIGATION PUMPING SYSTEM

INTRODUCTION

1.1 Purpose

To describe the wastewater irrigation operating system guidelines, operational parameters and corrective actions. To describe farm irrigation and runoff control system guideline operational parameters and corrective actions.

Principle

Waste water generated from process ends up in the Balancing Storage Dam, Polishing Pond, and Pump Out Pond. This water is irrigated under the supervision of the Environmental Officer.

PROCEDURE

2.1 Equipment Descriptions and Purpose

The pumping systems at the Balancing Storage Dam (BSD), Polishing Pond (PP) Pump Out Pond (POP) and Farm include the following equipment.

BSD Submersible Pump

This pump has a rated capacity of over 100 L/sec and is controlled by its own switchboard. The pump is able to pump direct to either the irrigation pumps or the Polishing Pond. This pump is also used to prime the main irrigation pumps.

B.S.D Farm Irrigation Pumps.

Located in B.S.D pump shed are 2 Southern Cross pumps powered by C.M.G. 55 K.W. Electrical motors. Each pump is controlled by its own switchboard and protected by a Murphy analogue type high and low pressure switch. The pump closest to the shed door can run up to two irrigators, Via the outlet line in the eastern side of the shed. This line has an outlet Bypass fitted to allow excess volume/ Pressure to be diverted back to Polishing pond. The other pump referred to as the "Mountain Pump", can run one irrigator, Via the outlet line on the western side of the shed. The two pumps have a common inlet manifold but separate outlet lines. Separate inline flow meters are fitted to each outlet line. Pressure Overload sensors are also fitted to all pumps, which shut down the pumps if blockages occur or outlets are shut. These are set between 120 and 140 psi.

WASTEWATER IRRIGATION PUMPING SYSTEM

The ponds/dams at the complex are as follows:

BSD Approximate storage capacity 160 ML, dead water volume (<2 ML), forced air aerated by submerged compressed air line, full storage level (FSL) at approximately 6.0 m of marker board at approximately 8.0 m of stored water.

The BSD receives water from the over flow of the POP, however water can be diverted from PP by manually setting valves. Such diversions should only occur if the POP is closed for maintenance.

PP This receives wastewater direct from the wastewater treatment plant (ex-clarifier only) as well as return flows from the irrigation pump bypasses and from the BSD submersible. It is forcibly aerated by two mechanical surface aerators and passes water to the POP over a small weir.

POP The POP receives water only from the PP and overflows to the BSD. The irrigation intake is installed in this pond.

The farm irrigation system consists of the following infrastructure:

Irrigators

Three hard hose irrigators

One soft hose irrigator

Field Pumps

Three diesel powered, trailer mounted, mobile Southern Cross pumps with petrol powered fire fighter priming pumps.

Command Lines

150 to 200 mm UVPC Class 9 and 12 underground main with hydrant heads and air valves connected to the main wastewater irrigation pumping station and connected in line to 150 mm fibro cement irrigation mains linked to the main bore field and river pump

The following devices protect the system:

Non-return valves Fitted to the main bore/river pump manifold booster pump, which stops backflow of wastewater to the bore field and factory water supply line.

Fitted to the outlet of the mountain pump in order to maintain head of water in the high-pressure mountain command line

Loss of pressure Sensors are fitted to all pumps (including the bores), which will automatically shut down the pumps in case of a line rupture. These are set at approximately 30 psi

Pressure overload Sensors fitted to all pumps, which shut down the pumps if blockages occur or all outlets, are shut. These are mostly set at 140 psi.

Isolation Valves The command system is divided into six separate areas isolated by control

WASTEWATER IRRIGATION PUMPING SYSTEM

valves, which allows areas to be irrigated whilst maintenance is being carried out on other areas.

2.2 Responsibilities

The Environmental Officer is responsible for supervising the operation and management of all of the above systems.

The Environmental Officer is responsible for ensuring MLS request required.

Scheduling and volume of irrigation shall be as directed by the Environmental Officer.

The Farm Operator shall follow direction regarding all irrigation and runoff pumping.

The Farm Operator is fully trained in the operation of this equipment.

Sampling and recording (onto ENVF005) of mag flow meter (totaliser readings) for irrigation is the responsibility of the Farm Operator.

Routine movement, fueling, care and operation of the mobile pumps is the responsibility of the Farm Operator.

The Farm Operator is responsible for maintaining the contour banks and grassed waterways culverts as per this procedure.

The Farm Operator is responsible for reporting required mechanical maintenance to the Environmental Officer.

Routine and emergent maintenance is the responsibility of Engineering staff.

2.3 Operating Guidelines

BSD The BSD forced air aeration should operate continuously.

The BSD submersible pump should be used when the rate of inflow from the factory is insufficient to meet irrigation needs. BSD may also be utilised when N levels are less than in POP.

Where WWTP inflow has a relatively high level of dissolved solids and BSD water is rich in algae, BSD water should be recirculated to the PP to aid in the polishing of the waste stream and control any potential for odour from the POP.

POP The POP should be maintained within 2.5 m of its full supply. This allows some solids to be taken into the irrigation system but also allows a small amount of sludge to accumulate over time in the base of the POP.

TRAP DAMS Irrigation runoff is managed by a series of contour banks waterways and trap dams such that no runoff water can pass directly to the natural drainage lines. These dams have a minimum capacity of 15% of the daily maximum irrigation amount per dam catchment. They trap both runoff from irrigation and first flush runoff after rain.

Irrigation scheduling is based on a combination of evaporation (measured at the weather station) and field observations of soil moisture.

The irrigation area available to the project is 121 ha.

WASTEWATER IRRIGATION PUMPING SYSTEM

2.4 Irrigation Procedure

At 7.30 am each day the flow meters at the main pump sheds are to be read by the Farm Operator.

Areas selected for irrigation by the Environmental Officer are to be inspected by the Farm Operator. Where the runoff trap dams are more than 25% full, the stored water should be pumped to the irrigation area or back to the BSD.

When irrigated areas are water logged irrigation will cease.

Where possible irrigators are to be pulled out to their maximum extent for the run. Nozzle sizes on the irrigators and bypass settings on the irrigation pumps should be set so that operating pressures at the irrigators are between 80 and 120 psi. Throw stopper on the guns are to be adjusted to match the wind conditions so that over throw or drift to buffer areas does not occur.

Reel speeds on the irrigators should be adjusted so that operating times of between 6 and 20 hours are obtained for the run.

Where possible, irrigators and runoff trap dams are to be inspected mid shift and at the end of the day. Where excessive ponding or runoff is occurring, irrigators should be turned off or sped up.

2.3 Rainfall Runoff

Runoff trap dams are to be kept less than 25% full in order to ensure that the initial component of rain induced runoff is stored.

After rainfall, runoff trap dams should be checked and the trapped water directed to the BSD.

Contour banks, grassed waterways culverts etc are to be inspected prior to each irrigation event and after rain.

2.4 Monitoring and Testing

The standard data records required on form ENVF 005 include the following:

Daily records of blocks irrigated.

Daily records of runoff water pumped back to BSD.

Daily volume of water irrigated.

At the commencement of each irrigation event, the operator should move downwind of the irrigators and determine whether any odour is likely to pass beyond the property boundary. If at any time wastewater quality and or wind conditions suggest that such cross boundary movement of odours may occur, the irrigator is to be turned off and or moved to a less sensitive location.

Diary notes of such actions are to be kept on ENVF 005.

Pan evaporation data is to be recorded daily on ENVF 030.

WASTEWATER IRRIGATION PUMPING SYSTEM

2.5 Operating Parameters

No operating parameter is directly measured from the BSD for safety reasons. All samples for the BSD are taken from reticulation water sample point at belt press. These samples are analysed for BOD, COD, TDS, TSS, Sulphide, pH, Total N and P (as per license requirements limits outlined in ENV007/C).

2.5 Monitoring and Testing

The following monitoring is to occur at the Pumping and Pond Complex.

Type	Frequency	Responsibility	Symptoms of Concern.
Mechanical and electrical	As required	Maintenance/engineering staff	<ul style="list-style-type: none"> • Over load • Excessive power use • Low operating pressures at pump • Pump noise and vibration • Leaks (Include manifold)
Irrigation water volume	Daily at meters (to be read at 7:30) Weekly BSD gauge height	Farm operator to record the meter readings daily on form No. ENVF005. Farm operator to gauge height of water in the BSD weekly onto to form No. ENVF015.	Where read outs do not match actual irrigation, or inflow and outflows, check gauges for accuracy. Check line pressure and mains for leaks.
Irrigation water EC	Weekly at outlets	Field EC by farm operator Environmental technician or environmental office.	Where EC in micro siemens times .64 times mega litres pumped divided by 121 ha is greater than 12000 kg/ha in any 12 month period a breach of licence has occurred. Report cumulative figure in monthly increments to factory management as KPIs.
BSD BOD	Weekly	Environmental technician- For management purposes BOD DO COD and BOD are measures more frequently on all ponds.	Where samples exceed 100 mg/L BOD, immediate re-sampling of the BSD taking 5 samples from each 0.5 m depth of water and averaging should be taken. A BSD figure of over 100 ppm is in breach of licence.

WASTEWATER IRRIGATION PUMPING SYSTEM

Irrigation water other tests	6 monthly sample	Environmental Technician to take at outlet of irrigation pumps, and send to outside laboratory for EC pH Cl N nitrate N Ammonium Ca Mg Total P bicarbonate and sulphate.	This data is needed to assist with nutrient mass balancing on farm and to determine medium term soil and water management strategies. The licence does not directly require them.
Dam wall checks	Weekly	Farm operator to inspect walls of BSD and record on form ENVF 015.	This is necessary to ensure safety of operation. Cracks and leaks and cause for immediate concern.

2.6 Corrective Actions and Emergency Responses

Where monitoring shows that there is a likelihood of the following licence conditions being breached, management is to be advised as early as possible to allow corrective measures to be employed:

Line Breaks/Low Operating Pressures

The section of command system causing the problem should be identified and isolated by the control valves. Repairs are to be undertaken as soon as practicable. Diary notes of such events are to be made on ENVF 005. Where a possible or actual breach of the licensing conditions exists, an Environmental Incident Report ENVF 008 to appropriate GELITA management is to be provided.

Rainfall during Irrigation

Irrigation should cease whenever the runoff trap dams are full. Irrigation can proceed if rainfall is light (less than 5-10 mm) however, the reel return rate should be sped up to ensure that runoff is not excessive.

BOD in BSD approaches 100 ppm

The BSD water should be recycled as quickly as possible through the PP to improve its aeration. Where a possible or actual breach of the licensing conditions exists, it shall be recorded onto the Environmental Incident Report form ENVF 008.

Salinity loading over a cumulative 12 month period is approaching 12.0t/ha/an.

The irrigation stream should be drawn from the lowest concentration source of water (either the BSD or the POP). Should such an event occur, this is to be recorded into daily irrigation sheet. Where a possible or actual breach of the licensing conditions exists, it shall be recorded onto the Environmental Incident Report form ENVF 008.

Where the following operational problems occur, management should be advised immediately and appropriate repairs and maintenance undertaken:

WASTEWATER IRRIGATION PUMPING SYSTEM

Pump and aeration system failures

Initiate immediate request for mechanical or electrical repairs. Where delays would result in a reduction of DO or rise in BOD, use a portable system from off site as an interim step. Ensure that minimum of 2 tonne of bulk lime is available in store in order to obtain short-term relief from odour problems. In such events an MSL request is to be completed. Where a possible or actual breach of the licensing conditions exists, it shall be recorded onto the Environmental Incident Report form ENVF 008.

Excessive accumulation of sludge in POP

The primary symptom of this will be black spray, clogging of irrigator system and reduced pump performance. Dilute the POP with BSD water, increase the rate of recycling of water back to the treatment system, import a stand by pump to recycle water from POP direct to the PP, reduce night time irrigation and increase day time irrigation. Diary notes of such events are to be made. Where a possible or actual breach of the licensing conditions exists, it shall be recorded onto the Environmental Incident Report form ENVF 008.

In the event that sludge accumulation exceeds capacity to process as above, the Environmental Officer may seek to apply the sludge to land as per the EPA Operational Guidelines.

Cracks or leaks in BSD

Management, upon notification of the occurrence of leaks or cracks in the BSD walls shall determine the appropriate course of action. Immediate expert engineering advice shall be sought.

BSD walls may be maintained through use of sprinklers during prolonged dry periods.

RECORDS

The below records are to be kept on site by the Environmental Officer for five years and archived for a total period of five years unless otherwise required for legal proceedings.

ENVF 008 Environmental Incident Report

ENVF 015 BSD water level

3.3 ENVF 005 Irrigation Data

3.4 Electronic records of the Environmental Officer shall be kept by the Environmental Officer for a minimum of 5 years, and then archived.

WASTEWATER IRRIGATION PUMPING SYSTEM

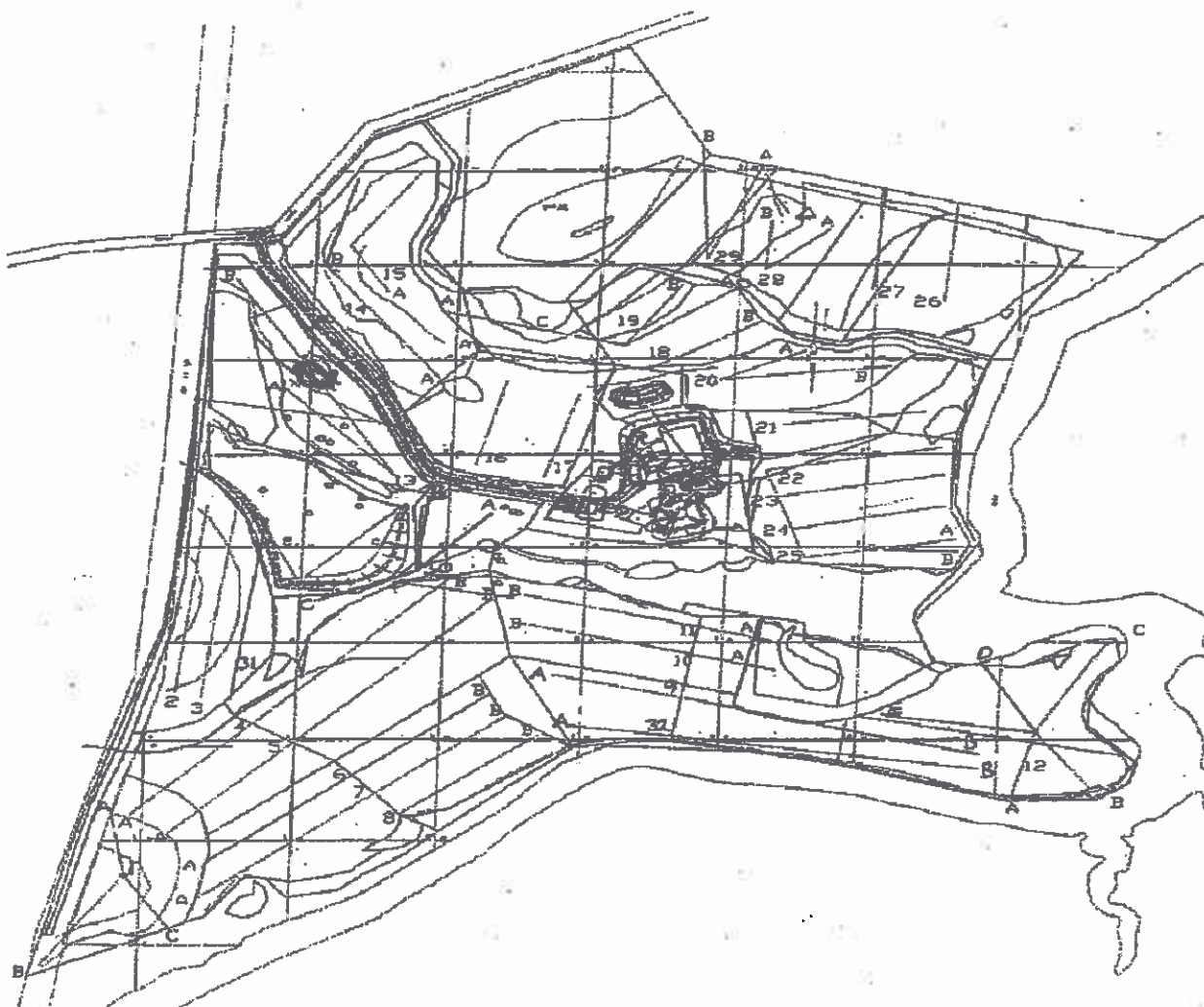
REFERENCES

EPA Operational Guidelines
Legal and Voluntary Register
EMS005 Incident Response
ENV007/C Farm Environmental monitoring.

ATTACHMENTS

Irrigation Command Lines

Attachment 5.1 Irrigation Command Lines



ENV005/A

If this document is not on blue paper it is an uncontrolled copy and the information it contains may be out of date.
Page 8 of 8

Don Shackel

From: Cameron.Smeal@gelita.com
Sent: Thursday, 6 October 2005 12:59 AM
To: UsersBeautesert@gelita.com
Cc: Don Shackel
Subject: Waste Water Biofilter Media Change

COPY

Nil Odour Complaints
RECEIVED 
18/10/2005

Please be advised that the media bed on the small waste water treatment biofilter will be replaced Thursday /Friday.

The machinery is expected to arrive on site around noon Thursday. If there are any other jobs that require an excavator or truck please let me know as soon as possible.

During the operation the fan extracting foul air from 1: the sludge holding tank and 2: the head space of the E_g tank will be switched off to allow the plant operator to work in safety. There will be some odour from these 2 points during the course of the operation. The fogging unit will be switched on to minimise the impact of any odour thus discharged.

It is expected that the job will be completed within the course of the afternoon but this is contingent on all going according to plan.

In the worst case the job will be completed on Friday morning.

There will be a 20 tonne excavator and body truck removing and replacing the spent media. This mobile plant will be moving between the large biofilter where the spent media will be placed, the compost pad to load fresh media and the new bitumen track to the small WWTP biofilter.

Please take all reasonable precautions and be aware of the machinery if in the vicinity of waste water.

Regards
Cameron Smeal
Environmental Manager
Gelita Australia
(07) 5541 9442

Don Shackel

From: Don Shackel [don.shackel@epa.qld.gov.au]
Sent: Thursday, 13 October 2005 8:27 AM
To: 'leil.mckenzie@epa.qld.gov.au'
Subject: Re: CLR / EMR CHECKS

LEIL,

Could you please confirm the INCLUSION / EXCLUSION of the following sites in / from either the EMR or CLR:

Lot 1 RP 118424, Parish of Tamrookum, County of Ward, Vol 5805 Folio 198;
Lot 2 RP 118424, Parish of Tamrookum, County of Ward, Vol 5805 Folio 199;
Lot 3 CP 862699, Parish of Tamrookum, County of Ward, Vol 8669 Folio 200;

owned by GELITA Australia Pty Ltd; and

located at:

"Sunny Hills"
Flood Road
JOSEPHVILLE via BEAUDESERT QLD 4285

Regards,

Don Shackel
Senior Inspector
Southern Region - Environmental Operations
Environmental Operations Division
Environmental Protection Agency

Ph: (07) 3225 1040
Fax: (07) 3225 8723
E-mail: don.shackel@epa.qld.gov.au

Visit us online at www.epa.qld.gov.au

Don Shackel

From: Leil McKenzie [leil.mckenzie@epa.qld.gov.au]
Sent: Wednesday, 19 October 2005 3:14 PM
To: don.shackel@epa.qld.gov.au
Subject: RE: CLR / EMR CHECKS

Hi Don,

Lot 1 & 2 RP 118424 are NOT listed on the EMR/CLR

> Lot 3 CP 862699 is the new parcel of the original base parcel site: L2 RP100815 which IS on the EMR: listed for Livestock Dip/Sprayrace.

Sorry for the late reply.

Regards
Leil McKenzie
Trainee Office Administrator
Contaminated Land Unit
Southern Region
Environmental Protection Agency

Ph: 3224 5090
email leil.mckenzie@epa.qld.gov.au

epa website: www.epa.qld.gov.au

> -----Original Message-----

> From: Don Shackel [mailto:don.shackel@epa.qld.gov.au]

> Sent: Thursday, 13 October 2005 8:27 AM

> To: leil.mckenzie@epa.qld.gov.au

> Subject: Re: CLR / EMR CHECKS

>

>

>

> LEIL,

>

> Could you please confirm the INCLUSION / EXCLUSION of the
> following sites in

> / from either the EMR or CLR:

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> Lot 1 RP 118424, Parish of Tamrookum, County of Ward, Vol

> 5805 Folio 198;

> Lot 2 RP 118424, Parish of Tamrookum, County of Ward, Vol

> 5805 Folio 199;

> Lot 3 CP 862699, Parish of Tamrookum, County of Ward, Vol

> 8669 Folio 200;

>

> owned by GELITA Australia Pty Ltd; and

>

> located at:

>

> "Sunny Hills"

> Flood Road

> JOSEPHVILLE via BEAUDESERT QLD 4285

>

> Regards,

>

> Don Shackel

> Senior Inspector

> Southern Region - Environmental Operations

> Environmental Operations Division

> Environmental Protection Agency

>

> Ph: (07) 3225 1040

> Fax: (07) 3225 8723

> E-mail: don.shackel@epa.qld.gov.au

Don Shackel

From: Cameron.Smeal@gelita.com
Sent: Thursday, 20 October 2005 9:33 PM
To: don.shackel@epa.qld.gov.au
Cc: Roger.Seach@gelita.com
Subject: Re: 18-10-2005 AUDIT FOLLOW-UP ISSUES

Regards
Cameron Smeal
Environmental Manager
Gelita Australia
(07) 5541 9442

"Don Shackel"
<don.shackel@
epa.qld.gov.a
u>

19/10/2005
04:12 PM

Please
respond to
<don.shackel@
epa.qld.gov.a
u>

To
cc
<cameron.smeal@gelita.com>
<andrew.connor@epa.qld.gov.au>
Subject
Re: 18-10-2005 AUDIT FOLLOW-UP
ISSUES

CAMERON,

I would appreciate your comments, when convenient, concerning a few additional matters which I failed to raise during our audit on 18/10/2005:

1.
The EPA Contaminated Land Unit has indicated the following concerning "Sunny Hills":

Lot 1 & 2 RP 118424 are NOT listed on the EMR/CLR
Lot 3 CP 862699 is the new parcel of the original base parcel site: L2 RP100815 which IS on the EMR: listed for Livestock Dip/Sprayrace.

Does a Cattle Dip / Spray Race still physically exist on site or has it long since been securely buried / sealed under infrastructure / earth?

Don, pls refer our correspondence of approximately 26/11/01 on this matter. I had discussions with Tess Dobinson (Registrar Contaminated Land Unit) and with John Taylor (EPA) at the time and advised both of them that the original spray race was under several hundred tonnes of earth (the aeration pond is believed to have been the approximate location of the original race.) I also advised them at the time that I was unable to locate any evidence that the previous owner had notified the company of the registration of the property on the original contaminated sites register. They subsequently forwarded me a copy of the letter send to Biggers in 1993

which stated that the site had only been classified as a PROBABLE site.

2.

Does GELITA operate AMMONIA refrigeration plant on site and if so, approximately what volume of liquor maintains the system? My sites running AMMONIA refrigeration plants are being encouraged to CONSIDER developing AMMONIA release emergency response plans, as a DUE DILIGENCE measure, following an number of recent abattoir discharges having the potential to impact residential areas (wind-driven etc.), however, considering the extensive buffer areas surrounding your facility, you may not consider such preparedness to be a priority for GELITA and that is understood.

GELITA currently operates a cooling system for the votators that relies on about 120 kg of ammonia. We will in the future (next year probably) be installing an ice machine with a total fill of around 750kg. It will be the responsibility of the site safety personnel to ensure that the appropriate emergency response plans are amended to the required standards. Installation of the new unit will also done in compliance with the standards.

3.

In view of recent publicity, I have also been highlighting ASBESTOS issues with clients suggesting that a site survey be completed to set up an ASBESTOS material register for the operation, if relevant and where necessary draw the attention of staff to such material, through labelling and/or OH&S awareness training (GED / Duty of Care issue).

Our Engineering Manager has assured me that we do not have asbestos on this site. All boiler lagging is rock wool/fibre and the lagging ropes are composites. We do not have asbestos roofing and the only possible/potential/unconfirmed source of asbestos would be if the old cottage ceiling liner was asbestos cement sheeting.

4.

Finally, could you please FAX or E-MAIL me a copy of your SR0722 / SR0007DA audit document originally provided to the EPA with your Jan 2005 Annual Return material, my copy of which I left with you yesterday, during the licence conditions review process.

Don, not certain what it is you left as there is nothing on my desk. Could you please clarify? I have also recovered your camera case and spare battery from the paddock. I will forward to you this week.

Just a few more issues to take up your valuable time!

Regards,

Don Shackel

PS -- Had good feedback from Wade this morning concerning his visit to GELITA!

Don Shackel

Senior Inspector
Southern Region - Environmental Operations
Environmental Operations Division
Environmental Protection Agency

Ph: (07) 3225 1040
Fax: (07) 3225 8723
E-mail: don.shackel@epa.qld.gov.au

Visit us online at www.epa.qld.gov.au

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Checklist

Annual Return for Environmental Authority

Assessment of Annual Return

This Checklist is to be used for the Assessment of Annual Returns.

Checklist for Assessment of Annual Return

This checklist aims to assist persons in assessing the content of annual returns and identify any outstanding issues that require further action. If you place a tick in any of the shaded boxes in the checklist, an explanation of any further action that was considered or recommended should be provided.

1. Environmental Authority Holder:	GELITA Australia Pty Ltd
2. Environmental Authority Number:	SR0722
3. Premises:	"Sunny Hills", Flood Road, Josephville via BEAUDESERT, Q 4285
4. Are the above details correct on the licence and the annual return?	YES
5. Has the annual return been signed?	YES
6. Date received:	31/01/2005
7. Date assessed:	2/11/2005
8. Assessed by:	Don Shackel, Site Officer, Heavy Industry Group
9. Time taken to assess:	2 hours
10. Supervising Officer:	Andrew Connor, OM, Heavy Industry Group

Environmentally Relevant Activities (are they correct?):

YES - ERAs: 50(b) - Rendering operation (Gelatine manufacture), 17 - Fuel burning and 15(a) - Sewage treatment

Assessment of Annual Returns	Yes	No	N/A
1. Is the holder required to complete monitoring / reports as a condition of the environmental authority or development approval	☒	☐	☐
2. Have the required monitoring / reports been completed in accordance with the environmental authority or development approval (Note: It is not necessary under this point to	☒	☐	☐



Checklist Assessment of annual returns

review the reports, just to ensure that the holder states that they have completed the reports on the annual return)			
3(a) Has holder stated that they have fully complied with environmental authority or development approval conditions and environmental duty	☒	☐	☐
3(b) If NO to 3(a), have any details of non-compliance been provided	☐	☐	☒
4. Correct annual fee lodged (N/A if fee waiver application has been lodged)	☒	☐	☐
5(a) Is this annual return for ERA 83?	☐	☒	☐
5(b) If YES to 5(a) have applicable forms been returned for licensed vehicles	☐	☐	☒
6. Notice of regulated waste vehicles registered with administrative authority	☐	☐	☒
7(a) Has rehabilitation of disturbed land been undertaken	☐	☐	☒
7(b) Have any details of unsuccessful rehabilitation been provided (N/A if no unsuccessful rehabilitation)	☐	☐	☒
Fee Waiver Application Submitted			
8. Fee waiver risk assessment checklist completed (In accordance with Operational Policy of Fee Waivers)	☐	☐	☒
Complaints			
9. Any Complaints / incidents noted in annual return registered on Ecotrack	☒	☐	☐
10. All complaints recorded on file	☒	☐	☐
11. Are there any outstanding complaints	☐	☒	☐
12. Do any registered complaints indicate a breach of environmental authority or development approval conditions	☐	☒	☐
Compliance			
13. Have any compliance inspections or environmental audits been carried out on the site in the past 12 months	☒	☐	☐
14. Did the inspection / audit show any breaches of environmental authority or development approval conditions	☐	☒	☐
15. Were any actions required as a result of the inspection/audits	☐	☒	☐
16. Are there any ongoing compliance issues	☐	☒	☐
17. Have any EMP's, Environmental Evaluations, or EPO's been issued for the site	☐	☒	☐
18. Has there been any enforcement action for the site – including amongst other things warning notices, and PINs.	☐	☒	☐
18. Are there any outstanding issues from questions 17 and 18	☐	☒	☐
19. Are there any outstanding critical dates	☐	☒	☐

Checklist Assessment of annual returns

Issues			
20. Outstanding issues identified Details: Additional monitoring requirements of agricultural-based outcomes arising from EMP No.SR1157 were included in Schedule H during amendment of SR0722 (See below) and the progress of these issues was reviewed during the most recent site audit and inspection completed on 18/10/2005 (See also 'Compliance Program - Inspection Checklist' from 18/10/2005 - Attached).	☒	☐	☐
25. Letter of request sent	☐	☐	☒
26. Further action Details: Recent reviews of conditions included in SR0722 were completed during formal environmental audits and site inspections of the Josephville operations of GELITA Australia Pty Ltd completed on 6/10/2004 and 18/10/2005 (Copies attached - 'Compliance Program - Inspection Checklist' from 6/10/2004 and 18/10/2005), when Company operations were found to be in compliance with the conditions of Registration Certificate No.SR0722 and with the general provisions of the EP Act, at the time of the inspection. NOTE: Assessment of EMP No.SR1157 "Final Report" was completed early in 2004, with closure of the 4.5 year process advised to the Company by EPA letter of 2/03/2004. EPA accepted outcomes arising from EMP No.SR1157 "Final Report" (File Note of 12/05/2004 - Copy attached) requiring amendment of conditions / limits / monitoring requirements included in SR0722 and this action was completed / approved by the Administering Authority on 1/06/2004.	☐	☒	☐

Assessing Officer:

Don Shackel

sch4p4(6) Person



Date: 2/11/2005

Position:

Senior Inspector

Supervising Officer:

Andrew Connor

sch4p4(6) Pers



Date: 8/11/05

Position:

Operations Manager

Disclaimer:

While this document has been prepared with care, it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to the Environmental Protection Agency should satisfy themselves independently and by consulting their professional advisors before embarking on any proposed course of action.

EPA SOUTHERN REGION			
Correspondence No. STH2005		Barcode No. 600	
File No. STH495	PART 8	FOLIO	
Action Officer Andrew Connors		Related Items	

Annual return

Environmental Operations

For environmental authority (non-mining) or integrated authority

This form must be completed and submitted to the administering authority each year by the holder of an environmental authority or integrated authority under the Environmental Protection Act 1994. Please answer the questions on this form in order, unless instructed to go to another question and label attachments alphabetically (e.g. "Attachment A").

OFFICIAL USE ONLY

DATE RECEIVED

31 / 1 / 2005

FILE REF

STH495

PROJECT REF

SR722

COMPLETE FORM



CORRECT AA



COMPLETE FEE



ENTERED BY (SIGNATURE)

scnip4/ 6/ Personal

Eve Riley

DATE

2 / 2 / 2005

All reports must be held in the same place and be available for inspection by the administering authority during business hours. You must forward the reports to the EPA on request or when the licence has either expired (provisional licence only), been surrendered (licence [without development approval] only) or cancelled.

See the guide for presenting data on pages 4 and 5.

1. Environmental authority¹ holder

NAME

GELITA Australia Pty/Ltd

2. Responsible person

NAME

Mr Roger Seach

3. Current environmental authority¹ numberENVIRONMENTAL AUTHORITY¹ NUMBER

SR0722

4. Does a condition of your environmental authority¹ or development approval (for a licence [with development approval]) require you to carry out any monitoring and/or prepare reports on your environmentally relevant activity?

☒ YES → Please do not submit the report(s) with this annual return — fill out the information below. If you require more space, attach additional information.

☐ No → Go to section 6.

Location of reports and/or monitoring

LOCATION

"Sunny Hills" Josephville

NATURE OF REPORT AND/OR MONITORING	PREPARED BY	DATES COVERED
Licence self monitoring/Annual return	C.Smeal	31 Jan 2004- 31 Jan 2005

¹ Including integrated authority.



For environmental authority (non-mining) or integrated authority

If the activity(ies) the subject of your environmental authority have or will be altered since the time your environmental authority was issued, your environmental authority may need to be amended. Contact your local EPA office for advice.

- 5. Have you completed all monitoring and/or reports as required as a condition of your environmental authority¹ or development approval (for a licence [with development approval])?**

☒ YES → Go to section 6.

☐ NO → Please attach a statement outlining your reasons for not completing all the required reports with this annual return.

- 6. If you choose, you may submit additional information with this annual return.**

For example, achievements, capital works, training, monitoring, new pollution controls, consultancy and related costs.

If you wish to submit information about non-compliance incident/s by way of a program notice (section 350 of the EP Act), please contact your local EPA office for the approved form. For information about your general environmental duty, see sections 319 and 320 of the EP Act.

- 7. Since your last annual return, have you fully complied with the conditions of your environmental authority¹ or development approval (for a licence [with development approval]) and your general environmental duty?**

☒ YES → Go to section 8.

☐ NO → Provide a description of the non-compliant incident/s and remedial action undertaken in response to the incidents/s. You may wish to submit program notice/s for non-compliant incidents.

- 8. Is this annual return for environmentally relevant activity 83 — Regulated waste transport?**

☐ YES → You will need to complete the EPA form "Details of regulated waste vehicles" and submit it along with this annual return

☒ NO → Go to section 9.

COPY

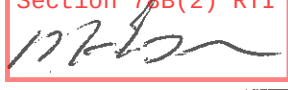
For environmental authority (non-mining) or integrated authority

The annual fees for all ERAs are listed in Schedule 1 of the *Environmental Protection Regulation 1998*. You can also contact your local EPA office for advice.

9. Declaration

Note: If you have not told the truth in this annual return you may be liable for prosecution under the relevant Acts or Regulations.

- I enclose the prescribed annual fee of \$6020.
- I do solemnly and sincerely declare that the information provided is true and correct to the best of my knowledge and I make this solemn declaration conscientiously believing the same to be true and by virtue of the provisions of the *Oaths Act 1867*.
- I understand that all information supplied on or with this application form may be disclosed publicly in accordance with the *Freedom of Information Act 1992* and the *Evidence Act 1977*.

APPLICANTS SIGNATURE 		Section 78B(2) RTI 
APPLICANTS NAME Roger Seach		DATE 28 January 2005

If you have any queries about how to complete this annual return correctly or need guidance on supporting information required please contact the help desk on 1300 368 326.

10. Annual return checklist

Annual return completed and signed

Annual fee enclosed

Supporting information or accreditation attached (if applicable)

To access a list of Statewide licensing contact points for the EPA visit our website at www.epa.qld.gov.au for a copy of the information sheet: "Contact details for licensing under the EP Act".

Please return your completed annual return to:

**Ecoaccess Customer Service Unit
Environmental Protection Agency**

PO Box 155
Brisbane Albert Street
Queensland 4002

Enquiries: **1300 368 326**
Facsimile: (07) 3115 9600
E-mail: eco.access@epa.qld.gov.au

COPY



ASIA PACIFIC AFRICA

28 January 2005

The Regional Manager (Environment)
Environmental Protection Agency
GPO 2771
BRISBANE QLD 4001

COPY

ATTENTION: MR DON SHACKEL

Dear Don:

RE: Annual Return-Environmental Authority SR0722
Annual Return-Environmental Authority SR1114

Please find attached two annual return Section 316 and cheque for annual fees of \$6420 being payment for both of the Authority's specified above.

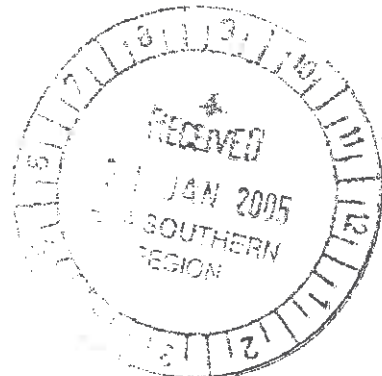
As discussed, full reports will be submitted by the end of February.

Please direct any queries you may have regarding these reports to Cameron Smeal on (07) 5541 9442.

Yours Sincerely,

sch4p4(6) Personal inf

Cameron Smeal



Gelatine Pharmaceutical Gelatine Photographic Gelatine



Hydrolysates

Instant Gelatine

Special Gelatine

GELITA Australia Pty Ltd. ABN 83 000 010 597

"Sunny Hills" Flood Road Josephville via Beaudesert QLD
PO Box 409, Beaudesert, Queensland 4285 Australia
Telephone 617 5541 3544 Facsimile 617 5541 3612
www.GELITA.com



**Queensland
Government**

Environmental Protection Agency

Incorporating the
Queensland Parks and Wildlife Service

Enquires Karen Francis
Telephone (07) 3225 1062
Our reference STH495

2 February 2005

COPY

Gelita Australia Pty Ltd
"Sunny Hills"
Flood Road
JOSEPHVILLE via BEAUDESERT QLD 4285

Attention: Mr Robert Wearne

Dear Mr Wearne

Re: Annual Return Licence No. SR722

Thank you for payment of your annual licence fee of \$6,020.00 and submission of your Annual Return for your activity/ies located at:

"Sunny Hills" Flood Road JOSEPHVILLE via BEAUDESERT QLD 4285

A copy of the receipt is enclosed for your records.

Your annual licence fee covers the period from 31 January 2005 until 30 January 2006.
The annual licence fee has been excluded from GST by the Commonwealth Government.

The annual return is being reviewed by our licensing staff and you may be contacted should further information be required regarding compliance with conditions of your licence.

Yours faithfully

sch4p4(6) Person

Karen Francis
Environmental Support Officer

Environmental Protection Agency
ABN 87 221 158 786
TAX INVOICE / RECEIPT



Queensland
Government

A 156970

Date: 31.01.05

RECEIVED by Cash/Cheque from Gileta Australia

Insert here name of drawer of cheque

) the sum of Six Thousand Four Hundred and Twenty

dollars _____ cents

on account of the Queensland Government, for Annual Return

4023

WBLOOSROR

Price Excluding GST:

\$ 6420 . -

GST (if applicable):

\$ - - -

TOTAL PRICE INCLUDING GST:

\$ 6420 . -

Signature: [Signature]

Cheques or other negotiable Instruments accepted subject to clearance

'Sunny Hills', Flood Road
Josephville via Beaudesert QLD 4285

PO Box 409, Beaudesert
QLD 4285 Australia

Telephone 07 5541-3544
Facsimile 07 5541-3612

Pty Ltd.

Vendor Code: 201755

Date: 28/01/05

Cheque No. 540683

THE GELATINE GROUP

Remittance Advice

Supplier: ENVIRONMENTAL PROTECTION AGENCY
PO BOX 155
ALBERT STREET
BRISBANE QLD

4002

Invoice Date	Invoice Number	Invoice Amount	Discount Amount	Payment Amount
12/11/04	SR1114	400.00		400.00
12/11/04	SR722	6020.00		6020.00
Cheque Total				\$ 6420.00



COPY

Checklist

Compliance

Compliance Program — Inspection Checklist

Instructions for use

Where an Agency issue is determined to be relevant, note appropriate detail in the observations section.
Where there is any non-compliance, discuss with the company representative and note any required action.
Where the assessment will include licence conditions, use the licence condition compliance section of the checklist.

This checklist is to be used for all inspections. Refer to the procedural guide for guidance.

Cover Sheet Module:

Company Name: GELITA Australia Pty Limited		Date of Inspection: 18/10/2005
Trading as: GELITA – ASIA PACIFIC AFRICA		RC No.: SR0722
Description of Business Activity: ERA 50(b) – Rendering operation (Gelatine manufacture)		
Site Street Address: Flood Road		
Suburb: Josephville	City/Town: Beaudesert	Post Code: 4285
Registered Office Address:		
"Sunny Hills", Flood Road, JOSEPHVILLE via BEAUDESERT QLD 4285		
Suburb: JOSEPHVILLE	City/Town: BEAUDESERT	Post Code: 4285
Site Representative: Cameron Smeal	Position: Environmental Manager	Contact phone: (07) 5541 9442

Inspection type	☐ Catchment	☐ Industry Sector	☐ Complaint	☒ Compliance
Compliance level	☐ 1	☐ 2	☒ 3	Inspection type
				☐ A
				☐ B
				☒ C
Audit focus is the following relevant Agency interests:				
☒ Water issues ¹	☒ Air issues ¹	☒ Noise issues ¹	☐ National and international	
☒ Land issues ¹	☒ Waste issues ¹	☒ Social issues	☒ Impacts on surrounds	
☐ Coastal issues	☐ Heritage issues	☐ Biodiversity		
☒ Resource allocation	☐ Tenure issues	☐ Other issues		

¹ Main issues to consider for *Environmental Protection Act 1994* focus.

DETAILS OF SCOPE OR PARTICULAR FOCUS**HISTORIC REVIEW:**

GELITA Australia Pty Ltd, previously Davis Gelatine Australia Pty Limited, recently acquired by German private business interests from Goodman Fielder (2003), has now completed EMP No. SR1157 concerned with, *"Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner"*, which reached full term for completion on 30 September 2003. E-mail advice from the Company at the due date of the reporting period on 30 October 2003, indicated that EMP No. SR1157 was completed and written-up, apart from "two final items from external sources for inclusion in the report", viz; an effluent stream characterisation under the cleaner production section and monitoring schedule from the Company soils consultant. The EPA received the "total" final report relevant to EMP No. SR1157 on 20 November 2003.

Subsequently, licence limits requirements included in SR0722, for treated wastewater parameters such as Total Nitrogen and Total Dissolved Solids, previously observed as not always achieving compliance on an historic on-going basis, were addressed by the EMP review process, within a "holistic" context, for the site. The company regularly provided progress reports over the lifetime of EMP No. SR1157 to the EPA, for assessment and information, indicating milestones towards achieving compliance by 30/09/2003.

Following internal assessment of the "progress" and "final completion" reports, together with "supporting information" provided by GELITA in relation to EMP No. 5080001157 (SR1157), originally approved on behalf of the former Leiner Davis Gelatin International Limited, as suitable, "Compliance / Completion Reports", in respect of the EMP, the EPA considered that the Company had achieved compliance with the matters dealt with by the program. Outcomes arising from completion of EMP No. SR1157, indicated a need to seriously reassess, amend and delete some or all treated wastewater limits from SR0722. Subsequently, following negotiated discussion of licence changes, between EPA Regional Management (D Brown, K Roberts, D K Shackel) and the then Company Environmental Officer (Cameron Smeal), the EPA approved amendment of SR0722 on 1/06/2004. See also: *GELITAAustSR1157EMPCompletionMemo.doc*.

EMP No. SR1157 outcomes indicated that sustainability of application of treated wastewater to on-site land will be achieved through a mix of options including; pasture / grazing systems (including Vetiver Grass), cropping (cutting & exporting hay products) and agro-forestry, which plant products will / may become a raw material source (green waste) for **on-site compost-making**, utilising all processing wastes generated by gelatine manufacturing ("skutch", belt-press sludge, boiler ash) for total on-site soil conditioning purposes.

To this end, the EPA approved continuation of composting activities on site late in 2003, following an initial 12 month waste composting project period (September 2002-September 2003) to trial processing methodology and assess outcomes (an 'Odour Control Plan' remains in place), with a view to long term, on-going total waste utilisation / recycling on site. GELITA Australia Pty Limited holds SR0007DA (with conditions) and SR1114 for ERA 53, relevant to "soil conditioner manufacturing". The company contracted part-time consultancy services from Johannes Biala of "The Organic Force", to assist with the composting project. The composting consultant Company has prepared a report dated October 2003, titled *"Assessing the Suitability of Covered Windrow Composting for On-site Processing of Gelatine By-products"*, for GELITA Australia Pty Ltd, which was also made available to the EPA. See also, *GELITASR0007DAComplianceProgramInspectionChecklist06102004.doc*.

2004/2005 AUDIT OVERVIEW:

2004 was the first period of consolidation for the treated effluent utilisation project following sign-off of EMP No.SR1157. As year one (1) in a seven (7) year establishment / installation program to fully implement the outcomes of the EMP, primarily energies were directed towards establishment of the Agro-forestry tree plantations and Vetiver Grass plantings to utilise irrigated treated wastewater. At the same time, irrigation control tools including, "Permeameter", "FullStop" and "LongStop" equipment have been utilised / installed to monitor critical soil infiltration and hydraulic conductivity parameters. The latter equipment has also begun to be used to provide liquid samples for determining salt and nitrate movement past the root zone to a soil depth of 1.5 metres. Groundwater monitoring recommenced following refurbishment of relevant piezometers (10 metre). Both liquid and solid applications of lime to control low soil pH values remains under investigation, after initial liming trials proved to be inefficient. For additional in-depth detail concerning the above projects, see **"GELITA AUSTRALIA – Farm Management Progress Report: October 2005"**, prepared by Company Soils Consultant Dr B M Schafer (Attached).

Also, a number of proposed site-based farm projects will assess compost incorporation to improve saline and sodic soils, a soil-based reed bed using Vetiver Grass for the treatment of effluent and the use of Vetiver Grass for remediation of herbicide contamination in surface and sub-surface water.

SITE CONTACT:

A review of conditions included in SR0722, followed by a subsequent site inspection were undertaken as part of the formal site audit completed on 18/10/2005, with the Company Environmental Manager, Mr Cameron Smeal. Six (6) personnel constitute the environmental group servicing the "Sunny Hills" Josephville gelatine manufacturing operation of GELITA Australia Pty Ltd.

PHOTOGRAPHS:

A series of 30 digital photographs taken during the site audit on 18/10/2005 indicate the current environmental status of the site, particularly with regard to land disposal issues and stormwater protection aspects, the composting operation, together with a limited number of records of external processing plant / infrastructure.

CHUCKLE / ECOTRACK:

A review of CHUCKLE, ECOTRACK and Company files, STH495 records for 2004/2005, indicated that any complaints received by the Company had been actioned and reports provided to the EPA, in each instance (4 odour complaints on file **Richards** noted for the period between the 2004 and 2005 October site audit dates – See also comments under **Condition G1** below).

Agency Interests Module:

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

ADMINISTRATIVE:

- Registration Certificate No. SR0722 (without development approval) (Section 93)
- The Company name, the registered business address of the Queensland legal entity and the activity location address were all confirmed as **CORRECT**.
- ASIC search provided a "Current Extract" for Organisation Number ACN 000 010 597 – Section 1274B – See attached printout.
- ERA Items – confirmed "no change" for the Josephville operation, at this time [ERAs 50(b), 15(a), 17 & 53].
- Real Property Description – confirmed "no change" for the Josephville site, at this time.
- Registration Certificate No. SR0722 "Effect Date" – 8/06/2004.
- Registration Certificate No. SR0722 "Anniversary Date" – 31 January (Amended from 4 November on 1/06/2004).
- CLU advice dated 19/10/2005 (Attached) indicates that historically the previous dairy farm activities of "Sunny Hills" included the operation of a cattle plunge dip and/or spray-race, prior to acquisition by GELITA Australia Pty Ltd. As such, the site remains an Item 22 **NOTIFIABLE ACTIVITY**, viz; "Livestock dip or spray race operations—operating a livestock dip or spray race facility", as defined in Schedule 2 of the *Environmental Protection Act 1994*. Subsequently, an information request was forwarded by e-mail to GELITA on 19/10/2005 requesting comment concerning the Item 22 EMR listing of the site. GELITA responded by e-mail of 20/10/2005 as follows: "Don, pls refer our correspondence of approximately 26/11/01 on this matter. I had discussions with Tess Dobinson (Registrar Contaminated Land Unit) and with John Taylor (EPA) at the time and advised both of them that the original spray race was under several hundred tonnes of earth (the aeration pond is believed to have been the approximate location of the original race.) I also advised them at the time that I was unable to locate any evidence that the previous owner had notified the company of the registration of the property on the original contaminated sites register. They subsequently forwarded me a copy of the letter sent to Biggers in 1993, which stated that the site had only been classified as a PROBABLE site."
- **AMMONIA** status of the site – During e-mail contact with Company audit / inspection personnel on 19/10/2005, the need for development of an Ammonia release emergency response plan for the operation was promoted. GELITA responded by e-mail of 20/10/2005 as follows: "GELITA currently operates a cooling system for the votators that relies on about 120 kg of ammonia. We will in the future (next year probably) be installing an ice machine with a total fill of around 750kg. It will be the responsibility of the site safety personnel to ensure that the appropriate emergency response plans are amended to the required standards. Installation of the new unit will also done in compliance with the standards."
- **ASBESTOS** status of the site – During e-mail contact with Company audit / inspection personnel on 19/10/2005, the matter of Asbestos was canvassed and was indicated by the Company not to be an issue of concern for the site workforce. GELITA responded by e-mail of 20/10/2005 as follows: "Our Engineering Manager has assured me that we do not have asbestos on this site. All boiler lagging is rock wool/fibre and the lagging ropes are composites. We do not have asbestos roofing and the only possible/potential/unconfirmed source of asbestos would be if the old cottage ceiling liner was asbestos cement sheeting."

NOTE: With regard to ERA 50(b) – Rendering operation, Cameron Smeal requested that his contention that he did not consider gelatine manufacture a rendering process be recorded. These comments were acknowledged by EPA Officer Don Shackel who considered / indicated that wording in the ERA definition including, "processing or extracting substances, including, for example, ----- proteinaceous matter, from animal wastes or by-products", were relevant to the GELITA Australia Pty Limited, Josephville Gelatine operation.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

ASSESSMENTS & OBSERVATIONS:**Schedule A - General Conditions:**

A1 – In-Compliance – GELITA operates a standard maintenance card, work request-advice / corrective-action system which is currently being upgraded to a computer-driven MFG-PRO system, with added MLS engineering / preventative maintenance workshop application, together with the current MIS accounting / stores purchasing system, which apart from other duties, is intended to address equipment, plant and building maintenance aspects, to reduce / minimise environmental risk. A proactive, in-house environmental audit process designated 'ENVIRONMENTAL WALK' identifies site deficiencies for remedial action, on a regular basis, using the job cards, work request, corrective action follow-up procedure, to achieve improvement (Sighted).

A2 – In-Compliance – GELITA Registration Certificate (Licence) SR0722 is displayed in the office foyer and the amenity areas on site, while each member of staff has been provided with a copy for personal use, during Company training sessions.

A3, A4 – In-Compliance – The formal audit completed on 18/10/2005, confirmed that Company environmental records are maintained / available as prescribed (Sighted).

A5 – In-Compliance – GELITA indicated that the Company was targeted to achieve a progressive / continuing increase in gelatine yield over recent figures (2500 MT), in the next 2 years (2005/2006), without any "increase in the risk of environmental harm / nuisance" – the current annual gelatine production goal is around 3000 MT. At the same time, processing effluent volumes have shown real reductions in disposals, due to ongoing improved plant water saving procedures.

A6 – In-Compliance – The calibration records file was perused during the formal site audit completed on 18/10/2005 (Sighted).

A7 – In-Compliance – GELITA indicated that four (4) odour complaints had been advised / recorded since the previous site audit completed on 6/10/2004. Odour sources identified included; raw materials receipt area and a power outage-initiated mechanical plant failure.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

A8, A9, A10, A11, A12, A13, A14 – In-Compliance – IEMS - Updating / amendment of the documentation was initially linked to company progress towards ISO 14001 certification [A14], which was achieved on 6/08/2003, prior to the time of a previous formal audit completed on 29/10/2003 (A12, A13, A14). Copies of SGS International Certification Services Pty Ltd documentation, *“Environmental Management Systems Preliminary Audit”* (28/04/2002-1/05/2002) and *“Environmental Management Systems Certification Audit”* (4-6/08/2003) of GELITA Australia Pty Ltd to AS/NZS ISO 14001:1996, were provided to the EPA during the formal audit completed on 29/10/2003. An SGS *“Audit Status and Itinerary”* form listed *“Standard Clauses”* of the *“Document Report Review”* for the ISO 14001 Environmental Management System (IEMS) assessment. SGS Certificate AU03/1818 was issued concerning the management system of GELITA Australia Pty Ltd, Flood Road, Josephville, QLD 4285 Australia, that was assessed and certified as meeting the requirements of ISO 14001:1996, for the following activities, *“Management of environmental effects associated with processing plant operations for manufacture of edible grade gelatins as well as the treatment and disposal of wastes.”* (Certificate valid from 06/08/2003 until 06/08/2006 – Issue 1. Certified since 06/08/2003).

Subsequently, ongoing Company certification assessment under updated AS/NZS ISO 14001:2004 was completed during 2004/2005, when SGS Certificate AU04/1818 dated 23/05/2005 was issued to GELITA Australia Pty Ltd, in respect of the following Josephville activities; *“Management of environmental effects associated with processing plant operations for manufacture of edible grade gelatins as well as the treatment and disposal of wastes”*. (Certificate AU04/1818 is valid from 06/08/2003 to 06/08/2006 – Issue 2. Certified since August 2003 – Copy attached).

The Company progressive staff training matrix was confirmed / sighted during the formal site audit completed on 18/10/2005 [A9(iii)].

The availability of prescribed environmental performance (“Annual Return” 2004 includes a GELITA in-house Audit reconciled against SR0722 conditions and *“GELITA Australia – Farm Management Annual Audit”* dated 31 January 2005 by Dr B M Schafer) and energy audits / reviews (See *“Natural Gas Feasibility Study”* Draft Report 3/11/2004 prepared by W Nicolle – 2004 “Annual Return”) were advised to the EPA with the 2004 Annual Return received by the Agency on 31/01/2005 (Material provided 21/09/2005 – previously with-held awaiting call-up by the EPA), [A9(iv), A10, A11].

On-site gelatine processing waste utilisation / composting trials were successfully completed (2003) with a view to achieving total internal recycling of nutrients, in due course (See, *“Development of Composting Operation at ‘Sunny Hills’, Beaudesert – 2004”* compiled by Consultants “The Organic Force” – 2004 “Annual Return”) [A9(v)].

The GELITA “Annual Return” for SR0722 for 2004 was received by the Agency on 31 January 2005, following the recent processing of a Company request for amendment of anniversary date from 4 November to 31 January, when appropriate reporting was provided / reviewed [A9(iv)(a)(b), A9(v), A10(i)(ii) & A11].

Energy auditing requirements called-up under Conditions A9(iv)(c), A10(iii) & A11 were provided as prescribed by SR0722 with the 2004 “Annual Return” (See reference above).

With the approved amendment of the anniversary dates for both SR0722 and SR1114 to 31 January (next due 31/01/2006), Company annual returns will now be received approximately 2-3 months later than previously available.

A15 – In-Compliance – GELITA consults with a local community (residents and Local Government [BSC] representatives) environmental liaison committee (Community Consultative Committee) on a quarterly to six monthly basis regarding complaints received, site environmental performance review and any other environmental / general business issues. An example copy of Minutes of a Community Consultative Committee (CCC) Meeting held during 2004 was provided to the EPA, where on-site project matters were discussed (Attached). During the formal site audit completed on 18/10/2005, Cameron Smeal indicated that difficulty was being experienced by Company Management to have participants attend CCC meetings, due to general satisfaction with the Company's ongoing performance.

A16 – In-Compliance – GELITA operates an “open transparent approach” in meeting the requirements of this Condition, concerning EPA access to the site.

Schedule B - Air:

B1, B2 – In-Compliance – GELITA has measures in place to minimise the release of contaminants (Boiler emissions, odour and dust controls) to atmosphere (See comments below).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

B3-B5 – In-Compliance – Release Points information included in Schedule B – Table 1 remains relevant and correct, except for the “pre-empted” Co-generation Plant release point, which remains in the planning stage.

B6, B7 – In-Compliance - Boiler Emissions Testing – Previously / historically, C Smeal / R Wearne had provided to the EPA a report of February 2003 titled, “**Stack Emissions Monitoring and Biofilter Odour Assessment**”, prepared by AIR NOISE ENVIRONMENT P/L, which indicated that the Finafire coal-fired, fluidised-bed Boiler had been found on 30/01/2003 to be in NON-COMPLIANCE with Particulates limits included in SR0722 (Limit – 250mg/Nm³ / Test result - 572mg/Nm³). To overcome the ongoing problems associated with the problematic wet-ash removal equipment (“Flosep” system), GELITA proposed replacing this particulate control equipment with a Baghouse to ensure particulate discharge was in compliance with licence conditions. The Company was requested to provide a timeframe for completion of this project, as soon as practicable. Company letter of 9/04/2003 from R C Wearne, General Manager of Davis Gelatine Australia Pty Limited, at that time, committed to the installation of a Baghouse system for the Finafire Boiler, commencing around February 2004. As part of the commissioning phase for replacement of the “Flosep” particulate wet scrubber with the Baghouse dust collection system, and in keeping with requirements of Schedule B, Table 2 (Particulates limit – 250 mg/Nm³) and Schedule H of SR0722, Boiler stack monitoring was undertaken on 9/03/2004. The analysis revealed that particulate discharge levels were 0.40 mg/Nm³, while Nitrogen Oxides were measured at 653 mg/Nm³. Improvement in control of particulate discharges had been outstanding.

However, the failure to meet compliance for NOx emissions during the commissioning phase of the Baghouse installation was unexpected and required complex reconfiguration of operational programs for the Boiler. This process was expedited with due care and consideration for health and safety concerns associated with altering boiler operating control systems. Subsequently, stack monitoring carried out on 8/04/2004 measured NOx levels at 468 mg/Nm³, which result established that the discharge was within compliance limits included in SR0722 (Nitrogen Oxides Limit – 500 mg/Nm³). See also “Oxides of Nitrogen Emissions Monitoring” of April 2004, prepared by AIR NOISE ENVIRONMENT P/L for GELITA Australia Pty Ltd, Beaudesert (Folio 11 filed on STH495/9).

Following the scheduled Boiler stack testing completed in February 2004, stack emissions testing being a biennial requirement of SR0722, falls due early in 2006.

B8 – In-Compliance – GELITA indicated that during the 2004/2005 audit period four (4) odour complaints were received, investigated and reported to the EPA. Odour sources identified included; the raw materials receival area and a power outage-initiated mechanical plant failure. Prior to and following the formal site audit and inspection completed on 18/10/2005, no noxious or offensive or any site odour was detected beyond the boundaries of the licensed place in Sandy Creek, Josephville and Flood Roads. The Company Environmental Manager is currently initiating an “Environmental Odour Identification and Assessment” project, “to determine more precisely and accurately the sources, quantity and nature of site odour components.”

B9, B10, B11 – In-Compliance – Fuels burned in on-site fuel-burning equipment were confirmed as prescribed in SR0722 [B9]. The Co-generation project remains on the “back-burner”, however sufficient biogas can now be collected and held to fuel a trial / short production run. GELITA provided a hardcopy of quality analyses, including coal Total Sulphur levels (0.60-0.63% [A.D.]) for domestic supplies received from Jeebropilly Collieries, with the Company “Annual Return” in January 2005. **Condition B11** is not in force at this time.

B12, B13, B14 – In-Compliance – During the audit inspection, doors servicing the raw materials receival area were observed to be part-open / open as “dumped” raw material was being transferred into the cleaning / de-hairing tank farm area. From the roadway observation point, offensive odour was not considered to be excessive, at the time. A proactive, in-house environmental audit process designated ‘ENVIRONMENTAL WALK’ identifies site deficiencies for remedial action, on a regular basis and particularly assesses the “Raw Materials” area in regard to the maintenance of effective odour control practices. As a further odour control measure, GELITA installed an 8 tonne/hour ice-making machine, during the 2004/2005 plant shutdown period, at a cost of around ~~\$200,000~~, for chilling bulk raw material stockpiles, awaiting processing. Currently, resiting and reinstallation of this odour control equipment remains to be completed prior to the upcoming high temperature 2005 Summer period. GELITA confirmed that the raw materials building ventilation air volume / changes had been improved / upgraded, with the installation of an additional fan unit (Mounted external eastern wall of plant - 2003) since original plant commissioning (Sighted).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

B15 – In-Compliance – The large Wet Scrubber / Biofilter Unit was reported to be operating effectively (Comments under **Condition B17** apply). The unit media was replaced over March-June 2004, following rebuilding of the internal support infrastructure using "Atlantis Mesh". The water / humidity control system was also upgraded early in 2004 using surface-located "soaker" hoses to maintain required media moisture / humidity levels. A further internal infrastructure upgrade within the unit is scheduled for 2006, when eroded concrete media / airline support blocks are replaced along with media in-fill top-up / replacement.

B16 – In-Compliance – The fan transferring foul air from the Hybractor Technology effluent treatment plant to the "Ferric" Biofilter was replaced with a new unit incorporating sealed housing and improved supply line connections, in December 2003. Reductions in odorous and corrosive air leakage to atmosphere in the immediate vicinity of the unit were acknowledged at the time of the 2004 inspection and the integrity of this equipment was observed to have been maintained during the formal inspection completed on 18/10/2005 (Comments under **Condition B17** apply). Replacement of the media fill of the "Ferric" Biofilter Unit was completed on 13-14/10/2005, while on-going resealing maintenance measures, planned for the media box, will also contributed to further minimising local fugitive odour leakage to atmosphere, compared to previous assessments (Photograph: 18).

B17 – In-Compliance - Biofilter Testing – Following previous comments highlighted by C Smeal, together with Company Consultants AIR NOISE ENVIRONMENT P/L, perceived "shortcomings" with the odour assessment process relevant to the on-site biofilters, have been addressed through tacit amendment of the assessment procedure to account for any background odour levels / impacts apparent at the time of testing. In this regard, EPA should consider clarifying the odour assessment process through possible amendment of **Condition B17** and **H10** included in SR0722, in due course, to take account of / deduct any background "contaminant" odour identified / measured at the time of assessment. Any fugitive odour leakage from the Biofilter units has not caused any impacts beyond the boundaries of the site resulting in nuisance complaints, as unit discharges generally remain totally localised. As an effective, short term odour control measure, a slow, odorous gas leak from the Primary Digester Unit is being attenuated through a temporary, "make-shift" Biofilter arrangement, until repairs requiring a major plant shutdown can be effected (Photograph: 21)

B18 – In-Compliance – Biogas is totally flared / Co-generation project remains "on hold".

B19, B20 – In-Compliance – GELITA indicated that regular system leakage checks and plant shutdown SOPs are in place. The proactive, in-house environmental audit process designated 'ENVIRONMENTAL WALK' identifies site deficiencies for remedial action, on a regular basis. No equipment breakdowns, requiring an enforced plant shutdown were advised. During the formal site inspection carried out on 18/10/2005, a short plant maintenance shutdown was in place, while cleaning of the Boiler Baghouse and bag replacement was completed (Photograph: 16).

Schedule C - Water:

C1 – In-Compliance – GELITA does not directly or indirectly release contaminants to "waters". The effectiveness of measures put in place by the Company is demonstrated by formal, Logan River water monitoring. DNR maintains River monitoring stations above and immediately below the GELITA property boundary, which continuously trace a range of indicator parameters for river water passing these points. Perusal of monitoring data (2004 and YTD 2005 - Sighted) indicated that these plots have not identified any significant deviations from expected ranges. River monitoring data for 2005 will be fully reviewed during the up-coming Company "Annual Return" for 2005, due to be provided to the EPA by 31/01/2006. When fully developed, cultivated Vetiver Grass paddocks / "absorption" wetlands will provide a critical utilisation element in the irrigated disposal of treated wastewater contaminants on site. (Reference Abstract: "**Proposal for a Soil Based Reed Bed Using Vetiver Grass for the Treatment of Effluent at Gelita, Beaudesert, Queensland**" by Cameron Smeal and Paul Turong).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

C2-C8 – In-Compliance - Ponds Conditions – The site inspection confirmed; “free-board” requirements as prescribed, ponds integrity maintained, stormwater impacts minimised (diversion banks / contour drains in place). Leakage of pond contents has not been identified for the Aerobic, BSD or Polishing and Pump-out Ponds on site. The contents of Aerobic Pond 1 were noted to be a “healthy caramel / light chocolate brown colour”, with an acceptable odour profile at the bank (Photographs: 19, 22). The VITOX oxygen delivery system, with pump and motor units replaced during October 2004, is now serving in a “back-up” mode, following the successful installation during 2005, of very effective compressed air injection / sparging technology, at a cost of ~~\$40,000~~, namely six (6) Stem-Drive Units, which result in highly effective air mixing / injection / aeration of the Aerobic Pond contents (Photographs: 19, 22). At the same time, the new aeration technology change / improvement has resulted in savings estimated around \$165,000 YTD of previous liquid oxygen costs, while taking into account increased electricity charges of approximately \$30,000 YTD to operate the units.

Schedule D – Stormwater Management:

D1, D2 – In-Compliance – GED Conditions - GELITA has measures in place to minimise the contact / release of contaminants with / to stormwater, viz; bunding, formed drainage lines directed to “catch” dams, contour banks and associated “spoon” drains, variously in place around the site (Photographs: 3, 4, 6, 7, 14, 17). The concrete-sealed “ring road” and associated curbing and channelling surrounding the gelatine processing plant serves as a “first-flush” catchment area, with all runoff directed, in the first instance, to a dual “catch” dam / detention basin holding system for return to and treatment in Aerobic Pond 1 (Photographs: 4, 6) (See additional comments below under **Condition D6**).

D3, D4 – In-Compliance – GED Conditions - GELITA has measures in place to minimise the release of contaminants to stormwater, viz; bunding, formed drainage lines directed to “catch” dams, contour banks and associated “spoon” drains, variously in place around the site (Photographs: 3, 4, 6, 7, 14, 17). During the formal site inspection completed on 18/10/2005, a “drive-tour” of the site included most of the site bank / property boundary along the Logan River, where the dry winter conditions allowed an effective visual assessment of the River protection measures in place, along the entire length of the property boundary. The site has a well-grassed, tree-lined contour bund and swale drainage system along the entire length of the River, located at a distance from the watercourse, in compliance with the irrigation buffer distances prescribed in **Conditions E10** and **E11** included in SR0722 (Photograph: 7).

A number of the more significant stormwater runoff gullies / waterways / catchments bisecting the site to the Logan River have been fitted with a series of earthen-wall / grassed “catch dams”, the larger drain-ways having up to six (6) detention basins over their length, prior to discharging to the River. A series of such protective “catch” dams serve to trap and minimise much of any storm-generated sediment from reaching the Logan River. (See also comments under **Condition C1** above concerning independent river monitoring carried out by DNR).

D5 – In-Compliance – Vehicle washing is currently carried out on a concrete pad, adjacent to the Belt-Press Shed, which drains to the wastewater treatment system. During 2006, GELITA has scheduled the installation of a dedicated vehicle wash facility, draining to the effluent treatment plant, in a vacant area between the new Hide Store and the present Belt-Press Shed.

D6 – In-Compliance – GELITA has SOPs, together with a number of spill control kits and “fitted” sump / gully trap guard-mats, strategically located in place around the site (Photograph: 15). Staff members are trained to effectively capture / contain / clean-up any spillages to the sealed surrounds of the processing facility. However, any liquid discharges to the formed drainage area / system and roadways located immediately adjacent to all hardstand areas surrounding the production buildings and associated plant installations, drain to a double “trap-dam” system, situated in a gully below the Belt-Press Shed (Photographs: 4, 6). Any material collected in these dams is pumped / returned to the effluent treatment plant for processing. It was noted during the site inspection that the second “catch” dam in the series was effectively empty, while the first detention dam appeared to indicate minimal holding volume.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕
<p>D7, D8 – In-Compliance – Both bunds servicing the Sulphuric Acid external storage tank were found to be in sound condition following rebuilding works completed during 2003/2004, while the small, above-ground diesel fuel storage tank, previously located in the now demolished “old stables” shed (replaced with a new Workshop building), has now been permanently relocated to a new dedicated bunded area on the eastern side of the “Ferric” Biofilter Unit. Bund installations on site are generally effectively serviced and well maintained (Photographs: 14, 17). During the site inspection on 18/10/2005, delivery vehicle rollover bunds were noted in place at the access points to the raw materials, bulk coal and Hide Store receival areas, whereas a rollover facility contains / safeguards the potential contaminant spill area which services the common Boiler ash and Skutch removal driveway.</p>
<p>D9-D14 – In-Compliance – All external bunded areas inspected during the formal site audit completed on 18/10/2005 and were found to be effectively serviced and well maintained (See further comments under Conditions D7, D8 above and Photographs: 14, 17).</p>
<u>Schedule E – Land Application:</u>
<p>E1 – In-Compliance – During the formal site audit and inspection completed on 18/10/2005, GELITA confirmed and the EPA verified that only prescribed contaminant releases were irrigated to land.</p>
<p>E2 – In-Compliance – Documentation was previously confirmed concerning “irrigation lands” on Company File 961EA472/1 concerning, “Leiner Davis Gelatin ‘Sunny Hills’ Irrigation Farm”, site plan. Cameron Smeal confirmed on 18/10/2005 that the “defined contaminant release areas” for the site remain essentially as previously documented and will not require updating / amendment, as a result of the recently completed EMP No. SR1157. EMP reference material - Hydro Plan Drawing No 1052-1 of 18/09/2003 remains relevant.</p>
<p>E3, E4 – In-Compliance – GELITA advised that no off-site disposal of treated wastewater had been undertaken or is proposed at this time (“Third party” disposal of treated wastewater Conditions are included in SR0722).</p>
<p>E5 – In-Compliance - While approximately 120 hectares of land comprises the current treated wastewater disposal areas on site, Cameron Smeal indicated that the “defined contaminant release areas” for the site will not require updating / amendment, as an outcome of recently completed EMP No. SR1157, as previously thought (See Condition E2 above).</p>
<p>E6-E9 – In-Compliance – Current land irrigation practices for treated wastewater applications continue to provide effective controls (Company EM Plan of 1994 and IEMS of 1997 remain relevant – C Smeal), but the site Irrigation Management Plan (IMP) will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157 (See additional comments under Conditions E17-E22 below), which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, were fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). The visual effectiveness of land irrigation practices (Winter-Spring Rye Grass / Kikuyu Grass managed grazing / hay-making paddocks) were observed / reviewed during a vehicle tour of the on-site disposal areas on 18/10/2005 (Photographs: 2, 5, 25, 26). Significant tree species plantings were completed during 2005 in the agro-forestry soil areas, while Vetiver Grass establishment has been scheduled to assume priority as Summer temperatures / storms provide an ideal growing environment for this species.</p>

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

E10, E11 – In-Compliance – With regard to the Logan River, the maintenance of prescribed irrigation buffer distances was confirmed during the formal site inspection completed on 18/10/2005 (defined by contour bank / swale drains which follow the geography of the River bank), by way of a “drive-tour” of the site which included most of the site bank / property boundary along the Logan River, where the dry winter conditions have allowed a good visual assessment of the River protection measures in place, along the entire length of the property boundary. The site has a well-grassed, tree-planted contour bund and swale drainage system along the total length of the River, located at a distance (or more extensive) in compliance with the irrigation buffer distances included in **Conditions E10 and E11**. Unplanted buffer headland strips adjacent to the Interstate Rail corridor, Flood and Tally-Ho Road boundaries were also noted, while the rough and broken nature of the land / drainage gully abutting the eastern fence-line of “Sunny Hills” with a neighbouring farm, precludes boundary irrigation over-spray / drift.

A number of the more significant stormwater runoff gullies / waterways / catchments bisecting the site, which drain to the Logan River, have been fitted with a series of earthen-walled / grassed “catch dams”, the larger / longer drain-ways having a series of up to six (6) detention basins, prior to discharging to the River (detain/solids-drop/overtop principal). A series of such protective “catch” dams serve to trap and minimise much of any storm-generated sediment and irrigation runoff from reaching the Logan River. (See also comments under **Condition C1** above concerning independent river monitoring carried out by DNR).

E12, E13 – In-Compliance – GELITA confirmed that land application and wet weather storage practices are in place (significant BSD “free-board” is consistently maintained for additional wet weather storage purposes), as prescribed in SR0722 and will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157. Current land disposal procedures referenced in documents included in Company EM Plan of 1994 and IEMS of 1997 remain relevant and take account of excessive / prolonged rainfall events. (See also **Conditions E6-E9** above).

E14-E16 – In-Compliance – The sewage effluent disposal area was inspected during the formal site audit completed on 18/10/2005. Restricted access signage and lockable valving were observed to be in place as required by SR0722.

E17-E22 – In-Compliance – Irrigation Management Plan (IMP) - Current land irrigation practices for treated wastewater applications continue to provide effective controls (Company EM Plan of 1994 and IEMS of 1997 remain relevant – C Smeal), but the site Irrigation Management Plan (IMP) will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). MEDLI modelling aspects of EMP No. SR1157 have addressed the 15 requirements included under **Condition E18**, which program included data / project inputs operated / generated by Company project work, UQ Consultancies and DNR advice.

Additional soil and groundwater sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity (“Permeameter” instrumental applications / “FullStop” and “LongStop” sampling and testing data) will be monitored on a needs basis / an annual basis, during the anticipated seven years during / following establishment of the Vetiver Grass and Rye Grass production units, planting for which commenced during late 2004 / during 2005. See also comments under **Conditions H33-H35** below. This data will be used to validate / fine-tune the predictive outcomes of the MEDLI Model, upon which the Vetiver Grass and Rye Grass irrigation programs are based. Documented corrective actions will be taken if values are deemed to be outside sustainability limits. (Reference material: “**Wastewater Irrigation Pumping System**” [ENV005/B] & “**Farm Operator Irrigation Procedure**” [ENV006/B] – Attached).

E23, E24 – In-Compliance – Treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). With regard to **Condition E24**, GELITA indicated that the Company was not aware of any likely problems arising concerning environmental nuisance or harm emanating from the microbiological / contamination issues prescribed by this condition.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

Schedule F – Noise:

F1 – In-Compliance – “Complaints-driven” Condition - GELITA indicated that no noise complaints had been received for 2004-2005 and hence no noise assessments had been undertaken by the Company as prescribed by this Condition.

F2, F3 – In-Compliance – GELITA indicated that heavy vehicle curfew hours remain in place, with infrequent non-compliances being policed using on-site cameras, then actioned by a Company warning letter to “breaching” Contractors. No curfew non-compliances were recorded for the 2004/2005 audit period.

Schedule G – Waste Management:

G1 – In-Compliance – GED Condition – During the formal audit and site inspection of the Josephville operation, completed on 18/10/2005, GELITA was observed to be meeting the requirements of this condition, viz; well operated compost-making operation, with fly ash, belt-press sludge and “scutch” transfers from the gelatine plant to the composting area using GED procedures, controlled fly ash dewatering operation (detention ponds and “catch” dam system in place). Soil conditioner manufacturing (composting) operational conditions are prescribed in SR0007DA.

G2 – In-Compliance – GELITA confirmed that the Company does not permit the burning of waste either on site or off site.

G3, G4 – In-Compliance - Appropriate recycling of waste materials is undertaken by GELITA, where practicable, viz; paper and cardboard by local collector “Spotty Bins”, belt-press sludge removed by licensed soil conditioner manufacturer Moreshost P/L [SR1406 – ERAs: 19(b), 20(b), 22(b), 53 - Attached], who maintains a Regulated Waste Transport Licence with the EPA [SR2588 - ERA 83(b)(i)], together with occasionally scrap metal disposal.

G5, G6, G7 – In-Compliance - Regulated waste, viz; belt-press sludge is transported to EPA licensed operator Moreshost P/L for garden mix / soil conditioner manufacturing purposes. Moreshost P/L has Soil conditioner manufacturing and Regulated Waste Transport Licences with the EPA (See comments under **Conditions G3, G4** above). Where appropriate, formal waste tracking procedures are used.

G8 – In-Compliance – GELITA uses EPA licensed operator J J Richards (SR1952 – ERA 83(a) – Attached) for removal of general waste materials (lift-bins) to local landfill. The GELITA waste-tracking database was confirmed to be operational.

Schedule H – Self Monitoring & Reporting:

H1-H8 – In-Compliance – GELITA has a standard data recording format in place which was viewed / confirmed, for complaints, incidents and emergencies. Complaints and incidents are actioned / followed-up as prescribed (**Condition H7**) and reported to the EPA. A complaints summary for 2005 will be included in the company “Annual Return” due for submission to the EPA by 31/01/2006 (Anniversary date of SR0722 was recently changed from 4 November to 31 January, by amendment, which change took effect from 8/06/2004). GELITA indicated at the formal site audit completed on 18/10/2005, that during the 2004/2005 audit period four (4) odour complaints were received (**Richards**), investigated and reported to the EPA (**Condition H1**). Odour sources identified included; raw materials receival area and a power outage-initiated mechanical plant failure. The administering authority did not require GELITA to undertake odour monitoring (**Condition H11**), as all odour issues were effectively resolved between the Company and complainant. GELITA has SOPs in place to ensure corrective action / feedback loops are completed for complaints and incidents as prescribed in **SR0722**.

H9 – In-Compliance – See comments under **Conditions B6** and **B7** above.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

H10, H11 – In-Compliance – The fan transferring foul air from the Hybractor Technology effluent treatment plant to the “Ferric” Biofilter was replaced with a new unit incorporating sealed housing and improved supply line connections, in December 2003, due to continuing odour leakage problems, resulting in local nuisance odour levels in the surrounding work area, but not beyond the boundaries of the site. See further comments concerning Biofilter odour monitoring under **Conditions B15, B16 & B17** above. The administering authority did not require GELITA to undertake odour monitoring (**Condition H11**), as all odour complaints issues were effectively resolved between the Company and complainant.

H12 – In-Compliance – GELITA indicated that both Boiler and Biofilter emissions monitoring were completed over January-March 2004 (see testing “Frequency” in Schedule H, Table 1 – “**Biennially from 2001**”), with relevant records confirmed in storage for the past seven (7) years. See results appraisal comments under **Conditions B6, B7 & B17** above. Following the scheduled Boiler stack testing completed in February 2004, stack emissions testing being a biennial requirement of SR0722, falls due early in 2006.

H13-H17 – In-Compliance – GELITA indicated that as no off-site noise complaints had been received during 2004-2005, the Company had not undertaken plant noise monitoring on site, as a requirement prescribed by SR0722.

H18-H21 – In-Compliance – During the formal site audit completed on 18/10/2005, GELITA provided the EPA with copies of weekly monitoring results for the PP (Pump Pond), POP (Pump-out Pond) and BSD (Balancing Storage Dam) sampling sources for the period 7/07/2004-2/08/2005 - Attached. Treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of “flow-on” recommendations for a number of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). Supporting information for EMP No. SR1157, included data emanating from projects operated / undertaken by the Company, UQ Consultancies, Forestry Research and private Consultants was nearing completion on 30/09/2003, for final submission by 31/10/2003 (See also comments under “Details of Scope or Particular Focus” [above] and the final comment under **Conditions H37, H38** [below]). A number of NATA Registered Laboratories are used by GELITA for monitoring / interpreting sample analyses; Brisbane Water, FALA, QG Health (**Conditions H21, H27 & H31**).

With reference to **Condition E24**, GELITA indicated that the Company was not aware of any likely problems concerning environmental nuisance or harm arising from issues prescribed by this condition.

H22, H23 – In-Compliance - GELITA confirmed that “mag” meter records are maintained of the total quantity of programmed contaminants released to dedicated irrigation areas on any day (Irrigation Records Book sighted), which remains below 3ML of final treated wastewater. GELITA indicated that reprogramming of treated wastewater discharge volumes / treatments, as a result of minor redefinition of contaminant release area utilisation, would be a further consequence of the outcomes of EMP No. SR1157.

H24-H28 – In-Compliance - Logan River Daily Monitoring – Daily monitoring is carried out by DNR automatic recording stations within the River, both above and also immediately below the GELITA downstream boundary at Bromelton. These recordings for 2004/2005 YTD were sighted / reviewed, at the formal site audit completed on 18/10/2005, indicating only inherent variations in parameters assessed at the two (2) river sampling points. This extensive chart data is available for “call-up” for EPA “Annual Return” assessment purposes. Parameters were confirmed as those included in the company EM Plan of 1994, which remains relevant. (Reference material: “**Irrigation Management Program**” [EP04/A] – Attached). See also comments under **Condition C1** above.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

H29-H32 – In-Compliance - Soils Monitoring - Soil / Agronomy Consultant Dr Brian Schafer has prepared and submitted to GELITA the following, **"GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report – October 2005"**, in which the preliminary soil monitoring data generated over 2004/2005 is presented and reviewed (Attached). Schafer has indicated that, **"These preliminary data are within the acceptable ranges deemed for Soil Salinity and Nutrient Status for the specified soil map units."** During the formal site audit completed on 18/10/2005, GELITA confirmed that the "FullStop" and "LongStop" Wetting Front Detectors, together with "Permeameter" instrumental assessments had been brought into use during 2005 to monitor irrigation infiltration effects and soil hydraulic conductivity status. (See also **"Gelita Australia – Farm Management Annual Audit"**, prepared by B M Schafer and dated 31/01/2005 and 2005 follow-on, **"GELITA Australia – Farm Management Progress Report: October 2005"** - Attached). Earlier "baseline" soil monitoring (2003/2004), together with ongoing soil assessment, constituted actions emanating from EMP No. SR1157, that included investigative data / projects reaching finality around 30/09/2003 and of which "supporting material" was provided to the EPA with EMP No. SR1157 "Final Report", for assessment and sign-off. Cropping trials, to ascertain nutrient utilisation in soils irrigated with treated wastewater, formed a number of projects associated with EMP No. SR1157. Following on from this work, planting applications of complimentary soil-type / plant-type agricultural systems, including agro-forestry plantations ("Walloon" soils), Vetiver Grass paddocks (heavy clay-derived soils), while maintaining grazing-based Kikuyu Grass / Rye Grass systems on the Logan River flats (deep drained sandy loams) are becoming a farm priority for 2005/2006. Additional soil and groundwater sampling / monitoring for determining soil behaviour in relation to critical infiltration and hydraulic conductivity effects will be maintained on a needs / annual basis throughout the anticipated 5-7 years, following regular maintenance of the established Rye / Rhodes / Kikuyu grassed areas, establishment of the Vetiver Grass "absorption" paddocks and servicing of the agro-forestry plantation blocks (See also comments under **Condition C1** above). Further proposed soil treatment trials will assess the potential for in-house-generated compost to counter salinity / sodicity in renovating on-site saline / sodic soils (Reference Abstract: **"Use of Compost to Improve Soil Properties and Plant Growth in Saline and Sodic Soils"**, to be undertaken by J Biala, J Raue, C Smeal, B Schafer and P Grace). Both liquid and solid applications of lime to control low soil pH values remains under investigation, after initial liming trials proved to be inefficient. Soil pH adjustment / equilibration using organic systems such as well incorporated compost applications remains a consideration, should inorganic procedures ultimately prove unworkable. (Reference material: **"Irrigation Management Program" [EP04/A]** – Attached). See also comments under **Conditions H33-H35** below.

H33-H35 – In-Compliance - Groundwater Monitoring - In the **"GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report – October 2004"**, Soil / Agronomy Consultant Dr Brian Schafer referred to field problems associated with the groundwater sampling program during 2004 (Attached). Schafer commented as follows, "Ground water analyses obtained from samples in September 2004 have been found to be in error. The piezometer boreholes installed in 1992 have variously deteriorated due to age. Later boreholes to replace some of these earlier boreholes in 2000 have also been damaged by farm operations and stock. Consequently, some of the bores which are strategic to the new monitoring program are unserviceable." During 2005, GELITA undertook a piezometer borehole refurbishment program resulting in a number of boreholes being returned to service, while a number of "nested" piezometers were rendered unserviceable due to leakage. The **"GELITA Australia – Farm Management Progress Report: October 2005"** by Dr B M Schafer, dated October 2005, reviews groundwater monitoring during 2005 from serviceable boreholes, together with "Irrigation Scheduling Procedure" and "Soil Management Issues", in regard to "deep drainage". In some farmed areas of "Sunny Hills", the shallow topsoil cover, over a deep clay base, precludes transfer of irrigated treated wastewater to groundwater (dedicated to Vetiver Grass "absorption" paddocks). GELITA intends to make use of data generated from recently installed "Full-Stop" and "LongStop" sampling / testing procedures, developed by CSIRO Scientist R Stirzaker (See CSIRO.au) to monitor moisture movement through soil profiles on site, as a practical measure of irrigated treated wastewater penetration / field capacity / percolation effectiveness, particularly in regard to tracking the movement ("wash-through") of salt(s) to deep drainage soil layers and the need to prevent nitrogen transfer to groundwater (refer Schedule H – Table 3).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

H36 – In-Compliance - GELITA seeks expert advice from a variety of sources regarding results emanating from the on-site monitoring programs, viz; Consulting NATA Laboratories, AIR, NOISE ENVIRONMENT P/L, UQ Project Teams Consultancies, Soil / Agronomy Consultant Dr Brian Schafer, DNR personnel advice (soil / plant systems advice [particularly Vetiver Grass applications / hydrology issues], J Biala of "The Organic Force" for composting guidance / reference and Dr Paul Truong, Vetiver Grass cultivation expert (Reference Abstract: **"Proposal for a Soil Based Reed Bed Using Vetiver Grass for the Treatment of Effluent at Gelita, Beaudesert, Queensland"** by Cameron Smeal and Paul Turong). Field trial work to be conducted on site at GELITA Australia will provide much of the research data to be included in this Technical Bulletin. Both authors Truong and Smeal co-presented papers at the Third International Conference on Vetiver Grass in Guangzhou, China in October 2003.

H37, H38 – In-Compliance - Licence limit(s) exceedances arising as a result of the irrigated disposal of treated wastewater to land on site were covered by EMP No. SR1157, for the 4.5 year lifetime of the process, to 30/09/2003 and hence have not been individually advised to the EPA. However, the EPA was always fully aware of results achieved over the course of EMP No. SR1157, following receipt of regular six (6) monthly and annual reviews of progress over the span of the EMP process.

Significant treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of "flow-on" recommendations for a number of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference / "supporting documents" provided with the "Final Report" for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). The only contaminant release quality characteristics now retained in Schedule H – Table 2 of SR0722 include; 5-day BOD (monthly), COD (weekly) and pH (weekly) determinations. GELITA was made aware of the need, in future, for timely reporting of any non-compliance involving these parameters.

Through restructuring /amendment of the monitoring components of SR0722 approved on 8/06/2004, the environmental control emphasis has been significantly shifted in relation to treated wastewater disposal at "Sunny Hills" from an "end-of-pipe" mentality to a practical, agriculturally oriented "outcomes-based" process, capable of reaction / correction, depending on the influences of prevailing real time conditions.

Schedule I – Definitions: NO COMMENT REQUIRED.

REQUIRED ACTIONS: NIL

Licence Conditions Module:

Condition Number(s)	Details of non-compliance(s)
<u>NIL</u>	

RECOMMENDATION:

NO RECOMMENDATIONS ARE OFFERED, AS CONDITIONS CURRENTLY INCLUDED IN SR0722 ARE CONSIDERED ADEQUATE TO ENSURE SUSTAINABILITY OF THE GELATINE MANUFACTURING ACTIVITIES CARRIED OUT ON SITE AND TO SAFEGUARD THE ENVIRONMENTAL INTEGRITY OF THE SURROUNDING SENSITIVE RECEPTORS, viz: adjacent land and any runoff to the nearby Logan River.

Signoff Sheet:

Additional Comments:
<u>NIL</u>
Recommendation:
<u>NIL</u>

Adoption of Report:
This report accurately represents the issues and outcomes of this site inspection and review of SR0722.

Inspecting officer

Don Shackel

Signed

Date

Inspecting officer

-

-

N/A

Signed

Date

Comments and Recommendation:

Supervisor

Doug Carey

Signed

Date

EPA SOUTHERN REGION			
Correspondence No. STH2005/5321		Barcode No.	
File No. ST-1495-8		PART	FOLIO
Action Officer Don Shackel		Related Items	

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ASIA PACIFIC AFRICA

2004 Annual Return

Environmental Authority No. SR 0722



Environmental Protection Agency



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Schedule A -General Conditions

(Items A1-A7) Compliance with Environmental Authority SR722 as per Schedule A, items A1 to A8, has been in accordance with license conditions and within parameters of Environmental Management Program (EMP) #5080001157.

This EMP program period has expired and a report was submitted to the EPA in May 2004.

General Conditions

Condition (A1)

All plant and equipment necessary to ensure compliance with license conditions has been installed as per condition (A1) (i).

All instruments and monitoring devices have been calibrated and maintained as per requirements condition (A1) (ii).

Operation of such items has been by appropriate personnel as required by condition (A1) (iii)

In this instance "plant and equipment" has been assessed as specifically including:

- (i) Front-end loader, tractor, bobcat, pumps and laboratory equipment used to determine and prevent the likelihood of environmental harm being caused.

It should be noted that a new Volvo L50D front-end loader was purchased early in 2004.

- (ii) trap dams, contours, drainage systems and bund walls constructed to contain potential contaminants and waste.

It should be noted that the sulphuric acid bund was refurbished in 2004 and that field drainage lines were refurbished by 20 tonne excavator as required.

- (iii) vehicular waste transport under direct GELITA Australia P/L control.

It should be noted that regulated waste is only transported from the site by EPA licensed operators. These operators include Moreshost and JJ Richards.

Waste paper is removed from the site by "Spotty Bins" for recycling purposes.

- (iv) storage vessels, including process tanks for the treatment of waste under GELITA Australia P/L control.

It should be noted that the wastewater treatment plant vessels were sandblasted and spray painted during 2004.

- (v) monitoring equipment and alarms:

It should be noted that there are gas monitors in raw materials process and that handheld devices are also available.

Dissolved oxygen probes are permanently installed on the aeration pond. These probes are constantly monitored on the computer system and are cross-checked with handheld units.

A pressure sensor is installed in the primary anaerobic digester and is constantly monitored on the computer.

and:

- (vi) the development of reasonable and practicable physical risk management infrastructure to address primary system failures.

It should be noted that physical barriers are in place to address structural failure of the wastewater treatment facility. In the event of any such failure procedures are in place to ensure appropriate level of response is enacted.

For further detail refer to GELITA document SAF005/B Emergency Management System.

Display of environmental authority

Condition (A2)

- (i) Copies of this environmental authority are displayed in the reception area and in the Environmental Officer's workstation. Copies of this authority are readily accessible to all personnel including contractors and visitors.

Records

Condition (A3)

- (i) All records required have been kept. These records are located in the Environmental and/or the Administration offices.

Condition (A4)

- (i) All such records are available for examination at the legitimate request of any authorised person.

Alterations

Condition (A5)

- (i) With the exception of the expansion of the composting trial, (under the conditions of the EPA Licence SR 1114), no major change in plant, operation or equipment likely to substantially increase the risk of environmental harm as defined is known to have occurred since the last annual return.

Total throughput of raw materials is planned to increase from 2500 to 3000 tonnes over the next twelve months.

Calibration

Condition (A6)

- (i) All measurement devices and instruments have been calibrated and are appropriately operated and maintained. Records of calibration are kept in the environmental office.

Nuisance

Condition (A7)

- (i) GELITA Australia P/L acknowledges that the authority does not convey or imply the right to cause any environmental nuisance beyond the GELITA Australia P/L boundaries by issue of the license.

Integrated Environmental Management System (IEMS)

Condition (A8)

- (i) GELITA Australia P/L has achieved ISO 14001 certification for IEMS. A copy of the certificate has been forwarded to the EPA.

Condition (A9)

The IEMS provides for the following functions:

- (i) Monitoring of releases of contaminants
- (ii) Monitoring of complaints and noise levels

(iii) Training of staff, agents and contractors in:

(a) GELITA Australia P/L Environmental Policy

All persons employed on the site are advised of the companies environmental goals embodied as a policy.

(b) Environmental objectives and targets

Environmental targets are specified as meeting licence limit criteria. Environmental objectives are to attempt to move beyond compliance under an environmental management system that promotes continuous improvement.

(c) Routine control procedures

Appropriate operational procedures have been formulated and are subject to review.

(d) Contingency and emergency response plans

Risk assessment to determine foreseeable emergency events and develop reasonable action plans is an ongoing process based on risk assessment, planning, and response.

(e) The organisational structure is team based with clearly defined levels of authority and responsibility. The system is reinforced in daily operations.

(f) Staff and management interaction in Environmental issues

Staff and management interact in diverse forums to discuss report and plan on all matters.

(g) Record keeping

All relevant personnel are trained to ensure records required under Schedule H are documented, held and maintained for the requisite period. Copies of the relevant documentation are appended where practicable. (Refer Schedule H).

(h) Staff and Corporate responsibilities under the Act

Item A9 (iii) regarding training to competency levels is an on-going procedure. An increase in the level of staff environmental awareness has been documented.

(iv) The conduct of environmental and energy audits to review periodically:

(a) level of environmental performance

The site is subject to regular environmental auditing. These audits include internal, corporate and regulatory reporting.

(b) the effectiveness of management procedures adopted.

(c) Efficiency in using energy and resources and opportunities for more efficient usage, (refer attached audit reports appendix);

(iv) The implementation of effective and appropriate strategies for waste prevention, treatment and disposal. Investigation and implementation of cost effective methodologies of waste minimisation, treatment and disposal include composting and trials of on-site washing of salted hide, cleaner production projects including ion exchange regeneration reuse and improved raw materials handling research.

For further detail regarding the IEMS system and specific procedures refer to GELITA document EMS Documentation links.

Condition (A10)

The conduct of environmental and energy audits as required under license conditions allows for a minimum frequency. The Audits have been conducted as necessary and within license conditions.

Environmental performance is monitored to internal Performance Indicators monthly.

- (i) Level of environmental performance is subject to internal audit. The next energy audit required under the licence should take place not later than October 2006.

Condition (A11)

- (i) GELITA Australia P/L must prepare a report summarising the outcomes of the environmental and energy audits under condition A9, and submit such a report with the annual return. The 2004 Energy Audit has been submitted with this Annual Return.

Condition (A12)

- (i) GELITA Australia P/L acknowledges as the holder of the environmental authority that no IEMS or amendment therein shall be implemented that may result in a deliberate contravention of the authority. No such contravention has occurred according to the best knowledge of GELITA Australia P/L.

Condition (A13)

- (i) Multiple copies of the IEMS certificate shall be kept on site. These shall be located in the Environmental Office, Administration and the Financial Controllers office.

Condition (A14)

- (i) GELITA Australia P/L will submit any amendments to the IEMS with the Annual Return, which immediately follows the enactment of such amendment. No such amendments are to be lodged with this return.

Community Liaison Committee

Condition (A15)

- (i) GELITA Australia P/L has actively promoted and serviced this Committee. Meetings have been held on a quarterly basis. GELITA AUSTRALIA P/L personnel have also actively represented the company in community groups including Beaudesert Landcare Group, and the Logan & Albert Rivers Catchment Association.

Inspections by Authorised Persons

Condition (A16)

- (i) GELITA Australia P/L has ensured reasonable access is available for authorised persons under item A16(i)(a-c) for checking compliance.
 - (a) monitoring facilities including boiler stack monitor, hard copy and electronic computer records.
 - (b) access to all parts of the facility where such monitoring is effected.
 - (c) all reasonable assistance authorised person requires to undertake compliance check.

Schedule B-Air

Non-specified Releases of Contaminants to the Atmosphere

Condition (B1)

- (i) To the best of GELITA Australia P/L knowledge, licensed ERAs are carried out in such a manner, and by such practicable means as to prevent release, or likelihood of release, of contaminants to atmosphere wherever possible.

Condition (B2)

- (i) Notwithstanding the requirements of condition B1, where it is not practicable to prevent contaminant release, all reasonable and practicable means necessary shall be employed to minimise the release, or likelihood of release of contaminants to atmosphere.

Specified Releases of Contaminates to Atmosphere

Condition (B3)

- (i) Contaminants resulting from the operation of the sources cited in Table 1 Schedule B of Environmental Authority #SR 0722 must only be released from those points specified in Table 1 therein. RP4 has not yet eventuated with plans for co-generation still being evaluated.

Condition (B4)

- (i) Contaminants discharged from each specified release point are directed vertically upwards without impedence or hindrance.

Condition (B5)

- (i) Contaminants are discharged from each specified release point at heights not less than that stated in the Schedule.

Condition (B6)

- (i) Contaminants are discharged from each specified release point at velocities not less than that stated in the Schedule.

Condition (B7)

- (i) Contaminants are not to be discharged from specified release points at concentrations higher than those stated in the Schedule.

Condition (B9)

- (i) Notwithstanding any other condition of the authority, there were 4 uncontested instances of complaints of release of contaminants from the licensed place believed to have caused a noxious or offensive odour beyond the boundaries of GELITA Australia P/L in 2004. Each was reported to the EPA and remediation work immediately effected. Of the total 6 odour complaints received during 2004, 2 were contested. All 6 incidents related to a single complainant.

Parameter	Units	1998	1999	2000	Limit	2001	2002	2003	2004	Limit
Total Solid Particulates Average emission rate	g/min		133	24.8	Not specified	0.37 g/s 22.2 g/min	N/a	0.70 g/s 42 g/min	0.006 g/s 0.04 g/min	Not specified
Total Solid Particulates Average concentration	mg/Nm ³ 12%CO ₂	466	335	280	100	226	N/a	572	0.40	250
Nitrogen Oxides (NO ₂) Average	mg/Nm ³	485	513	462	500	399	N/a	116	468	500
Sulphur Dioxide Average	mg/Nm ³	205	179	109	Not specified	602	N/a	1127	1082	Not specified
Average Velocity	m/s	19.2	14.8	21.4	15 m/s minimum	17.0	N/a	25.8	29.2	15 minimum
Actual Flow Rate	Gas Nm ³ /min	95.7	90.6	90.2	Not specified	98.7	N/a	107	105	Not specified

Table 1: Boiler Stack Monitoring

The boiler discharge characteristics are well within licence limits following the installation of the baghouse.

Fuel Burning

Condition (B9)

- (i) The only fuel burnt in the boilers for this period has been coal, LPG and/or natural gas.

Condition (B10)

- (i) The average sulphur content of coal was determined by the supplier to average 0.63% by weight for this license period. Item B11 specifies an upper limit of 1% sulphur by weight. This license condition has not been breached. Total Sulphur on coal burnt has not reached 1%. Refer attached report from New Hope Coal Australia.

Condition (B11)

- (i) The sulphur content of biogas burnt in industrial fuel burning equipment is to be maintained at minimal practicable levels. There is currently no biogas burnt in industrial fuel burning equipment.

Ventilation

Condition (B12)

- (i) All external doors of the raw materials building must be kept fully closed when processing or stockpiling of animal matter is occurring, except when necessarily being opened for access. Compliance with this condition has been achieved.

Condition (B13)

- (i) Raw Materials building to be kept under negative pressure when processing or stockpiling animal matter with exception of delivery area at time of delivery.

Condition (B14)

- (i) Raw Materials building ventilation system to extract 5.8 times total internal volume per hour. This condition has not been actively monitored. Design specifications and calculations for extraction fans indicate that the extraction rate exceeds the criteria.

Ventilation Air and Effluent Gas Collection and Treatment

Condition (B15)

- (i) Ventilation air and effluent gases from the Raw Materials building are collected and treated by a wet scrubber and biofilter prior to release to the atmosphere.

Condition (B16)

- (i) Off gases from the sludge holding tank and the equalisation tank are passed through a biofilter prior to release to the atmosphere.

Condition (B17)

- (i) The odour level measured at the biofilters was recorded in excess 100ou during monitoring in February 2003. This was due to fugitive odour associated with a hole in the primary digester and EPA staff have been advised. The analysis will be repeated after the difficult repair to the digester is undertaken in January 2004.

Condition (B18)

- (i) Biogas from the hybractor is flared prior to release to atmosphere at RP 3.

Condition B19

- (i) Ducting and extraction systems are constructed of HDPE, stainless steel and poly pipe and have been rigorously maintained to prevent the leakage of effluent gases to atmosphere.

Condition B20

- (i) In the event of visible emissions from the Raw Materials building, or the gas, extraction system ducting the processing of raw materials will cease.

4. Water

Schedule C

Release of Contaminants to Waters

Condition (C1)

Contaminants must not be directly or indirectly released from the licensed place to any waters or the bed and banks of any waters except:

- (i) as permitted under the stormwater management schedule; or
- (ii) to a sewer as permitted or otherwise agreed from time to time by the relevant local government.

There have not been any direct or indirect discharges of contaminants to Local Government sewer systems from this site. This condition is not applicable to the site at this point in time due to the lack of council sewerage infrastructure.

Pond Conditions

All aspects of these pond conditions have been complied with to the conditions established by the license. There is no evidence that groundwater contamination of any kind has occurred as a result of discharge through bed or banks of any pond on the site.

Condition (C2)

- (i) All ponds used for the storage or treatment of contaminants or wastes have been installed and maintained with a freeboard of not less than 0.5 metres at all times.

Condition (C3)

- (i) All ponds used for the storage or treatment of contaminants or wastes have been installed and maintained to ensure the stability of their construction

Condition (C4)

- (i) All ponds used for the storage or treatment of contaminants or wastes have been installed and maintained to minimise potential for receiving stormwater runoff.

Condition (C5)

- (i) Suitable banks and diversion drains have been installed and maintained to minimise potential for storage ponds receiving stormwater runoff.

Condition (C6)

- (i) Suitable blower and aerator systems have been installed and maintained to minimise the likelihood of anaerobic conditions developing in the main storage ponds. Anaerobic digestion within sealed vessels comprises the primary step of the wastewater treatment process on the licensed place.

Condition (C7)

- (i) All ponds used for the storage or treatment of contaminants or wastes are operated and maintained to minimise potential for short-circuiting of contaminant or waste flow.

Condition (C8)

- (i) All ponds used for the storage or treatment of contaminants or wastes have been installed, operated and maintained in such a fashion as to minimise potential for discharge of contaminant or waste flow through the bed or banks of the pond to any waters including groundwater.

**Stormwater Management
Schedule D**

Contamination of Rainfall Stormwater Runoff

Condition (D1)

- (i) The ERAs are carried out with due regard to prevention of contamination of stormwater with waste materials.

Condition (D2)

- (i) The ERAs are carried out with due regard to minimising the risk of contamination of stormwater with waste materials where prevention is not practicable.

Release of Contaminated Stormwater Runoff

Condition (D3)

- (i) The ERAs are carried out with due regard to the prevention of release of stormwater contaminated with waste materials.

Condition (D4)

- (i) The ERAs are carried out with due regard to the minimisation of release of stormwater contaminated with waste materials where prevention is not practicable.

General

Condition (D5)

- (i) The maintenance and cleaning of vehicles, equipment or plant is carried out in areas where contaminants cannot be released into any stormwater drainage system.

Condition (D6)

- (i) Any spillage of material is cleaned up as quickly as practicable. Procedures prohibit the cleaning up by hosing sweeping or release of contaminants into any stormwater drainage system, roadside gutter or waters.

Material Storage and Handling Conditions

Condition (D7)

- (i) The base and walls of all bunded areas must be maintained free from gaps or cracks.

Condition (D8)

- (i) The loading/unloading of bulk materials is restricted to designated areas. There is no evidence that these procedures have been breached during the reporting period.

Bunding

Condition (D9)

- (i) All chemical and fuel tank storage's are required to be banded so that the capacity of the bund is sufficient to contain at least 100% of the largest storage tank plus 10% of the second largest tank within the bund

Condition (D10)

- (i) All chemical and fuel drum storage's are required to be banded so that the capacity of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.

Condition (D11)

- (i) The base and walls of all banded areas must be maintained free from gaps or cracks.

Condition (D12)

- (i) All bunding must be roofed where practicable.

Condition (D13)

- (i) Where it is impracticable to roof a banded area any stormwater captured within the bund is directed to the wastewater treatment system.

Condition (D14)

- (i) All bunding must be constructed and maintained as impervious and to allow retention and recovery of any materials being stored within the bund.

**Land Application
Schedule E**

Release of Contaminants to Land

Condition (E1)

The only contaminants released to land have been the treated waste waters irrigated from the Balancing Storage Dam, polishing pond, pump out pond and sewage treatment plant.

Contaminant Release Location(s)

Condition (E2)

- (i) The defined contaminant release areas are as marked on the “Leiner Davis Sunny Hills Irrigation Farm Plan” as lodged with the original application for an environmental authority. No further agreement for disposal has been entered into with any other party at this point.

Condition (E3)

- (i) No treated wastewater is currently discharged to any land under the control of any person or body other than the holder of this authority.

Condition (E4)

- (i) The holder of this authority must supply a copy of any agreement or contract under Condition (E3) within 30 days of finalisation of such contract. No such contracts are currently under consideration.

Condition (E5)

- (i) The defined contaminant release areas encompass not less than 121 hectares, excluding buffer zones.

Condition (E6)

- (i) The storage and disposal of contaminants is confined to the specified release areas. The release of contaminants to waters either directly or indirectly is not permitted and has not occurred..

Condition (E7)

- (i) The specified release areas have been maintained in a proper and efficient manner by maintaining adequate drainage, deep ripping, discing and liming of these areas to provide adequate assimilation, percolation, evaporation, and transpiration.

Condition (E8)

- (i) There has been no incident of spray drift from the specified release areas beyond the boundaries of the licensed place.

Condition (E9)

- (i) Access of grazing animals to effluent irrigation area has been controlled to prevent soil pugging.

Buffer Distance

Condition (E10)

- (i) The release of contaminants to land has not been carried out within 30 metres of any watercourse.

Condition (E11)

- (i) The release of contaminants to land has not been carried out within 20 metres of any boundary of the licensed place.

Wet Weather Storage

Condition (E12)

- (i) The release of contaminants to land has not been carried out if soil moisture conditions are such that surface runoff or ponding is likely to occur.

Condition (E13)

- (i) When weather conditions or soil conditions have precluded the application of final treated effluent the contaminants have been directed to the effluent balancing storage dam.

Additional Requirements for the Disposal of Sewage Effluent

Condition (E14)

- (i) Public/employee access to any contaminant release area for the disposal of sewage effluent is prohibited during the release of contaminant to land and until the release area has dried. This area is enclosed with barbed wire and has adequate signage.

Condition (E15)

- (i) Notices warning that contaminants released in this area are not fit for human use are prominently displayed and are maintained in a visible and legible condition.

Condition (E16)

- (i) Pipelines and fittings for the release of contaminants to land are clearly identified. Standard taps, hoses, water cocks are not fitted to contaminant release pipelines, and the contaminant release system is not connected to other service pipelines. Lockable valves or removable handles are fitted to the release pipelines in areas of public access.

Irrigation management Plan

Condition (E17)

- (i) GELITA Australia P/L has developed and implemented an Irrigation Management Plan, which details the means of effective and appropriate management of the irrigation process in order to sustainably comply with all conditions of the environmental authority. The original Irrigation Management Plan was completed in 1998 but is currently under review. The revised plan has been forwarded to the Environmental Protection Authority as part of the EMP submission.

Condition (E18)

The revised Irrigation Management Plan details how irrigation is to be managed and scheduled with regard to the following items:

- (i) soil moisture results
- (ii) weather forecasts and climate monitoring results
- (iii) irrigation records for each effluent disposal area
- (iv) water quality results for adjacent creeks
- (v) groundwater level results
- (vi) groundwater quality results
- (vii) crop history for each effluent disposal area
- (viii) sustainable hydraulic loadings
- (ix) sustainable biological oxygen demand loadings
- (x) sustainable nitrogen loadings
- (xi) sustainable phosphorus loadings
- (xii) sustainable salt loadings
- (xiii) production of appropriate records and reporting of results and environmental issues.

Condition (E19)

- (i) The Irrigation Management Plan was developed with due regard to plans, procedures and previously prepared documentation.

Condition (E20)

- (i) The Irrigation Management Plan forms part of the IEMS for the licensed place. A copy of the Plan is located on site. Refer Hydroplan document.

Condition (E21)

- (i) No amendment or implementation of the Irrigation Management Plan has wilfully resulted in a contravention of any condition of this environmental authority.

Condition (E22)

- (i) Details of any amendments to the Irrigation Management Plan must be submitted to the administering authority with the annual return immediately following the enactment of such amendment.

Quality of Contaminants Released to Land

Condition (E23)

- (i) The contaminants released to land comply at the sampling and in-situ measurement points specified in Schedule H with each of the release limits specified in Schedule E Table 1 or are within the allowable parameters of the applicable EMP for each quality characteristic.

Condition (E24)

- (i) Notwithstanding the quality characteristic limits specified in Schedule E, the contaminants released are not known to contain organisms or contaminants in concentrations capable of causing environmental harm or nuisance beyond levels allowed.

SCHEDULE E - TABLE 1 - RELEASE QUALITY CHARACTERISTIC LIMITS

QUALITY CHARACTERISTICS	RELEASE LIMIT	RELEASE LIMIT UNITS	LIMIT TYPE
5-day Biochemical Oxygen Demand	400	mg/L	maximum
Chemical Oxygen Demand	800	mg/L	maximum
pH	6.5 - 11	pH units	range

6. Schedule F-Noise

Emission of Noise

Condition (F1)

- (i) The emission of noise from the licensed place has not resulted in levels greater than specified in Table 1 of the Noise Schedule. Records of monitoring undertaken during the license period demonstrate overall compliance for factory and associated process.

Condition (F2)

- (i) The entry and/or departure of heavy vehicles used to carry fresh raw materials has only been carried out between the hours of:

6:00 am and 11:00 pm	Mondays to Fridays
7:00 am and 6:00 pm	Saturdays, Sundays and public holidays.

Condition (F3)

- (i) The entry and/or departure of all other heavy vehicles has only occurred between the hours of:

6:00 am and 8:00 pm	Mondays to Fridays
7:00 am and 6:00 pm	Saturdays, Sundays and public holidays.

6. Waste Management-Schedule G General

Condition (G1)

- (i) There has been no known release, storage, transferral or disposal of waste from the site that contravenes any condition of this environmental authority.

Condition (G2)

GELITA Australia P/L as the holder of this environmental authority has not:

- (i) burnt waste at or on the licensed place; nor
- (ii) allowed waste to burn or be burnt at or on the licensed place; nor
- (iii) removed waste from the licensed place and burnt it elsewhere.

Condition (G3)

- (i) An area for the identification, segregation and storage of recyclable solid wastes has been established behind the compost.

Condition (G4)

- (i) This condition does not apply, as there are currently no cost-free recycling services available.

Off-Site Movement of Regulated Wastes

Condition (G5)

Where regulated waste is removed from the site GELITA Australia P/L monitors and records the following:

- (a) date, quantity and type of waste removed: and
- (b) name of the waste transporter and/or disposal operator that removed the waste: and
- (c) the intended treatment/disposal destination of the waste.

Condition (G6)

- (i) Regulated waste has not been sent for disposal at any facility without the appropriate approval of the person operating the facility.

Records

Condition (G7)

- (i) Records are maintained for a period of 5 years for all wastes mentioned in the schedule.

Notification of Improper Disposal of Regulated Waste

Condition (G8)

- (i) If GELITA Australia P/L becomes aware that a person has removed waste from the licensed place and dispose of the waste in a manner which is improper, unlawful or not authorised by the environmental authority, then GELITA Australia P/L will as soon as practicable, notify the administering authority of all relevant facts, matters and circumstances concerning the disposal.

Self Monitoring and Reporting

Schedule H

To the best knowledge of GELITA Australia P/L officers and staff, all complaints, incidents, notification and monitoring requirements of this license for the period of this annual return, have been fulfilled as required. These requirements have been acknowledged in prior aspects of this annual return.

Any failure to comply with any of these requirements is neither wilful nor deliberate. GELITA Australia P/L seeks to ensure all personnel are actively engaged in fulfilling environmental obligations and is developing a managerial culture to reinforce this goal.

Complaints Recording

Condition (H1)

All complaints received by GELITA Australia P/L have been recorded and include the following details:

- (i) time, date and nature of complaint;
- (ii) type of communication;
- (iii) name, contact details (where possible);
- (iv) response and investigation undertaken as a result of the complaint;
- (v) name of the person responsible for investigating complaint; and
- (vi) action taken as a result of the complaint investigation and signature of responsible person.

For copies of complaints recorded for 2004 refer to EPA records.

Condition (H2)

- (i) The complaints record required under condition H1 will be maintained for a minimum period of 5 years.

Incident Recording

Condition (H3)

A record has been maintained of events including, but not limited to:

- (i) the time date and duration of equipment malfunctions that may affect the environmental performance of the licensed place
- (ii) any shut down of the biofilter, waste water treatment plant or other equipment upon which the environmental performance of the licensed place depends;
- (iii) the hours of operation of the plant when these events have occurred.

All such records are filed in the environmental office under Environmental Hazard Reports.

Condition (H4)

- (i) The incident record required under condition H3 will be maintained for a minimum period of 5 years.

Notification of Emergencies and Incidents

Condition (H5)

- (i) As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of the environmental authority, GELITA Australia P/L will notify the administering authority of the release.

Condition (H6)

The notification of emergencies or incidents as required by condition H5 will include but not be limited to the following :

- (i) GELITA Australia P/L
- (ii) location
- (iv) licence number SR722
- (v) designated contact person details
- (vi) time of release
- (vii) time of discovery of release
- (viii) suspected cause
- (ix) environmental harm or nuisance caused, threatened or suspected to be caused by the release
- (x) actions taken to prevent any further release and mitigate harm or nuisance

Condition (H7)

Not more than 14 days following the initial notification of emergency or incident, GELITA Australia P/L must provide written advice of the information supplied under condition H6 in addition to:

- (i) proposed actions to prevent recurrence
- (ii) outcomes of actions taken at time to prevent/minimise environmental harm.

Condition (H8)

- (i) As soon as practicable but not more than 6 weeks following the conduct of any monitoring performed in relation to the emergency of incident, GELITA AUSTRALIA P/L must provide written advice of the results of such monitoring performed.

Monitoring of Contaminant Releases to the Atmosphere

Condition (H9)

GELITA Australia P/L must conduct a monitoring program of contaminant releases to the atmosphere at the release points, frequency and for the parameters specified in Schedule H table 1 and which complies with the following:

- (a) All determinations of the quality of contaminants released must be performed by a person, or body possessing appropriate experience and qualifications to perform the required measurements.

- (b) Monitoring provisions for the release points listed in Schedule H table 1 must comply with the Australian Standard AS 4323.1-1995 "Stationary Source Emissions Method 1 Selection of Sampling Provisions".
- (c) The following tests must be performed for each required determination specified in table 1:
 - (i) gas velocity and volume flow rate;
 - (ii) temperature;
 - (iii) water vapour concentration,
- (d) Where practicable samples taken must be representative of the contaminants when emissions are expected to be at a maximum.

Condition (H10)

- (i) GELITA Australia P/L must monitor and record the odour level in the ambient air measured at any point one metre downwind from the surface perimeter of each of the biofilters at least once every 2 years.

Condition (H11)

- (i) In addition to the odour monitoring, at the frequency prescribed in Condition H10, monitoring must also be undertaken upon receipt of a written request from the administering authority to carry out such monitoring.

No such request has been received in this reporting period.

Records

Condition (H12)

- (i) Records must be kept of the results of all monitoring of releases of contaminants to the atmosphere for at least 5 years.
All records have been retained. Copies have been submitted to the administering authority.

Noise monitoring

Condition (H13)

- (i) In the event of a complaint about noise that constitutes annoyance being made to the administering authority (not classified as frivolous or vexatious,) GELITA Australia P/L must undertake monitoring to investigate such a complaint upon written request from the EPA.

Condition (H14)

- (i) For the purposes of checking compliance with condition F1 of the noise Schedule, monitoring and recording the noise levels from the ERAs must be undertaken for the following:
 - (i) $L_{Amax, Adj T}$:
 - (ii) $L_{Abg T}$ OR $L_{A90 T}$:
 - (iii) $L_{AN, T}$:
 - (iv) Max_{pAT} :
 - (v) $L_{Aeq, T}$:
 - (vi) level and frequency of occurrence of impulsive or tonal noise
 - (vii) atmospheric conditions including temperature, relative humidity, wind speed and direction: and
 - (viii) effects due to extraneous factors

Condition (H15)

- (i) In conjunction with the measurement and recording of noise, the following parameters and conditions must be recorded:
 - (a) location of sampling points
 - (b) date of sampling
 - (c) time of sampling

Condition (H16)

- (i) The method of measurement and reporting of noise levels must comply with the Departments Noise measurement manual current edition.

Condition (H17)

- (i) Records of the results of all monitoring of noise levels will be retained for at least 5 years.

Monitoring of Contaminant Releases to Land

Condition (H18)

- (i) For the purposes of checking conformity with Condition E22 GELITA Australia P/L has made determinations of the quality of the contaminants released as per the quality and frequency requirements of Schedule H-Table 2.

These results are available as per the attached graphs.

Condition (H19)

- (i) The monitoring and in-situ measurement points described as SMP1 and SMP2 have been utilised for sampling purposes

Condition (H20)

- (i) All determinations of contaminant quality have been made in accordance with DEH Water Quality Sampling Manual current edition.

Condition (H21)

- (i) The frequency of quality analysis for release of contaminants as per condition E22 of this license has been maintained at the requisite level. Methodology for analysis has followed accepted criteria and testing has been undertaken by appropriately experienced and qualified personnel.

Condition (H22)

- (i) The daily quantity of contaminants released has been determined by an appropriate and accurate method. This volume is determined by flow meter totaliser which records flow from the pumps to irrigation gun.

Condition (H23)

- (i) GELITA Australia P/L has kept records of volumes, dates, time and duration of irrigation events on the property. These records are compiled and stored on site.

Receiving Waters Monitoring Program

Condition (H24)

- (i) The Receiving Waters Monitoring Program has been carried out as required.

Condition (H25)

- (i) The parameters and frequency of monitoring have been in accordance with the requirements of the GELITA Australia P/L EMP Section 4.8.

Condition (H26)

- (i) There has been no direct release of contaminants to waters. This condition would appear to be superfluous.

Condition (H27)

- (i) All determinations of the river water quality have been undertaken by the DNR, Queensland Government Health laboratory, and appropriately trained GELITA Australia P/L laboratory personnel. No contaminants have been directly released to the river waters.

Condition (H28)

- (i) The records of the results of all monitoring and determinations carried out under this Program will be retained for at least 5 years.

Contaminant Release Area Monitoring Program

Condition (H29)

- (i) GELITA Australia P/L is required to conduct a program to monitor the condition of the land to which contaminants are applied.
This program undertaken in compliance with the EMP will be replaced the following program, undertaken by an external consultant.

"The existing licence conditions have included soil and water monitoring and the following schedules are a continuation and extended to meet the requirements of the Draft Environmental Management Program (EMP Reference No. 5080001157). The initial monitoring program recommended in the Environmental Impact Statement on soil and water monitoring (GHD, 1992) was implemented as policy in the Company (Leiner Davis Gelatin (Australia) Environmental Management Plan, 1994.

The revised program of irrigation scheduling (Hydroplan report, September 2003) is aimed to sustain soil conditions for productive growth according to soil properties as determined in the Land Management Study Phase 1, Task A- Soil Sampling and Analysis as reported above.

To meet the requirements of the revised licence proposal more detailed sampling will be required to monitor soil conditions according to soil and crop type. The sites for sampling will follow from this report and will be taken from similar locations for comparison over time.

Additional soil and ground water sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity will be also monitored on an annual basis during the five years following establishment of the vetiver/ryegrass production unit. This will be used to validate the recommendations of the MEDLI program upon which the vetiver/ryegrass program is based. Corrective actions will be taken if values are deemed to be outside sustainable limits. This will be affected by modifying the leaching fraction and by deducing salt load in irrigation water by shandyng with bore water.

Element	Sites	Method	Frequency
Soil Salinity	Within soil units 2a, 2b, 2c, 2d, 2e, 3a, 3b,	Soil sampling and analysis for pH (1:5), EC sat, Cl, NO ₃ , SO ₄ , effective CEC, exchangeable Ca, Mg, Na,	annual
Soil infiltration and hydraulic conductivity	Within soil units, 2a, 3b, 2e	Field instrumentation	annual
Nutrient Status	As Above	Soil Sampling and analysis for Total N, NO ₃ -N, NH ₄ -N, Acid extractable P	Bi-annual
Groundwater	Relevant bores with water table within soil units listed above	Tape measurement and EC. Water laboratory analysis	Bi-annual
Effluent	Pump out pond outlet	Water laboratory analysis,	Monthly

These analyses will be used in conjunction with wastewater treatment data to assess compliance with the relevant licence conditions proposed in this submission.”

Condition (H30)

- (i) The parameters and frequency for monitoring under this program shall be in accordance with the GELITA Australia P/L EMP Sections 4.1, 4.2, and 4.3.

Condition (H31)

- (i) All determinations of the condition of the contaminant release areas have been undertaken by the University of Queensland, external consultants, and appropriately trained GELITA Australia P/L laboratory personnel. GELITA Australia P/L acts on the premise that these persons and bodies are acceptable to the administering authority.

Condition (H32)

- (i) The records of the results of all monitoring and determinations carried out under this Program will be retained for at least 5 years.

Monitoring of Groundwater Quality

In all conditions of this aspect of the license GELITA Australia P/L has met and exceeded requirements.

Condition (H33)

- (i) GELITA Australia P/L is required to maintain bores for the purpose of sampling and analysing groundwater as specified locations. GELITA Australia P/L has extended the monitoring program to 31 bore sites as part of the Farm Study.

Condition (H34)

- (i) GELITA Australia P/L has a responsibility to ensure a groundwater-monitoring program is performed, which complies with the following requirements:
- (a) All determinations of quality of contaminants released to groundwater are in accordance with the EPA Water Quality Sampling Manual current edition.
 - (b) Standing water levels must be measured in metres and recorded on each occasion sampling takes place.

- (c) Samples of groundwater must be taken from each of the bores on at least one occasion every six months.
- (d) Samples must be analysed for:
 - (i)
 - (ii) Electrical conductivity
 - (iii) Sodium
 - (iv) Magnesium
 - (v) TDS
 - (vi) Total Nitrogen
 - (vii) Sulphate
 - (viii) Carbonic acid
 - (ix) pH
 - (x) Chloride
 - (xi) Calcium
 - (xii) Total Phosphorus as P

Condition (H35)

- (i) The records of the results of all monitoring and determinations carried out under this Program will be retained for at least 5 years.

Environmental Impact Analysis Reporting

Condition (H36)

- (i) GELITA Australia P/L must ensure that the monitoring data gathered in accordance with this authority is analysed and interpreted by an expert in the field of each monitoring program to assess the nature and extent of any environmental impact of the ERA. The data analyses and assessments must be submitted to the EPA with each annual return.

Exception Reporting

Condition (H37)

- (i) GELITA Australia P/L must notify the EPA in writing of any monitoring result that indicates an 'exceedance' of any license limit within 28 days of completion of analysis.

Condition (H38)

- (i) The written notification required by Condition (H37) must include:
 - (i) the analysis results;
 - (ii) details of investigation or corrective actions taken; and
 - (iii) any subsequent analysis.

**Interim report on the
establishment of hardwood
plantations for Gelita Australia**

**'Sunny Hills' Property
Beaudesert, Qld**

January 2005

Prepared for Gelita Australia

by

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Background

Gelita Australia produces gelatine from cattle by-products sourced from various abattoirs at their Sunny Hills property 7 km from Beaudesert. The plant also produces approx 1.5 ML of wastewater per day that is irrigated over the property. The company has contracted the Treecorp Group to establish c.30 ha of commercial hardwood plantations during 2005 in order to assist with the uptake of the wastewater and to produce a commercial return from the tree crop.

Treecorp has been managing commercial plantations for a variety of clients for over 20 years and presently manages almost 20,000 ha of trees and land. The group also manages irrigation projects utilising wastewater with hardwood plantations in Victoria. As part of its commitment to research and development, Treecorp has, in the Queensland region, established an agreement with CSIRO Forestry and Forest Products (CFFP) based around the CFFP office at Cooroy north of Brisbane. The relationship between CFFP and Treecorp brings together the best of forestry research and commercial plantation management.

The CFFP, one of the premier forestry research and development organisations in Australia, conducts investigations into all aspects of forestry from genetic improvement, plantation development, environmental and sustainable forestry, and timber processing. Included within this portfolio CFFP initiated research and development into irrigating plantations with effluent and has published the results which act as the definitive guidelines under Australian conditions.

The objective of establishing plantations on Sunny Hills is to:

- Provide a commercial return from solid wood products.
- To assist in the utilisation of the wastewater.
- To assist in the uptake of nutrients from the wastewater.

Site Factors Relevant to this Proposal

- Altitude varies from 50 to 70 m ASL. The topography consists of moderate to gentle slopes falling from the volcanic hill to the nearby Logan River that surrounds the property on three sides.
- Rainfall as measured at nearby Beaudesert has a long-term annual mean of 915 mm with 300 mm (33%) falling in the six driest months from May until October. Spring and early summer are often the most demanding periods for tree growth.
- Mean annual temperature at Beaudesert is 19.6°C with a mean daily maximum of 26.5°C and daily minimum of 12.7°C. There are an average of 6 days per year with screen temperatures <0°C with a lowest recorded temperature of -5.5°C.
- On sites such as Sunny Hills productivity for non-irrigated forest plantations would be low to moderate. Difficult soil rooting environment combined with marginal rainfall conditions result in difficult growing conditions. However, under irrigation and with best silvicultural practices it is considered that acceptable returns could be achieved on this property.

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Operations to Date

The operations undertaken to date are summarised below and will be subsequently be discussed in detail.

Operation	Date	
	start	end
Planning		
Soil survey	21-Oct-04	21-Oct-04
Mapping	11-Nov-04	19-Nov-04
Nursery operations		
Order seed	Nov-04	Nov-04
Sow seed into 512 seedlings trays	12-Dec-04	16-Dec-04
Transfer seedlings into Hyco 40 trays	24-Jan-05	4-Feb-05
Establishment operations		
Broadcast spraying	1-Dec-04	2-Dec-04
Rip and mounding	20-Dec-04	22-Dec-04
Create tracks for irrigation unit	22-Dec-04	22-Dec-04

Soil Survey

A soil survey for a project such as this is vital to obtain the fundamental soils related information that will directly affect tree growth, the choice of most suitable tree species and determine the amount of effluent that can be applied. The soils of the Sunny Hills property have been previously surveyed but the results have been analysed from an agricultural and not a forestry view. Accordingly a survey was conducted on 21 October 2004 by David Boden (CFFP) and Brian Schafer (pedologist and environmental consultant to Gelita). Eight soil profiles, dug to a depth of 2 m, were described and samples taken from representative horizons for analysis.

The full description is included as Appendix 1 and can be summarised as follows:

- Heavy textured profiles, with all B-horizons varying from light to heavy clays.
- All profiles moist to very moist which reflect a combination of irrigation and the recent (1 to 2 days prior) 60-75 mm rainfall.
- Lack of intense hydromorphic colours and strong/bleached A2 horizon indicates drainage is not impeded. However, the abundant mottling indicates low permeability of soil moisture.
- Structure generally moderately strong, but may become stronger in the dry state.
- A horizons, although shallow (usually only 10 cm in depth) generally healthy with a good organic material component. The irrigation over the last 8 years has undoubtedly contributed.
- A horizon often had an Ao component of undecomposed grass material. This is a highly unusual occurrence for Walloon derived soils, obviously influenced by the irrigation practices. Assumed the build up is due to NH4 component that leads to a reduction in pH and consequent reduction/exclusion of biological activity that would otherwise break down this layer.
- The minimal textural contrast between A and B horizons, and the absence of a well defined bleached A2 horizon make the profiles inspected less intensely duplex than typical profiles found on the Walloon coal measures
- No well-defined barrier to rooting, with absolute rooting depth to at least 1m and often deeper. Rooting of the current grass sward was abundant in the upper horizons and usually was common down to 80 or 100 cm. However, the firm to very firm consistence, the problematic drainage and sometimes strong structure will combine to have a negative effect on tree root development. Therefore the Effective Rooting Depth (ERD), while extremely difficult to define with any degree of accuracy on these profiles, was generally estimated as 45 to 60 cm.
- Chemical analysis will be conducted on the 13 soil samples collected and reported upon once the results are available. However, it is known that most of the subsoils have Exchangeable Sodium Percentages (ESP) values between 6 and 14.9 (qualifying as a sodic horizon) or above 15 (highly

sodic). (ESP is the percentage of sodium cations relative to the effective cation exchange capacity (ECEC= sum of Ca, K, Mg, Mn, Na, H and Al cations).

- The soil types classified by the Australian soil classification system (Isbell 1996) as sodosols (profiles 4 to 7), grey vertisols (profiles 2 and 3), black vertisols (profile 1) and rudosol (profile 8).

The following recommendations relating to silvicultural practices were made as a result of the soil survey:

- Species tolerant of heavy imperfectly drained soils (eg gum topped box - *Eucalyptus moluccana*) should be planted on the flats. Species adapted to better-drained soils (eg spotted gum) should be allocated to land on the slopes where the drainage is improved.
- Pre-cultivation spray vital to eliminate the abundant and deep roots of the pasture grasses in order to improve effectiveness of the cultivation operations. It is recommended to use 7 L Roundup 360 per ha.
- Allow the profile to dry out (and so improve the shatter of the rip) by ceasing the irrigation immediately.
- Must use a wide wing attached to the base of the ripping tyne and set at an attacking angle to ensure a good shatter of these firm subsoils.
- Do not attempt to rip too deep (which will result in a smeared thin rip line), a depth of c.40 to 45 cm is recommended.
- Mound in order to establish the seedlings above any effluent that may accumulate, and above any excess rainfall that may accumulate on these imperfectly drained soils.
- Mounding will also bring a greater volume of the (firm) subsoils to the surface where a combination of exposure to the climatic elements and the subsequent second cultivation will assist in improving soil tilth.
- Consider aligning rows against the contour on the flats of the Hill paddock to facilitate the drainage of water and salts off the site. However, the alignment of the rows must facilitate and not interfere with the irrigation applications.

Soil analyses were undertaken on fourteen soil samples taken from four of the eight soil profiles described. Details are given in appendix 2. A summary of the analysis is presently been undertaken together with the CSIRO review of past and future irrigation practices as they impact on hardwood plantations.

Species Choice

The soil types encountered on Gelita are not usually used for commercial forestry in this rainfall zone. Therefore it is planned to use only the most hardy tree species which are detailed as follows:

Common name	Species	Provenance or seed collection location	Seed stock no	% of area	Area to be planted
	Corymbia				23.00
Spotted gum	<i>Corymbia citridora</i> subsp <i>citridora</i>	Richmond range	1050	43.5	10.01
Corymbia hybrid	<i>Corymbia</i> hybrid	Dendros		6.5	1.50
	Eucalypts				
Grey gum	<i>E. longirostrata</i>	NW Monto	ATSC 15637	10.0	2.30
Gum topped box	<i>E. moluccana</i>	NE Cooyar	ATSC 15221	10.0	2.30
Western white gum	<i>E. argophloia</i>	Burncluith	ATSC 20493	5.0	1.15
Grey gum	<i>E. biturbinata</i>	Girad SF	ATSC 19809	5.0	1.15
Grey ironbark	<i>E. siderophloia</i>	SF 207 Jimna	DPI 11896	5.0	1.15
	Other genus				
Wattle	<i>Acacia glaucocarpa</i>	SF 865 Byfield	DPI 11067	10.0	2.30
River she oak	<i>Casuarina cunninghamiana</i>	26km SE Mt Morgan	ATSC 13511	5.0	1.15
Total				100.0	23.00

Spotted gum has become a widely planted species over the last 3 to 4 years only after seed from provenances tolerant of the shoot blight *Ramularia* became available. This seed remains in short supply and this project was fortunate to source sufficient amounts from Richmond Range (northern NSW). This species will be planted on the upper slopes as it is sensitive to severe frosts.

The remaining species are regarded as even more hardy than spotted gum and will be used on the mid to lower slopes at Gelita. Gum topped box occurs naturally on these sites and is particularly adapted to the poor duplex soils which are often sodic. Western white gum is rapidly proving itself as a commercial option on hard and dry sites more than c.50 km from the coast. While grey gum and grey ironbark have not been planted as commercial species on a large scale, they have performed well in hardwood trials located on similar sites to those at Gelita.

As there is no improved seed available from breeding programs for any of these species, all seed is from those wild sources which have proved themselves in trials.

A small area will be planted to the *Corymbia* hybrid, a promising hybrid between spotted gum and *Corymbia torrelliana* with germplasm recently acquired by Dendros from Brazil.

In addition to the eucalypts and the closely related *Corymbias*, small areas will be planted to wattle and river she oak in order the supply some variation to the species choice. The wattle selected is a fast grower on poor sites but must be managed on a relatively short rotation of 10 to 15 years. The river she oak is a slow but solid performer on the hard inland sites and provides a dense timber.

Nursery Operations

Seedlings are being grown at the Subtropical Commercial Timber Nursery (SCTN) near Nambour. Sowing was undertaken in mid December when the seed was sown into Hiko 512 trays. When the germinants were 2 to 3 cm tall they were transplanted into Hiko 40 trays during late January/early February. Hereafter the seedlings will be grown to a height of c.30 cm (mid March) when they are ready for planting in the field.

Spraying and Burning

A complete broadcast spray was undertaken prior to site preparation in order to:

- Improve the effectiveness of the site preparation as the dead grasses lead to a rapid breakdown of the clods,
- Broadcast spraying prior to the planting of trees is considerably cheaper than spraying after planting,
- Initiates our objective of growing the trees in a completely weed free environment prior to canopy closure.

Spraying was undertaken using a 4WD tractor and 6 m boom. The vegetation sprayed was essentially grasses and the herbicide used Glyphosate (Roundup 450) at a rate of 4.8 L/ha (equivalent to Roundup 360 at 6 L/ha), together with Brush-off, a herbicide effective against broadleaves, and Hotup which improves the effectiveness of the two herbicides.

An excellent result was obtained in all blocks, and was improved by the recent rains which stimulated grass growth and increased the uptake of herbicide.

Once the grasses had died off following the herbicide application, they were burnt to reduce their bulk and so improve the rip and mounding operation. Some difficulty was experienced with the burn as intermittent rain events delayed the drying out of grasses.

Site Preparation

A rip and mound operation was used to cultivate strips 4.0 m apart. Particular care and attention was focused on this operation as the fragile duplex soils are very prone to erosion if water is concentrated into the sodic subsoil horizons. For this reasons the following aspects were adhered to:

- Mounds were run at 1 degree off the contour,
- The uninterrupted length of cultivation was kept short (100 to 150 m) by the frequent use of waterways and tracks to carry water off the site.
- Existing contour banks were retained
- The rip depth was set relatively shallow (at 40 cm) to allow for only partial shatter of the upper subsoil and thus limit the amount of water theoretically flowing into this horizon.

A Komatsu D85A bulldozer was used together with a Savannah 206 stump jump moulder and centrally mounted ripping tyne. A wing 40cm wide was attached to the shoe. The 3 sets of discs formed mounds c.45 cm high and 1.6 m wide. The effectiveness of the ripping tyne was assessed when trenches were dug at right angles to the mounds and the zone of shatter inspected. Unfortunately there was little shatter observed as the heavy subsoils had been saturated following the frequent rains making effective shatter almost impossible. To be most effective, such rip and mound operations need to be undertaken in the drier months of June to September.

Appendices

Appendix 1. Descriptions of soil profiles.

Appendix 2. Soil analysis.

Appendix 1 Interim report January 2005. Soil profile descriptions

Property:	Gellia, portions of localities 30 to 34	Location:	10 km south east of Baudecourt	Shire:	Baudecourt
Elevation:		Date:	21st October 2004	Surveyors:	Robert Schaffer, David Boden
Map Reference:				Previous history:	Cattle grazing
Present use:	Intonation of industrial effluent for pastures (since 1960), cattle grazing				
Topography:	Gentle to moderately undulating				
Geology:	Wollan coal measures with some volcanic (basaltic) intrusions				
Soils:	Heavy textured subsoils, classified as Sodosols or Vertisols				
Aspect:					

Profile ID:	cella 1	Elevation:	Northings:	Eastings:	8659 697	Location:	Hill paddock, alkali bank nr Logan R
A0	0-5 cm	dense mat of undecomposed oaks					
A	5-60	10YR 2/1, lt-med clay, strong medium polyhedral (sib) structure, obvious cupins-smooth and fabric, v firm, abd roots					
Bz1	60-110	10YR 5/4, med clay, compound structure (not as well defined as A), v firm, occ carbonate nodules					
Bz2/C	110+	Yellow-orange mollic on grey matrix, med-heavy clay, massive, v firm, Mn nodules common					
ERDepth(cm):	7-45 cm	Limitations: firm, strong structure, low permeability.					
Comments:	Represents only small area of this paddock, profile when wet difficult to inc. use when mound to this soil to surface, consider soil calibration of fresh depth cells						Landscapes position: Vertical (black) Soil type: A11 (5-20 cm), A12 (20-50) Potential for trees: Low

Profile ID:	cella 2	Elevation:	Northings:	Eastings:	8659 721	Location:	Hill paddock, flat beyond cella 1
A	0-20	10YR 5/4, R clay, small fine angular to granular, friable, abd roots, clear transition to					
Bz1	20-40	10YR 5/2, red mollic on grey matrix, lt-med clay, fine polyhedral (to medium sub), well defined cupins, v firm, diffuse tr					
Bz2/C	40-100	10YR 5/6, med-heavy clay, fine platy/polyhedral, slickensides, abd Mn nodules, seeping water 40-50, roots common					
ERDepth(cm):	100-140+	as for cella-1, yellow-brown mollic on grey matrix, med-heavy clay, occ Mn nodules					
Comments:	7-60 cm	Limitations: firm, strong structure, low permeability.					
		No intrans hydroporphic colours, (s) healthy A with obvious organic matter, abd rooting throughout.					
		consider soil calibration of fresh depth cells					

Profile ID:	cella 3	Elevation:	Northings:	Eastings:	8659 812	Location:	Hill paddock, near main irrigation line and paddock fence
A	0-10	as for cella-2					
Bz1	10-50	more pronounced than cella-2, with distinct grey mollic on red-brown matrix					
Bz2	50-90	as for cella-2					
Bz3/C	90-140+	as for cella-2					
ERDepth(cm):	7-60 cm	Limitations: firm, strong structure, low permeability.					
Comments:							Landscapes position: Vertical (grey) Soil type: None Potential for trees: Low-moderate

Profile ID:	cella 4	Elevation:	Northings:	Eastings:	8659 871	Location:	Hill paddock, between profiles 3 & 5,
A1	0-12	10YR 3/2, clay loam, small coarse blocky to subangular, friable, abd roots					
A2	12-15	10YR 6/2, weakly developed					
Bz1	15-90	red mollic to yellow-brown (s-s) mollic on grey matrix, lt-med clay, weak polyhedral with some slickensides,					
		inclusions down shrinkage cracks, firm, abd roots,					
Bz2	90-140+	10YR 7/1, heavy clay, massive, no rooting.					
ERDepth(cm):	7-50 cm	Limitations: v firm, low permeability.					
Comments:	Bz2 below-grey plasticine						

Profile ID:	cella 5	Elevation:	Northings:	Eastings:	8659 903	Location:	Hill paddock, At base line data point
A	0-15	10YR 2/1, dark friable, granular? massive?					
A2	15-20	pale (not bleached), 10YR 4/8-5/3, lt clay, fine polyhedral.					
Bz1	20-40	grey mollic on red brown matrix, med clay, fine angular blocky (polyhedral)					
Bz2	40-90	grey mollic on yellow brown matrix, med-heavy clay					
B/C	90-150	yellow-brown mollic on grey matrix, mudstone particles					
C	150+	well decomposed sediments, pink-brown colours, coal seams, abd clear fossils					
ERDepth(cm):	7-60 cm	Limitations: v firm, low permeability.					
Comments:	Essentially same as cella 4, Bz1 has oxidation colours						

Profile ID:	cella 6	Elevation:	Northings:	Eastings:	8600 477	Location:	Hill paddock, heddy end
A	0-15	dark humic, organic clay loam.					
Bz1	15-130	grey mollic on red brown matrix, 7.5YR 4/8, lt med ranging to heavy clay, moderately strong medium sub, firm to v firm					
C	130+	well weathered Wollan sediments					
ERDepth(cm):	7-80 cm	Limitations: v firm, low permeability.					
Comments:							Landscapes position: Sodosol Soil type: A (0-15), Bz1 (15-7), Bz2 (7-150), C (130+) Potential for trees: Low-moderate

Profile ID:	cella 7	Elevation:	Northings:	Eastings:	8600 768	Location:	Sunny hill paddock, immediately below first contour,
A	0-10	clay loam, granular, friable					
Bz1	10-50	5YR 5/8, generally uniform colours with faint grey mollic, lt clay, firm					
Bz2	50-70	10YR 5/6 with grey mollic, lt-med clay					
C	70+	well weathered sandstones					
ERDepth(cm):	90	Limitations: firm Bz1, some imperfect drainage					
Comments:	Best profile seen, distinctly red colours, high clay content implies of sandstone parent material, moderate slope improves drainage						Landscapes position: Mid-slope Soil type: Sodosol (but traditional profile) Potential for trees: None Moderate
		Healthy but shallow A, large zones (15-45 cm diam) on surface not indicative of rooting depth, adverse rain, reduce erosion					

Profile ID:	cella 8	Elevation:	Northings:	Eastings:	8600 783	Location:	Sunny hill paddock, above profile 7.
A	0-10	friable					
Bz1	10-40	extremely variable,					
C/R	40+	well weathered basal					
ERDepth(cm):	40 (later tel)	Limitations: Shallow rooting depth					
Comments:	Soil/C/R Interface very variable ranging from 15 to 70 cm depth, (photo will > EHO						Landscapes position: Mid-slope Soil type: Rudsol Potential for trees: None Low

Appendix 2 Interim report January 2005. Soil analysis data

Date sampled: 21-Oct-04 Date analysed: 21-Nov-04 Laboratory FALLA Batch no: 2030 535

Soil Profile	Sample ID	Horizon	Depth cm	pH		OC %	N nitrate	P mg/kg		Ca	K	mg/kg				Ca/Mg	Al mg/kg	Cond mS/cm	mg/kg							Total soluble salts
				23.3C	1:5 CaCl2			bicarb	acid																	
1	1	A1-1	5-20	4.8	4.5	7.6	6.0	101.0	465.0	4,188	239	821	821	260	517	5.1	21.6	0.80	776	3.7	7.9	5	3,523	823	2,492	2,544
1	2	A1-2	20-50	6.3	6.1	2.2	7.5	36.5	544.0	5,027	264	1,392	19	671	3.6	5.0	2.0	0.42	112	2.8	1.9	5	2,482	61	183	1,350
2	3	A1	0-10	4.6	4.2	3.4	4.3	2.9	10.7	2,604	84	525	247	631	5.0	5.0	158.0	1.59	192	1.1	2.2	5	627	2,051	6,147	5,074
2	4	B21	20-40	5.3	4.9	1.3	5.0	9.5	4.1	2,950	81	1,240	233	1,408	2.4	2.4	52.4	1.56	124	1.7	2.4	5	974	998	2,991	4,996
2	5	B22	40-100	8.1	7.7	1.0	3.1	4.7	205.0	11,760	122	2,150	13	2,054	5.5	2.0	2.0	1.63	44	1.2	1.6	5	1,960	553	1,657	5,198
2	6	B23/C	100-140	7.4	7.1	0.5	3.6	30.2	619.0	3,908	156	2,109	7	2,304	1.9	2.0	2.0	1.26	23	1.6	2.7	5	3,426	39	118	4,018
4	7	A1	0-15	4.4	4.2	8.1	7.4	15.5	12.9	5,108	186	528	48	766	8.7	8.7	111.0	3.06	478	1.9	2.6	5	730	3,769	11,294	9,788
4	8	B21-1	15-45	4.8	4.3	2.0	3.8	3.0	8.1	2,708	235	1,048	65	1,281	2.6	2.6	379.0	1.81	188	2.4	1.5	5	950	778	2,331	5,155
4	9	B21-2	45-90	4.5	4.2	1.0	3.6	10.7	12.7	3,220	105	2,305	37	2,136	1.4	1.4	479.0	2.42	191	2.9	1.7	5	1,877	1,441	4,319	7,746
4	10	B22	90-140	5.1	4.7	0.5	3.8	24.9	40.6	3,509	275	4,304	1	3,503	0.8	0.8	272.0	0.90	195	3.9	1.4	5	5,308	15	47	2,870
6	11	A1	0-15	4.4	4.1	6.4	4.0	14.3	6.4	2,079	110	201	53	516	10.3	10.3	106.0	1.77	359	0.9	2.0	5	2,201	1,394	4,177	5,676
6	12	B21-1	15-60	5.0	4.7	0.9	8.7	4.3	1.3	2,216	79	2,395	13	1,710	0.9	0.9	72.2	1.88	105	1.8	0.8	5	2,177	225	673	6,026
6	13	B21-2	60-130	5.5	5.3	0.7	5.5	5.1	0.1	2,318	122	2,914	1	1,948	0.8	0.8	4.6	1.50	60	1.8	1.4	5	2,338	56	169	4,766
6	14	C	130-160	5.7	5.5	0.6	5.6	7.0	22.4	2,702	89	3,368	1	1,939	0.8	0.8	2.0	1.13	35	2.4	2.4	5	3,433	32	96	3,616

SIZE
25 x 6

DOMESTIC COAL QUALITY ANALYSES FROM

Assume

JEEBROPILLY COLLIERIES

FM 4.5%

DATE	I.M.(AD)	ASH (AD)	C.V.(AD)	S.E.(AD)	T.S. (A.D.)	T.M. (AR)	GAR (AR)	CV (GAR)
Jan-03	4.3	8.6	7230	30.27	0.53	8.8	28.85	6890
Feb-03	5.6	11.9	6720	28.14	0.60	10.1	26.79	6400
Mar-03	5.5	13.6	6590	27.59	0.63	10	26.28	6275
Apr-03	5.3	11.3	6800	28.47	0.53	9.8	27.12	6480
May-03	5.2	11.1	6890	28.85	0.54	9.7	27.48	6565
Jun-03	4.9	10.5	6955	29.11	0.67	9.4	27.73	6625
Jul-03	4.1	13.1	6845	28.66	0.62	8.6	27.32	6525
Aug-03	5.1	13.8	6645	27.83	0.66	9.6	26.51	6330
Sep-03	5.3	10.7	6920	28.97	0.70	9.8	27.59	6590
Oct-03	4.7	11.8	6875	28.79	0.64	9.2	27.43	6550
Nov-03	4.7	10.6	6970	29.19	0.63	9.2	27.81	6640
Dec-03	4.3	12.1	6875	28.78	0.68	8.8	27.43	6550
Jan-04	5.8	12.5	6725	28.15	0.65	10.3	26.81	6405
Feb-04	6.8	8.9	6910	28.94	0.68	11.3	27.54	6580
Mar-04	5.9	11.6	6780	28.38	0.65	10.4	27.02	6455
Apr-04	4.3	11.4	6930	29.01	0.59	8.8	27.65	6605
May-04	5.7	13.2	6640	27.79	0.54	10.2	26.46	6320
Jun-04	4.9	12.7	6740	28.22	0.67	9.4	26.88	6420
Jul-04	5	12.8	6695	28.03	0.62	9.5	26.70	6375
Aug-04	5.7	12.2	6680	27.96	0.63	10.2	26.63	6360
Sep-04	5.6	13.3	6560	27.46	0.56	10.1	26.15	6245

Average last 12 months	5.3	11.9	6782	28.39	0.63	9.8	27.04	6459
Average last 3 months	5.4	12.8	6645	27.82	0.60	9.9	26.49	6327

Where:-

I.M.(AD)	=	Inherent Moisture on air dried basis
ASH (AD)	=	Ash on air dried basis
C.V.(AD)	=	Calorific Value on air dried basis
S.E.(AD)	=	Specific Energy on air dried basis
T.S. (A.D.)	=	Total Sulphur on air dried basis

School of Natural Resource Sciences
Queensland University of Technology

Recycled organic products to reduce the salinity and sodicity impacts on soil properties and plant growth

Research Proposal

For
SC 80 Masters of Applied Science

By

Judith Raue (B.App.Sc.)

Supervisor: *Dr Robin Thwaites*
Queensland University of Technology

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The Organic Force

Abstract

Salt affected soils are responsible for the decline in soil structure and plant growth in Australia. Knowledge about the different kinds of saline soils is still very limited. Salinity is generally ameliorated with vegetation and ground water management, whereas sodic soils are usually restored with the application of gypsum.

This study sets out to investigate whether, and to what extent, recycled organic products can improve chemical and physical properties of saline soil, and consequently enhance the establishment and growth of pasture on salt affected land.

Introduction

Salt affected soils and their effects on land and water resources have been identified as one of the most severe environmental problems facing Australia.

These soils can be naturally occurring, but also be triggered or exacerbated by human activities. One of the widespread causes of salinity is the removal of native vegetation and replacement with shallow-rooted agricultural crops, plus increased irrigation. On the other hand irrigation with low quality water that is high in sodium chloride can lead to sodicity problems (SalCon, 1997). The degradation of the surrounding landscape due to salinity and sodicity may show for example through increased erosion, poor crop yields or seedling emergence, deterioration of the soil structure and waterlogging of the soil (Rengasamy and Walters, 1994; SalCon, 1997; Rengasamy, 2002).

The Australian Dryland Salinity Assessment in 2000 predicted that by 2050 more than 17 million hectares of land in agricultural and pastoral regions, could be affected by salinity (National Land and Water Resources Audit (NLWRA), 2000). The soils affected by sodicity

are up to five times larger in area than those soils affected by salinity (Rengasamy, 2001). Overall there are approximately 200 million hectares affected by sodic soils compared with 40 million hectares of saline soils (Rengasamy, 2001).

There is confusion in the differences between salinity and sodicity and therefore both phenomena are often treated as the same (Rengasamy, 2001). There is a need for greater clarification of the difference between salinity and sodicity to ensure correct management strategies are applied (Surapaneni et al. 2002).

Two management strategies generally exist for salt affected soils. A lowering of the water table either by re-vegetation or groundwater engineering for saline soils (NLWRA, 2000), and the application of chemical ameliorants such as gypsum for sodic soils (Rengasamy, 2001).

This study proposes to investigate to what extent recycled organic products are able to improve chemical and physical properties of saline and sodic soil and consequently how they enhance the establishment and growth of plants on the affected land.

This is based on numerous studies (Aggelides and Londra, 2000; Borken *et al.* 2002; Stokes *et al.* 2003; Hanay *et al.* 2004) that have shown that the addition of organic matter to soil can improve its chemical, physical and biological properties and therefore enhance the establishment and growth of plants.

Location of field

Research will be carried out at the property of GELITA Australia near Beaudesert, Queensland. GELITA Australia is located on a 170 ha grazing property approximately 8 km

south west of Beaudesert. The company manufactures gelatine from cattle hide. Due its natural geological setting and also due to extensive irrigation with effluent from the gelatine process the farm experiences substantial salinity and sodicity problems. Gelita's production process generates 475 Mega-litres of treated effluent per year, all of which is irrigated as treated effluent on the property. However, this effluent is high in nitrogen and total dissolved salts, thus resulting in an increase of irrigation-induced salinity.

Aim and objectives of the proposed program of research

Aim

Determine the beneficial effects composted organic residues have on the chemical, physical properties of salt-affected soils and the establishment and growth of pasture species.

Objectives

1. Investigate whether surface applied composted organic products will improve the chemical and physical properties of a saline-sodic soil
2. Determine the effects of composted organic products on soil properties when incorporated in the upper layer of the saline or sodic soil
3. Establish whether surface applied composted organic products improve
 - a) seedling emergence in saline and sodic soils and;
 - b) enhance the growth of established plants

Relation to previous work and significance

Previous work in this area has divided the saline soils into three major groups, saline soils, sodic soils and saline-sodic soils. These soils can occur naturally due to the nature of the Australian continent, yet they can also be induced through human activity.

Salts in salinity affected areas commonly consist of chlorides, sulfates and carbonates, with the soluble sodium chloride the most common form of salt in Australian soils (Fitzpatrick *et al.* 2001).

In contrast sodic soils contain high amounts of exchangeable sodium ions, particularly when rain or irrigation water flushes out the soluble salts, such as sodium chloride and calcium. The exchangeable sodium ions are then adsorbed by the fine clay fractions of the soil particles (Rengasamy and Walters, 1994).

These sodium ions weaken the bonds between the clay particles, resulting in dispersion of the clay particles. As these particles move down the soil profile, they clog the pore spaces, thus reducing water infiltration which can result in temporary waterlogging (Naidu and Rengasamy, 1995; Sumner, 1995; Qadir *et al.* 2001; Warrence *et al.* 2003). Generally, sodicity leads to a decline in soil structure (Rengasamy, 2002).

Saline soils on the other hand generally display a good soil structure as the excess salts in the soil keep the clays in a flocculated state (Abrol *et al.*, 1988; Warrence *et al.* 2003), but high salt levels have a detrimental effect on plants.

One of the key factors in the management of salinity is to reduce water recharge. This can be achieved with the establishment of perennial plants, either herbaceous (pastures and crops) or

woody (trees and shrubs) species (Pannell *et al*, 2004) although recent research has demonstrated that the area planted with perennials has to be of a considerable size to be effective (Pannell *et al*, 2004). In areas where the watertables are already shallow the option for farmers is to use salt tolerant crop species or engineering methods (e.g. open drains) (Pannell *et al*, 2004).

The most common amelioration strategy for sodic soil is the application of gypsum, which is moderately soluble and readily available and cheap (Sumner, 1995; Abrol *et al.*, 1988). The main constituent of gypsum is calcium, which can prevent the repulsion of the negative charges that cause the clay particles to separate thus stopping the clay from dispersing when wet (Hollier, 2003).

Several field trials have demonstrated the benefits of gypsum applications and in combination with organic matter (Abrol and Bhumbla, 1979; Valzano *et al.* 2001; Hanay *et al.* 2004). These studies found that the rate of water infiltration increased significantly and reduced the exchangeable sodium percentage (ESP) in the surface soil layers.

To date, only limited research has been conducted on the effects and application of organic matter in the form of compost or mulch on saline and sodic soils and how this may affect plant growth. Borken *et al.* (2002) and Stokes *et al.* (2003) have reported that the addition of organic matter can improve chemical, physical and biological soil properties and, therefore, enhance the establishment and growth of crops and pastures.

Recycled organic products are increasingly available for agricultural and horticultural use due to improved organic resource management and increased recycling of organic by-products

from industrial and commercial activities. Previous work has concentrated on the horticultural sector where the use of agroindustrial waste (Garcia-Gomez, A. *et al.*, 2002) or composted municipal organics (Deutsche Bundesstiftung Umwelt, 1997; Biala and Hauke, 1998, Biala, 1999) were assessed as a component in growing media for horticultural use.

Furthermore a recent study from Pakistan (Kahlowan and Azam, 2003) showed that with the application of organic wastes the chemical, physical and biological soil properties of sodic and saline soils could be improved. Additionally a recent study carried out by Hanay *et al.* (2004) on a saline-sodic soil found that compost together with gypsum helped restore the soils physical, chemical and biological properties.

The NSW Department of Environment and Conservation (Resource NSW, 2004) recently established a trial near Yass in which the effects of recycled organic materials and an organic fertiliser were assessed on the establishment and growth of eucalyptus species. Documentation of the trial and preliminary results have not yet been published. Nevertheless, anecdotal information suggests that the use of compost and mulch (recycled organics) and particularly that of organic fertiliser (pelletised chicken manure) has resulted in improved plant growth (Bragg, pers. comment).

Mowland (pers.comment), of the NSW Department of Land and Water Conservation has also reported the use of mulch on salt-affected lands resulted in improved plant growth. He estimated that mulching increased plant growth by up to 30%. However, mulch applications were made on an ad hoc basis and not part of a documented trial.

In relation to irrigation salinity, research has been carried out into the use of saline irrigation water in combination with the application of farmyard manure (FYM) on sugarcane (Choudhary, *et al.* 2004). It was found that under long term sodic irrigation the application of gypsum combined with FYM increased the yield of sugarcane as the soil conditions improved due to lowering of pH and ESP.

This current study sets out to investigate whether, and to what extent, recycled organic products can improve the chemical, physical and biological properties of saline soil, and consequently enhance the establishment and growth of pasture on salt affected land.

Previous studies (Truong, 2003) carried out on the property of Gelita Australia have indicated that the naturally sodic clays on the site are typically impermeable, thus resulting in an increased concentration of salts at the surface (Truong, 2003). Furthermore Truong (2003) reports that pasture species experience difficulties in the first weeks after being planted in soils affected by salinity. The plants showed slow growth in the beginning, but once they had grown through the compacted top layer the plants started to grow vigorously. The role of compost could involve breaking up that compacted layer, as well as improving the chemistry, physical and biological properties of the soil. The application of compost may also reduce the evaporation of water from the top layer of the soil, reducing irrigation requirements and consequently lowering the watertable.

Research methods and plan

This study will consist of pot and field trials. The pot trials will be carried out at QUT Carseldine and the field trials at the Gelita Australia property. Composts used for this project will originate from Gelita's own mix (gelatine by-products), as well as a standard green organics compost made primarily from garden organics. The Gelita compost is relatively high in nutrients and electrical conductivity, while the green organics compost is lower in nutrient content and conductivity.

Common pasture species that show tolerance to salinity will be used in the experimental trials. In this case these will be Vetiver grass (*Chrysopogon zizanioides*) and Rhodes grass (*Chloris gayana*).

Field trial

This study will comprise two field trials. In the first trial, the compost will be surface applied on established Rhodes and Vetiver grass pasture. In the second trial, the compost is incorporated into the soil surface layer and the pasture species are either newly sown (Rhodes) or planted (Vetiver)

1. In the first field trial the efficacy of various application rates of compost will be compared in regards to changes in soil properties and plant growth. The compost will originate from Gelita's own production (gelatine by-products) and be applied as top-dressing on established plants. There will be three application rates (0t dm/ha, 25t dm/ha and 75t dm/ha). The first amount is the control where no compost is applied, the 25t dm/ha resembles the general application rate of compost how it is applied on farms. 75t dm/ha is triple the usual amount. Changes in the physical and chemical properties of the soil will be monitored regularly.

2. For the second field trial, two different composts will be incorporated into the soil. One will originate from Gelita's own mix whereas the other one will represent a standard green organics compost made primarily from garden organics. Plants in this trial will be either freshly sown or planted as tubestock. There will be three different quantities of compost applied, which represent no application as control, the general rate that is applied by farmers, and triple the amount of compost applied in general practice. However the direct amounts have not yet been determined.

Sampling for the field trials

Soil: Soil samples at depths of 0-10; 10-20; 20-30; 30-60; 60-90 cm will be taken before the trial starts, and at the end of the trial. The focus of this research will be on the regular monitoring of the chemical, physical properties of the soil. Every 2nd month random samples of soils will be taken within each plot at depths of 0-10 and 10-20 cm.

The following soil chemical measurements will be taken for the field-trial:

Cations/Anions, Exchangeable Ca, Mg, Na, K	ICP Analysis
Cation Exchange Capacity (CEC)	Included in ICP
1:5 pH	Soils are air dried (at 40°C) and ground (to less than 2mm particles) and then mixed into suspension in a solution of one part soil and five parts deionised water at 25°C. After shaking for one hour, the EC, pH and Cl are measured. (Taken from SalCon, 1997)
1:5 Electrical conductivity (EC)	
C:N Ratio	The C:N ratio in residues helps to determine the rate of decay and the rate at which nitrogen is made available to plants
Total P (as soil might be deficient of P)	To determine if there is a need for the application of a phosphate fertiliser

Exchangeable Sodium Percentage (ESP)	$ESP = \frac{100Na^+}{CEC}$
Mineral Nitrogen (NH_4^+ -N and NO_3^- -N)	Extracted by KCl

The following soil physical properties will be assessed:

- Soil texture
- Soil structure
- Penetration resistance (this is the force required to push a pedometer or micro-pedometer tip into soil) It indicates the resistance experienced by elongating plant roots and shoots and hence indicate soil suitability for plant growth.
- Hydraulic conductivity
- Soil permeability
- Soil:water retention

Plants: The established plants for the first trial will be cut back before the trial starts. This is carried out to give all plants the same height, as the above plant biomass is determined at the end of the trial. The plants used in the second field trial will be harvested at the end of the trial.

The plants will be analysed for:

- Salt content, such as Na^+ , and Cl^- .
- Nutrient concentration in dry matter (principally N)
- Above plant biomass production

Glasshouse trial:

The glasshouse trial will be run over three months. The trial will comprise of a series of pot trials in where two different composts are incorporated on a volumetric basis into the growing

media to constitute the different growing media (treatments). The pot trials will provide the opportunity for the direct effects of compost on plant growth to be examined.

The soil used in the first trial will represent the A-Horizon (top 10-15 cm) of one of the field trial sites. The trial will comprise:

- Two common pasture species (Rhodes grass (*Chloris gayana*) and Vetiver grass (*Vetiver zizanoides* ‘Monto’). Plants will be used as both tubestock (Vetiver) and seeds (Rhodes) grass
- Three different proportions of compost that are mixed with soil (10%, 25%, and 50% [v/v] and controls, which contain no added compost.
- Four replicates for each treatment.
- Two different compost treatments. One will originate from Gelita’s own mix whereas the other one will represent a standard green organics compost made primarily from garden organics.
- Plants will receive deionised water to exclude any influence of contaminants that may be present in portable water. Half of the plants will also receive effluent water from the Gelita effluent. Water will be applied at regular intervals to ensure no stress on plant growth

Sampling for the glasshouse trial

Soil and soil-compost samples will be taken at the beginning and end of the trial.

The following soil chemicals and physical properties will be measured in the Glasshouse-trial:

Cations/Anions, Exchangeable Ca, Mg, Na, K	ICP (inductively coupled plasma spectrometry) Analysis
CEC (Cation Exchange	Included in ICP

Capacity)	
1:5 pH	Soils are air dried (at 40°C) and ground (to less than 2mm particles) and then mixed into suspension in a solution of one part soil and five parts deionised water at 25°C. After shaking for one hour, the EC, pH and Cl are measured. (Taken from SalCon, 1997)
1:5 Electrical conductivity (EC)	
C:N Ratio	The C:N ratio in residues helps to determine the rate of decay and the rate at which nitrogen is made available to plants
Bulk Density (when compost is applied by volume)	Is defined as the mass of dry soil per unit of bulk volume, including air space. The bulk volume is determined before drying to constant weight at 105 °C. BD= Weight of oven dry soil/volume of soil
Total P (as soil might be deficient of P)	To determine if there is a need for the application for a phosphate fertiliser Included in ICP analysis
Mineral Nitrogen (NH_4^+ -N and NO_3^- -N)	Extracted by KCl

Plants: The plants used in the glasshouse trial will be harvested after a growing period of 6 weeks and at the end of the trial (ie. after 3 months)

Plants will be analysed for:

- Salt content, such as Na^+ , and Cl^- .
- Nutrient concentration in dry matter (specifically nitrogen)
- Above plant biomass production

The results of the glasshouse trial will provide an indication of expected outcomes from the field trial.

Redact Page

Timetable of activities required for completion of this project

[illegible]

References

- Abrol, I.P. and Bhumbla D.R., 1979.** Crop responses to differential Gypsum Applications in a highly sodic soil and the tolerance of several crops to exchangeable sodium under field conditions. *Soil Science*, Vol. 127, No. 2, pp.79-84.
- Abrol, I.P., Yadav, J.S.P. and Massoud, F.I., 1988.** Salt-Affected Soils and their Management. *FAO Soils Bulletin 39*. Food and Agricultural Organization of the United Nations, Rome.
- Agglides, S.M. and Londra, P.A., 2000.** Effects of compost produced from town wastes and sewage sludge on the physical properties of a loamy and a clay soil. *Bioresource Technology*, Vol. 71, pp. 253-259.
- Biala, J. and Hauke, H., 1998.** Use of organic waste compost in growing media - research and developments in Germany. Presentation at „Scotts 2nd Australasian Potting Mix Manufacturers' Conference“, Sydney, June 18th - 19th 1998
- Biala, J., 1999.** Germans try compost in growing media, *Australian Horticulture*, February 1999, 102 – 105
- Borken, W., Muhs, A. and Beese, F., 2002.** Changes in microbial and soil properties following compost treatment of degraded temperate forest soils. *Soil Biology & Biochemistry* 34, pp 403-412.
- Brady, N.C. and Weil, R.R., 1999.** The Nature and Properties of Soils, 12th Edition. Prentice Hall, Inc., USA.
- Choudhary, O.P., Josan, A.S., Bajwa, M.S., and Kapur, M.L., 2003.** Effect of sustained sodic and saline-sodic irrigation and application of gypsum and farmyard manure on yield and quality of sugarcane under semi-arid conditions. *Field Crops Research*, 87, pp 103-116.
- Deutsche Bundesstiftung Umwelt (Hrsg.), 1997.** F- und E- Vorhaben Substratentwicklung auf Kompostbasis, Abschlussbericht, Zeller Verlag, Osnabrueck, Germany
- Fitzpatrick, R., Rengasamy, P, Merry, R. and Cox, J, 2001.** Is dryland salinity reversible? National Dryland Salinity Program
- Garcia-Gomez, A., Bernal, M.P. and Roig, A., 2002.** Growth of ornamental plants in two composts prepared from agroindustrial wastes. *Bioresource Technology* 83, pp. 81-87
- Hanay, A., Bueyueksenmez, F., Kiziloglu, F.M. and Canbolat, M.Y., 2004.** Reclamation of Saline-Sodic Soils with Gypsum and MSW Compost. *Compost Science & Utilisation*, Vol. 12, No. 2, pp. 175-179.
- Hollier, C., 2003.** Small Farm: Soil physical properties-texture and structure. Agricultural Notes, DPI Victoria.
- Kahlow, M.A. and Azam, M., 2003.** Effect of saline drainage effluent on soil health and crop yield. *Agricultural Water Management* 62, pp. 127-138.

- National Land and Water Resources Audit (NLWRA), 2000.** Australian Dryland Salinity Assessment 2000. Retrieved at 08.08.2003 from
http://audit.ea.gov.au/ANRA/land/land_frame.cfm?region_type=AUS&region_code=AUS&info=sal_manage.
- Pannell, D.J., Ewing, M.A., and Ridley, A.M., 2004.** Dryland salinity in Australia: Overview and prospects. Sourced on 15.7.2004 from: http://www1.crcsalinity.com.au/uploads/6e8a9017-0098-49f2-8966-1a18bca62748/docs/06_1-1_Pannell_Ewing.pdf
- Qadir, M., Schubert, S., Ghafoor, A. and Murtaza, G., 2001.** Amelioration strategies for sodic soils: A Review. *Land Degradation and Development* 12, pp. 357-386.
- Rengasami, P. and Walters, L., 1994.** Introduction to Soil Sodicity. Cooperative Research Centre for Soil and Land Management, Adelaide. Retrieved at 15.7.2004 from:
[http://www.nre.vic.gov.au/web/root/Domino/vro/vrosite.nsf/0d08cd6930912d1e4a2567d2002579cb/813c7894348b29d4ca256ea8000327c6/\\$FILE/crc%20intro%20soil%20sodicity.pdf](http://www.nre.vic.gov.au/web/root/Domino/vro/vrosite.nsf/0d08cd6930912d1e4a2567d2002579cb/813c7894348b29d4ca256ea8000327c6/$FILE/crc%20intro%20soil%20sodicity.pdf)
- Rengasami, P., 2001.** National audits of soil sodicity. Audit themes and projects. National Land and Water Resources Audit. Retrieved on 15.4.2004 from:
http://www.nlwra.gov.au/minimal/30_themes_and_projects/50_scoping_projects/04_methods_papers/26_Rengasamy/Sodicity.html
- Rengasami, P., 2002.** Transient salinity and subsoil constraints to dryland farming in Australian sodic soils: an overview. *Australian Journal of Experimental Agriculture*, 42, pp 351-361.
- SalCon (Salinity and Contaminant Hydrology Group), 1997.** Salinity Management Handbook. Queensland Department of Natural Resources, Brisbane.
- Schafer, B.M., 2003.** Technical Soils Report. Contaminant Release Area Monitoring Program. Background Study. Irrigated Effluent Management: Davis Gelatine Australia, Beaudesert.
- Stokes, J., Cody, J. and Maheswaran, J., 2003.** A long-term study into compost applications for broadacre cropping. Proceedings of the 11th Australian Agronomy Conference, Geelong, 2003.
- Sumner, M.E., 1995.** Sodic Soils: New Perspectives. In 'Australian Soils: Distribution, properties and management'. (Eds: Naidu, R., Sumner, M.E. and Rengasamy, P) pp.1-34. Published by CSIRO Australia.
- Surapaneni, A., Olsson, K.A., Burrow, D.P., Beecher, H.G., Ham, G.J., Stevens, R.M., Hulugalle, N.R., McKenzie D.C. and Rengasami, P., 2002.** Tatura Sodicity Conference: knowledge gaps in sodicity research for major agricultural industries. *Australian Journal of Experimental Agriculture*, Vol. 42, pp. 379-387.
- Truong, P., 2003.** Application of the Vetiver System for Effluent Treatment Davis Gelatine, Sunny Hills, Queensland. Veticon Consulting Brisbane.

- Valzano, F.P., Greene, R.S.B., Murphy, B.W., Rengasamy, P. and Jarwal, S.D., 2001.** Effects of gypsum and stubble retention on the chemical and physical properties of a sodic grey Vertosol in western Victoria. *Australian Journal of Soil Research*, 39, pp. 1333-1347.
- Warrence, N.J., Bauder, J.W. and Pearson, K.E., 2002.** The Basics of Salinity and Sodicity Effects on soil Physical Properties. The Department of Land Resources and Environmental Science, Montana State University – Bozeman.

6/10/2004 A/R

POP					BSD															
		pH	EC	COD (mg/L)	pH	EC	TDS (ppm)	TSS (mg/L)	COD (mg/L)	BOD (mg/L)	Total P (mg/L)	PO4 (mg/L)	NOx (mg/L)	TN (mg/L)	EX-TN (mg/L)	S2- F (mg/L)	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	
10/9/03	Wed	6.97	6870	164	6.51	6850	3405	60	180	15	0.89	1.4	15	300	290	0	580			
17/9/03	Wed	7.38	7410	203	6.42	7000	3510	70	178			1.7	15.6	310		0				
23/9/03	Tue	7.6	7000	277	6.14	7010	3613	50	183			1.9	14.5	320		0				
1/10/03	Wed	6.8	6960	223	5.34	7030	4614	50	204			1.8	15.4	314		0				
9/10/03	Thu	7.31	6880		5.49	6830	4424	50				1.4	15			0				
14/10/03	Tue	7.46	7060	242	5.8	6830	3957	60	237	15	1.3	1.3	15.7	312	310	0	600	410		
22/10/03	Wed	7.3	7100	252	6.14	6950	4022	70	254			1	21.4	316		0				
28/10/03	Tue	7.18	6990	247	6.67	6940	3880	50	244			1.2	18	328		0				
4/11/03	Tue	7.34	6890	258	6.4	6940	4494	50	243			1.3	18	310		0				
11/11/03	Tue	7.19	6930	290	6.39	6930	4563	60	236	18	0.1	0.7	16	328	200	0	630	380		
18/11/03	Tue	7.11	7020	287	6.18	6970	4580	70	269			1.1	15	308		0				
25/11/03	Tue	7.53	7200	289	5.2	6990	4449	120	291			0.8	13	312		0				
2/12/03	Tue	7.42	7380	330	5.37	7060	4601	110	223			0.7	8.4	336		0				
9/12/03	Tue	7.11	7370	265	5.3	6850	4017	80	259	14	0.95	0.6	10	292	260	0	610	390		
16/12/03	Tue	7.83	7000	175	5.28	6750	4064	90	272			0.6		272		0				
23/12/03	Tue	7.5	7040	207	5.79	6860	4354	80	230			0.5	4	268		0				
30/12/03	Tue	7.03	7640	196	5.85	6920	3632	10	216			0.5	1.9	256		0				
6/1/04	Tue	6.75	8810	241	5.55	7080	3898	60	188	14	1.1	0.2	2.1	274	260	0	630	390		
9/1/04	Fri	6.85	8500																	
13/1/04	Tue	7.21	8780		6.32	5930	4103	80	270			0.6	1.2	280		0				
20/1/04	Tue	7.09	7550	170	6.28	6390	3452	60	166			3.6	2.6	214		0				
27/1/04	Tue	7.64	7760	283	6.91	6200	4069		239			2.9				0				
3/2/04	Tue	7.33	7610	203	7.2	6390	3448	40	157			3.6	2.1	232		0				
12/2/04	Thu	7.2	6760	174	7.06	6390	3293	40	153	9	1.3	2.7	9	244	200	0	620	350		
17/2/04	Tue	7.09	7170	306	6.84	6370	3543	40	141			2.8	11	236		0				
25/2/04	Wed	7.55	6910	214	6.94	6390	3464	30	178			2.1	6.9	252		0				
2/3/04	Tue	7.38	6630	204	7.05	6420	3619	40	188			1.7	8.1	252		0				
9/3/04	Tue	7.53	6680	246	6.95	6230	3372	60	206			2.1	10.4	260		0				
16/3/04	Tue	7.51		287	7.25		3395	80	216	21	1.1	1.8	9.5	276	120	0	590	310		
23/3/04	Tue	7.2	6600	271	7.2	6400	3412	90	257			2.1	13	268		0				
30/3/04	Tue	7.38		300	7.19		2962	80	247			2.6	13	288		0				
8/4/04	Thu	7.5	7010	298	7.32	6510	3977	80	283	18	1.9	3.2	11	320	340	0	560	290		
20/4/04	Tue	7.43		280	7.41		3846	110	270			1.8	3.8	332		0				
28/4/04	Wed	7.43		271	7.35		4001	100	246			1.9	2.8	348		0				
5/5/04	Wed	7.52		303	7.43		3182	70	261			1.6	4	340		0				
11/5/04	Tue	7.64		247	7.56		3613	80	222	20	1.2	1.8	2.6	352	290	0				
18/5/04	Tue	7.64	7900	317	7.47	7190	3883	40	247			1.5	2.4	364		0				
25/5/04	Tue	7.48	7720	241	7.55	7380	3215	30	222			2.3	2.7	420		0				
1/6/04	Tue	7.57	7650	170	7.6	7480	3084	40	192			2.1	2.5	428		0				
9/6/04	Wed	7.61	7630	199	7.69	7540	3236	40	185	9	1.2	2.4	2.1	440	450	0	570	270		
16/6/04	Wed	7.76	7900	166	7.77	7760	3314	30	197			2.6	2.6	460		0				
22/6/04	Tue	7.76	7830	152	7.75	7790	3220	30	153			2.8	3.3	472		0				
30/6/04	Wed	7.82	7950	165	7.83	7870	3250	9	195			2.9	4	468		0				
7/7/04	Wed	7.83		201	7.84	7780	3244	40	211			2.6	3.7	492		0				
13/7/04	Tue	7.86	7940	198	7.89	7940	3252	9	193	9	1.2	2.4	4.4	480	530	0				
20/7/04	Tue	7.83	7890	170	7.84	7940	3244	10	183			2.5	4.4	496		0				
27/7/04	Tue	7.73	7960	171	7.78	7960	3227	9	194			3	4.2	500		0				
3/8/04	Tue	7.46	7860	209	7.43	7910	3326	40	214			2.1	11.2	488		0				
10/8/04	Tue	7.33	8000	275	7.29	7910	3307	100	396	24	1.5	2.6	22	488	430	0				
17/8/04	Tue	7.54	7880	247	7.51	7870	3222	80	283			3.2	25			0				
24/8/04	Tue	7.31	8520	232	7.26	8480			258							0				
27/8/04	Fri	7.66			7.66		4700	60				4.5	12.9	496						
31/8/04	Tue	7.53	8170	248																
8/9/04	Wed	7.41	8360	250	7.4	8210	3132		287	28	2.4	4.3	20.5	552	600		495	330	53	
14/9/04	Tue	7.39	8270	286	7.3	8320	3596	80	319			3.7	25	552						
21/9/04	Tue	7.41	8050	304	7.32	8060	3522	100	300			4.2	25.7	528		0				
28/9/04	Tue	7.33	7910	272	7.3	7960		60	281			2.8	26.8	520		0				
5/10/04	Tue	7.18	7920	283	7.11	7890		120	296			2.9	34.2	532		0				

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		pH	EC	COD (mg/L)	TSS (mg/L)	PO4 (mg/L)	Total P (mg/L)	BOD (mg/L)	TN (mg/L)	EX-TN (mg/L)	TDS (ppm)	EX- TDS (ppm)	NOx (mg/L)	S2- T (mg/L)	S2- F (mg/L)	Mg (mg/L)	Ca (mg/L)	Na (mg/L)
10/9/03	Wed	6.97	6870	164	30	1.5	0.95	19	302	320	3456		15	0	0			600
17/9/03	Wed	7.38	7410	203	50	1.5			348		3512		12.3	0	0			
23/9/03	Tue	7.6	7000	277	130	1.3			320		3691		8.5	0	0			
1/10/03	Wed	6.8	6960	223	80	1.6			302		4174		12.5	0	0			
9/10/03	Thu	7.31	6880		40	1.1			316		4035		12.5	0	0			
14/10/03	Tue	7.46	7060	242	70	1.4	1.5	20	348	300	4125		13	0	0		380	610
22/10/03	Wed	7.3	7100	252	60	1.3			360		3940		15.5	0	0			
28/10/03	Tue	7.18	6990	247	60	1.3			360		3896		14	0	0			
4/11/03	Tue	7.34	6890	258	70	1.3			324		4383		15	0	0			
11/11/03	Tue	7.19	6930	290	80	0.6	1.5	28	344	170	4447		14	0	0		370	620
18/11/03	Tue	7.11	7020	287	100	1			320		4496		12	0	0			
25/11/03	Tue	7.53	7200	289	100	1.6			400	363	4440		14	0	0			
2/12/03	Tue	7.42	7380	330	100	1.5			404		4494		23	0	0			
9/12/03	Tue	7.11	7370	265	100	1.5	1.5	27	376	380	4531		25	0	0		370	610
16/12/03	Tue	7.83	7000	175	30	6			332		3893			0	0			
23/12/03	Tue	7.5	7040	207	60	1.5			300		4281		8	0	0			
30/12/03	Tue	7.03	7640	196	30	4.2			296		3993		14	0	0			
6/1/04	Tue	6.75	8810	241	40	1.6	1.3	14	292	290	5062	5030	17	0	0	61	510	970
9/1/04	Fri	6.85	8500		58		1						74					
13/1/04	Tue	7.21	8780		50	1.5			276		5237		7.6	0	0			
20/1/04	Tue	7.09	7550	170	40	1.9			154		4787		2.9	0	0			
27/1/04	Tue	7.64	7760	283		1.9					4908			0	0			
3/2/04	Tue	7.33	7610	203	40	3.7			360		3506		19	0	0			
12/2/04	Thu	7.2	6760	174	30	2.4	1.6	16	312	200	3486		13	0	0		340	610
17/2/04	Tue	7.09	7170	306	60	2.4			384		3404		40	0	0			
25/2/04	Wed	7.55	6910	214	30	3.4			364		3258		8.5	0	0			
2/3/04	Tue	7.38	6630	204	50	2.3			304		3532		5.3	0	0			
9/3/04	Tue	7.53	6680	246	50	5.8			348		3190		5	0	0			
16/3/04	Tue	7.51		287	35	2.8	1.6	40	312	150	3063		2.1	3.2	0		270	570
23/3/04	Tue	7.2	6600	271	70	3.5			328		3385		11	0	0			
30/3/04	Tue	7.38		300	100	3.7			332		2967		11	0	0			
8/4/04	Thu	7.5	7010	298	70	3.1	2.1	21	364	390	4136		11	0	0		280	570
20/4/04	Tue	7.43		280	100	1.4			368		4162		5.4	0	0			
28/4/04	Wed	7.43		271	70	1.3			368		3868		2.7	0	0			
5/5/04	Wed	7.52		303	130	1.1			372		3162		4.4	0	0			
11/5/04	Tue	7.64		247	70	1.2	1.4	39	400	270	4110		3.1	0	0			
18/5/04	Tue	7.64	7900	317	90	2.6			528		3863		2.3	2.4	0			
25/5/04	Tue	7.48	7720	241	40	2.4			488		3117		13	0	0			
1/6/04	Tue	7.57	7650	170	20	2			448		3030		7.4	0	0			
9/6/04	Wed	7.61	7630	199	30	2.5	1.2	9	468	460	3247		4.6	0	0		270	550
16/6/04	Wed	7.76	7900	166	30	2.3			456		3215		4.5	0	0			
22/6/04	Tue	7.76	7830	152	9	2.3			496		3194		5.2	0	0			
30/6/04	Wed	7.82	7950	165	20	2.4			492		3332		5.7	0	0			
7/7/04	Wed	7.83		201	40	2.4			492		3178		3.6	0	0			
13/7/04	Tue	7.86	7940	198	40	2.2	1.2	14	496	540	3160		4.5	0	0			
20/7/04	Tue	7.83	7890	170	20	2.6			496		3261		3.9	0	0			
27/7/04	Tue	7.73	7960	171	9	2.6			488		3212		4.1	0	0			
3/8/04	Tue	7.46	7860	209	10	1.6			488		3225		10	0	0			
10/8/04	Tue	7.33	8000	275	60	3.2	2.3	29	496	470	3266		16	0	0			
17/8/04	Tue	7.54	7880	247	60	3.8			512		4572		15	0	0			
24/8/04	Tue	7.31	8520	232										0	0			
27/8/04	Fri	7.66			50	3.4			520		4688		10.9					
31/8/04	Tue	7.53	8170	248	30	3.8			560		4754		13.5					
8/9/04	Wed	7.41	8360	250		3.7	2.3	34	564	630	3108	3200	15.4			51	320	500
14/9/04	Tue	7.39	8270	286	90	3.1			588		3586		22.1					
21/9/04	Tue	7.41	8050	304	70	3.5			532		3338		19.2	0	0			
28/9/04	Tue	7.33	7910	272	90	2			516				20	0	0			
5/10/04	Tue	7.18	7920	283	110	3.9			524				26.1	0	0			

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		pH	TSS (mg/L)	COD (mg/L)	NOx (mg/L)	TN (mg/L)
10/9/03	Wed	6.93	30	150	14	328
17/9/03	Wed	7.2	50	180	12.5	336
23/9/03	Tue	7.15	50	160	7.3	324
1/10/03	Wed	6.76	40	203	12.5	316
9/10/03	Thu	7.12	50		13	
14/10/03	Tue	7.28	40	220	12.5	332
22/10/03	Wed	7.22	40	237	16.1	376
28/10/03	Tue	7.09	40	225	14	340
4/11/03	Tue	7.17	50	253	14	324
11/11/03	Tue	7.01	50	207	13.6	344
18/11/03	Tue	7.06	60	263	13	328
25/11/03	Tue	7.26	100	234	14	380
2/12/03	Tue	6.86	60	239	20	376
9/12/03	Tue	6.76	70	215	25	376
16/12/03	Tue	7.27				
23/12/03	Tue	7.26	70	191	9	306
30/12/03	Tue	6.74	40	225	17	294
6/1/04	Tue	6.38	40	255	20	304
9/1/04	Fri					
13/1/04	Tue	6.71	65	320	7.5	264
20/1/04	Tue	7.13	30	171	2.9	156
27/1/04	Tue	7.43		257		
3/2/04	Tue	7.09	160	388	29	392
12/2/04	Thu	7.09	10	200	17	320
17/2/04	Tue	6.71	50	232	36	404
25/2/04	Wed	7.8	30	216	10.4	408
2/3/04	Tue	7.36	50	211	5.7	300
9/3/04	Tue	7.5	80	276	6.2	372
16/3/04	Tue	7.45	63	296	5	320
23/3/04	Tue	7.16	40	306	12	320
30/3/04	Tue	7.43	80	279	10	328
8/4/04	Thu	7.47	80	270	12	376
20/4/04	Tue	7.44	80	262	6.4	368
28/4/04	Wed	7.42	40	263	3	372
5/5/04	Wed	7.5	40	260	5.6	368
11/5/04	Tue	7.64	80	255	4.3	392
18/5/04	Tue	7.59	90	332	2.1	520
25/5/04	Tue	7.48	50	252	15	492
1/6/04	Tue	7.57	10	175	7.8	448
9/6/04	Wed	7.62	9	200	4.5	468
16/6/04	Wed	7.78	9	166	4.3	468
22/6/04	Tue	7.75	30	175	5.3	488
30/6/04	Wed	7.84	9	179	3.7	496
7/7/04	Wed	7.81	20	172	2.4	500
13/7/04	Tue	7.84	30	207	4.2	508
20/7/04	Tue	7.83	20	162	3.7	496
27/7/04	Tue	7.71	9	187	3.9	508
3/8/04	Tue	7.44	30	229	8.9	480
10/8/04	Tue	7.31	20	284	15	512
17/8/04	Tue	7.51	111	266	16	512
24/8/04	Tue	7.29		250		
27/8/04	Fri	7.68	80		10.4	524
31/8/04	Tue	7.56	40	243	13	576
8/9/04	Wed	7.43		259	16	568
14/9/04	Tue	7.36	90	278	21.4	576
21/9/04	Tue	7.34	70	293	18.4	532
28/9/04	Tue	7.25	90	258		504
5/10/04	Tue	7.16	50	299	25.5	524

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Memorandum



Queensland Government
Environmental Protection Agency
Incorporating the
Queensland Parks and Wildlife Service

Enquiries
Telephone
Your reference
Our reference

Don Shackel
(07) 3225 1040
EMP001-30031999
STH495-8-SR0722

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27 February 2004

To: Kyle Roberts, Operations Manager - Heavy Industry Group

From: Don Shackel, Senior Inspector – Heavy Industry Group

Subject: **Completion of Environmental Management Program (EMP)
No.5080001157 (SR1157) - GELITA Australia Pty Ltd.**

**NOTE: EMP No.SR1157
(Period-in-Force: 4.5yrs)**

Original "Date of Certificate of Approval" – 3/05/1999 – Period-in-Force – 33/03/2002
Amended "Date of Certificate of Approval" – 1/12/2001 – Period-in-Force – 30/09/2003

1. COMPLIANCE / COMPLETION REPORT ASSESSMENT

Verification:

On 30 October 2003, e-mail advice was received by the EPA from Cameron Smeal, Environmental Officer for GELITA Australia Pty Ltd advising that EMP No.SR1157 and internal reporting requirements were completed, as prescribed, by 30/10/2003, viz; "within 30 days of the final date for completion of the environmental management program as stated on this "Certificate of Approval" (Tuesday, September 30, 2003), the person to which the environmental management program applies must forward a report to the administering authority detailing compliance with the conditions of this "Certificate of Approval" (Copy attached).

In consideration of the Company response to completion of EMP No.SR1157, verification of compliance with mandatory "period-in-force" timelines is confirmed.

Further, "compliance shall be verified in the report (a compliance report) by inclusion of such copies of plans, procedures, photographs, photocopies of purchase receipts, statutory declarations by the person and/or other documentation as may be necessary to demonstrate such compliance." Effective reporting requirements are confirmed

A 35 page "Compliance Report", including 'Executive Summary' and 'Effluent Management Final Report' including outcomes from the 'Gelatine Effluent Land Management Study' and 'Cleaner Production Trials', was received by the EPA on 20/11/2003, due to a delay awaiting two (2) final items from external company sources (consultants) for inclusion in the extensive "Supporting Information" package (Reference - STHR1242). In consideration of the material provided, effective reporting requirements are confirmed.

GELITA Australia has also consistently and diligently provided necessary six (6) monthly and annual reports concerning progressing outcomes associated with EMP No.SR1157.

In consideration of the Company response to completion of EMP No.SR1157, verification of compliance with prescribed reporting requirements is confirmed.

Report Assessment:

The Company “Compliance Report” and “Supporting Information” materials have consumed considerable extra-office commitment to assess the outcomes of this complex, five (5) year, multi-disciplinary project with concurrent investigative strands. Not unexpectedly, the reports and findings associated with EMP No.SR1157 are extensive.

An “Executive Summary” details 18 major outcomes of the project, in dot point form, each of which has been read / reviewed in context, with the appropriate aspect in the “Supporting Information”, from which it was derived.

GELITA Australia submits that the outcomes of the program meet the “General Conditions” of ‘Certificate of Approval No.SR1157 for Environmental Management Program’, in respect of, “Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner”, the stated purpose of the EMP.

In summary, the study has determined that the operation is sustainable in terms of mineral salts but that altered practices to control nitrogen balances are required. Each of the thirteen (13) soil types identified will require individual irrigation treatments to achieve optimal outcomes. Results to date indicate that current licence conditions do not promote the most sustainable approach to site management, viz; outcome based, driven by climatic variations.

Rigorous research has determined that irrigation of treated effluent to specific soil types, using outcome-based criteria, as opposed to application load limits, currently included in site Environmental Licence No.SR0722, is the optimal management philosophy. Such a philosophy demands implementation of a reflexive irrigation model capable of dealing with extreme climatic variations (viz; 2001-2004 prevailing seasons) that is not based on assumptions of “average” conditions. **This requires a fundamental change in management from qualitative control criteria to outcome-based assessment of the operation.**

Based on the improved understanding of the soil dynamics associated with treated effluent irrigation across the farm site, a strategy is proposed to improve the long-term sustainability of the operation. An irrigation management schedule has been devised for the various soils under a forage/agro-forestry production program.

Recommended changes/amendments to Company Environmental Licence No.SR0722 will need to be progressed to allow this outcomes-based model to be effectively applied at “Sunny Hills”.

Revised Treated Effluent Management Program:

A revised management approach has been devised to allow for a robust response to the soil capacities for treated effluent, given a range of climatic conditions. There are four aspects to the proposed management scheme. The concept requires graduated phases of establishment over a seven-year period.

These involve implementation of agro-forestry for limited treated effluent disposal over the less permeable soil types, the progressive establishment of a Vetiver Grass system for maximising nitrogen uptake across soils with higher hydraulic conductivity, early implementation of lateral

drainage of heavy clays and immediate improved wastewater treatment (liquid lime addition as necessary) for nitrogen removal.

The addition of liquid lime at the pump-out facility for treated effluent irrigation will raise the pH value of dosed material to levels where excess nitrogen will be volatilised. Theoretically, up to 80% of ammoniacal nitrogen in the wastewater can be eliminated by this means.

TDS limits included in Company Environmental Licence No.SR0722 will need to be removed to allow this process to be implemented.

In order to implement a disposal system best suited to meeting the criteria of ESD, GELITA Australia has proposed adoption of a seven-year implementation program. This program will be dependent on the realisation of significant changes/amendment to Company Environmental Licence No.SR0722. The core of the program will require the propagation and planting of Vetiver Grass as the key to beneficial reuse of treated effluent. The deep rooting system and high nitrogen requirement of Vetiver Grass are ideal for nutrient removal from site soils.

The harvested material will be utilised in composting trials for pasture improvement in non-irrigated areas over the farm. Supplementary plantings of trees and ephemeral cropping rotations will provide diverse and flexible means of treated effluent use to match climate and treated effluent quality variations.

The central tenets of the proposed system are as follows:

- flushing of “salts” below root zone to maintain healthy soils
- reduced irrigation disposal area to ensure flushing occurs
- crop selection (Vetiver/Rye grasses) to maximise nitrogen uptake
- nitrogen export from irrigated zones
- chemical nitrogen control contingency option
- precise irrigation management plan
- elimination of grazing within irrigated zones
- outcome-based monitoring regime
- annual independent expert assessment

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In order to achieve these outcomes (above) a number of amendments to Company Environmental Licence No.SR0722 will be required and ARE SUPPORTED:

- removal of TDS discharge limit
- removal of daily treated effluent discharge volume limit
- removal of irrigation prohibition during rainfall (aids “salts” flushing, while requirements to prevent ponding, run-off will be maintained)
- substitution of altered monitoring program

Within the “Compliance Report” and “Supporting Information”, the Vetiver Grass system has been identified as having the potential to meet ESD criteria. The “Supporting Information” details the outcomes of research on the application of the Vetiver Grass system to date:

- On site R&D conducted at “Sunny Hills” has proved that Vetiver Grass is highly productive, while off-site research projects have confirmed these findings;
- Vetiver Grass has out-yielded other grasses used on site by six (6) fold;
- With this high production capability, Vetiver Grass has the potential of exporting three (3) times the nitrogen of other grass species;
- Based on field experimentation, the potential total land area required to sustainably dispose of all of the gelatine factory treated effluent would be approximately 50 ha;

- After allowing for 15%-20% salt leaching (conservative figures), MEDLI simulation also predicted that the Vetiver Grass planting area can be reduced to 49.5 ha to sustainably dispose of the total treated effluent output;
- Data on growth and nitrogen content of mature plants indicated that the deep and extensive root system of Vetiver Grass could reduce or eliminate nitrogen leaching, maintaining groundwater quality.

Consequently, the Vetiver Grass system will form a critical part of the overall proposal for a sustainable farm and factory treated effluent disposal regime.

Research Conclusions:

The following conclusions are drawn from information gained since 1999, over the lifetime of EMP No.SR1157. Data contained in reports and technical material that are included in the "Support Information", detail the findings of this research. In summary, the conclusions that are drawn from these works indicate the following:

- *That all nitrogen and salts can be sustainably dealt with on site.*
- *That Exchangeable Sodium Percentages (ESP) have increased over time.*
- *The leaching fraction determined from current actual irrigation practice is double the conservative values used for the MEDLI modelling process (reports sourced from three [3] separate modellers reached similar conclusions).*
- *Current irrigation practice with treated effluent is sustainable on the dermosol (alluvium - Logan River "flats") soil type in terms of salinity management.*
- *Nitrate is being leached to depth in the dermosol (alluvium – lower slopes, sandy clay/loam levees) soil type but levels are less than the licence limits.*
- *Nitrate levels in the surface soil should be utilised by improved plant growth using the proposed Vetiver/Rye Grass whole year production system.*
- *Nitrate is not accumulating at depth in the vertosol (basaltic alluvium, Walloon siltstone, mixed basaltic/Walloon sediments) and surface concentrations can be utilised for plant growth using the proposed Vetiver/Rye Grass production system.*
- *Cleaner production methods have been achieved.*

Revised Irrigation Schedule According to Soil Type and Production Type:

Based on the improved understanding of the soil dynamics associated with treated effluent irrigation across the farm site, it is the intent of GELITA Australia to ensure that specific soil types receive irrigation to match soil properties.

A strategy is proposed to improve the long-term sustainability of the operation. An irrigation management schedule has been devised for the various soil types under a forage/agro-forestry production program.

Concentrating treated effluent disposal to less than 60 hectares of suitable soils incorporating the proposed production program is recommended to prevent salt build-up to deleterious levels in the soils, under current treated effluent and climate characteristics.

Monitoring of the irrigation (quantity, quality and distribution), rainfall and potential evapo-transpiration allows for the determination of the leaching fraction achieved.

A water (treated effluent) balance model (MEDLI), developed by DNR, is used to assess past and current leaching fractions and will be included as part of the revised monitoring program to determine future leaching fractions.

Maintenance of an appropriate leaching fraction for each soil type will ensure that the concentration of leachate draining below the root zone is at a level not deleterious to productivity of plant biomass. This will provide a more relevant assessment of sustainability of the disposal system.

This program is designed to apply treated effluent according to plant water requirements at 85% of field capacity and is based on soil infiltration and hydraulic conductivity characteristics.

In conjunction with the soil monitoring program, the actual leaching fraction can be altered as required to ensure soil levels of nitrogen and “salts” remain within sustainable levels.

Proposed Amendment of GELITA Environmental Licence No.SR0722:

In order to implement the “**best practice environmental management**” program emanating from completion of EMP No.SR1157, a number of **AMENDMENTS** to Schedule E Conditions included in Company Environmental Licence No.SR0722 will be required.

Amendments sought by GELITA Australia Pty Ltd in respect of Environmental Licence No. SR0722 are set out, together with justifications for such changes, in the attached “**Recommended Licence amendments**”, included on pages 28-32 inclusive of the Company “Compliance Report”.

The proposed amendments to Environmental Licence No.SR0722, are fully supported by Assessment Officer / Site Licensing Officer Don Shackel, in respect of the outcomes emanating from EMP No.SR1157.

Conclusion / Final Comment:

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Specific requirements of the EMP have been extensively addressed and in general GELITA Australia has exceeded these requirements in **developing a model** for site Environmentally Sustainable Development (ESD). Comprehensive “Supporting Information” in the form of technical documentation was provided with the “Compliance Report”.

2. ADMINISTRATION

Considering that the **AIM** of EMP No.SR1157 was to manage “Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner”, results emanating from the completed program have demonstrated that this **AIM** has been achieved for all practicable and economic purposes.

At the same time, agreed **OBJECTIVES** and **METHODS OF MEETING OBJECTIVES and TIMEFRAMES**, documented in EMP No.SR1157 have been effectively researched / trialed / actioned over the 4.5 year lifetime of the program.

Hence, the **AIMS** and **OBJECTIVES** of EMP No.SR1157, are considered to have been met by GELITA Australia Pty Ltd.

In order to implement the “**best practice environmental management**” program emanating from completion of EMP No.SR1157, a number of **AMENDMENTS** to Schedule E Conditions included in Company Environmental Licence No.SR0722 will be required. Such amendments will be considered / progressed using the Application Form – Part A – ‘General details of all applications’ and Application Form – Part B – ‘Amend environmental authority’ processes, accompanied by the appropriate Schedule 6 fee of \$150.00.

At the same time, it is considered that GELITA Australia Pty Ltd has **ACHIEVED THE INTENT OF EMP No.SR1157** and hence it is **CONFIRMED THAT EMP No.SR1157 IS CORRECTLY TERMINATED.**

Regulatory Requirements:

In consideration of the information provided by GELITA Australia Pty Ltd through “Progress Reports”, submitted to the Administering Authority over the lifetime of EMP No.SR1157, together with the recent “Compliance Report” and “Supporting Information”, such information is considered to have satisfied the intent of the EMP process and hence **EMP No.SR1157 IS COMPLETED AND NO LONGER IN FORCE.**

Verification aspects of EMP No.SR1157 were considered and assessed at the top of this memorandum.

Fee Assessment / Payment:

Environmental Operations - Operational Policy – “Environmental management program (EMP) fees” indicates that Section 52(1)(b) of the EP Regulation prescribes that the fees for assessing the holders annual return and *monitoring compliance with the program* is the amount that:

- the authority considers to be reasonable; and
- is not more than the reasonable cost of the assessment and monitoring.

Fees for assessment of an EMP annual return and *monitoring of a compliance program* of an EMP are charged at a rate of \$73.40 per hour (includes GST), or part thereof, plus any reasonable cost for analysis and travel. The reasonable cost of travel will be the cost of travel, plus GST.

Fee Assessment:

Monitoring final compliance report of completed EMP No.SR1157:

- 20 hours at \$73.40/hour

Cost of monitoring final compliance report of completed EMP No.SR1157:

- \$1,468.00 (includes GST)

Travel to GELITA Australia Pty Ltd at Josephville to review completed EMP No.SR1157:

- Holden Commodore Wagon - Registration No. QGR 132 (3800cc engine capacity)

Cost of travel to GELITA Australia Pty Ltd at Josephville to review completed EMP No.SR1157:

- 148km (18/02/2004) at 60.0c/km (Directive No.3/03 *Motor Vehicle Allowances* June 2003 – for automobiles 2601cc and over)
- Calculated cost \$88.80 + GST
- Total travel cost \$97.70 (rounded)

Total fee for assessment of completed EMP No.SR1157:

- \$1,468.00 + \$97.70
- **\$1,565.70**

A compliance assessment fee, **considered to be the reasonable cost of assessing final compliance**, for completed EMP No.SR1157 has been determined at \$1,565.70 (above), comprising twenty (20) hours of assessment / reporting time amounting to \$1,468.00, together with travel expenses, to and return from Josephville to review the “Compliance Report”, calculated at \$97.70.

3. RECOMMENDATION

IT IS RECOMMENDED THAT:

1. GELITA Australia Pty Ltd formerly Leiner Davis Gelatin International Limited, the holder of the 'Certificate of Approval', be advised in writing that based on information supplied, the administering authority considers that the Company has **ACHIEVED FULL COMPLIANCE** with the *Environmental Protection Act 1994*, **FOR THE MATTERS DEALT WITH BY THE PROGRAM**; and
2. The Environmental Support Officer, Southern Region – Environmental Operations forward GELITA Australia Pty Ltd an invoice for the \$1,565.70 fee for monitoring / assessing / reporting final compliance with the program.

Assessing Officer:

Don Shackel
Senior Inspector
Heavy Industry Group
Environmental Operations
Southern Region

C/c: Cathy Ufer
Environmental Support Officer
Environmental Operations Division
Southern Region

For your information and necessary action concerning Recommendation 2.

DKS.

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File note of meeting/discussion:✓ Meeting ☐ Telephone

Date: 12/05/2004

Time: 9-10:30AM

Between: Cameron Smeal, Environmental Officer of: GELITA Australia Pty Ltd

And: Damian Brown, Kyle Roberts, Don Shackel of: EPA Southern Region

Subject: Outcomes of EMP No.SR1157.

The following issues / outcomes in relation to Company EMP No.SR1157, previously advised to GELITA Australia, for consideration, by e-mail of 5/05/2004, were addressed at the meeting:

1. Explain the need for a seven (7) year lifetime to put elements of the EMP in place;
2. Expand and possibly add monitoring limits, i.e. what are the sustainable soils limits (pH etc) to Schedule H - Table 3 (Condition H30);
3. Consider adding "waterlogging" to current Condition E13;
4. Confirm the role of Vetiver Grass in the composting process;
5. Discuss groundwater shallow and deep drainage issues concerning "flushing" of salt(s) through soils and possible outcomes, i.e. salt scalding and destination of solutes, particularly in regard to the Logan River;
6. Confirm the source(s) of bore-water for soil "flushing rehabilitation purposes" and "extending" of treated wastewater for irrigation purposes.

Item 1: Relates to the time/cost required to plant/grow the proposed 50ha of Vetiver Grass to effectiveness, which planting program may be achieved prior to the 7 year estimate, however the planting window for 2004 has already been "lost". The Company had allocated around \$250,000 over the 2004-2005 period for initial Vetiver Grass pasture establishment, to be followed by progressive annual plantings to achieve the required operational grass area. Also, development of the proposed agroforestry plots was necessarily a 5 year program to achieve canopy closure.

Item 2: From an EPA perspective, D Brown indicated that Schedule H - Table 3 (Condition H30) should be expanded to include relevant, available soil monitoring parameter limits, for those soil types receiving irrigated treated wastewater. Cameron Smeal agreed to rework Schedule H - Table 3 to include soil constituent/condition limits/ranges, where such reliable information was available.

Item 3: C Smeal acknowledged that "waterlogging" could be added to Condition E13, however "surface runoff or ponding" would need to be removed from the Condition to allow the proposed flood-irrigation option to be exercised, with which to achieve solutes "flushing" when appropriate. C Smeal indicated that trap dams were intended to capture/contain any surface runoff from flood-irrigation of treated wastewater, obviating any discharge to the surrounding Logan River.

Item 4: C Smeal confirmed that Vetiver Grass would provide “green-waste” additions to the on-site composting process, on an availability basis.

Item 5: Groundwater issues were discussed in depth by D Brown and C Smeal, in particular salt(s) “flushing”, including transfers to the alleged “shallow transient” water table, around a depth of 3-4m and subsequent deep drainage to the reported “deep” aquifer around a depth of 12m, located on the Logan River alluvial flats. Speculative discussions also considered the likelihood of “deep drainage” and “river recharge” effects impacting this deep aquifer. C Smeal confirmed that historically, irrigation of treated wastewater to river flat soils on site, over a number of years, had not impacted water quality of the adjacent Logan River, according to monitoring data generated by the two (2) DNR stream monitoring stations, above and below the GELITA property.

Item 6: C Smeal confirmed that a number of the 30 bores on site provided reasonable quality water sources, from a salinity perspective, for use for “flushing” and “shandyng” purposes.

MEDLI Modelling: C Smeal indicated that sustainable EMP outcomes had been derived/applied from MEDLI modelling by Gardiner/Veritz of DNR, using deliberately conservative parameters/values, viz; one half actual soil leaching rate.

Action:

1. GELITA Australia to provide additional information requested prior to 1/06/2004.
2. The RSA for amendment of SR0722 to be changed to reflect the meeting outcomes.

Don Shackel
Heavy Industry Group
Environmental Operations
Southern Region



**Queensland
Government**

Enquiries Don Shackel
Telephone (07) 3225 1040
Your reference EMPNo5080001157
Our reference STH495-8-EMPSR1157

Environmental Protection Agency

Incorporating the
Queensland Parks and Wildlife Service

2 March 2004

Mr R Seach
General Manager
GELITA Australia Pty Ltd
PO Box 409
BEAUDESERT QLD 4285

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Dear Mr Seach

Re: Completion of Environmental Management Program No.5080001157.

The Administering Authority has assessed Progress and "Final Completion" Reports, together with "Supporting Information" provided by GELITA Australia Pty Ltd in relation to Environmental Management Program (EMP) No.5080001157 (SR1157), approved on behalf of the former Leiner Davis Gelatin International Limited, as suitable "Compliance / Completion Reports", in respect of this EMP and considers that the Company has achieved compliance with the matters dealt with by the program.

It is noted that full compliance with the approved timeframe of the EMP was achieved.

Section 52(1)(b) of the *Environmental Protection Regulation 1998* allows the Administering Authority to impose a fee for monitoring compliance with the EMP.

This fee has been assessed at \$1,565.70 (includes GST), and hence an invoice for this amount will be forwarded to you, in due course.

Should you have any queries regarding these matters, please contact Don Shackel on (07) 3225 1040.

Yours sincerely

Kyle Roberts
Operations Manager
Heavy Industry Group
Environmental Operations
Southern Region

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C/c Mr Cameron Smeal
Environmental Officer
GELITA Australia Pty Ltd



**Queensland
Government**

Enquiries Don Shackel
Telephone (07) 3225 1040
Your reference
Our reference STH495-9-SR0722&SR0007DA

Environmental Protection Agency

Incorporating the
Queensland Parks and Wildlife Service

22 October 2004

Mr R Seach
General Manager
GELITA Australia Pty Ltd
PO Box 409
BEAUDESERT QLD 4285

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Attention: Mr Cameron Smeal, Environmental Officer

**Re: Compliance Inspection Report for Environmental Licence No.SR0722 and
Development Approval No.SR0007DA**

I refer to the inspection of GELITA Australia Pty Ltd, Josephville site located at Flood Road, Josephville via Beaudesert, on 6 October 2004 by Environmental Protection Agency (EPA) Officers Don Shackel and Adam Burt.

The purpose of the inspection was to assess site compliance with the conditions of Development Approval No.SR0007DA, issued under the *Integrated Planning Act 1997* and Environmental Licence No.SR0722, issued under the *Environmental Protection Act 1994*, for the site, assess compliance with the general provisions of the *Environmental Protection Act 1994* (the Act) and associated policies, and to develop an action plan to address any potential non-compliances.

I am pleased to report that the Company was in compliance with the conditions of the environmental authority and with the general provisions of the Act, at the time of the inspection.

The EPA thanks you for your co-operation during the inspection and looks forward to your continued co-operation in the environmental management of the site.

Yours sincerely

Andrew Connor
Acting Operations Manager
Heavy Industry Group
Southern Region EPA

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Checklist

Compliance

Compliance Program — Inspection Checklist

Instructions for use

Where an Agency issue is determined to be relevant, note appropriate detail in the observations section.

Where there is any non-compliance, discuss with the company representative and note any required action.

Where the assessment will include licence conditions, use the licence condition compliance section of the checklist.

This checklist is to be used for all inspections. Refer to the procedural guide for guidance.

Cover Sheet Module:

Company Name: GELITA Australia Pty Limited		Date of Inspection: 6/10/2004
Trading as: GELITA – The Gelatine Group		EA No.: SR0722
Description of Business Activity: ERA 50(b) – Rendering operation		
Site Street Address: Flood Road		
Suburb: Josephville	City/Town: Beaudesert	Post Code: 4285
Registered Office Address: "Sunny Hills", Flood Road, JOSEPHVILLE via BEAUDESERT QLD 4285		
Suburb: JOSEPHVILLE	City/Town: BEAUDESERT	Post Code: 4285
Site Representative: Cameron Smeal	Position: Environmental Officer	Contact phone: (07) 5541 9442

Inspection type	☐ Catchment	☐ Industry Sector	☐ Complaint	☒ Compliance
Compliance level	☐ 1	☐ 2	☒ 3	Inspection type ☐ A ☐ B ☒ C
Audit focus is the following relevant Agency interests:				
☒ Water issues ¹	☒ Air issues ¹	☒ Noise issues ¹	☐ National and international	
☒ Land issues ¹	☒ Waste issues ¹	☒ Social issues	☒ Impacts on surrounds	
☐ Coastal issues	☐ Heritage issues	☐ Biodiversity		
☒ Resource allocation	☐ Tenure issues	☐ Other issues		

¹ Main issues to consider for *Environmental Protection Act 1994* focus.

DETAILS OF SCOPE OR PARTICULAR FOCUS:

GELITA Australia Pty Ltd, previously **Davis Gelatine Australia Pty Limited**, recently acquired by German private business interests from Goodman Fielder, has now completed **EMP No. SR1157** concerned with, **"Operation of the Effluent Disposal System in a Long Term Environmentally and Economically Sustainable Manner"**, which reached full term for completion on 30 September 2003. E-mail advice from the Company at the due date of the reporting period on 30 October 2003, indicated that EMP No. SR1157 was completed and written-up, apart from "two final items from external sources for inclusion in the report", viz; an effluent stream characterisation under the cleaner production section and monitoring schedule from the Company soils consultant. The EPA received the "total" final report relevant to EMP No. SR1157 on 20 November 2003.

Subsequently, licence limits requirements included in **SR0722**, for treated wastewater parameters such as Total Nitrogen and Total Dissolved Solids, previously observed as not achieving compliance on an historic on-going basis, were addressed by the EMP review process, within a "holistic" context, for the site. The company has regularly provided progress reports over the lifetime of EMP No. SR1157, to the EPA, for assessment and information, indicating milestones towards achieving compliance by 30/09/2003.

Following internal assessment of the "progress" and "final completion" reports, together with supporting information provided by GELITA in relation to EMP No. 5080001157 (SR1157), originally approved on behalf of the former Leiner Davis Gelatin International Limited, as suitable "Compliance / Completion Reports", in respect of the EMP, the EPA considered that the Company had achieved compliance with the matters dealt with by the program. Outcomes arising from completion of EMP No. SR1157, indicated a need to seriously reassess, amend and delete some or all treated wastewater limits from SR0722. Subsequently, following negotiated discussion of licence changes, between EPA Regional Management (D Brown, K Roberts, D K Shackel) and the Company, the EPA approved amendment of SR0722 on 1/06/2004. See also: *GELITAAustSR1157EMPCompletionMemo.doc* (Attached).

EMP No. SR1157 outcomes indicated that sustainability of application of treated wastewater to on-site land will be achieved through a mix of options including; pasture / grazing systems (including Vetiver Grass), cropping (cutting & exporting hay products) and agro-forestry, which plant products will / may become a raw material source (green waste) for **on-site compost-making**, utilising all processing wastes generated by gelatine manufacturing ("skutch", belt-press sludge, boiler ash) for total on-site soil conditioning purposes.

To this end, the EPA approved continuation of composting activities on site late in 2003, following an initial 12 month waste composting project period (September 2002-September 2003) to trial processing methodology and assess outcomes (an Odour Control Plan is in place), with a view to long term, on-going total waste utilisation / recycling on site. GELITA Australia Pty Limited holds **SR0007DA** (with conditions) and **SR1114** for ERA 53, relevant to "soil conditioner manufacturing". The company has contracted part-time consultancy services from Johannes Biala of "The Organic Force", to assist with the composting project. The composting consultant Company has prepared a report dated October 2003, titled **"Assessing the Suitability of Covered Windrow Composting for On-site Processing of Gelatine By-products"**, for GELITA Australia Pty Ltd, which was also made available to the EPA. See also, *GELITASR0007DAComplianceProgramInspectionChecklist06102004.doc* (Attached).

SITE CONTACT:

A review of conditions included in SR0722, followed by a subsequent site inspection were undertaken with the Company Environmental Officer, Mr Cameron Smeal.

PHOTOGRAPHS:

A series of 41 digital photographs taken during the site audit on 6/10/2004 indicate the current environmental status of the site, particularly with regard to land disposal issues and stormwater protection aspects, together with a limited number of records of external processing plant / operations.

CHUCKLE:

A review of CHUCKLE and Company files, STH495 records for 2003/2004 indicated that any complaints received by the company had been actioned and reports provided to the EPA, in each instance (4 odour complaints for 2003-2004 – see also comments under Conditions H1-H8 below).

Agency Interests Module:

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

ADMINISTRATIVE:

1. Environmental Licence No. SR0722 (without development approval) (Section 93)
2. The Company name, the registered business address of the legal entity and the activity location address were all confirmed as CORRECT.
3. ASIC search provided a "Current Extract" for Organisation Number ACN 000 010 597 – Section 1274B – See attached printout.
4. ERA Items – confirmed "no changes" for the Josephville site, at this time [ERAs 50(b), 15(a), 17 & 53].
5. Real Property Description – confirmed "no changes" for the Josephville operation.
6. Environmental Licence No. SR0722 "Effect Date" – 8/06/2004.
7. Environmental Licence No. SR0722 Anniversary Date – 31 January (Amended from 4 November on 1/06/2004).
8. GELITA Australia Pty Ltd does not carry out a NOTIFIABLE ACTIVITY as defined in Schedule 2 of the *Environmental Protection Act 1994*.

NOTE:

With regard to ERA 50(b) – Rendering operation, Cameron Smeal indicated that he did not consider gelatine manufacture a rendering process. These comments were acknowledged by EPA Officer Don Shackel who considered / indicated that wording in the ERA definition including, "processing or extracting substances, including, for example, ----- proteinaceous matter, from animal wastes or by-products", were relevant to the GELITA Australia Pty Limited, Josephville Gelatine operation.

OBSERVATIONS:

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✖

Schedule A - General Conditions:

A1 – In-Compliance – GELITA operates a standard maintenance card, work request-advice / corrective-action system which is currently being upgraded to a computer-driven MFG-PRO system, with added MLSS engineering / preventative maintenance workshop application, together with the current MIS accounting / stores purchasing system, which is intended to address equipment, plant and building maintenance aspects to reduce / minimise environmental risk. A proactive, in-house environmental audit process designated 'ENVIRONMENTAL WALK' identifies site deficiencies for remedial action, on a regular basis, using the job cards, work request, corrective action follow-up procedure, to achieve improvement (Attached).

A2 – In-Compliance – GELITA Environmental Licence SR0722 is displayed in the office foyer and the amenity areas on site, while each member of staff has been provided with a copy for personal use, during Company training sessions.

A3, A4 – In-Compliance – The formal audit completed on 6/10/2004, confirmed that Company environmental records are available as prescribed.

A5 – In-Compliance – GELITA indicated that the Company was targeted to achieve up to a 20% increase in gelatine yield over recent figures (2200 MT), in the next 2 years (2004/2005), without an "increase in the risk of environmental harm / nuisance" – the annual gelatine production goal is around 2550 MT. At the same time, processing effluent volumes have shown real reductions in disposals, due to improved plant water saving procedures.

A6 – In-Compliance - The calibration records file was perused during the formal site audit completed on 6/10/2004.

A7 – In-Compliance – GELITA indicated that four (4) odour complaints had been advised / recorded since the previous site audit completed on 29/10/2003. Odour sources identified included; raw materials receival area, uncovered hide truck and inappropriate compost turning operation (unsuitable wind direction).

A8, A9, A10, A11, A12, A13, A14 – In-Compliance – IEMS - Updating / amendment of the documentation was linked to company progress towards ISO 14000 certification [A14], which was achieved on 6/08/2003, prior to the time of the previous formal audit completed on 29/10/2003 (A12, A13, A14). Copies of SGS International Certification Services Pty Ltd documentation, "**Environmental Management Systems Preliminary Audit**" (28/04/2002-1/05/2002) and "**Environmental Management Systems Certification Audit**" (4-6/08/2003) of GELITA Australia Pty Ltd to AS/NZS ISO 14001:1996, were provided to the EPA during the formal audit completed on 29/10/2003. An SGS "**Audit Status and Itinerary**" form listed "**Standard Clauses**" of the "**Document Report Review**" for the ISO 14001 Environmental Management System (IEMS) assessment. SGS Certificate AU03/1818 was issued concerning the management system of GELITA Australia Pty Ltd, Flood Road, Josephville, QLD 4285 Australia, that was assessed and certified as meeting the requirements of ISO 14001:1996, for the following activities, "**Management of environmental effects associated with processing plant operations for manufacture of edible grade gelatins as well as the treatment and disposal of wastes.**" (Certificate valid from 06/08/2003 until 06/08/2006 – Issue 1. Certified since 06/08/2003). Company ISO certification assessments fall due in December 2004 for the Josephville operation.

The on-going Company training matrix was confirmed [A9(iii)].

Environmental performance and energy audits / reviews were provided to the EPA in the 2002 Annual Return (Copy provided 29/10/2003 – previously with-held awaiting call-up), [A9(iv), A10, A11].

On-site gelatine processing waste utilisation / composting trials have been successfully completed (2003) with a view to achieving total internal recycling of nutrients, in due course [A9(v)].

The GELITA "Annual Return" for 2004 now falls due on 31 January 2005, following the recent processing of a Company request for amendment of anniversary date from 4 November 2004, where appropriate reporting will be provided / reviewed [A9(iv)(a)(b), A9(v), A10(i)(ii) & A11].

Energy auditing requirements called-up under Conditions A9(iv)(c), A10(iii) & A11 are due with the 2004 Annual Return. GELITA has contracted Arrow Energy to undertake this requirement.

With approved amendment of the anniversary dates of both SR0722 and SR1114 to 31 January (next due 31/01/2005), Company annual returns will now be received approximately 2-3 months later than previously available.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

A15 – In-Compliance – GELITA consults with a local community (residents and Local Government representatives) environmental liaison committee (Community Consultative Committee) on a quarterly to six monthly basis regarding complaints received, site environmental performance review and any other environmental / general business issues. A copy of Minutes of the Community Consultative Committee (CCC) Meeting of 14/07/2004 was provided to the EPA, where the matters of "Drought and Water" were also discussed, at some length (Attached). The next CCC Meeting is noted for 13/10/2004, at the GELITA site.

A16 – In-Compliance – GELITA operates a "transparent approach" in meeting the requirements of this Condition, concerning EPA access to the site.

Schedule B - Air:

B1, B2 – In-Compliance – GELITA has measures in place to minimise the release of contaminants (Boiler emissions, odour, dust) to atmosphere (See comments below).

B3-B5 – In-Compliance – Release Points information included in Schedule B – Table 1 remains relevant and correct.

B6, B7 – In-Compliance - Boiler Emissions Testing – Previously, C Smeal / R Wearne had provided a report of February 2003 titled, "Stack Emissions Monitoring and Biofilter Odour Assessment", prepared by AIR NOISE ENVIRONMENT P/L which indicated that the Finafire coal-fired, fluidised-bed Boiler had been found on 30/01/2003 to be in NON-COMPLIANCE with Particulates limits included in SR0722 (Limit – 250mg/Nm³ / Test result - 572mg/Nm³). To overcome the ongoing problems associated with the problematic wet-ash removal equipment (Flosep system), GELITA proposed replacing this particulate control equipment with a Baghouse to ensure particulate discharge was in compliance with licence conditions. The Company was requested to provide a timeframe for completion of this project, as soon as practicable. Company letter of 9/04/2003 from R C Wearne, General Manager of Davis Gelatine Australia Pty Limited, at that time, committed to the installation of a Baghouse system to the Finafire Boiler, commencing around February 2004. As part of the commissioning phase of replacement of the "Flosep" particulate wet scrubber with the Baghouse dust collection system, and in keeping with requirements of Schedule B, Table 2 (Particulates limit – 250 mg/Nm³) and Schedule H of SR0722, Boiler stack monitoring was undertaken on 9/03/2004. The analysis revealed that particulate discharge levels were 0.40 mg/Nm³, while Nitrogen Oxides were measured at 653 mg/Nm³. Improvement in control of particulate discharges had been outstanding.

The failure to meet compliance for NOx during the commissioning phase of the Baghouse installation was unexpected and required complex reconfiguration of operational programs for the Boiler. This process was expedited with due care and consideration for health and safety concerns associated with altering boiler control systems. Subsequently, stack monitoring carried out on 8/04/2004 measured NOx levels at 468 mg/Nm³, which result established that the discharge was within compliance limits included in SR0722 (Nitrogen Oxides Limit – 500 mg/Nm³). See also "Oxides of Nitrogen Emissions Monitoring" of April 2004, prepared by AIR NOISE ENVIRONMENT P/L for GELITA Australia Pty Ltd, Beaudesert (Folio 11 filed on STH495/9).

Following the scheduled Boiler stack testing completed in February 2003, stack emissions testing is a biennial requirement of SR0722, falling due in 2005 (H9).

B8 – In-Compliance – GELITA indicated that during the 2003/2004 audit period four (4) odour complaints were received, investigated and reported to the EPA. The Company confirmed three (3) complaints were attributed to the raw materials area and one (1) associated with compost turning operations. During the formal site audit and inspection completed on 6/10/2004, no noxious or offensive or any odour was detected beyond the boundaries of the licensed place.

B9, B10, B11 – In-Compliance – Fuels burned in on-site fuel-burning equipment were confirmed as prescribed in SR0722. The Co-generation project remains on the "back-burner", however sufficient biogas can now be collected and held to fuel a trial / short production run. GELITA provided perusal copies of quality analyses, including coal Total Sulphur levels for domestic supplies received from Jeebropilly Collieries.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

B12, B13, B14 – In-Compliance – During the audit inspection, doors servicing the raw materials receival area were observed to be closed as prescribed by SR0722. A proactive, in-house environmental audit process designated 'ENVIRONMENTAL WALK' identifies site deficiencies for remedial action, on a regular basis and particularly assesses the "Raw Materials" area in regard to odour control (Attached – see Page 2). As a further odour control measure, GELITA will install an 8 tonne/hour ice-making machine, during the 2004/2005 shutdown period, at a cost of around \$200,000, for chilling bulk raw material stockpiles, awaiting processing. GELITA advised that the raw materials building ventilation air volume / changes had been improved / upgraded, with the installation of an additional fan unit (2003) since original plant commissioning.

B15 – In-Compliance – The large Biofilter is operating effectively (Comments under B17 apply). The unit media was replaced over March-June 2004, following rebuilding of the internal support infrastructure using "Atlantis Mesh". The water/humidity control system was also upgraded early in 2004 using surface-located "soaker" hoses to maintain required media moisture / humidity levels.

B16 – In-Compliance – The fan transferring foul air from the plant to the Hybractor Technology Biofilter was replaced with a new unit with sealed housing and improved line connections, in December 2003 (Photo.4). Reductions in odorous and corrosive air leakage to atmosphere in the immediate vicinity were acknowledged (Comments under B17 apply). On-going maintenance measures to the Biofilter media box have also contributed to minimising local fugitive odour leakage to atmosphere, compared to previous assessments (Photos.3, 4).

B17 – In-Compliance - Biofilter Testing – Following previous comments from C Smeal and Company Consultants AIR NOISE ENVIRONMENT P/L, perceived "shortcomings" with the odour assessment process relevant to the on-site biofilters, have been addressed through amendment of the assessment procedure to account for any background odour levels / impacts apparent at the time of testing. In this regard, EPA should consider clarifying the odour assessment process through possible amendment of Condition B17 and H10 included in SR0722, in due course, to take account of any background "contaminant" odour. Any fugitive odour leakage from the Biofilter units has not impacted beyond the boundaries of the site, to cause nuisance complaints and generally remains totally localised.

B18 – In-Compliance – Biogas is flared / Co-generation project remains "on hold".

B19, B20 – In-Compliance – GELITA indicated that regular system leakage checks and plant shutdown SOPs are in place. A proactive, in-house environmental audit process designated 'ENVIRONMENTAL WALK' identifies site deficiencies for remedial action, on a regular basis. No equipment breakdowns, requiring an enforced plant shutdown were advised.

Schedule C - Water:

C1 – In-Compliance – DNR maintains Logan River monitoring stations above and immediately below the GELITA property boundary, which continuously trace a range of indicator parameters on river water passing these points. Perusal of monitoring data indicated that these plots have not identified any significant deviations from expected ranges. The data will be fully reviewed in the up-coming Annual Return for 2004, due by 31/01/2005.

C2-C8 – In-Compliance - Ponds Conditions – The site inspection confirmed; "free-board" requirements as prescribed, ponds integrity maintained, stormwater impacts minimised (diversion banks / drains in place). The contents of Aerobic Pond 1 were noted to be a "healthy chocolate brown colour", with an acceptable odour profile at the bank (Photos.9,10,11). The current VITOX oxygen delivery system is to be upgraded with pump and motor units replaced during October 2004 (Photos.1, 11).

Schedule D – Stormwater Management:

D1, D2 – In-Compliance – GED Conditions – GELITA has measures in place to minimise the release of contaminants to stormwater, viz; bunding, formed drainage, "catch" dams, contour banks and drains, variously in place around the site (Photos.6, 7, 18, 25, 28, 29, 34, 36, 40, 41). The concrete-sealed "ring road" surrounding the gelatine processing plant serves as a "first-flush" catchment, with all runoff directed to a dual "catch" dam / detention basin holding system for return and treatment in Aerobic Pond 1 (See additional comments below under D6).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✖

D3, D4 – In-Compliance – GED Conditions - GELITA has measures in place to minimise the release of contaminants to stormwater, viz; bunding, formed drainage, catch dams, contour banks and drains, variously in place around the site (Photos.6, 7, 18, 25, 28, 29, 34, 36, 40, 41).

During the formal site inspection completed on 6/10/2004, a "drive-tour" of the site included most of the site bank / property boundary along the Logan River, where the dry winter conditions have allowed a good visual assessment of the River protection measures in place, along the entire length of the property boundary. The site has a well-grassed contour bund and swale drainage system along the entire length of the River, located at a distance in compliance with the irrigation buffer distances included in Conditions E10 and E11.

A number of the more significant stormwater runoff gullies / waterways / catchments bisecting the site to the Logan River have been fitted with a series of earthen-wall / grassed "catch dams", the larger drain-ways having up to six (6) detention basins over their length, prior to discharging to the River. A series of such protective "catch" dams serve to trap and minimise much of any storm-generated sediment from reaching the Logan River. (See also comments under C1 above concerning independent river monitoring carried out by DNR).

D5 – In-Compliance – Vehicle washing is currently carried out on a concrete pad, adjacent to the Belt-Press Shed, which drains to the wastewater treatment system. During 2005, GELITA has scheduled the installation of a dedicated vehicle wash facility, draining to the effluent treatment plant, in a vacant area between the new Hide Shed and the present Belt-Press Shed (Photo.30).

D6 – In-Compliance – GELITA has SOPs, together with a number of spill control kits and "fitted" sump / gully trap guard mats, strategically located in place around the site (Photo.33). Staff members are trained to effectively capture / contain / clean-up any spillages to the sealed surrounds of the processing facility. However, any liquid discharges to the formed drainage system and roadways located immediately adjacent to all areas surrounding the production buildings and associated plant installations, drain to a double "trap-dam" system, situated in a gully below the belt-press shed (Photos.28, 29). Any material collected in these dams is pumped to the effluent treatment plant for processing. It was noted during the audit that the second "catch" dam in the series was empty, while the first detention dam appeared to indicate minimal holding volume.

D7, D8 – In-Compliance – Both bunds servicing the Sulphuric Acid external storage tank were found to be in sound condition following rebuilding works completed during 2003/2004, while the small, above-ground diesel fuel storage tank, previously located in the now demolished "old stables" shed (Photo.2), has been temporarily relocated to a bunded area on the northern side of the processing plant building. A dedicated, bunded storage facility is planned for this tank in association with a new Workshop project. Bund installations on site are generally effectively serviced and maintained (Figs.6, 7, 34, 36, 40).

D9-D14 – In-Compliance – All external bunds were inspected during the formal site inspection completed on 6/10/2004 and were found to be effective and well maintained (See further comments under D7, D8 above and Photos.6, 7, 34, 36, 40).

Schedule E – Land Application:

E1 – In-Compliance – During the formal site audit and inspection completed on 6/10/2004, GELITA confirmed and the EPA verified that only prescribed contaminant releases were irrigated to land.

E2 – In-Compliance – Documentation was confirmed on file 961EA472/1 concerning, "Leiner Davis Gelatin Sunny Hills Irrigation Farm", site plan. Cameron Smeal indicated on 6/10/2004 that the "defined contaminant release areas" for the site remain essentially as previously documented and will require only minor updating / amendment, as a result of the recently completed EMP No. SR1157. EMP reference material - Hydro Plan Drawing No.1052-1 of 18/09/2003 remains relevant.

E3, E4 – In-Compliance – GELITA advised that no off-site disposal of treated wastewater had been undertaken or is proposed at this time ("Third party" disposal of treated wastewater Conditions).

E5 – In-Compliance - While approximately 120 hectares of land comprises the current treated wastewater disposal areas on site, Cameron Smeal indicated that the "defined contaminant release areas" for the site will require minor updating / amendment, as an outcome of the recently completed EMP No. SR1157 (See E2 above).

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

E6-E9 – In-Compliance – Current land irrigation practices for treated wastewater applications continue to provide effective controls (Company EM Plan of 1994 and IEMS of 1997 remain relevant – C Smeal), but the site Irrigation Management Plan (IMP) will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the "Final Report" for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). The visual effectiveness of land irrigation practices (Winter Rye Grass paddocks) were observed / reviewed during a vehicle tour of the on-site disposal areas on 6/10/2004.

E10, E11 – In-Compliance – The maintenance of prescribed irrigation buffer distances were confirmed during the formal site inspection completed on 6/10/2004, by way of a "drive-tour" of the site which included most of the site bank / property boundary along the Logan River, where the dry winter conditions have allowed a good visual assessment of the River protection measures in place, along the entire length of the property boundary. The site has a well-grassed contour bund and swale drainage system along the entire length of the River, located at a distance in compliance with the irrigation buffer distances included in Conditions **E10** and **E11**.

A number of the more significant stormwater runoff gullies / waterways / catchments bisecting the site to the Logan River have been fitted with a series of earthen-walled / grassed "catch dams", the larger drain-ways having up to six (6) detention basins, prior to discharging to the River (detain/solids-drop/overtop principal). A series of such protective "catch" dams serve to trap and minimise much of any storm-generated sediment from reaching the Logan River. (See also comments under **C1** above concerning independent river monitoring carried out by DNR).

E12, E13 – In-Compliance – GELITA confirmed that land application and wet weather storage practices are in place, as prescribed in SR0722 and will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157. Current land disposal procedures referenced in documents included in Company EM Plan of 1994 and IEMS of 1997 remain relevant. (See also **E6-E9** above).

E14-E16 – In-Compliance – The sewage effluent disposal area was inspected during the formal site inspection completed on 6/10/2004. Restricted access signage and lockable valving were observed to be in place.

E17-E22 – In-Compliance – Irrigation Management Plan (IMP) - Current land irrigation practices for treated wastewater applications continue to provide effective controls (Company EM Plan of 1994 and IEMS of 1997 remain relevant – C Smeal), but the site Irrigation Management Plan (IMP) will be augmented with operational data / information arising from on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the "Final Report" for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). The 15 requirements included under condition **E18** have been addressed by MEDLI aspects of EMP No. SR1157, which includes data / project inputs operated by the Company, UQ and DNR.

Additional soil and groundwater sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity will be monitored on an annual basis during the anticipated seven years, following establishment of the Vetiver Grass / Rye Grass production unit, planting for which is expected to commence October 2004. See also comments under Conditions **H33-H35** below. This data will be used to validate the predictive outcomes of the MEDLI model, upon which the Vetiver Grass / Rye Grass program is based. Documented corrective actions will be taken if values are deemed to be outside sustainable limits.

E23, E24 – In-Compliance – Treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the "Final Report" for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). With regard to Condition **E25**, GELITA indicated that the Company was not aware of any problems concerning environmental nuisance or harm arising from issues prescribed by this condition.

Schedule F – Noise:

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✖

F1 – In-Compliance – “Complaints-driven” Condition - GELITA indicated that no noise complaints had been received for 2003-2004 and hence no noise assessments had been undertaken by the Company.

F2, F3 – In-Compliance – GELITA indicated that vehicle curfews remain in place and infrequent non-compliances are actioned with “breaching” Companies (one [1] during 2003-2004 – 14/09/2004 – uninformed new driver breach).

Schedule G – Waste Management:

G1 – In-Compliance – GED Condition – During the formal audit and site inspection of the Josephville operation, completed on 6/10/2004, GELITA was observed to be meeting the requirements of this condition, viz; well operated compost-making operation, fly ash, belt-press sludge and “scutch” transfers from the gelatine plant to the composting area using GED procedures, controlled fly ash dewatering operation.

G2 – In-Compliance – GELITA confirmed that the Company does not permit the burning of waste either on site or off site.

G3, G4 – In-Compliance - Appropriate recycling of waste materials is undertaken, where practicable, viz; paper and cardboard by local collector “Spotty Bins” (Photo.32), belt-press sludge removed by licensed soil conditioner manufacturer Moreshost P/L [ERA 53], who was recently issued with a Regulated Waste Transport Licence [ERA 83(b)(i)] and occasionally scrap metal disposal.

G5, G6, G7 – In-Compliance - Regulated waste, viz; belt-press sludge and occasionally boiler ash are transported to EPA licensed operator Moreshost P/L for garden mix / soil conditioner manufacturing purposes. Moreshost P/L has a Regulated Waste Transport Licence with the EPA.

G8 – In-Compliance – GELITA uses EPA licensed operator J J Richards for removal of general waste materials (lift-bins) to local landfill (Photo.32). The GELITA waste-tracking database was confirmed to be operational.

Schedule H – Self Monitoring & Reporting:

H1-H8 – In-Compliance – GELITA has a standard recording format in place which was viewed / confirmed, for complaints, incidents and emergencies. Complaints and incidents are actioned / followed-up as prescribed (H7) and reported to the EPA. A complaints summary for 2004 will be included in the company Annual Return due for submission to the EPA by 31/01/2005 (Anniversary date of SR0722 was recently amended from 4 November to 31 January, by amendment, which change took effect from 8/06/2004).

GELITA indicated at the formal site audit completed on 6/10/2004, that during the 2003/2004 audit period four (4) odour complaints were received, investigated and reported to the EPA (H1). The Company confirmed that three (3) complaints were attributed to the raw materials area and one (1) associated with compost turning operations. The administering authority did not require GELITA to undertake odour monitoring (H11), as all odour issues were effectively resolved between the parties involved.

GELITA have SOPs in place to ensure corrective action / feedback loops are completed for complaints and incidents as prescribed in SR0722.

H9 – In-Compliance – See comments under Conditions B6 and B7 above.

H10, H11 – In-Compliance – See comments under Condition B17 above.

The foul air fan supplying the Hybractor Technology (wastewater treatment plant) Biofilter (Photos.3, 4) was replaced in December 2003, due to continuing odour leakage problems, resulting in local nuisance odour levels in the surrounding work area, but not beyond the boundaries of the site. See further comments under Conditions B16 & B17.

H12 – In-Compliance – GELITA indicated that both Boiler and Biofilter emissions monitoring were completed over January-March 2004 (see testing “Frequency” in Schedule H, Table 1 – “Biennially from 2001”), with relevant records confirmed in storage for the past seven (7) years. See results appraisal comments under Conditions B6, B7 and B17 above.

H13-H17 – In-Compliance – GELITA indicated that while no off-site noise complaints had been received during 2003-2004, the Company had undertaken plant noise monitoring on site during April-May 2004, for workplace health and safety “due diligence” purposes.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

H18-H21 – In-Compliance – During the formal site audit completed on 6/10/2004, GELITA provided the EPA with copies of weekly monitoring results for the PP (Pump Pond), POP (Pump Out Pond) and BSD (Balancing Storage Dam) sampling sources for the period 10/09/2003-5/10/2004.

Treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of “flow-on” recommendations for a number of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). Supporting information for EMP No. SR1157, included data emanating from projects operated / undertaken by the Company, UQ, Forestry Research and private Consultants was nearing completion on 30/09/2003, for final submission by 31/10/2003 (See also comments under “Details of Scope or Particular Focus” above). A number of NATA Registered Laboratories are used by GELITA for monitoring / interpreting sample analyses; Brisbane Water, FALA, QG Health (**H21, H27 & H31**).

With reference to Condition **E24**, GELITA indicated that the Company was not aware of any likely problems concerning environmental nuisance or harm arising from issues prescribed by this condition.

H22, H23 – In-Compliance - GELITA confirmed that “mag” meter records are maintained of the total quantity of programmed contaminants released to dedicated irrigation areas on any day (sighted), which remains below 3ML of final treated wastewater. GELITA indicated that reprogramming of treated wastewater discharges, as a result of minor redefinition of the contaminant release areas, would be a further consequence of the outcomes of EMP No. SR1157.

H24-H28 – In-Compliance - Logan River Daily Monitoring – Daily monitoring is carried out by DNR automatic recording stations within the river, both above and also immediately below the GELITA downstream boundary. These recordings for 2003/2004 were sighted / reviewed, at the formal site audit completed on 6/10/2004, indicating only inherent variations in parameters assessed at the two (2) river sampling points. This extensive chart data is available for call-up for Annual Return assessment purposes. Parameters were confirmed as those included in the company EM Plan of 1994, which remains relevant.

H29-H32 – In-Compliance - Soils Monitoring - Soil / Agronomy Consultant Dr Brian Schafer has prepared and submitted to GELITA the following, “**GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report – October 2004**”, in which the preliminary “baseline” soil monitoring data generated over 2003/2004 is presented and reviewed (Attached). Schafer has indicated that, “These preliminary data are within the acceptable ranges deemed for Soil Salinity and Nutrient Status for the specified soil map units.” And further, “Field instrumentation (“Full-Stop” Wetting Front Detectors) are yet to be installed and so soil infiltration and hydraulic conductivity data are not available at this stage.” GELITA indicated that the “Full-Stop” installation program would be implemented as soon as practicable. The “baseline” soil monitoring constitutes actions completed under EMP No. SR1157, that included data / projects reaching finality around 30/09/2003 and which supporting material was provided to the EPA with the EMP No. SR1157 “Final Report”, for assessment and sign-off. Cropping trials, to ascertain nutrient utilisation in soils irrigated with treated wastewater, formed a number of projects associated with EMP No. SR1157. Additional soil and groundwater sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity will be monitored on an annual basis during the anticipated seven years following establishment of the Vetiver Grass / Rye Grass production unit, planting for which is expected to commence October 2004. See also comments under Conditions **H33-H35** below.

SECTION: Compliance Audit : Agency Interest : SR0722 & Site Review : Non-compliant ✕

H33-H35 – In-Compliance - Groundwater Monitoring - Soil / Agronomy Consultant Dr Brian Schafer has prepared and submitted to GELITA the following, “**GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report – October 2004**”, in which he indicates field problems associated with the groundwater sampling program during 2004 (Attached). Schafer comments as follows, “Ground water analyses obtained from samples in September 2004 have been found to be in error. The piezometer boreholes installed in 1992 have variously deteriorated due to age. Later boreholes to replace some of these earlier boreholes in 2000 have also been damaged by farm operations and stock. Consequently, some of the bores which are strategic to the new monitoring program are unserviceable.” GELITA indicated that a piezometer borehole refurbishment program would be implemented as soon as practicable. Review of groundwater results available during the 2003 site audit did not indicate nutrient transfer / leakage to the “deep” groundwater systems on site and hence to the Logan River. In many areas of the “farm”, shallow topsoil cover, over a deep clay base, precludes transfer of irrigated treated wastewater to groundwater. GELITA intends to adopt the “Full-Stop” Controller, developed by CSIRO Scientist R Stirzaker (See CSIRO.au) to monitor moisture movement through soil profiles on site, as a measure of irrigated treated wastewater penetration / field capacity / percolation effectiveness (refer Schedule H – Table 3).

H36 – In-Compliance - GELITA seeks expert advice from a variety of sources regarding results emanating from the site monitoring programs, viz; Consulting NATA Laboratories, AIR, NOISE ENVIRONMENT P/L, UQ Project Team, Soil / Agronomy Consultant Dr Brian Schafer, DNR personnel (soil / plant systems [particularly Vetiver grass applications / hydrology issues], J Biala of “The Organic Force” for composting guidance and Dr Paul Truong, Vetiver Grass cultivation expert (Attached – “Research, Development and Implementation of the Vetiver System for Wastewater Treatment” by Paul Truong and Cameron Smeal, August 2003, relevant to the GELITA site, where most of the research data used in this Technical Bulletin was generated). Both authors Truong and Smeal co-presented the above paper at the Third International Conference on Vetiver Grass in Guangzhou, China in October 2003 (Attached).

H37, H38 – In-Compliance - Licence limit(s) exceedances arising with the irrigated disposal of treated wastewater to land on site have been covered by EMP No. SR1157, for the past 4.5 years, to 30/09/2003 and hence have not been individually advised to the EPA. However, the EPA has been aware of results achieved over the course of EMP No. SR1157, following regular and annual reviews of progress over the lifetime of the process.

Significant treated wastewater release quality characteristics amendments / deletions actioned in relation to Schedule E – Table 1 of SR0722, came into effect on 8/06/2004. Conditions changes completed for SR0722 arose as a result of “flow-on” recommendations for a number of issues addressed through recently completed on-site projects emanating from EMP No. SR1157, which reached conclusion on 30/09/2003 (Reference / supporting documents provided with the “Final Report” for EMP No. SR1157, at completion, have been fully reviewed, discussed and considered on sustainability grounds by EPA Management [D Brown, K Roberts, D K Shackel], in this regard). The only contaminant release quality characteristics now retained in Schedule H – Table 2 of SR0722 include; 5-day BOD (monthly), COD (weekly) and pH (weekly) determinations. GELITA was made aware of the need for timely reporting of non-compliances involving these parameters in future.

Schedule I – Definitions: NO COMMENTS REQUIRED.

REQUIRED ACTIONS: NIL

Licence Conditions Module:

Condition Number(s)	Details of non-compliance(s)
<u>NIL</u>	

RECOMMENDATION:
<u>NO RECOMMENDATIONS ARE OFFERED, AS CONDITIONS CURRENTLY INCLUDED IN SR0722 ARE CONSIDERED ADEQUATE TO ENSURE SUSTAINABILITY OF THE GELATINE MANUFACTURING ACTIVITIES CARRIED OUT ON SITE AND TO SAFEGUARD THE ENVIRONMENTAL INTEGRITY OF THE SURROUNDING SENSITIVE RECEPTORS, viz: runoff to adjacent land and the Logan River.</u>

Signoff Sheet:

Additional Comments:
<u>NIL</u>
Recommendation:
<u>NIL</u>

Adoption of Report:
This report accurately represents the issues and outcomes of this site inspection.

Inspecting officer

Don Shackel

Signed

Date

Inspecting officer

N/A

Signed

Date

Comments and Recommendation:

Supervisor

Doug Carey

Signed

Date

COPY

GELITA AUSTRALIA FARM MANAGEMENT ANNUAL AUDIT

EXECUTIVE SUMMARY

This report assesses the progress of the implementation of new farm technologies recommended in the license application submitted in November 2003. The new work was initiated after approval of the license in June 2004 and therefore this report is for the first 6 months... However the annual audit date is deemed to fall on January 31 of each year.

Work has substantially commenced on the agro-forestry enterprise with establishment of trees to be completed by the end of April 2005. This work is being completed by TreeCorp, a commercial arm of CSIRO.

Vetiver establishment and concurrent composting trials are progressing. Further areas of vetiver are to be planted in February 2005. Future plantings will be made as time permits over the next few years after other farm procedures including irrigation scheduling are put in place.

Chemical treatment of effluent to control the low soil pH values is being investigated further after initial liming trials proved to be inefficient.

Monitoring equipment has been progressively installed to provide data for effluent management according to soil and climatic variables. Regular measuring over time will provide ranges of values which will be used to vary irrigation rates to meet crop requirements and the maintenance of a robust sustainable farming system.

Full Stop and Longstop equipment have been installed to monitor soil infiltration and hydraulic conductivity. The latter equipment is also intended to be used to provide samples for determining salt and nitrate movement past the root zone to a depth of 1.5 metres.

Groundwater monitoring will recommence following refurbishment of selected piezometers. The bore holes have been purged of contaminants and will be repetitively sampled to provide reliable data.

The compliance report submitted in October 2004 (see attachment) showed that the soil data are within the limits set. Further sampling and analysis will continue to provide a reliable data set over the following year.

Actual daily water output variability is another parameter which will be addressed in the ongoing farm management revision.

BACKGROUND

The irrigation farming system originally proposed by Gutteridge Haskins and Daveys Pty Ltd (EIS Report, 1992) was based on treated waste water from the Gelatine plant being applied as

- irrigation via border check system of forage crops on the flatter lands along the Logan River which are comprised of deep sandy clay soils on slopes of less than 0.75%.
- spray irrigation of the higher lands on the property. These areas comprise moderately deep to deep clay soils derived from basalt and/or sandstone on slopes of 5 to 20%.

This water was to be applied to 105 hectares of land and was aimed at maximizing water and nutrient use by the crops with some to be applied to a proposed re-afforestation area (40 hectares) on the northern slopes of Sunny Hill.

Crops were to be harvested using green chop method and sold locally. Crop establishment was aimed to ensure continuous harvesting and removal of forage and hence nutrients (salts) from the farm.

No attempt was made in the initial plan to specify water requirements for crop use or for any contingencies to account for soil and climatic variability.

After production commenced in 1996 the whole farm cropping area was however irrigated by travelling irrigators based on an opportunistic approach rather than by using irrigation scheduling procedures according to soil conditions and crop requirements. No attempt was made to develop the proposed border check system.

Neutron moisture meter monitoring equipment was intended to be used to monitor irrigation scheduling but the technique was never employed.

Subsequent management of the effluent was based on irrigated pasture species comprised of mainly Rhodes Grass, Kikuyu and Couch Grass and cut for hay production. This was deemed to be uneconomical and production management was changed to cattle grazing of pastures until the proposed changes to EPA license conditions approved in June 2004.

INTRODUCTION

Current Irrigation Management Procedures

The revised land management approach mooted in the approved license has been devised to allow for a robust response to the soil capacities for effluent over a range of climatic conditions. The proposed management scheme is being implemented in graduated phases over a seven year period.

These are

- agro forestry on an area of approximately 27 hectares on hill slope soils developed on mainly Walloon Sediments (soil units 3a,2e, 3c)
- Vetiver cropping on the alluvial soils along the Logan River (soil units 2a, 2b, 2c, 2d, 3b).
- Drainage of heavy clay soil (soil unit 2e) to prevent salt accumulation at depth in the soil profile by lateral drains discharging into evaporation ponds.
- Chemical control by raising the pH of the effluent with liquid lime and thus promoting the volatilization of ammoniacal nitrogen.
(refer map and description of soil units in report, ATTACHMENT A)

Agro forestry

The area designated for agro forestry has been treated to remove vegetative growth by spraying with glyphosate herbicide and deep ripped on the contour to prepare beds for planting. Irrigation tracks have been formed to control the movement of travelling irrigators and ensure uniformity of watering over the whole area. The frequency of irrigation will be determined by the use of Full Stop equipment after establishment in March-April 2005.



Photo 1: Deep ripped agro forestry area. Irrigation track to right hand side of picture

Vetiver Establishment

Vetiver grass has been established on approximately 2 hectares of the 2e soil unit. The technique used involves the use of transplants using a special machine towed behind a tractor. Row spacing of approximately 50 cm allows for the establishment of ryegrass during the winter months when vetiver growth is minimal. In the picture below, the ryegrass can be seen as providing green growth during the winter period of 2004.

Further experimentation using compost manufactured from the bio-solids and using vetiver as a green waste source is currently being conducted on site. See picture below.

Results from this work are expected to be at hand in 18 months time.

Vetiver- Ryegrass pasture. Note ryegrass actively growing between rows during the winter months.

FOTO in here

Experimental Plots: Vetiver and Compost trials

Drainage of Soil Unit 2d

Work on establishing drainage channels to enhance movement of salts by lateral drainage has not commenced. This work will be undertaken following implementation of the revised irrigation scheduling program proposed by HYDROPLAN.

Chemical Control

Initial trialling of the use of liquid lime in the pump out pond proved to be inefficient. Agricultural lime applications to pastures have also proved to be costly. Further investigations are being made as to alternative means of maintaining soil pH values within the accepted range for plant growth.

In spite of the low pH values encountered in the soil surface, there does not appear to be any observed deleterious effects on plant growth.

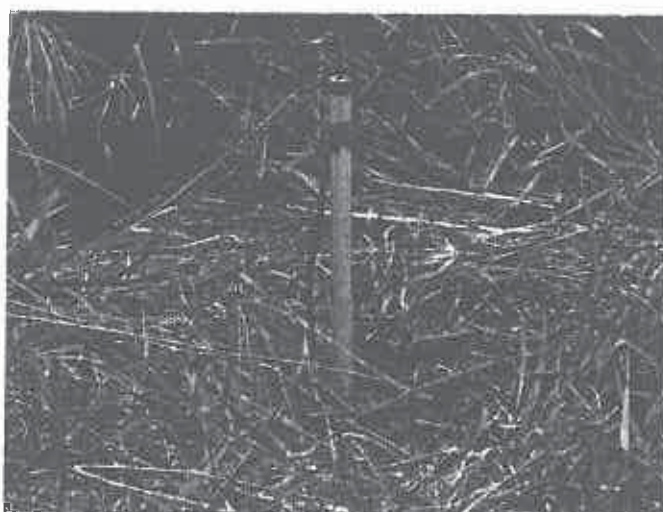
Monitoring Equipment

Full Stop and Longstop equipment have been installed on the major soil types used for forage production. Sampling has commenced and will continue on a weekly basis to

provide a data set on soil water status for irrigation scheduling and also samples for conductivity and nitrate measurements at depths of more than a metre.



Full Stop Moisture monitoring equipment showing red button up when soil water profile is full at 50 cm



Longstop equipment used for extraction of soil solution for nitrate and salt status below the root zone.

These data will be complemented with further infiltration measurements using double ring infiltrometers and used to rerun the MEDLI model. The University of Queensland data used in the first instance was found to be limited.

Refurbishment of selected piezometers and the removal of contaminants is being undertaken by repetitive purging. The process is time consuming and a new pump is being purchased from the United States for this purpose.

It is intended that more comprehensive data for the MEDLI model will be available by December 2005.

Analytical data are being determined by Queensland Department of Health Laboratories and a private firm FALA. This provide cross checks on the accuracy of data used for compliance purposes.

Irrigation Management Plan

Reduced irrigation area used for the vetiver/ agro forestry enterprises has necessitated revision of the irrigation management. In the past irrigation procedures have been left to farm staff. Currently they are being trained to use the program provided by HYDROPLAN. However this program will require further modification due to the reduced irrigation areas and change of crop types and as further analytical data becomes available from the analytical soil and effluent monitoring program.

Irrigation data from June 2004 to December is to be analysed to provide data on the variability of daily effluent output from gelatine production.

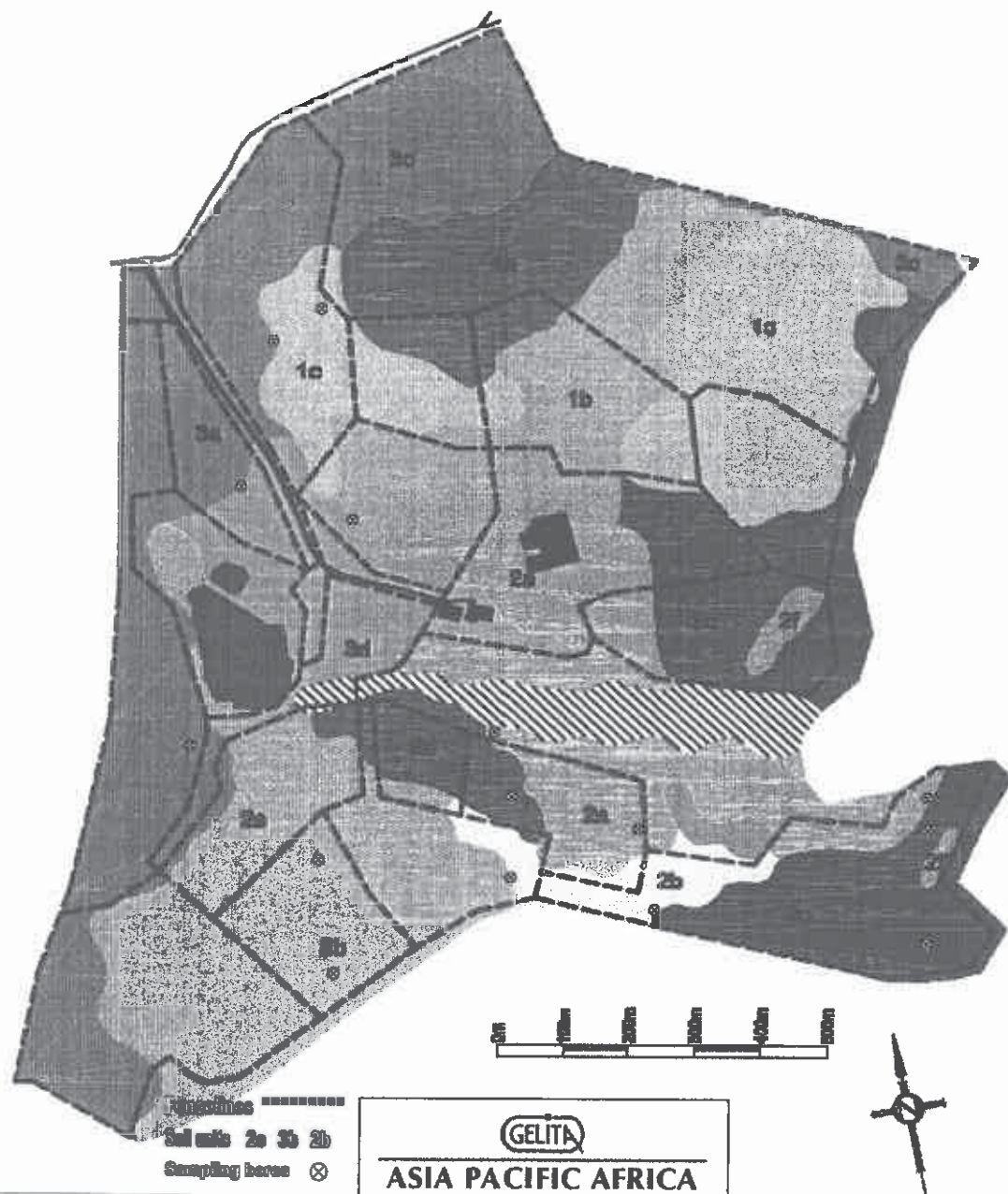
REFERENCE

Gutteridge Haskins and Daveys Pty Ltd. Brisbane.
Gelatine Manufacturing Plant and Irrigation System Sunny Hills, Josephville, Beaudesert Shire. Environmental Impact Statement. February 1992.

Signed: Dr B.M.Schafer

31 January 2005

Soil Map units and sampling bore locations



Soil units for monitoring purposes are described in this table and presented in map format above. Fence lines and groundwater monitoring bores are also detailed on this map.

The bores listed for monitoring are detailed in the map above. Therefore Condition H33 should be expanded to include the additional bore monitoring sites proposed by GELITA.

The proposed Schedule H Table 3 does not seek any changes to the parameters within the current licence conditions regarding groundwater quality monitoring other than a reduced frequency from bi-monthly to bi-annual. Condition H34 c would require amendment to reflect this proposed change.

Groundwater monitoring parameters and reporting requirements are further proposed to constitute an integral aspect of the Annual Audit process. This process will comprise an analysis and interpretive report of the monitoring program by an external consultant; and shall include an annual modeling exercise.. The MEDLI model will be a major predictive tool in long-term management of the site and shall form part of the annual reporting requirement.

GELITA will also continue to regularly monitor the following effluent quality characteristics for irrigation management purposes as required by our ISO 14001 procedures. The proposed changes to the licence are designed to achieve an outcome based reporting format and do not preclude the continuation of the GELITA waste-water monitoring program.

The following parameters are required for data input into the MEDLI model and shall continue to be collected and collated. All such records are maintained on-site indefinitely.

Irrigation Water Quality Monitoring

pH	EC	COD (mg/L)	TSS (mg/L)	BOD (mg/L)	TN (mg/L)	TDS (ppm)	NOx (mg/L)
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The initial monitoring program recommended in the Environmental Impact Statement on soil and water monitoring (GHD, 1992) was implemented as policy in the Company (Leiner Davis Gelatin Australia) Environmental Management Plan, 1994.

The revised program of irrigation scheduling (Hydroplan report, September 2003) is aimed to sustain soil conditions for productive growth according to soil properties as determined in the Land Management Study Phase 1, Task A- Soil Sampling and Analysis as reported above.

To meet the requirements of the revised licence proposal more specific sampling will be required to monitor soil conditions according to soil and crop type. The sites for sampling will follow from this report and will be taken from similar locations for comparison over time.

Additional soil and ground water sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity will be monitored on an annual basis during the seven years following establishment of the vetiver/ryegrass production unit.

These data will be used to validate the predictive outcomes of the MEDLI program upon which the vetiver/ryegrass program is based. Corrective actions will be taken if values are deemed to be outside sustainable limits.

This will be effected by:

- modifying the leaching fraction and

- b) by reducing salt load in irrigation water by shandyng with bore water and
- c) maintaining physical soil properties by mechanical intervention (eg ripping) and
- d) controlling nitrogen loads where necessary by chemical means.

These analyses will be used in conjunction with wastewater treatment data to assess compliance with the relevant licence conditions proposed in this submission. **

SAMPLING PROGRAM 2004

The sampling program to establish preliminary baseline data for the current monitoring program began on 29 January 2003. Samples were taken by hand auger to depth from sites within the mapped soil units which were located with GPS coordinates for future reference. Further sampling will be effected to meet the criteria of depth for future monitoring. The samples were submitted to the accredited analytical laboratory, Food and Agriculture Laboratories Australia for analysis. The data are presented in Table 1. below.

These preliminary data are within the acceptable ranges deemed for Soil Salinity and Nutrient Status for the specified soil map units (see Tables under Schedule H Table 3 above). Field instrumentation (FullStop Wetting Front Detectors) are yet to be installed and so soil infiltration and hydraulic conductivity data are not available at this stage.

Ground water analyses obtained from samples in September 2004 have been found to be in error. The piesometer boreholes installed in 1992 have variously deteriorated due to age. Later boreholes to replace some of these earlier boreholes in 2000 have also been damaged by farm operations and stock. Consequently some of the bores which are strategic to the new monitoring program are unserviceable. (see photographs attached).

The design of the piesometer above ground casing and caps is unsatisfactory because caps have been knocked off by cattle rubbing against them. This has resulted in the ingress of hair and effluent resulting in contamination of the ground water. This was observed in preliminary analyses even after standard purging and sampling procedures. Consequently the data was inconsistent and did not reflect the influence of management on groundwater conditions.

It is recommended that a refurbishment program is implemented to rectify the situation to allow for credible licence compliance monitoring .

TABLE 1.
GELITA BASELINE DATA
2004

Site/ Profile Depths	pH 1:5	E.Cond.	Chlorid e	CEC	Ca ++	Mg ++	Na +	K +	Exch.ac id	Exch. Al	Ex t
ID 0493647 6899828 haplic mesotrophic brown dermosol Sampled 7 April											
2a 0-10	6.5	0.117	71	24.8	4009	445	161	171	0.01	0.01	0.
2a 10-30	6.2	0.093	95	30.8	4360	908	286	133	0.04	<0.01	0.
2a 30-60	6.3	0.306	178	37.5	4982	1304	343	166	<0.01	<0.01	<0
2a 60-90	7.1	0.18	332	39.4	4987	1525	346	171	<0.01	<0.01	<0
2a 90-120	7.1	0.601	518	46.1	6067	1673	366	171	<0.01	<0.01	<0
2a 120-150	7.1	0.466	415	46.5	6308	1599	346	139	<0.01	<0.01	<0
ID 0493306 6899766 melanic mesotrophic brown dermosol Sampled 31 January											
2b 0-10	4.7	0.18	66	10.9	1405	81.9	134	143	2.3	1.8	0
2b 10-20	4.7	0.306	28	13.6	1749	97.6	160	161	3	2.4	0
2b 20-30	4.5	0.544	66	15.1	1883	128	205	170	3.3	2.7	0
2b 30-60	5.1	0.62	161	18.9	2624	344	372	132	1	0.7	0
2b 60-75	6.7	0.475	244	19.6	2612	476	510	115	0.1	0.08	0.
ID 0493644 6899686 haplic eutrophic brown dermosol Sampled 31 January											
2c 0-10	4.5	1.126	131	19.6	2986	163	412	106	1.3	1	0
2c 10-20	4.6	0.96	180	20.2	2871	223	476	115	1.6	1.2	0
2c 20-30	4.8	1.256	730	25.5	3574	383	681	118	1.2	1	0
2c 30-60	5.5	1.39	351	32.4	4331	807	868	95	0.08	0.04	0.
2c 60-75	6.6	1.093	655	30.8	3621	1076	831	96	0.04	0.04	0.
ID 0493471 6900134 haplic eutrophic brown dermosol Sampled 7 April											
2c1 0-10	4.5	0.531	225	24	3316	291	410	318	3.9	3	0
2c1 10-30	4.8	0.63	202	30	4322	501	403	252	1.6	0.8	0
2c1 30-60	6.6	1.27	340	47	6344	1377	858	178	<0.01	<0.01	<0
2c1 60-90	7	1.02	593	48	6120	1649	865	133	"	"	
2c1 90-120	6.9	0.95	546	45	5458	1580	836	165	"	"	
ID 0492665 6899731 episodic self mulching black vertosol Sampled 7 April											
2d 0-10	4.9	0.24	154	23	3156	388	259	482	1.67	1.12	0.
2d 10-30	4.9	0.22	189	44	3160	493	248	265	2.38	1.32	1.
2d 30-60	6.9	0.61	165	41	5323	1340	745	199	0.04	<0.01	0.
2d 60-90	6.4	0.99	545	49	5628	1948	1058	166	<0.01	"	<0
2d 90-120	7	1.09	688	50	5588	2055	1070	168	"	"	
2d 120-150	6.4	0.9	621	43	3780	1459	713	122	"	"	
2d 150-160	7	0.9	558	37	4388	1458	723	133	"	"	

Site/ Profile Depths	pH 1:5	E.Cond.	Chlorid e	CEC	Ca ++	Mg ++	Na +	K +	Exch.ac id	Exch. Al	Ex t
ID 0492948 6900059 episodic epipedal brown vertosol Sampled 31 January											
2e 0-10	4.6	2.04	589	24	3006	392	819	204	1.42	0.95	0.

Soil Order	Description	Soil Unit	Proposed irrigation treatment
Dermosol	Basalt mid-slope shelf. Shallow stony light clay pH 8.5 at depth. Irrigation zone.	1b	This area has been subject to irrigation in the past and future effluent irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Dermosol	Basalt lower slope. Shallow stony brown medium clay. Irrigation zone.	1c	This area has been subject to irrigation in the past and future effluent irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Dermosol	Alluvium, relic and current levees. Deep sandy loam, pH neutral at depth.	2a	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Dermosol	Alluvium dissected levee. Deep clay/sandy loam. pH neutral. Irrigation zone.	2b	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Dermosol	Alluvium, backplain. Deep layered sandy clay loam. Alkaline pH at depth. Irrigation zone.	2c	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Basaltic alluvium, closed depression. Black cracking clays. Alkaline. Irrigation zone.	3d	This zone will be progressively planted to vetiver and receive effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Basaltic alluvium, relic backplain. Dark cracking medium clays, alkaline. Irrigation zone.	3e	This zone will be subject to drainage channels and the soil flushed. It will receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation. Intensive monitoring as per table 3 required.
Dermosol	Alluvium dissected relic levee. Brown sandy clay loam. Irrigation zone	2f	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Characteristics of this dermosol are typical of the other dermosols on site. This soil type limited in area. Intensive monitoring as per table 3 not required.
Sodosol	Walloon sandstone, relic terrace, upper convex slopes. Brown clay loam, mottled yellow subsoil, neutral to alkaline. Irrigation zone.	3a	This zone will be subject to irrigated agroforestry and the soil flushed. It will receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation. Intensive monitoring as per table 3 required.
Vertosol	Walloon siltstone, relic terrace. Brown clay loam, yellow brown clay, alkaline. Irrigation zone.	3b	This zone will be retained as irrigated pasture and receive effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Colluvium basalt/Walloon sediments relic gully infill. Brown clay, alkaline.	3d	This area is not ideal for effluent irrigation. It will continue to receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation.

Nutrient	Acceptable Range for Soil Map Units at 10 cm Depth						
	2a	2b	2c	2d	2e	3a, 3d	3b
Total N (%)	0.1-0.25	0.1-0.25	0.1-0.3	0.2-0.5	0.2-0.5	0.2-0.4	0.2-0.5
NO ₃ -N (mg/Kg)	10-120	10-120	10-120	10-120	10-120	10-120	10-120
NH ₄ -N (mg/Kg)	20-450	20-450	20-450	20-450	20-450	20-450	20-450
Acid Extractable P (mg/Kg)	10-450	10-450	10-450	10-450	10-450	10-450	10-450
Bicarbonate Extractable P (mg/Kg)	10-100	10-100	10-100	10-100	10-100	10-100	10-100

The schedules above are proposed as a continuation of the original licence conditions and have been extended to meet the requirements of the EMP. Soil sampling shall be conducted to 1.5 metre depth across soil units on an annual basis to establish benchmarks and monitor movement of "salts" and nitrogen through soil profiles. Solution for analysis shall be drawn from FullStop wetting front detectors at 10 and 50 cm for irrigation scheduling and also at depths of 1 and 1.5 metres for soil solution extracts.

Soil infiltration and hydraulic conductivity

Soil Map units for monitoring. 2a, 2b, 2c, 2d, 2e, 3a, 3b, 3d	Sampling Methods	Acceptable Range	Irrigation Response	Testing Frequency
Infiltration and hydraulic conductivity	FullStop Monitor time for distribution of measured amount of applied effluent of SAR 12 mmol/L ^{0.5} through soil to 50cm depth at saturation using constant head infiltrometer.	20 mm/ hour at SAR 12 mmol/L ^{0.5} on dermosols, Soil Map Unit 2a , 2b, 2c 1mm/ hour at SAR 12 mmol/L ^{0.5} on vertosols/sodosols Soil MapUnits 2d, 2e, 3b, 3d, 3a	Irrigate to 50% soil water deficit based on Fullstop indicators placed at 10cm and 50 cm depths.	Annual

Nutrient Status

Soil Salinity

Soil units 2a, 2b, 2c, 2d, 3a, 3b, 3d	Soil solution sampling via FullStop Soil core sampling depth 0-120cm.	Acceptable Range at 10cm depth	Acceptable Range at 50cm depth	Acceptable Range at 120cm depth	Irrigation response	Testing Frequency
pH	(1:5) solution soil extract	4.5-7.0	5.5-7.5	6.0-8.5	pH <5.0 add lime/compost. Field pH test response. pH >8.0 stop lime dosing. Flush neutral pH water.	Annual
ESP (% calculated from sodium and cation exchange capacity)	soil	10	15	20	Flush bore water	Annual
SAR (Calculated from calculated from soil solution cations Ca++, Mg++ Na+)	solution	15	20	40	Flush bore water	Annual
EC _{sat} (dS/m)	solution	3	4	5	EC >5 on clay flushing water/shandy	Annual
Cl ⁻	solution	0-150 mg/kg	0-450 mg/kg	0-600+ mg/kg	Flushing water/shandy	Annual
NO ₃ ⁺	solution /soil	120mg/kg	100mg/kg	20mg/kg (soil sample)	NO ₃ > 100mg/kg at 50 cm irrigate only flushing water. Monitor to depth 150cm Increase pH Irrigation water.	Annual
Total sulphate sulphur	Solution- (includes gypsum precipitate)	4000mg/l	5000mg/l	6000 mg/kg (soil sample)	Calcium amendment	Annual

ATTACHMENT A

GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report

October 2004

INTRODUCTION

The current licence conditions include monitoring of soil and effluent to complement a best practice management program. The following statements are taken from the EMP submission to the EPA made in November 2003.

“The parameters to be monitored and the frequency of monitoring in the Contaminant release Area Monitoring Program shall be in accordance with the parameters and monitoring frequency prescribed in schedule H Table 3.

Schedule H Table 3

Element	Sites	Method	Frequency
Soil Salinity	Within soil units 2a, 2b, 2c, 2d, 2e, 3a, 3b,	Soil sampling and analysis for pH (1:5), EC sat, Cl, NO ₃ , SO ₄ , effective CEC, exchangeable Ca, Mg, Na,	annual
Soil infiltration and hydraulic conductivity	Within soil units, 2a, 3b, 2e	Field instrumentation	annual
Nutrient Status	As Above	Soil Sampling and analysis for Total N, NO ₃ -N, NH ₄ -N, Acid extractable P	bi-annual
Groundwater	Relevant bores with water table within soil units listed above	Tape measurement and EC. Water laboratory analysis	bi-annual
Effluent	Pump out pond outlet	Water laboratory analysis,	monthly

The existing licence conditions include soil and water monitoring requirements. The schedules above are proposed as a continuation of the original conditions and have been extended to meet the requirements of the EMP. *The combined table above is based on the following detailed schedules of monitoring and irrigation response as detailed below.*

TABLE 1.
GELITA BASELINE DATA
2004

Site/ Profile Depths	pH 1:5	E.Cond.	Cl	CEC	Ca ++	Mg ++	Na +	K +	Exc acid	Exc. Al
ID 0493647 6899828 haplic mesotrophic brown dermosol Sampled 7 April										
2a 0-10	6.5	0.117	71	24.8	4009	445	161	171	0.01	0.01
2a 10-30	6.2	0.093	95	30.8	4360	908	286	133	0.04	<0.01
2a 30-60	6.3	0.306	178	37.5	4982	1304	343	166	<0.01	<0.01
2a 60-90	7.1	0.18	332	39.4	4987	1525	346	171	<0.01	<0.01
2a 90-120	7.1	0.601	518	46.1	6067	1673	366	171	<0.01	<0.01
2a 120-150	7.1	0.466	415	46.5	6308	1599	346	139	<0.01	<0.01
ID 0493306 6899766 melanic mesotrophic brown dermosol Sampled 31 January										
2b 0-10	4.7	0.18	66	10.9	1405	81.9	134	143	2.3	1.8
2b 10-20	4.7	0.306	28	13.6	1749	97.6	160	161	3	2.4
2b 20-30	4.5	0.544	66	15.1	1883	128	205	170	3.3	2.7
2b 30-60	5.1	0.62	161	18.9	2624	344	372	132	1	0.7
2b 60-75	6.7	0.475	244	19.6	2612	476	510	115	0.1	0.08
ID 0493644 6899686 haplic eutrophic brown dermosol Sampled 31 January										
2c 0-10	4.5	1.126	131	19.6	2986	163	412	106	1.3	1
2c 10-20	4.6	0.96	180	20.2	2871	223	476	115	1.6	1.2
2c 20-30	4.8	1.256	730	25.5	3574	383	681	118	1.2	1
2c 30-60	5.5	1.39	351	32.4	4331	807	868	95	0.08	0.04
2c 60-75	6.6	1.093		30.8	3621	1076	831	96	0.04	0.04
ID 0493471 6900134 haplic eutrophic brown dermosol Sampled 7 April										
2c1 0-10	4.5	0.531		24	3316	291	410	318	3.9	3
2c1 10-30	4.8	0.63	202	30	4322	501	403	252	1.6	0.8
2c1 30-60	6.6	1.27	340	47	6344	1377	858	178	<0.01	<0.01
2c1 60-90	7	1.02	593	48	6120	1649	865	133	"	"
2c1 90-120	6.9	0.95	546	45	5458	1580	836	165	"	"
ID 0492665 6899731 episodic self mulching black vertosol Sampled 7 April										
2d 0-10	4.9	0.24		23	3156	388	259	482	1.67	1.12
2d 10-30	4.9	0.22	189	44	3160	493	248	265	2.38	1.32
2d 30-60	6.9	0.61	165	41	5323	1340	745	199	0.04	<0.01
2d 60-90	6.4	0.99	545	49	5628	1948	1058	166	<0.01	"
2d 90-120	7	1.09		50	5588	2055	1070	168	"	"
2d 120-150	6.4	0.9	621	43	3780	1459	713	122	"	"
2d 150-160	7	0.9	558	37	4388	1458	723	133	"	"

Site/ Profile Depths	pH 1:5	E.Cond.	Cl	CEC	Ca ++	Mg ++	Na +	K +	Exc.acid	Exc. Al
ID 0492948 6900059 episodic epipedal brown vertosol Sampled 31 January										
2e 0-10	4.6	2.04		24	3006	392	819	204	1.42	0.95
2e 10-20	5.6	0.79		16	1595	398	610	102	1.67	1.32
2e 20-30	5.1	1.15		26	2445	856	1085	93	1.8	1.41
2e 30-60	5.9	1.68		38	3258	1645	1781	77	0.08	<0.01
2e 60-90	6.1	1.49		42	3349	1943	2107	87	0.08	"
ID 0493638 6900236 brown Sampled 31										

dermosol

January

2f 0-10	6	0.19	85	6	46	485	225	218	0.04	<0.01
2f 10-30	6.2	0.29	117	30	4282	859	367	154	<0.01	"
2f 30-60	6.7	0.41	189	25	3269	789	358	112	"	"
2f 60-90	6.8	0.34	212	20	2578	646	299	97	"	"
2f 90-120	6.8	0.37	308	21	2715	688	274	115	"	"

ID 0492422 6899593

mottled subnatic

Sampled 31

yellow sodosol

January

3a 0-10	4.7	1.97		30	3614	681	991	186	1.34	1.04
3a 10-20	4.8	2.27		45	4762	1431	1473	135	3.09	2.61
3a 20-30	5.1	2.11		49	4742	1964	1721	143	1.67	1.28
3a 30-60	5.6	1.94		49	4010	2449	1830	149	0.42	0.25
3a 60-90	5.9	1.69		48	3759	2571	1747	164	0.084	<0.001
3a 90-100	6.2	1.43		41	3056	2234	1489	174	0.042	"

ID 0492955 6899797

epiacidic epipedal

Sampled 31

grey vertosol

January

3b 0-10	4.6	1.99		31	4164	428	860	372	1.67	1.28
3b 10-20	4.9	1.95		30	3480	657	1282	218	1.17	0.91
3b 20-30	5.5	1.98		40	4083	1285	1804	203	0.25	0.12
3b 30-60	6.1	2.12		49	4296	2214	2095	147	<0.001	<0.001
3b 60-90	7.1	2.12		69	6665	3097	2338	145	"	"

2e 10-20	5.6	0.79	376	16	1595	398	610	102	1.67	1.32	0.
2e 20-30	5.1	1.15	557	26	2445	856	1085	93	1.8	1.41	0.
2e 30-60	5.9	1.68	1039	38	3258	1645	1781	77	0.08	<0.01	0.
2e 60-90	6.1	1.49	1390	42	3349	1943	2107	87	0.08	"	0.

ID 0493638 6900236 brown
dermosol

Sampled 31
January

2f 0-10	6	0.19	85	6	46	485	225	218	0.04	<0.01	0.
2f 10-30	6.2	0.29	117	30	4282	859	367	154	<0.01	"	<0
2f 30-60	6.7	0.41	189	25	3269	789	358	112	"	"	
2f 60-90	6.8	0.34	212	20	2578	646	299	97	"	"	
2f 90-120	6.8	0.37	308	21	2715	688	274	115	"	"	

ID 0492422 6899593 mottled subnatic
yellow sodosol

Sampled 31
January

3a 0-10	4.7	1.97	718	30	3614	681	991	186	1.34	1.04	0
3a 10-20	4.8	2.27	970	45	4762	1431	1473	135	3.09	2.61	0.
3a 20-30	5.1	2.11	1174	49	4742	1964	1721	143	1.67	1.28	0.
3a 30-60	5.6	1.94	1847	49	4010	2449	1830	149	0.42	0.25	0.
3a 60-90	5.9	1.69	1870	48	3759	2571	1747	164	0.084	<0.001	0.
3a 90-100	6.2	1.43	1668	41	3056	2234	1489	174	0.042	"	0.

ID 0492955 6899797 epiacidic epipedal
grey vertosol

Sampled 31
January

3b 0-10	4.6	1.99	506	31	4164	428	860	372	1.67	1.28	0.
3b 10-20	4.9	1.95	889	30	3480	657	1282	218	1.17	0.91	0.
3b 20-30	5.5	1.98	1274	40	4083	1285	1804	203	0.25	0.12	0.
3b 30-60	6.1	2.12	1735	49	4296	2214	2095	147	<0.001	<0.001	<0.
3b 60-90	7.1	2.12	2128	69	6665	3097	2338	145	"	"	

Signed: Dr B.M Schafer

5 October 2004

A/R

ANNUAL ENVIRONMENTAL AUDIT



ASIA PACIFIC AFRICA

Date: 31 JAN 2005Auditor: sc4p4 (6) Persona
C. Smeyl

A. General Conditions

Summary Pass ☒ No of Fails ☐ Number of Greencards ☐Comments: A14 MINOR PROCEDURAL CHANGES

B. Air

Summary Pass ☒ No of Fails ☐ Number of Greencards ☐Comments: SAMPLING AT BIO FILTER: AMBIENT ODOUR > UCL
HIGH GREEN CARD RESPONSE.

C. Water

Summary Pass ☒ No of Fails ☐ Number of Greencards ☐

Comments: _____

D. Storm Water Management

Summary Pass ☒ No of Fails ☐ Number of Greencards ☐Comments: DIESEL TANK NEEDS TO BE RELOCATED

E. Land Applications

Summary Pass ☒ No of Fails ☐ Number of Greencards ☐

Comments: _____

F. Noise

Summary Pass ☒ No of Fails ☐ Number of Greencards ☐

Comments: _____

G. Waste Management

Summary Pass ☒ No of Fails ☐ Number of Greencards ☐

Comments: _____

H. Self Monitoring and Reporting

Summary Pass ☒ No of Fails ☐ Number of Greencards ☐Comments: ALL INCIDENTS AND MONITORING REQUIREMENTS METTotal Pass ☒ No of Fails ☐ Pass %

ANNUAL ENVIRONMENTAL AUDIT

SCHEDULE A - General Conditions

“(A1) The holder of the environmental authority must:

- (i) install all plant and equipment necessary to ensure compliance with the conditions; and
- (ii) maintain such plant and equipment in a proper and efficient condition; and
- (iii) operate such plant and equipment in a proper and efficient manner.”

1. General Conditions

Is it reasonable to state that all plant and equipment necessary to ensure compliance with the conditions has been installed, maintained and operated properly and efficiently?

☒ Yes ☐ No

If no specify

“In this condition, “plant and equipment” includes:

- (i) plant and equipment used to prevent and/or minimise the likelihood of environmental harm being caused;
- (ii) devices and structures to contain foreseeable escapes of contaminants and waste;
- (iii) vehicles used to transport waste;
- (iv) devices and structures used to store, handle, treat and dispose of waste;
- (v) monitoring equipment and associated alarms; and
- (vi) backup systems that act in the event of failure of a primary system”.

2. Display of environmental authority

“(A2) A copy of this environmental authority must be kept in a location readily accessible to personnel carrying out the activity.”

Is Environmental authority displayed?

☒ Yes ☐ No

If yes, where is authority displayed? ... ENV OFFICE & RECEPTION

3. Records

“(A3) Any record required to be kept by a condition of this environmental authority must be kept at the licensed place and be available for examination by an authorised person.

(A4) Copies of any record required to be kept by a condition of this environmental authority must be provided to any authorised person or the administering authority on request.”

Are the records for the last 5 years available?

☒ Yes ☐ No

If yes, where are the records located? ... ENV OFFICE

ANNUAL ENVIRONMENTAL AUDIT

4. Alterations

“(A5) No change, replacement or operation of any plant or equipment is permitted if the change, replacement or operation of the plant or equipment increases, or is likely to substantially increase, the risk of environmental harm above that expressly provided by this environmental authority.

An example of a substantial increase in the risk of environmental harm is an increase of 10% or more in the quantity of the contaminant to be released into the environment”.

Has there been any replacement or changes of plant equipment since the last audit that is likely to increase environmental harm?

☒ No

☐ Yes

If yes specify

5. Calibration

“(A6) All instruments and measurement devices used for the measurement or monitoring of any parameter under any condition of this environmental authority must be calibrated, and appropriately operated and maintained”.

Has all monitoring equipment been calibrated/serviced according to procedures?

☒ Yes

☐ No

Where are calibration records located? ... ENV TECHNICIAN FILES

6. Nuisance

“(A7) Notwithstanding any other condition of this environmental authority, this environmental authority does not authorise any release of contaminants which causes or is likely to cause an environmental nuisance beyond the boundaries of the licensed place.”

Has there been any unauthorised release of contaminants beyond the boundaries of the site that have caused environmental nuisance?

☒ Yes

☐ No

Where are records located? ... REPORTS LODGED WITH EPA AND ON FILE IN ENV OFFICE

ANNUAL ENVIRONMENTAL AUDIT

7. Integrated Environmental Management System (IEMS)

“(A8) The holder of this environmental authority, must implement an Integrated Environmental Management System (IEMS) which provides for the effective and appropriate management by the holder of this environmental authority of the actual and potential environmental impacts resulting from the carrying out of the environmentally relevant activity/activities”.

Has an IEMS been implemented?



Yes



No

Specify 150 14001

“(A9) The Integrated Environmental Management System must provide for at least the following functions:

- (i) The monitoring of releases of contaminants into the environment, for example measurement of the quantities and concentrations of releases of contaminants to the environment as required under this environmental authority;”

Has this condition been met?



Yes



No

Where are the records located? ... ENV TECHNICIANS FILES

- “(ii) The assessment of the environmental impacts of any releases of contaminants into the environment, for example any ambient environmental quality monitoring, noise monitoring or complaints monitoring required under this environmental authority; ”

Has this condition been met?



Yes



No

Where are the records located? ... ENV OFFICE (EPA FOLDER)

ANNUAL ENVIRONMENTAL AUDIT

- (iii) The training of all relevant staff, agents and contractors ("staff") to competent levels in at least the following:
- (a) the environmental policy of the holder of this environmental authority so that staff are aware of any relevant commitments to environmental management; and
 - (b) any relevant environmental objectives and targets so that all staff are aware of the relevant performance objectives and can work towards these; and
 - (c) control procedures for routine operations for day to day operational activities to prevent or minimise environmental harm, however occasioned or caused; and
 - (d) contingency plans and emergency procedures for non-routine situations to deal with foreseeable risks and hazards including corrective responses to prevent and mitigate environmental harm (including any necessary site rehabilitation); and
 - (e) organisational structure and responsibility to ensure that roles, responsibilities and authorities are appropriately defined to manage environmental issues effectively; and
 - (f) effective communication to ensure two-way communication on environmental matters between operational staff and higher management; and
 - (g) documentation systems so that appropriate records of environmental matters are kept to satisfy the holder of this environmental authority, the administering authority and the community that the applicant is meeting environmental commitments; and
 - (h) responsibilities of the holder of this environmental authority and staff under the Act so that these can be met;"

Has this condition been met?

☒ Yes ☐ No

Where are the records located? SAFETY CO-ORDINATORS OFFICE
TRAINING MATRIX

"(iv) The conduct of environmental and energy audits to review periodically:

- (a) the level of environmental performance; and
- (b) the effectiveness of environmental management procedures adopted; and
- (c) efficiency in using energy and resources and opportunities for more efficient usage;"

Has this condition been met?

☒ Yes ☐ No

Where are the records located? RECORDS ENV OFFICE
COPIES TO EPA IN ANN RETURN

"(v) The implementation of effective and appropriate strategies for waste prevention, treatment and disposal."

Has this condition been met?

☒ Yes ☐ No

Where are the records located? COMPOST FILE } ENV
WETIVER FILE } OFFICE
TREE FILE }

ANNUAL ENVIRONMENTAL AUDIT

"(A10) The conduct of environmental and energy audits required by condition A9(iv) must be carried out as often as necessary but not less frequently than the frequency specified below:

- (i) the level of environmental performance: annually;
- (ii) the effectiveness of environmental management procedures adopted: once every two (2) years; and
- (iii) efficiency in using energy and resources and opportunities for more efficient usage:

within two (2) years of the granting of this environmental authority and then not less than once every five (5) years."

Has this condition been met?



Yes



No

Specify last audit date: ENERGY NOV 2004, ISO 2004

Where are the records located? ENV OFFICE
COPIES TO EPA

"(A11) The holder of this environmental authority must prepare a report summarising the outcomes of the environmental and energy audits required by condition A9(iv) and submit the report with the annual return which follows the conduct of the audits."

Has this condition been met?



Yes



No

Specify outcomes: CONSIDER CONVERTING TO NATURAL GAS

Where are the records located? ENV OFFICE

"(A12) The holder of this environmental authority must not implement a integrated Environmental Management System or amend the Integrated Environmental Management System where such implementation or amendment would result in a contravention of any condition of this environmental authority"

Has this condition been met?



Yes



No

"(A13) A copy of the Integrated Environmental Management System must be kept at the licensed place."

Has this condition been met?



Yes



No

Where are the records located? ENV OFFICE NETWORK COMPUTER
QUALITY

"(A14) The holder of this environmental authority must submit details of any amendment to the Integrated Environmental Management System to the administering authority with the annual return which immediately follows the enactment of any such amendment."

Has this condition been met?



Yes



No

What amendments have been made to the IEMS? MINOR FORM CHANGES
PROCEDURE & UPDATES

Where are the records located? ENV OFFICE

8. Community Liaison Committee

ANNUAL ENVIRONMENTAL AUDIT

“(A15) The holder of the environmental authority must, in consultation with the administering authority, co-operate with and service any community environment liaison committee established in respect of either the licensed place specifically or the industrial estate where the licensed place is located.”

Has this condition been met?

☒

Yes

☐

No

When was the last time GELITA Australia met with Community Consultation Committee?

☒

< 1 month

☐

< 6 mths

Where are the records located?

Community Consultation File
ENV OFFICE

(A16) At all reasonable times, and to the satisfaction of an authorised person, the following must be provided to enable an authorised person to check compliance with the conditions of this environmental authority:

- (i) monitoring facilities; and
- (ii) access to such facilities; and
- (iv) any reasonable assistance which the authorised person deems necessary.

Has this condition been met?

☒

Yes

☐

No

ANNUAL ENVIRONMENTAL AUDIT

SCHEDULE B -Air

Non-specified Releases of Contaminants to the Atmosphere

- “(B1) Except as otherwise provided by the conditions of the air schedule of this environmental authority, the environmentally relevant activities must be carried out by such practicable means necessary to prevent the release or likelihood of release of contaminants to the atmosphere.
- (B2) Where it is not practicable to prevent a release of contaminants to the atmosphere as required by condition number B1, the environmentally relevant activities must be carried out by such practicable means necessary to minimise the release or likelihood of any such release of contaminants to the atmosphere.”

Have these conditions been met?

☒ Yes ☐ No

Specify ... *BIOFILTER MAINTENANCE + COVERED WINDROWS*

Specified Releases of Contaminants to the Atmosphere

- (B3) Contaminants resulting from the operation of the sources described in Table 1 must only be released to the atmosphere from those release points specified in Table 1 of the air schedule.
- (B4) Contaminants released from each release point specified in Table 1 of the air schedule must be directed vertically upwards without any impedance or hindrance.
- (B5) Contaminants must be released to the atmosphere from a release point at a height not less than the corresponding height stated for that release point in Table 1 of the air schedule.
- (B6) Contaminants must be released to the atmosphere from a release point at a velocity not less than the corresponding velocity stated for that release point in Table 1 of the air schedule.
- (B7) Contaminants must not be released to the atmosphere from a release point at a concentration in excess of that stated in Table 2 of the air schedule.”

SCHEDULE B - Table 1

RELEASE POINT NUMBER	SOURCE DESCRIPTION	MINIMUM RELEASE HEIGHT (metres)	MINIMUM EFFLUX VELOCITY (metres/second)
RP 1	1 x 5MW Finafire Fluidised Bed Boiler	21	15
RP 2	1 x 5MW LPG - Fired Stand-by Boiler	16	10
RP 3	1 x UASB Biogas Flare	5	-
RP 4	1 x Co-generation Plant Exhaust	5	-

Have there been any modifications to the Finafire Fluidised bed boiler stack height since the

ANNUAL ENVIRONMENTAL AUDIT

last audit that would make it < than 21 meters high?

☐ Yes ☒ No

What was the last measured Finafire boiler minimum efflux velocity?

☒ ≥ 15 m/s
☐ < 15 m/s

Have there been any modifications to the stand-by boiler release height since the last audit that would make the minimum release height < 16 meters?

☐ Yes ☒ No

What was the last measured stand by boiler minimum efflux velocity?

☒ ≥ 10 m/s
☐ < 10 m/s

SCHEDULE B - Table 2

RELEASE POINT NUMBER	CONTAMINANT	RELEASE LIMIT	RELEASE LIMIT UNITS
RP 1	Total Solids Particulates (Adjusted to 12% CO ₂)	250	mg/Nm ³
RP 1	Nitrogen Oxides (expressed as NO ₂)	500	mg/Nm ³

Total Solid particulate (Adjusted to 12% CO₂) release amount?

☒ ≤ 100 mg/Nm³
☐ > 250 mg/Nm³

Nitrogen Oxides (Expressed as NO₂): Release Amount?

☒ ≤ 500 mg/Nm³
☐ > 500 mg/Nm³

Fuel Burning

“(B9) The only type of fuel to be burnt in the industrial fuel burning equipment is coal, liquid petroleum gas, natural gas and biogas.”

Has this condition been met?

☒ Yes ☐ No

Specify ... *COAL & GAS ONLY* ...

“(B10) The sulphur content of coal, liquid petroleum gas and natural gas burnt in industrial fuel burning equipment is not to exceed one (1) percent by weight.”

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Has this condition been met?



Yes



No

What is the measured Sulphur Content of coal supplied?



≤ 1% by weight



> 1%

What is the measured Sulphur Content of gas supplied?



≤ 1% by weight

N/A



> 1%

Specify ... INFORMATION NOT AVAILABLE

“(B11) The sulphur content of biogas burnt in industrial fuel burning equipment is to be maintained at minimal practicable levels.”

Has this condition been met?



Yes



No

N/A

Specify ... NO BIO GAS BURNED IN EQUIPMENT SPECIFIED

Ventilation

“(B12) All external doors of the raw materials building must be kept fully closed when processing or stockpiling of animal matter is occurring, except when necessarily being opened for access.”

Has this condition been met?



Yes



No

Specify ... RAW MATERIAL DAY OPERATOR DILIGENT



Yes



No

“(B13) The raw materials building must be kept under negative pressure when processing or stockpiling of animal matter is occurring, except in the case of the raw material delivery area which must be permitted to return to atmospheric pressure while access doors are opened for the delivery of raw materials.”

Are extractor fans operational?



Yes



No

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“(B14) The raw materials building ventilation system must be operated so that the volume of building air extracted in any one hour period is not less than a volume equivalent to 5.8 times the total internal volume of the raw materials building.”

Are extractor fans operational?

☒ Yes ☐ No

“(B15) Ventilation air and effluent gases from the raw materials building must be collected and treated by a wet scrubber and a biofilter prior to release to the atmosphere.”

Is the ventilation air from raw materials collected and treated by a wet scrubber and biofilter prior to release to the atmosphere?

☒ Yes ☐ No

“(B16) Effluent gases from the raw wastewater balance tank, the equalisation tank and the sludge storage tank must be collected and treated through a biofilter prior to release to the atmosphere.”

Are the gases from the wastewater balance tank, equalisation tank and sludge holding tank treated through a biofilter prior to release to the atmosphere?”

☒ Yes ☐ No

Specify ... *SMALL BIOFILTER AT WWTP* ...

“(B17) The odour level in the ambient air, when measured at any point one metre from the surface perimeter of any of the biofilters, must not exceed 100 odour units.”

What was the last measured odour level at 1 meter from the wastewater and raw materials biofilter perimeters?

☐ ≤ 100 odour units
☒ > 100 odour units

Specify ... *ANALYSIS AMBIENT AIR DEMONSTRATED INTERFERENCE IN DATA. BIOFILTERS IN COMPLIANCE* ...

“(B18) Gas/biogas generated by the high flow anaerobic digester (UASB “Hybractor”) not required for the co-generation process must be collected and flared prior to release to the atmosphere.”

Has this condition been met?

☒ Yes ☐ No

Specify ... *FLARE AT WWTP* ...

ANNUAL ENVIRONMENTAL AUDIT

“(B19) The ducting and extraction systems which transfer effluent gases from one location to another must be constructed, operated and maintained so that no leakage of effluent gases to the atmosphere occurs.”

Has this condition been met?

(Are there, or have there been, any leaks in the ducting or extraction system?)

☒ Yes

☐ No

What operation and maintenance practices are in place to detect and repair leaks?

Specify ... WEEKLY AUDITING OF WWTP ...

“(B20) In the event of visible emissions occurring from the raw materials building or the gas extraction system ducting, the processing of animal matter must cease and must not recommence until the fault or omission which resulted in the emission is corrected, except in the case where such fault or omission is corrected within 120 minutes of its detection.”

Has this condition been met?

☒ Yes

☐ No

Specify ... NON-EVENT ...

ANNUAL ENVIRONMENTAL AUDIT

SCHEDULE C - Water

Release of Contaminants to Waters

- (C1) Contaminants must not be directly or indirectly released from the licensed place to any waters or the bed and banks of any waters except:
- (i) as permitted under the stormwater management schedule; or
 - (ii) to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.

Pond Conditions

- (C2) All ponds used for the storage or treatment of contaminants or wastes must be installed and maintained so that a freeboard of not less than 0.5 metres is maintained at all times.

Has this condition been met?

☒ Yes ☐ No

Specify

- (C3) All ponds used for the storage or treatment of contaminants or wastes must be installed and maintained to ensure the stability of the pond's construction.

Has this condition been met?

☒ Yes ☐ No

Specify

- (C4) Ponds or other structures used for the storage or treatment of contaminants or wastes must not be located in any area likely to receive substantial stormwater runoff.

Has this condition been met?

☒ Yes ☐ No

Specify

- (C5) Suitable banks and or diversion drains must be installed and maintained to exclude stormwater runoff from entering wastewater treatment ponds.

Has this condition been met?

☒ Yes ☐ No

Specify

- (C6) The holder of this environmental authority must operate all relevant equipment and undertake all practicable measures necessary to ensure that anaerobic conditions do not occur within any pond, or during any stage, of the wastewater treatment process on the licensed place.

Has this condition been met?

☒ Yes ☐ No

Specify

ANNUAL ENVIRONMENTAL AUDIT

- (C7) All ponds used for the treatment of contaminants or wastes must be operated in such a manner that short-circuiting of the flow of contaminants or wastes does not occur.

Has this condition been met?

☒ Yes ☐ No

Specify

- (C8) All ponds used for the storage or treatment of contaminants or wastes must be installed and maintained to prevent any discharge through the bed or banks of the pond to any waters (including groundwaters).

Has this condition been met?

☒ Yes ☐ No

Specify

ANNUAL ENVIRONMENTAL AUDIT

SCHEDULE D - STORMWATER MANAGEMENT

Contamination of Rainfall and Stormwater Runoff

- (D1) The environmentally relevant activities must be carried out by such practicable means necessary to prevent the contact of incident rainfall and stormwater runoff with wastes or other contaminants.

Has this condition been met?

☒ Yes ☐ No

Specify

- (D2) Where it is not practicable to prevent contact as required by condition number D1, the environmentally relevant activities must be carried out by such practicable means necessary to minimise any such contact.

Has this condition been met?

☒ Yes ☐ No

Specify

Release of Contaminated Stormwater Runoff

- (D3) Except as otherwise provided by the conditions of the stormwater management schedule and the water schedule of this environmental authority, the environmentally relevant activity must be carried out by such practicable means necessary to prevent the release or likelihood of release of contaminated runoff from the licensed place to any stormwater drain or waters or the bed or banks of any such waters.

Has this condition been met?

☒ Yes ☐ No

Specify

- (D4) Where it is not practicable to prevent any release of contaminated runoff as required by condition D3, the environmentally relevant activity must be carried out by such practicable means necessary to minimise any such release or the likelihood of any such release.

Has this condition been met?

☒ Yes ☐ No

Specify

ANNUAL ENVIRONMENTAL AUDIT

General

- (D5) The maintenance and cleaning of vehicles and any other equipment or plant must be carried out in areas from where contaminants cannot be released into any waters, roadside gutter or stormwater drainage system.

Has this condition been met?

☒ Yes ☐ No

Specify

- (D6) Any spillage of wastes, contaminants or other materials must be cleaned up as quickly as practicable. Such spillages must not be cleaned up by hosing, sweeping or otherwise releasing such wastes, contaminants or material to any stormwater drainage system, roadside gutter or waters.

Has this condition been met?

☒ Yes ☐ No

Specify

Material Storage And Handling Conditions

- (D7) The base and walls of all bunded areas must be maintained free from gaps or cracks.

Has this condition been met?

☒ Yes ☐ No

Specify REPAIRS TO BUNDS EFFECTED WHEN NOTED DURING AUDITS

- (D8) All loading/unloading of bulk materials must take place only within designated vehicle loading/unloading areas.

Has this condition been met?

☒ Yes ☐ No

Specify

Bunding

- (D9) All chemical and fuel tank storages must be bunded so that the capacity of the bund is sufficient to contain at least 100% of the largest storage tank plus 10% of the second largest tank within the bund.

Has this condition been met?

☐ Yes ☒ No

Specify DIESEL FUEL TANK SUBJECT OF EXTERNAL SUPPLIER AUDIT REQUIRES RELOCATION. PROCESS IN RANNING PHASE.

ANNUAL ENVIRONMENTAL AUDIT

- (D10) All chemical and fuel drum storages must be bunded so that the capacity of the bund is sufficient to contain at least 25% of the maximum design storage volume within the bund.

Has this condition been met?

☒ Yes ☐ No

Specify ...

- (D11) The base and walls of all bunded areas must be maintained free from gaps or cracks.

Has this condition been met?

☒ Yes ☐ No

Specify ...

- (D12) All bunding must be roofed where practicable.

Has this condition been met?

☒ Yes ☐ No

Specify ...

- (D13) Where it is impractical to completely roof a bunded area, the holder of this environmental authority must ensure that any stormwater captured within the bund is free from contaminants or wastes prior to any release.

Has this condition been met?

☒ Yes ☐ No

Specify ...

- (D14) All bunding must be constructed and maintained so as to be sufficiently impervious to allow retention and recovery of any materials being stored within the bund.

Has this condition been met?

☒ Yes ☐ No

Specify ...

ANNUAL ENVIRONMENTAL AUDIT
SCHEDULE E - LAND APPLICATION

Release of Contaminants to Land

- (E1) The only contaminants to be released to land are treated wastewaters irrigated from the final effluent balancing storage dam and the final effluent polishing and pump-out ponds and sewage treatment plant effluent.

Has this condition been met?

☒ Yes ☐ No

Specify

Contaminant Release Location(s)

- (E2) The defined contaminant release areas are marked on the 'Leiner Davis Gelatin Sunny Hills Irrigation Farm' plan included with Leiner Davis Gelatin International Limited's application for an environmental authority, together with those areas of land where the holder of this environmental authority has a legal agreement or contract to dispose of treated wastewaters onto such property or supply treated effluent for reuse.

Has this condition been met?

☒ Yes ☐ No

Specify *GELITA SITE ONLY*

- (E3) Where treated wastewater is discharged to any land vested in or under the control of a person or body other than the holder of this environmental authority, the holder of this environmental authority, must have a legal agreement or contract with such body or person to dispose of treated wastewater onto that property or supply treated effluent for reuse. This agreement or contract must clearly identify the contractual obligations of the parties to the agreement or contract for any environmental harm arising from the supply or transfer or storage or reuse of the treated wastewater.

Has this condition been met?

☐ Yes ☐ No

Specify *N/A*

- (E4) The holder of this environmental authority must supply the administering authority with a copy of any agreement(s) or contract(s) held under condition (E3) within thirty (30) days of the agreement or contract being finalised.

Has this condition been met?

☐ Yes ☐ No

Specify *N/A*

ANNUAL ENVIRONMENTAL AUDIT

- (E5) A minimum of 120 hectares of land, excluding buffer zones, must be provided for the contaminant release areas on site, apart from those areas of land where the holder of this environmental authority has a legal agreement or contract to dispose of treated wastewaters onto such property or supply treated effluent for reuse.

Has this condition been met?

☒ Yes ☐ No

Specify

- (E6) All contaminants must be stored or disposed of on the defined contaminant release areas. There must be no direct or indirect release of contaminants to any waters.

Has this condition been met?

☒ Yes ☐ No

Specify

- (E7) The contaminant release areas must be maintained in a proper and efficient condition so as to provide adequate assimilation, percolation, evaporation and transpiration of the released contaminants.

Has this condition been met?

☒ Yes ☐ No

Specify

- (E8) Spray from any release of contaminants to land must not drift beyond the boundaries of the licensed place or beyond the boundaries of those areas of land where the holder of this environmental authority has a legal agreement or contract to dispose of treated wastewaters onto such property or supply treated effluent for reuse.

Has this condition been met?

☒ Yes ☐ No

Specify

- (E9) The holder of this environmental authority must ensure that, on any treated effluent irrigation area under their control, access of grazing animals is controlled to prevent soil pugging.

Has this condition been met?

☒ Yes ☐ No

Specify

ANNUAL ENVIRONMENTAL AUDIT

Buffer Distance

- (E10) The release of contaminants to land must not be carried out within 30 metres of any watercourse.

Has this condition been met?

☒ Yes ☐ No

Specify

- (E11) The release of contaminants to land must not be carried out within 20 metres of any boundary of the licensed place.

Wet Weather Storage

- (E12) The release of contaminants to land must not be carried out if soil moisture conditions are such that water-logging of soils is likely to occur.

Has this condition been met?

☒ Yes ☐ No

Specify

- (E13) When weather conditions or soil conditions preclude the application of final treated effluent, the contaminants must be directed to the effluent balancing storage dam.

Has this condition been met?

☒ Yes ☐ No

Specify

Additional Requirements for Disposal of Sewage Effluent

- (E14) Public/employee access to any contaminant release area for the disposal of sewage effluent must be denied during the release of contaminants to land and until the release area has dried.

Has this condition been met?

☒ Yes ☐ No

Specify

- (E15) Notices warning the public/employees not to use or drink the release of contaminants to land must be prominently displayed and must be maintained in a visible and legible condition.

Has this condition been met?

☒ Yes ☐ No

Specify

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- (E16) Pipelines and fittings for the release of contaminants to land must be clearly identified. Standard water taps, hoses and cocks must not be fitted to contaminant release pipelines and the contaminant release system must not be connected to other service pipelines. Lockable valves or removable handles must be fitted to the contaminant release pipelines where there is public access to the contaminant release areas.

Has this condition been met?

☒ Yes ☐ No

Specify

Irrigation Management Plan

- (E17) The holder of this environmental authority must develop and implement an Irrigation Management Plan which details how the holder of this environmental authority will effectively and appropriately manage the effluent irrigation process so as to sustainably comply with all conditions of this environmental authority.

Has this condition been met?

☒ Yes ☐ No

Specify

- (E18) The Irrigation Management Plan must detail how irrigation is to be managed and scheduled having regard to at least the following:

- (i) soil moisture results;
- (ii) weather forecasts and climate monitoring results;
- (iii) irrigation records for each effluent disposal area;
- (iv) water quality results for on-site and adjacent creeks;
- (v) effluent quality results;
- (vi) soil quality results for the effluent disposal areas;
- (vii) groundwater level results;
- (viii) groundwater quality results;
- (ix) crop history for each effluent disposal area;
- (x) sustainable hydraulic loadings for the contaminant release areas;
- (xi) sustainable biological oxygen demand loadings for the contaminant release areas;
- (xii) sustainable nitrogen loadings for the contaminant release areas;
- (xiii) sustainable phosphorus loadings for the contaminant release areas;
- (xiv) sustainable salt loadings for the contaminant release areas;
- (xv) production of appropriate records and reporting of results and environmental issues.

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Has the Irrigation Management Plan been updated or changed since the last audit?

☒ No

☐ Yes..... Does it have regard to?

	Yes	No
i) Soil moisture results	☒	☐
ii) Weather forecasts and climate monitoring	☒	☐
iii) Irrigation records for each effluent disposal areas	☒	☐
iv) Water quality results for on-site and adjacent creeks	☒	☐
v) Effluent quality results	☒	☐
vi) Soil quality results for the effluent disposal areas	☒	☐
vii) Ground water level results	☒	☐
viii) Ground water quality results	☒	☐
ix) Crop history for each effluent disposal area	N/A	☐
x) Sustainable hydraulic loading for the contaminates release	☒	☐
xi) Sustainable BOD loading for contaminates release areas	☒	☐
xii) Sustainable N loadings for contaminate release areas	☒	☐
xiii) Sustainable salt loadings for contaminate release areas	☒	☐
xiv) Production of appropriate records and reporting results and environmental issues.	☒	☐

Specify

(E19) In developing and implementing the Irrigation Management Plan use may be made of any relevant and appropriate plans, procedures or other relevant documents previously prepared.

Has this condition been met?

☒ Yes

☐ No

Specify

(E20) A copy of the Irrigation Management Plan must be kept at the licensed place.

Has this condition been met?

☒ Yes

☐ No

Specify HYDRO PLAN Document

(E21) The holder of this environmental authority must not implement an Irrigation Management Plan or amend an Irrigation Management Plan where such implementation or amendment would result in a contravention of any condition of this environmental authority.

Has this condition been met?

☒ Yes

☐ No

Specify

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- (E22) The holder of this environmental authority must submit details of any amendment to the Irrigation Management Plan to the administering authority with the annual return which immediately follows the enactment of any such amendment.

Has this condition been met?

☒

Yes

☐

No

Specify ... *2/10* ...

Quality of Contaminants Released to Land

- (E23) The contaminants released to land under the control of the holder of this environmental authority or supplied to any other person or body for irrigation to land must comply, at the sampling and in-situ measurement points specified in schedule H, with each of the release limits specified in schedule E - Table 1 for each quality characteristic.

Has this condition been met?

☒

Yes

☐

No

Specify ...

- (E24) Notwithstanding the quality characteristic limits specified in schedule E - Table 1, the contaminants released must also comply with the following qualitative characteristics:

- (i) the release must not have any properties nor contain any organisms or contaminants in concentrations which are capable of causing environmental harm or an environmental nuisance.

Has this condition been met?

☒

Yes

☐

No

Specify ...

SCHEDULE E - TABLE 1 - RELEASE QUALITY CHARACTERISTIC LIMITS

QUALITY CHARACTERISTICS	RELEASE LIMIT	RELEASE LIMIT UNITS	LIMIT TYPE
5-day Biochemical Oxygen Demand	400	mg/L	maximum
Chemical Oxygen Demand	800	mg/L	maximum
pH	6.5 - 11	pH units	range

Has this condition been met?

☒

Yes

☐

No

Specify ...

ANNUAL ENVIRONMENTAL AUDIT

SCHEDULE F - NOISE

Emission of Noise

- (F1) The emission of noise from the licensed place must not result in levels greater than those specified in Table 1 of the Noise Schedule.

SCHEDULE F - TABLE 1

NOISE LIMITS AT A NOISE SENSITIVE PLACE	
<i>Period</i>	<i>Noise Level at a Noise Sensitive Place Measured as the Adjusted Maximum Sound Pressure Level ($L_{Amax,adj,T}$).</i>
7 am - 6 pm	Background noise level plus 5 dB(A)
6 pm - 10 pm	Background noise level plus 5 dB(A)
10 pm - 7 am	Background noise level plus 3 dB(A)
NOISE LIMITS AT A COMMERCIAL PLACE	
<i>Period</i>	<i>Noise Level at a Commercial Place measured as the Adjusted Maximum Sound Pressure Level ($L_{Amax,adj,T}$).</i>
7 am - 6 pm	Background noise level plus 10 dB(A)
6 pm - 10 pm	Background noise level plus 10 dB(A)
10 pm - 7 am	Background noise level plus 8 dB(A)

Has this condition been met?

☒ Yes ☐ No

Specify

- (F2) The entry and/or departure of heavy vehicles used to carry fresh raw materials, must only be carried out between the hours of:

6.00 am and 11.00 pm Mondays to Fridays
7.00 am and 6.00 pm Saturdays, Sundays and public holidays.

Has this condition been met?

☐ Yes ☒ No

Specify ONE CURFEW BREACH

- (F3) Notwithstanding the entry and/or departure times of heavy vehicles used to carry fresh raw materials specified in condition number F2, the entry and/or departure of all other heavy vehicles must only be carried out between the hours of:

6.00 am and 8.00 pm Mondays to Fridays
7.00 am and 6.00 pm Saturdays, Sundays and public holidays.

Has this condition been met?

☒ Yes ☐ No

Specify

SCHEDULE G - WASTE MANAGEMENT

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General

- (G1) Waste must not be released to the environment, stored, transferred or disposed of contrary to any condition of this environmental authority.

Has this condition been met?

☒

Yes

☐

No

Specify

- (G2) The holder of this environmental authority must not:

- (i) burn waste at or on the licensed place; nor
- (ii) allow waste to burn or be burnt at or on the licensed place; nor
- (v) remove waste from the licensed place and burn such waste elsewhere.

Has this condition been met?

☒

Yes

☐

No

Specify

- (G3) An area must be set aside for the segregation and storage of recyclable solid wastes.

Has this condition been met?

☒

Yes

☐

No

Specify SPOTTY BINS PAPER / SCRAP STEEL

- (G4) Where a no-cost recycling service is available, reasonable and practicable steps must be taken to ensure recyclable waste is not deposited in the general waste stream. Such steps may include, but not be limited to; provision of receptacles, suitable signs, and promotion of awareness among staff of the recycling service.

Has this condition been met?

☒

Yes

☐

No

Specify PAPER + METAL RECYCLING

Off Site Movement of Regulated Waste

- (G5) Where regulated waste is removed from the licensed place (other than by a release as permitted under another schedule of this environmental authority), the holder of this environmental authority must monitor and record the following:

- (a) the date, quantity and type of waste removed; and
- (b) name of the waste transporter and/or disposal operator that removed the waste; and
- (c) the intended treatment/disposal destination of the waste.

Has this condition been met?

☒

Yes

☐

No

Specify MORE HOST

(NOTE: Records of documents maintained in compliance with a waste tracking system established under the *Environmental Protection Act 1994* or any other law for regulated waste will be deemed to satisfy this condition.)

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- (G6) Regulated waste must not be sent for disposal at any facility without the written approval of the person operating that facility.

Has this condition been met?

☒ Yes ☐ No

Specify

Records

- (G7) Records must be maintained for a period of five (5) years for all wastes mentioned in this schedule.

Has this condition been met?

☒ Yes ☐ No

Specify

Notification of Improper Disposal Of Regulated Waste

- (G8) If the holder of this environmental authority becomes aware that a person has removed waste from the licensed place and disposed of the waste in a manner which is not authorised by this environmental authority or improper or unlawful, then the holder of this environmental authority must, as soon as practicable, notify the administering authority of all relevant facts, matters and circumstances known concerning the disposal.

Has this condition been met?

☒ Yes ☐ No

Specify

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SCHEDULE H - SELF MONITORING AND REPORTING

Complaint Recording

(H1) All complaints received by the holder of this environmental authority relating to operations at the licensed place must be recorded and include the following details:

- (i) time, date and nature of complaint;
- (ii) type of communication (telephone, letter, personal etc.);
- (iii) name, contact address and contact telephone number of complainant, where possible, (Note: if the complainant does not wish to be identified then "Not identified" is to be recorded);
- (iv) response and investigation undertaken as a result of the complaint;
- (v) name of person responsible for investigating complaint; and
- (vi) action taken as a result of the complaint investigation and signature of responsible person.

Has this condition been met?

☒

Yes

☐

No

Specify

(H2) The complaints record required by condition number H1 must be maintained for a period of not less than five (5) years.

Has this condition been met?

☒

Yes

☐

No

Specify

Incident Recording

(H3) A record must be maintained of events including but not limited to:

- (i) the time date and duration of equipment malfunctions that may affect the environmental performance of the licensed place;
- (ii) any shut-downs of the biofilters, waste water treatment plant or other equipment upon which the environmental performance of the licensed place depends;
- (iii) the hours of operation of the plant when these events have occurred.

Has this condition been met?

☒

Yes

☐

No

Specify INCIDENT REPORT TO EPA

(H4) The record required by condition number H3 must be maintained for a period of not less than five (5) years.

Has this condition been met?

☒

Yes

☐

No

Specify

ANNUAL ENVIRONMENTAL AUDIT

Notification of Emergencies and Incidents

- (H5) As soon as practicable after becoming aware of any emergency or incident which results in the release of contaminants not in accordance, or reasonably expected to be not in accordance with the conditions of this environmental authority, the holder of this environmental authority must notify the administering authority of the release by telephone, facsimile or e-mail.

Has this condition been met?

☒ Yes ☐ No

Specify

- (H6) The notification of emergencies or incidents as required by condition number H5 must include but not be limited to the following:

- (i) the holder of the environmental authority;
- (ii) the location of the emergency or incident;
- (iii) the number of the environmental authority;
- (iv) the name and telephone number of the designated contact person;
- (v) the time of the release;
- (vi) the time the holder of the environmental authority became aware of the release;
- (vii) the suspected cause of the release;
- (viii) the environmental harm and or environmental nuisance caused, threatened, or suspected to be caused by the release; and
- (ix) actions taken to prevent further any release and mitigate any environmental harm and or

Has this condition been met?

☒ Yes ☐ No

Specify

- (H7) Not more than 14 days following the initial notification of an emergency or incident, the holder of the environmental authority must provide written advice of the information supplied in accordance with condition number H6 in addition to:

- (i) proposed actions to prevent a recurrence of the emergency or incident; and
- (ii) outcomes of actions taken at the time to prevent or minimise environmental harm.

Has this condition been met?

☒ Yes ☐ No

Specify

- (H8) As soon as practicable, but not more than six (6) weeks following the conduct of any environmental monitoring performed in relation to the emergency or incident, the holder of the environmental authority must provide written advice of the results of any such environmental monitoring performed.

Has this condition been met?

☒ Yes ☐ No

Specify

ANNUAL ENVIRONMENTAL AUDIT

Monitoring of Contaminant Releases to the Atmosphere

(H9) The holder of this environmental authority must conduct a monitoring program of contaminant releases to the atmosphere at the release points, frequency, and for the parameters specified in schedule H - Table 1 and which complies with the following:

- (a) All determinations of the quality of contaminants released must be performed by a person or body possessing appropriate experience and qualifications to perform the required measurements.

Has this condition been met?

☒

Yes

☐

No

Specify ... *AIR NOISE ENVIRONMENT (P/L)*

- (b) Monitoring provisions for the release points listed in schedule H - Table 1 must comply with the Australian Standard AS 4323.1 - 1995 "Stationary source emissions Method 1: Selection of sampling provisions".

Has this condition been met?

☒

Yes

☐

No

Specify ...

- (c) The following tests must be performed for each required determination specified in Table 1:

- (i) gas velocity and volume flow rate;
- (ii) temperature;
- (iii) water vapour concentration,

Has this condition been met?

☒

Yes

☐

No

Specify ...

- (c) Where practicable samples taken must be representative of the contaminants discharged when emissions are expected to be at a maximum.

Has this condition been met?

☒

Yes

☐

No

Specify ...

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Schedule H - Table 1
Required Release Point Determinations

RELEASE POINT NUMBER	DETERMINATION REQUIRED	FREQUENCY
RP 1	Mass rate and concentration of Total Solids Particulates where gas volume is calculated at 12% CO ₂ .	Biennially from 2001
RP 1	Mass rate and concentration of Sulphur Dioxide (expressed as SO ₂).	Biennially from 2001
RP 1	Mass rate and concentration of Nitrogen Oxides (expressed as NO ₂ at a 7% oxygen level).	Biennially from 2001

- (H10) The holder of this environmental authority must monitor and record the odour level in the ambient air, measured at any point one metre downwind, from the surface perimeter of each of the biofilters, at least biennially from 2001.

Has this condition been met?

☒ Yes ☐ No

Specify

- (H11) In addition to the odour monitoring, at the frequency prescribed in condition H10, monitoring must also be undertaken to investigate any complaint of odour nuisance upon receipt of a written request from the administering authority to carry out such monitoring.

Has this condition been met?

☐ Yes ☐ No

Specify *N/A*

Records

- (H12) Records must be kept of the results of all monitoring of releases of contaminants to the atmosphere for a period of at least five (5) years.

Has this condition been met?

☒ Yes ☐ No

Specify

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Noise Monitoring

- (H13) In the event of a complaint about noise that constitutes annoyance being made to the administering authority that the administering authority considers is not frivolous or vexatious, the holder of this environmental authority must undertake monitoring to investigate such a complaint upon written request from the administering authority.

Has this condition been met?

☐ Yes ☒ No

Specify *N/A*

- (H14) For the purposes of checking compliance with condition number F1 of the noise schedule, monitoring and recording the noise levels from the environmentally relevant activities must be undertaken for at least the following descriptors, characteristics and conditions:

- (i) $L_{Amax, Adj T}$;
- (ii) $L_{Aeq, T}$ (or $L_{A90, T}$);
- (iii) $L_{AN, T}$ (where N equals statistical levels of 1, 10, 50, 90, 95);
- (iv) $Max L_{pA T}$;
- (v) $L_{Aeq, T}$;
- (vi) the level and frequency of occurrence of impulsive or tonal noise;
- (vii) atmospheric conditions including temperature, relative humidity and wind speed and direction; and
- (viii) effects due to extraneous factors such as traffic noise.

Has this condition been met?

☐ Yes ☒ No

Specify *N/A*

- (H15) In conjunction with the measurement and recording of the noise, the following parameters and conditions must be recorded:

- (a) location of sampling point(s);
- (b) date sample(s) taken; and
- (c) time sample(s) taken.

Has this condition been met?

☐ Yes ☒ No

Specify *N/A*

- (H16) The method of measurement and reporting of noise levels must comply with the Department of Environment and Heritage Noise Measurement Manual, second edition, March 1995, or more recent editions or supplements to that document as become available.

Has this condition been met?

☐ Yes ☒ No

Specify *N/A*

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- (H17) Records must be kept of the results of all monitoring of noise levels and other information required to be recorded in conjunction with such monitoring for a period of at least five (5) years.

Has this condition been met?

☒ Yes ☐ No

Specify

Monitoring of Contaminant Releases to Land

- (H18) For the purposes of checking conformity with condition E23 of the land application schedule, the holder of this environmental authority must be responsible for the making of determinations of the quality of the contaminants released. Such determinations must be performed for at least the quality characteristics and at least the frequency specified in Schedule H - Table 2.

Schedule H - Table 2

QUALITY CHARACTERISTIC	FREQUENCY
5-day Biochemical Oxygen Demand (mg/L)	Monthly
Chemical Oxygen Demand (mg/L)	Weekly
pH (units)	Weekly

Has this condition been met?

☒ Yes ☐ No

Specify

- (H19) The determinations of the quality of contaminants released to check conformity with condition E23 of the land application schedule must be undertaken at the monitoring and in-situ measurement point(s) described as:

SMP 1: the in-line sampling point of the final effluent balancing storage dam reticulation pump; and

SMP 2: the overflow from the final effluent polishing and pump-out ponds.

Has this condition been met?

☒ Yes ☐ No

Specify

- (H20) All determinations of the quality of contaminants released to the land must be made in accordance with methods prescribed in the Department of Environment and Heritage, Water Quality Sampling Manual, 2nd Edition, February 1995, or more recent editions or supplements to that document as such become available.

Has this condition been met?

☒ Yes ☐ No

Specify

ANNUAL ENVIRONMENTAL AUDIT

- (H21) All determinations of the quality of contaminants released must be performed by a person or body possessing appropriate experience and qualifications to perform the required measurements.

Has this condition been met?

☒ Yes ☐ No

Specify

- (H22) The daily quantity of contaminants released must be determined by an appropriate and accurate method, for example, a flow meter.

Has this condition been met?

☒ Yes ☐ No

Specify

- (H23) The holder of this environmental authority must keep records of the volume, date, time of commencement and duration of each occasion on which any release of contaminants is made to the contaminant release areas and the dates on which no such releases take place.

Has this condition been met?

☒ Yes ☐ No

Specify *IRRIGATION BOOKS*

Receiving Waters Monitoring Program

- (H24) The holder of this environmental authority must design and conduct a Receiving Waters Monitoring Program to monitor the effects of the release of contaminants on the receiving waters.

Has this condition been met?

☒ Yes ☐ No

Specify *DNR WATER MONITORING*

- (H25) The parameters to be monitored and the frequency of monitoring in Receiving Waters Monitoring Program shall be in accordance with the parameters and monitoring frequency prescribed in 'Leiner Davis Gelatin (Australia), June 1994, Environmental Management Plan (Draft)', Section 4.8, or more recent editions or supplements to that document as such become available and approved by the administering authority.

Has this condition been met?

☒ Yes ☐ No

Specify

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- (H26) All determinations of the quality of contaminants released to waters shall be made in accordance with methods prescribed in the Department of Environment and Heritage Water Quality Sampling Manual, 2nd Edition, February 1995, or more recent editions or supplements to that document as such become available.

Has this condition been met?

☒ Yes ☐ No

Specify

- (H27) All determinations of the quality of contaminants released must be performed by a person or body acceptable to the administering authority.

Has this condition been met?

☒ Yes ☐ No

Specify

- (H28) Records must be kept of the results of all determinations and monitoring carried out under the Receiving Waters Monitoring Program for a period of at least five (5) years.

Has this condition been met?

☒ Yes ☐ No

Specify

Contaminant Release Area Monitoring Program

- (H29) The holder of this environmental authority must conduct a Contaminant Release Area Monitoring Program to monitor the condition of the land to which contaminants are applied.

Has this condition been met?

☒ Yes ☐ No

Specify *Refer IRRIGATION PROGRAM*

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(H30) The parameters to be monitored and the frequency of monitoring in the Contaminant Release Area Monitoring Program shall as a minimum be in accordance with the parameters and monitoring frequency prescribed in Schedule H - Table 3.

Schedule H - Table 3

Element	Sites	Method	Frequency
Soil Salinity	Within soil units 2a, 2b, 2c, 2d, 2e, 3a, 3b,	Soil sampling and analysis for pH (1:5), EC sat, Cl, NO ₃ , SO ₄ , effective CEC, exchangeable Ca, Mg, Na,	Annual
Soil infiltration and hydraulic conductivity	Within soil units, 2a, 3b, 2e	Field instrumentation	Annual
Nutrient Status	As Above	Soil Sampling and analysis for Total N, NO ₃ -N, NH ₄ -N, Acid extractable P	Bi-annual
Groundwater	Relevant bores with water table within soil units listed above	Tape measurement and EC. Water laboratory analysis	Bi-annual
Effluent	Pump out pond outlet	Water laboratory analysis,	Monthly

Has this condition been met?

☒

Yes

☐

No

Specify

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Soil Salinity Monitoring

Soil units 2a, 2b, 2c, 2d, 3a, 3b, 3d	Soil solution sampling via FullStop. Soil core sampling depth 0-120cm.	Acceptable Limit at 10cm depth	Acceptable Limit at 50cm depth	Acceptable Limit at 120cm depth	Testing Frequency
pH	(1:5) solution soil extract	4.5-7.0	5.5- 7.5	6.0- 8.5	Annual
ESP (% calculated from sodium and cation exchange capacity)	soil	10	15	20	Annual
SAR (Calculated from soil solution cations Ca++, Mg++ Na+)	solution	15	20	40	Annual
EC sat (dS/m)	solution	3	4	5	Annual
Cl ⁻	solution	0-150 mg/kg	0-450 mg/kg	0-600 mg/kg	Annual
NO ₃ ⁺	solution /soil	120mg/kg	100mg/kg	20mg/kg (soil sample)	Annual
Total sulphate sulphur	Solution- (includes gypsum precipitate)	4000mg/l	5000mg/l	6000 mg/kg (soil sample)	Annual

(H31) All determinations of the condition of the contaminant release areas must be made by a person or body acceptable to the administering authority for the required determinations.

Has this condition been met?

☒ Yes ☐ No

Specify ... *BENCH MARK DATA COLLECTED DR SCHAFER*

(H32) Records must be kept of the results of all monitoring carried out under the Contaminant Release Area Monitoring Program for a period of at least five (5) years.

Has this condition been met?

☒ Yes ☐ No

Specify ...

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Monitoring of Groundwater Quality

- (H33) The holder of this environmental authority must maintain bores for the purpose of sampling and analysing groundwater at the locations shown on Dawson Thompson and Associates Pty Ltd, 4/12/93, 'Sunny Hills' Site Plan, Flood Road Josephville, as submitted with the application.

Has this condition been met?

☒

Yes

☐

No

Specify

- (H34) The holder of this environmental authority is responsible for ensuring a groundwater monitoring program is performed which complies with the following requirements:

- (a) All determinations of the quality of contaminants released to groundwater must be made in accordance with methods prescribed in the Department of Environment and Heritage Water Quality Sampling Manual, 2nd Edition, February 1995, or more recent editions or supplements to that document as such become available.

Has this condition been met?

☒

Yes

☐

No

Specify

- (b) Standing water levels must be measured in metres and recorded on each occasion that samples are obtained. Such measurement must be undertaken prior to any disturbance by sampling and must be reported as the depth in metres from the ground level to the water surface within the bore.

Has this condition been met?

☒

Yes

☐

No

Specify

- (c) Samples of groundwater must be taken from each of the bores at least twice per annum, at approximately six (6) monthly intervals.

Has this condition been met?

☒

Yes

☐

No

Specify

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(d) The samples obtained in accordance with paragraph (c) of this condition must be analysed for:

- (i)
- (ii) Electrical conductivity;
- (iii) Sodium;
- (iv) Magnesium;
- (v) Total Dissolved Solids;
- (vi) Total Nitrogen;
- (vii) Sulphate;
- (viii) Carbonic acid;
- (ix) pH;
- (x) Chloride;
- (xi) Calcium;
- (xii) Total Phosphorus as P.

Has this condition been met?

☒ Yes ☐ No

Specify

(H35) Records must be kept of the results of all determinations of the quality of groundwaters for a period of at least five (5) years.

Has this condition been met?

☒ Yes ☐ No

Specify

Environmental Impact Analysis Reporting

(H36) The holder of this environmental authority must ensure the monitoring data gathered in accordance with this environmental authority is analysed and interpreted, by an expert in the field of each monitoring program, to assess the nature and extent of any environmental impact of the environmentally relevant activity. The data, analyses and assessments must be submitted to the administering authority with each annual return.

Has this condition been met?

☒ Yes ☐ No

Specify

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Exception Reporting

- (H37) The holder of this environmental authority must notify the administering authority in writing of any monitoring result which indicates an exceedance of any licence limit within 28 days of completion of analysis.

Has this condition been met?

☒ Yes ☐ No

Specify

- (H38) The written notification required by condition number H37 above must include:

- (i) the analysis results; and
- (ii) details of investigation or corrective actions taken; and
- (iii) any subsequent analysis.

Has this condition been met?

☒ Yes ☐ No

Specify

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SCHEDULE I - DEFINITIONS

- (I1) For the purposes of this environmental authority any term not otherwise defined in the Act and any subordinate legislation made pursuant to the Act or in the definitions schedule of this environmental authority has the meaning conferred to that term in its common usage.
- (I2) In the event of any inconsistency arising between the meaning of any term provided in the definitions schedule of this environmental authority and any common usage of that term, the meaning conferred in the definitions schedule of this environmental authority prevails.

For the purposes of this environmental authority the following definitions apply:

- (I3) "Act" means the Environmental Protection Act 1994.
- (I4) "administering authority" means the Environmental Protection Agency or its successor.
- (I5) "effluent gases" shall be taken to include gaseous emissions as well as vapours.
- (I6) "land" means land excluding waters and the atmosphere.
- (I7) "Total Nitrogen" means the sum of Organic Nitrogen, Ammonia Nitrogen, Nitrite plus Nitrate Nitrogen
- (I8) "mg/l" means milligrams per litre.
- (I9) "ML" means mega litre.
- (I10) "raw materials building" refers to the building containing the raw materials area, acidulators and by products area and the alkali treatment area.
- (I11) "odour level" ("OU") of a sample means the odour level measured in accordance with the Department of Environment and Heritage laboratory method no. 6 "Determination of odour concentration by dynamic olfactometry" (March 1995) as amended from time to time.
- (I12) "noxious" means harmful or injurious to health or physical well-being.
- (I13) "offensive" means causing offence or displeasure; is disagreeable to the sense; disgusting, nauseous or repulsive.
- (I14) "annoyance". In determining what constitutes "annoyance", regard must be had to Australian Standard 1055.2 - 1989 Acoustics - Description and Measurement of Environmental Noise, Part 2 - Application to specific situations.
- (I15) " $L_{Amax\ adj, T}$ " means the average maximum A-weighted sound pressure level, adjusted for noise character and measured over a time period of not less than 15 minutes, using Fast response.
- (I16) "background noise level" means either:

$L_{A90, T}$ being the A-weighted sound pressure level exceeded for 90 percent of the time period of not less than 15 minutes, using Fast response, or

ANNUAL ENVIRONMENTAL AUDIT

$L_{Avg, T}$ being the arithmetic average of the minimum readings measured in the absence of the noise under investigation during a representative time period of not less than 15 minutes, using Fast response.

(I17) “noise sensitive place” means -

- (a) a dwelling, mobile home or caravan park, residential marina or other residential premises; or
- (b) a motel, hotel or hostel; or
- (c) a kindergarten, school, university, or other educational institution; or
- (d) a medical centre or hospital; or
- (e) a protected area; or
- (f) a park or gardens.

(I18) “protected area” means -

- (a) a protected area under the *Nature Conservation Act 1992*; or
- (b) a marine park under the *Marine Parks Act 1982*; or
- (c) a World Heritage Area.

(I19) “commercial place” means a place used as an office or for business or commercial purposes.

(I20) “events” means uncontrolled or irregular release events.

SCHEDULE J - APPROVED DOCUMENTS

For the purposes of this environmental authority the following stated documents are approved documents:

- (J1) Dawson Thompson and Associates Pty Ltd, 4/12/93, ‘Sunny Hills’ Site Plan, Flood Road Josephville.



BP COMMERCIAL FACILITIES COMPLIANCE CHECK REPORT

FOR
GELITA Australia PTY LTD

AT
Sunny Hill Flood Road
Josephville Qld 4285

BP LOS = LEIBEABEAC

Audited by:
BP Australia Pty Ltd
Date Inspected
Report Date

A Cooper
28/07/04
07/10/04

A/R

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INTRODUCTION:

CONFIDENTIAL

The purpose of this site audit report is to ascertain if the equipment and procedures in use at this site are meeting BP Australia Pty Ltd Company Policies, as well as Australian Standards and their associated Codes of Practice.

This report is based on observations made during a relatively short visit to the site and without the knowledge of the complete history of the site and it's operations and as such can therefore only be offered as a guide to the state of the facility rather than being a definitive statement.

BP Australia Limited agrees to hold the contents of this report as CONFIDENTIAL, and will not disclose the contents to third parties without the express permission of the Site Owner in writing.

A risk assessment matrix is provided to enable the defining of potential risk from the equipment or procedures not meeting the required standards. A copy of the risk matrix has been included as Appendix B.

The risk level determines what areas should be addressed first, Level 1 (A1 - highlighted in red) being IMMEDIATE ACTION in the next month, through to Level 20 (E1V) being action in the next 12 months (depending on the risk involved).

The standard referenced throughout the document are for the most part Australian Standards. However where action items are referenced as a BP Standard (S1) these should be regarded as being a recommendation for serious consideration rather than an absolute requirement.

NOTE

This report including it's format and contents shall remain the property of BP Australia Pty Ltd at all times and shall not, as a whole or in part, be copied or transferred to third parties without the express permission of BP Australia Pty Ltd in writing.

DISCLAIMER

This report sets out the results of our audit of your facilities. Despite our best efforts, it may not include all relevant issues relating to your facilities. The report is provided for your information and action as you see fit. To the maximum extent permitted by law we do not accept any liability for any inaccuracies or omissions in this report and any decisions you make on the information contained in the report are your responsibility.

ACTION LIST

Section Ref.	Risk Level	Actions Required	Standards		By Whom		Time Limit (Months)	Date Completed
			No	Clause	BP	Cust		
		SITE OVERVIEW – General						
Note		<p>The site is gelatin processing plant located in a rural environment. The fuel facility is centrally located amongst the plant infrastructure.</p> <p>The fuel facility comprises 2.3KL horizontal overhead diesel storage tank, which gravity feed to dispensing point</p> <p>This fuel facility is reported to be a temporary installation.</p>						
1.0		- Environmental						
1.1		<p>The fuel facility is located within 200 meters of a natural watercourse. This situation means that any loss of fuel containment or uncollected spilt fuel would be expected to easily migrate underground or flow over ground to the near by watercourse.</p> <p>A formal risk assessment of the potential impact of fuel loss from this site is recommended if it does not already exist.</p>				C		
1.1,6		<p>The detail of the site's geology was not known at the time of the inspection. Therefore, although the soil around these facilities does not appear to be of a type that would readily allow rapid penetration by lost fuel, any potential for detrimental effects from fuel loss remains to be determined by others.</p> <p>Any spillage at the storage facility was reported to flow into a wastewater reclamation system.</p>	S1	Note		C		

Section Ref.	Risk Level	Actions Required	Standards		By Whom		Time Limit (Months)	Date Completed
			No	Clause	BP	Cust		
1.7,8,9		<p>The proximity of groundwater, drinking water, and agricultural water was not investigated during the inspection. However it is assumed that this information is known and readily available for use should a fuel loss incident occur.</p> <p>A formal risk assessment of the potential impact of fuel loss from this site is recommended if it does not already exist.</p>		Note		C		
		OVERHEAD HORIZONTAL TANK FACILITY - 1 x 2.3 KL Tank						
4.2		<p>All above-ground fuel storage tank are to have a bund compound that is impervious and so designed as to contain 100% of the tank capacity and enable recovery of any spilt product.</p> <p>Install a concrete bund compound or equally impervious material compound to contain any spilt product.</p>	S2	5.9.1		C		
4.2.1		The minimum separation from an above ground tank to the inside edge of a bund wall is 1000mm or if elevated as this tanks is, they must be half of their height from the bund wall.	S2	5.9.3(g)		C		
4.2.7		<p>The bund drain valve should be a rising spindle, knife edge gate valve or a ball valve on the outside of the bund, the distinction between the open and closed positions should be obvious, and the valve should be locked to prevent it from being inadvertently left open.</p> <p>A Bund Drain Valve to be kept Closed and Locked.</p>	S2 S2	5.9.6 (c) 9.7.14(f)		C		
4.2.8		A sign must be placed adjacent to the bund drain valve "BUND DRAIN VALVE TO BE KEPT CLOSED AND LOCKED" in black letters 50mm high on a white background.	S2	9.7.14(f)		C		

Section Ref.	Risk Level	Actions Required	Standards		By Whom		Time Limit (Months)	Date Completed
			No	Clause	BP	Cust		
4.3.3		The foot of the tank cradle should be at least 100mm above the bund floor to prevent repeated submersion after rainfall and the resultant corrosion problems. The cradle supports of this tank are resting on the concrete bund floor making corrosion control difficult.	S3	2.1.4		C		
4.3.4		The high center of gravity of overhead horizontal tanks puts this tank at a greater risk from an overturning force. The tank supports must rest on sound foundations with each tank support anchored to the foundations.	S2	5.10.1		C		
4.3.4		Verify that there is at least two hold down bolts per tank support.	S2	5.10.1		C		
4.3.5		A fuel storage tank should be installed with a slight fall to the water drain outlet to ensure water can be removed by water draining the tank. This tank appears to sit level.	S3	2.4.2		C		
4.4.5		The horizontal tank cradles are loose and do not have a sealed interface with the tank. AS 1940-1993 calls for this interface to be sealed so that it is corrosion free. Cradles continuously welded to the tank are an accepted effective method.	S3	2.1.5 AS 1250		C		

Section Ref.	Risk Level	Actions Required	Standards		By Whom		Time Limit (Months)	Date Completed
			No	Clause	BP	Cust		
4.5.1-21	High	<p>The access ladder fitted to the tank does not comply with the requirements of AS1657 including for the following reasons:</p> <p>Rung Ladder</p> <ul style="list-style-type: none"> The ladder is to be 70 to 75 degrees to horizontal. The ladder stiles must continue to handrail height. A minimum of 200mm between the tank and back of ladder. The ladder stiles to be clear of obstruction. Supporting "L" bracket welded to the underside of rung. The ladder is not fully clear of obstruction at ground level. <p>Platform</p> <ul style="list-style-type: none"> A platform complying with AS 1657 should be immediately adjacent to the dip point. The size of the platform at least 600x600mm. A kick plate mid rail and top rail to enclose the platform at the dip point. (Consider a dip tube extension) 	S2	3.2.1				
			S4	3.2.1.2				
			S4	5.6.1.1				
			S4	5.6.3.1				
			S4	5.6.7		C		
4.6.1 4.6.2 4.6.3 4.6.4		<p>Dispensed fuel quality from this tank may be compromised. This tank has the drain point plugged off and the outlet to the dispenser point is located on the bottom of the tank.</p> <p>All aboveground tanks must have a drain point valve installed at the lowest point of the tank to enable the safe removal of the entire liquid content of the tank. This drain point valve must be a cast steel anti static fire-safe valve that must be locked shut or capped off.</p> <p>The fuel facility maintenance plan should include regularly de-watering the tank; ideally this is done through the tank drain point. Consider the installation of a spring loaded, normally closed 15 or 20mm ball valve after the larger tank drain valve. This allow for safe and easy dewatering of the tank fuel/water mix into a small clear container for inspection. See Section Reference 13.3.5 and 13.3.6</p>	S2	7.3.3(f)				
			S2	9.2.4(i)(p)				
			S3	2.4		C		

Section Ref.	Risk Level	Actions Required	Standards		By Whom		Time Limit (Months)	Date Completed
			No	Clause	BP	Cust		
4.6.8		Check that tank vent is at least 32mm diameter. It is recommended that a 50mm vent pipe be installed to ensure adequate venting to avoid pressurizing the tank if the vent gauze is blocked.	S1 S2	5.5.2(b)		C		
4.6.10 4.6.11		Diesel tank vents must terminate a minimum of 4 metres above ground level and 150mm above the top of the tank.	S2	5.5.4(b)(c)		C		
4.6.17		Tank Safe Fill Level (SFL) is to be established and shown on the dipstick. Recommend a SFL sign be installed on the tank shell as well. Ideally the sign would be legible to the filling operator from tanker unloading point.	S2 S2 S3	5.3.4 9.7.3.1(a) 2.2.1		C		
4.6.20		Earthing of the tank was not recorded during inspection - verify or electrically bond tank to earth and regularly test for correct electrical resistance. Tank earthing is required to dissipate static electricity and lightning strikes.	S5	AS 1020		C		
4.7.2		The content of each tank at this site is to be identified. Install 150mm high product signage (DIESEL) to the shell of each tank.	S2 S2	3.4.2 5.2.2(a)		C		
4.7.4		Install product class label (CLASS CI) for diesel 150mm high.	S2 S2	3.4.2(b) 3.4.3		C		
4.7.8		"Warning - Restricted Area, Authorized Personnel Only" and "Danger - No smoking, No Naked Flames" signs must be displayed at each point of access to the bulk diesel storage tank area.	S2	3.4.2(a)(c)		C		
4.7.9		Display an "Emergency contact phone numbers and the occupier name, address and phone number" on a sign at the fuel facility compound entry.	S2	3.4.2(d)(e)		C		
4.7.11		Recommend recording of the tank last cleaned date on tank shell.	S2	9.2.1(c)		C		

Section Ref.	Risk Level	Actions Required	Standards		By Whom		Time Limit (Months)	Date Completed
			No	Clause	BP	Cust		
5.4.1	High	Install ground level fill connection complying with the requirements of AS 1940 (5.3.3) for bulk deliveries to the overhead tank. Queensland Workplace Health and Safety Act regulates working at heights	S1 S23	Working at heights		C		
5.4.2		Splash filling of a fuel storage tank generates vapour and static electricity. Check that the fill tube into tank so as to maintain a liquid seal.	S3	2.1.7		C		
5.5.1		Replace brass valves, which are below the liquid level of the tank with a fire-safe cast steel type.	S2	7.3.3(f)		C		
5.5.3		Recommend pipeline of 50mm and larger constructed from welded Schedule 40 black steel pipe and fittings and ANSI 150" flanged joints, in line with industry standards. The existing screwed joints and galv fittings are more prone to leaks/failure.	S1 S2	7.2.1		C		
7.1.1-2		The fuel delivery tanker should be able to access the tank fill point and exit in a continuous forward direction and not have the tanker unloading hoses pass under the truck. This safe work practice should be part of the sites emergency procedures plan and operating procedures plan. BP policy requires the delivery driver to remain beside tanker operational equipment throughout the delivery process and be able view of this tank vent outlet.	S2 S2 S18	9.7.3.4(a) 9.7.3.4(b) 10.2.4		C		
10.1.1		Install a 9KG dry powder type fire extinguisher between 3 and 10 metres from the storage tank.	S2	10.7.1		C		
10.1.5		Site to check the requirements of AS 2444 to ensure the fire extinguishers and associated signage are at the right height. Indicator signs must be a minimum of 2 m above ground level and extinguishers must be mounted between 100 mm and 1200 mm above ground level.	S2	10.3.2		C		

Section Ref.	Risk Level	Actions Required	Standards		By Whom		Time Limit (Months)	Date Completed
			No	Clause	BP	Cust		
11.1.6		Recommend the Installation of a holding tank and coalescent plate type separator or as minimum a triple interceptor type separator system to treat effluent discharge from the tank bund, the dispensing slab and tanker unloading slab. Records of effluent treatment and discharge are to be kept. Site risk management assessment, the Local Authority or the EPA to determined minimum effluent treatment required.	S2 S2 S2 S2	5.9.6(d) 9.2.4(r) 9.2.5(k) 9.6		C		
11.1.11		It is recommended that an emergency spill kit be supplied adjacent to the fuel dispensers.	S2	9.2.6(p)		C		
13.1.2		Site to check and confirm up to date copies of the following licenses that may be required for a facility such as this: <ul style="list-style-type: none"> Flammable & Combustible Liquids license issued under the Dangerous Goods Safety Management Act by the Local Council. Approval by Local Council for ERA Recommend that the F&C Licence, equipment manuals, maintenance records and all other related information of the fuel installation be stored together in a folder.	S2 S19 S21 S22 S23			C		
13.2.5		A register for dangerous goods is required for all premises where dangerous goods and combustible liquids are stored and handled. This register can be combined with the register of hazardous substances required under the Workplace Health & Safety Act.	S22	Paper		C		

Section Ref.	Risk Level	Actions Required	Standards		By Whom		Time Limit (Months)	Date Completed
			No	Clause	BP	Cust		
13.3.1		<p>Develop and implement maintenance procedures and a checklist for the fuel facility. It shall include but not limited to the following –</p> <ul style="list-style-type: none"> • Clean, repair and repaint corroded tanks walkway, • Dispenser meter calibration check, • Regularly test tank for water and dewater tanks at drain point. • Service line filters and replace leaky head gasket, • Train staff in operating procedures for fuel facility. • Environmental monitoring, <p>A record of test results and maintenance activities to be kept and be readily available.</p>	S2 S2 S2 S2 S2	9.2.1(c) 9.2.5 9.7.14 9.8.7 9.14.9		C		
13.3.5		<p>The fuel facility maintenance plan should include regularly de-watering of the tank. Drain water from the tank regularly to prevent fungal growth. This should be carried out as soon as possible as fungal contamination can quickly stop/delay the entire mobile fleet.</p> <p>To check if the fuel stays clean, some product should be drained regularly from the tank into a 1 litre glass jar. The contents of the jar can then be checked for the presence of water.</p>	S1 S2 S3	9.8.4 2.5.1		C		
13.3.6		<p>The tank maintenance plan should include internally cleaning of the tank to assure fuel quality is maintained. A tank in-service for a number of years without cleaning may accumulate a quantity of rust scale, sludge and water in the bottom of the tank to a point where dispensed fuel quality may be comprised. Internal tank access enables efficient tank cleaning. Recommend the tank be cleaned every 5 years.</p>	S1 S2 S3	9.8.4 2.5.1		C		
13.3.6		<p>Tank cannot be internally cleaned, as it has no manway. Recommend establishing a regular water drain and inspection of the tank contents to check if water is removed as per section reference 13.3.5.</p>	S1 S2 S3	9.8.4 2.5.1		C		

Section Ref.	Risk Level	Actions Required	Standards		By Whom		Time Limit (Months)	Date Completed
			No	Clause	BP	Cust		
13.5		A site plan indicating storage tanks, plant, main pipeline (or routes), switchboards, emergency stop valves, fire protection system, drainage, etc is to be developed appropriate to the installation. The plan is to be readily accessible in an emergency.	S2	9.2.1(a)		C		
13.5.1		Develop and display operating procedures to suit the installation to include but not limited to the following – <ul style="list-style-type: none"> Fuel unloading procedures. Control of ignition sources, earthing and bonding. Environmental monitoring, treatment of leakage, spillage and clean-up. 	S2 S2 S2	9.2.2 9.2.4 9.7.3		C		
13.6.1		Record, maintain and reconcile an inventory of fuel received, stored and dispensed in order to comply. Monthly stock trends (+/- %) to be graphed.	S2	6.6.1		C		
13.7		Records of any testing performed on the fuel facility, such as effluent discharge must be kept.	S2 S6 S12	9.6 10.1.5 8.4		C		
13.9.1		Develop a documented emergency procedures plan covering action to take in the event of fire, spillage, accident, equipment failure or other abnormalities or emergencies.	S2 S2	9.2.6 3.4.2		C		
End of Action List								

APPENDIX A: Risk Assessment Matrix

		PROBABILITY				
		A	B	C	D	E
CONSEQUENCES	I	1	2	4	7	11
	II	3	5	8	12	15
	III	6	9	13	16	18
	IV	10	14	17	19	20
		<div>1 - 6 IMMEDIATE ACTION WITHIN 1 MONTH</div> <div>7 - 14 ACTION REQUIRED WITHIN 3 MONTHS</div> <div>15 - 20 ACTION REQUIRED WITHIN 6 MONTHS</div>				

PROBABILITY CATEGORY	DEFINITION
A	COMMON OR REPEATING OCCURRENCE "IT WILL HAPPEN"
B	KNOWN TO OCCUR OR "IT HAS HAPPENED"
C	COULD OCCUR OR "I'VE HEARD OF IT HAPPENING"
D	NOT LIKELY TO OCCUR
E	PRACTICALLY IMPOSSIBLE

CONSEQUENCE CATEGORY	CONSIDERATIONS		
	General Impact	Safety Impact	Environmental Impact (Contamination and / or Pollution)
I	HIGH	FATALITY OR PERMANENT DISABILITY	OFF SITE
II	MODERATE	SERIOUS LOST TIME INJURY OR ILLNESS	MAJOR ON SITE
III	LOW	MODERATE LOST TIME INJURY	MINOR ON SITE
IV	NO IMPACT	NO LOST TIME	SAFELY CONTAINED and CLEANED UP

APPENDIX B: Site Asset Listing –
STORAGE AND PUMPING EQUIPMENT

PUMPS and EQUIPMENT							
	Number	Product	Manufacture	Model	Serial No.	Ownership	Estimated Current Value \$
Unloading Pumps							
Transfer Pumps							
Dispenser Pumps							
Dispenser							
Decanting Pumps							
Others							
Flo Meter	1	ADF					

TANKS										
Facility	IBC	U/G	O/G Vert	O/G Horz	O/H	Size (SFL)	Age Yrs	Product Stored	Ownership	Estimated Current Value \$
					1	2300 L		Diesel		

APPENDIX C: Standards References

Reference Number	Short Name of Standard	Month /Year	Rev. No.	Full Name of Standard	Notes
S1	-	Jun '99	-	BP Commercial Design Standards.	Company Std
S2	AS 1940	Oct '93	-	The storage and handling of flammable and combustible liquids.	Australian Standard
S3	AS 1692	Dec '89	-	Tanks for flammable and combustible liquids	Australian Standard
S4	AS 1657	Nov '92	-	Fixed platforms, walkways, stairways and ladders - Design construction and installation.	Australian Standard
S5	AS 1020			The control of undesirable static electricity	Australian Standard
S6	AS 2683	2000		Hose and hose assemblies for distribution of petroleum products	Australian Standard
S7	AS 4041	1992		Pressure Piping	Australian Standard
S8	ASNZS2430	1997		Classification of Hazardous Areas	Australian Standard
S9	API 650			Vertical Bulk Tank Construction	American Std.
S10	API 653			Vertical Bulk Tank Maintenance & Repairs	American Std.
S11	CP1	1992		Control of Water Effluents From Service Station	Aust. Code of Practice
S12	CP4	Oct 98		AIP - Design, Installation & Operation of Underground Petroleum Storage Systems	Aust. Code of Practice
S13	CP5	1995		AIP - Pipeline and Underground Tank Identification	Aust. Code of Practice
S14	CP16	1993		AIP - Inspection & Integrity Monitoring of Large Steel Petroleum Storage Tanks	Aust. Code of Practice
S15	CP22	1994		AIP - Removal & Disposal of Underground Petroleum Storage Tanks	Aust. Code of Practice
S16	CP26	1995		Design and Operation of Low Pressure Liquid Hydrocarbon Pipes	Aust. Code of Practice
S17	CP27	1996		Performance Specification & Use of Fittings in Tanker Operations	Aust. Code of Practice
S18	ADG Code	1999	Ed.6	Australian Dangerous Goods Code for Road and Rail	Australian Code
S19	Old Building Act	1975	QLD	Building (Flammable & Combustible Liquids) Building Act 1975	
S20	Harbour Act	1958	QLD	Section 86, Harbours Act 1958	
S21	EPA		QLD	Local Environmental Protection Authority and Council Requirements	Various EPA Codes
S22	DGSM Act	2001		Queensland Dangerous Goods Safety Management Act 2001	Papers 1 & 2
S23	WHS Act	1995		Queensland Workplace Health and Safety Act 1995	
S24	AS 1940 Draft	2003		The storage and handling of flammable and combustible liquids.	Draft Australian Standard

Emission report

You are here: [NPI Home](#) > [Database Search](#)

1 February 2005 14:09

Emission Report - Gelita Australia Pty Ltd

Industrial facilities are required to report emissions to the NPI if they use more than a certain amount of one or more substances on the NPI reporting list, or consume more than a specified amount of fuel or electric power, or emit more than a certain amount of nitrogen or phosphorus to water. Emissions are estimated using techniques outlined in industry handbooks and related manuals - see [further details](#) on industry reporting.

Location: Postcode 4285

Reporting Year: 2003 - 2004

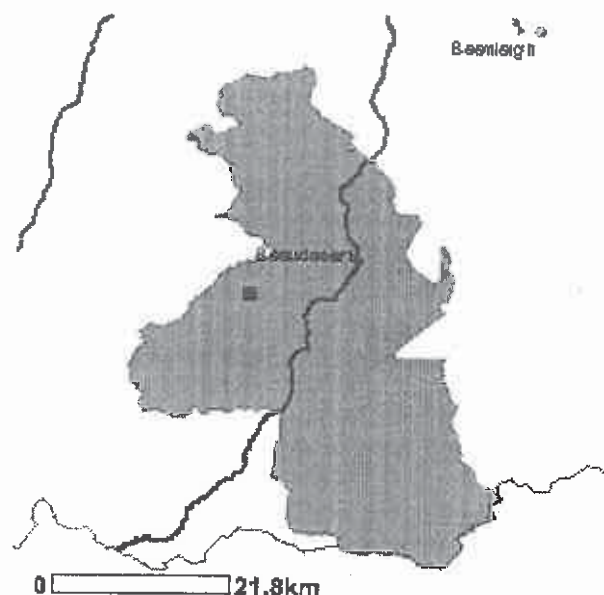


This report includes:

- [Company details](#) for **Gelita Australia Pty Ltd.**
- [Emissions](#) for 01-Jul-2003 to 30-Jun-2004.
- [Reduction Activities](#).
- [Explanation of Data](#).

See also:

- [Detailed Facility Emission Report](#).
- [Zoomable Map](#) of this facility.



Map of Postcode 4285:
Selected NPI facility is shown as ■

Company Details - Gelita Australia Pty Ltd

Other Years' Report(s):	2000 , 2001 , 2002 , 2003
ACN:	000010597
Address:	SUNNY HILLS FLOOD RD JOSEPHVILLE BEAUDESERT QLD 4285
Postal Address:	SUNNY HILLS FLOOD RD JOSEPHVILLE BEAUDESERT QLD 4285
Public Contact:	Mr Roger Seach
Public Contact (Phone):	(07) 5541 3544
Public Contact Email:	
Web Address:	

Number of Employees: 71
Main Activities: Starch - Gelatin manufacture
Primary ANZSIC Industry Class: Meat Processing
Subsidiary ANZSIC Industry Class (s):
ANZSIC Industry Group: Meat and Meat Product Manufacturing

Emissions for 01-Jul-2003 to 30-Jun-2004 to All Destinations

All emissions have been rounded to two significant figures. Note that totals may differ from the sum of the individual amounts because of this rounding. Substance emissions are ranked on a scale of 1-100: 1=lowest; 100=highest. Rankings are shown as: ● =0-25; ● =26-50; ● =51-75; ● =76-100. Actual rankings are shown in brackets [] - see [further explanation](#) of ranking below.

Substance	Ranking [1 - 100]	Total (kg)	Air	Land Water
<u>Ammonia (total)</u>	● [Low - 1]	140	87	52
<u>Antimony & compounds</u>	● [Low - 1]	0.0051	0.0051	
<u>Arsenic & compounds</u>	● [Low - 1]	1.2	1.2	
<u>Benzene</u>	● [Low - 1]	3.7	3.7	
<u>Beryllium & compounds</u>	● [Low - 1]	0.059	0.059	
<u>Cadmium & compounds</u>	● [Low - 1]	1.4	1.4	
<u>Carbon disulfide</u>	● [Low - 1]	0.37	0.37	
<u>Carbon monoxide</u>	● [Low - 1]	51,000	51,000	
<u>Chloroform (trichloromethane)</u>	● [Low - 1]	0.17	0.17	
<u>Chromium (III) compounds</u>	● [Low - 1]	0.51	0.51	
<u>Chromium (VI) compounds</u>	● [Low - 1]	0.22	0.22	
<u>Cobalt & compounds</u>	● [Low - 1]	0.28	0.28	
<u>Cumene (1-methylethylbenzene)</u>	● [Low - 1]	0.0015	0.0015	
<u>Cyanide (inorganic) compounds</u>	● [Low - 1]	7.3	7.3	
<u>Dichloromethane</u>	● [Low - 1]	0.84	0.84	

	1]		
<u>Ethylbenzene</u>	☉ [Low - 1]	0.26	0.26
<u>Fluoride compounds</u>	☉ [Low - 1]	420	420
<u>Formaldehyde (methyl aldehyde)</u>	☉ [Low - 1]	0.68	0.68
<u>Hydrochloric acid</u>	☉ [Low - 1]	3,400	3,400
<u>Lead & compounds</u>	☉ [Low - 1]	120	120
<u>Magnesium oxide fume</u>	☉ [Low - 1]	31	31
<u>Manganese & compounds</u>	☉ [Low - 1]	1.4	1.4
<u>Mercury & compounds</u>	☉ [Low - 1]	0.23	0.23
<u>Oxides of Nitrogen</u>	☉ [Low - 1]	310,000	310,000
<u>Particulate Matter 10.0 um</u>	☉ [Low - 1]	21	21
<u>Phenol</u>	☉ [Low - 1]	0.0045	0.0045
<u>Polychlorinated dioxins and furans</u>	☉ [Low - 1]	0.0000050	0.0000050
<u>Polycyclic aromatic hydrocarbons</u>	☉ [Low - 1]	0.062	0.062
<u>Selenium & compounds</u>	☉ [Low - 1]	3.7	3.7
<u>Styrene (ethenylbenzene)</u>	☉ [Low - 1]	0.073	0.073
<u>Sulfur dioxide</u>	☉ [Low - 1]	2,900	2,900
<u>Total Volatile Organic Compounds</u>	☉ [Low - 1]	130	130
<u>Xylenes (individual or mixed isomers)</u>	☉ [Low - 1]	0.11	0.11

Emission Reduction Activities

Cleaner Production Activities

1

- A4. Modified process, equipment, layout, or piping

Installation of Pollution Control Equipment

- E3. Fabric filter
- E6. Flue gas recirculation
- E8. Biofilter

Explanation of Data and Ranking of Substance Emissions

The NPI reports on emissions of chemical substances and where and from what sources they are generated. The ultimate fate of these substances and therefore exposure to humans and the environment as pollution cannot be determined from the NPI. Numerous factors such as height of emission (high stacks versus ground level vehicle exhausts), nature of receiving environment, chemical reactivity of the substance and prevailing meteorological conditions determine whether an emission is felt as ground level pollution. Since NPI does not attempt to collect these parameters, the data can only reflect pollutant generation at source.

The NPI holds emission data reported by industrial facilities, and aggregated emission data collected by participating jurisdictions. Industrial facilities are required to report emissions to the NPI if they use more than a certain amount of one or more substances on the NPI reporting list, or consume more than a specified amount of fuel or electric power, or emit more than a certain amount of nitrogen or phosphorus to water. Aggregated data include smaller facilities that are not required to report, and mobile and non-industrial sources such as transport, domestic activities and agriculture (see [further details on NPI data](#)).

The techniques used to estimate emissions in the NPI have been variously approved by Commonwealth, State and Territory environment agencies but it is important to note that the accuracy of these estimates is likely to vary according to the technique used. For the aggregated emissions data in particular, comparative analysis of the data may be misleading, because jurisdictions may have used different approved estimation techniques. Industrial facilities estimate emissions using a technique described in an appropriate NPI handbook, or else otherwise approved.

The [listed substances](#) span a wide range of toxicities. A small number may not necessarily imply an insignificant emission; for example, a small emission of a highly toxic substance may be of more concern than a larger emission of a substance of relatively lower toxicity. All emission amounts reported here have been rounded to two significant figures - totals may differ from the sum of the individual amounts on these reports because of this rounding. Some minor discrepancies may also occur with catchment and airshed data, particularly when queried at a fine spatial resolution such as a postcode. This is because these data are collected at varying spatial resolutions.

Facility Ranking: Individual substance emissions from each facility are compared against the maximum emission of that substance from all of the facilities reported on the NPI, on a scale of 1-100 (from lowest to highest) - if the total emission of a substance is 10% of the maximum reported to the NPI, the emission ranking would be **10**; if the total emission is 95% of the maximum, the ranking would be **95**. A score of 100 means that the facility is the highest facility emitter of that substance - in some cases many facilities may score 100, due to rounding. Top substances are those substance emissions that are ranked highest for any individual facility.

For example, a small rural sewage treatment plant may report a very small Total Nitrogen emission in comparison with a large metropolitan facility. If the rural facility reported an emission that is 7% of the

maximum Total Nitrogen emission in Australia it would attract a ranking of 7. This ranking tells you that there are many other facilities that have much larger emissions of Total nitrogen. On the other hand a metropolitan sewage treatment plant may have a very large Total Nitrogen emission and therefore attracts a ranking of 100 for this substance. This only means that this particular facility has approximately the largest individual emission of that substance in Australia.

The [disclaimer](#) has further information about the use of NPI data.

[NPI Home](#) | [Make a Map](#) | [Substances Background](#) | [Download Data](#) | [Data Changes](#)

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DRAFT.

**NATURAL GAS FEASABILITY STUDY.
@
GELITA, JOSEPHVILLE, QLD.**

For

Mr. Ross Pointing.

**Project Manager.
GELITA, ASIA PACIFIC.**

By

**Mr. W. NICOLLE.
November, 2004**

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1 EXECUTIVE SUMMARY.

1.0 INTRODUCTION.

Arrow Energy have submitted a proposal to Gelita, to supply to the following Energy sources to the processing plant @ Josephville, QLD, in the form of a "Letter of Intent"

- Natural Gas (Coal Seam Gas) @ \$2.75/GJ & 100% CPI, Natural Gas consumption must be greater than 90 TJ / yr &
- Electricity supply at 6¢/kWhr, for 5 years.@ 100% CPI. Based on electricity consumption of 15 GWhrs / year.

The offer of \$2.75 / GJ for a Natural Gas consumption at > 90 TJ / year is very attractive.

At present, the exact location of the well head and gas condition, is to be determined by Arrow Energy, however latest indication is the "Well Head" is "close to the Gelita & A.J.Bush sites".

Gelita has just signed another 2 ½ year Electricity Supply contract with Country Energy and present indications are electricity costs have dropped to 5.2¢/kWhr as versus the 6¢/kWhr offered by Arrow Energy.

As the Energy supply offer is not dependant on accepting both supplies, Gelita need only accept the Natural gas supply offer, if desired.

Gelita has recently been advised by the current coal supplier New Hope Coal, Australia, of possibly only 2 years supply, and Gelita's research on alternative Coal sources, from mines at considerable distance, indicate that coal transport costs could increase the price of coal from the present \$52.20 / tonne delivered, (to July 2005), to greater than \$67 / tonne, as received.

The purpose of this report is to present to Gelita the current position of fuel costs, and steam requirements for current operation & to then estimate the fuel costs at projected future gelatin production tonnages.

It was indicated by Gelita, that gelatin production levels are estimated to reach 4,000 tonne per year, and this figure was targeted for 2007.

To then compare these costs against the proposal from Arrow Energy in supplying N.G for Gelita's fuel requirements, and for future operations.

This report has not reviewed strategies for remaining on coal firing if the Arrow Energy's offer is unacceptable or the Natural Gas reserves prove unsatisfactory.

Note. All prices quoted within this report are ex G.S.T

1.1 ANNUAL FUEL USED & COST ESTIMATES.

Table 1.1 demonstrates the effect of future production levels, using the existing Boiler fuels of Coal & LPG compared to the current offer by Arrow Energy in supplying N.G for Gelita's operations.

All fuels have been adjusted for a CPI of 2.5% / year, the calculations demonstrate as the production tonnages increase, the fuel energy costs will increase at a greater rate due to the dependence on LPG firing the 2nd steam boiler, which can only operate on LPG.

Note. 1.1.1 The replacement of the W.W.T.P. steam Heat Exchanger with a biogas / Natural Gas. H.W.H has not been factored in to the above figures, due to un-availability of data. Hence magnitude of Energy / cost reduction not considered.

1.1.2 The production tonnages for each year are assumed as targets for that year.

1.1.3 Coal and LPG prices will be directly affected by transport costs.

1.1.4 Figures excludes Cogeneration & possible current refrigeration dryer system replacement.

TABLE 1.1 ESTIMATED ANNUAL FUEL COSTS.

Year	2004	2005	2006	2007
Gelatin	2,650	3,000	3,500	4,000
Estimated Fuel energy needed, (GJ / yr)	163,400	185,000	215,800	246,600
Estimated Fuel energy cost \$/GJ (Fuel Coal & LPG)	\$417,170	\$547,540	\$888,159	\$1,566,180
Convert to Natural Gas & operate on N.G. only	\$449,343	\$521,408	\$623,517	\$735,405
Operating Difference. (\$/year)	-\$32,173	+\$26,132	+\$264,642	+\$830,775

1.2 ESTIMATED STEAM LOADS.

Currently steam production for process is produced from the 5MW_{th} Finafire Boiler, using Coal, with LPG replacement as required.

It is known at peak process steam load, the 5MW_{th} Finafire Boiler struggles to deliver the required steam load of greater than 8,200 kg/hr.

As Gelatin production increases the steam load will increase directly.

Future steam calculations, based on current "steam load profile" for the week 30th September to 7th October, 2004, were done to estimate boiler operation at increased production levels. As a result of the increased peak steam load, the standby LPG fuels Maxitherm Boiler will have to operate in conjunction with the Finafire Boiler, to deliver an increasing proportion of the steam load.

Table 1.2 demonstrates the various calculated steam requirements for future production levels, & that even without the possible addition of Kathabar De-humidification option, the estimated peak steam load 91% of the MCR of the 2 boilers.

Consequently purchase of at least one new 5 MW_{TH} Natural Gas fired, Water tube Boiler, unattended operation to AS 2593 to replace the older smaller Maxitherm could be a preferred option.

The situation then arises that for future operation, there will be two operating boilers, with no standby!

Gelita would need to consider the purchase of a third, 5 MW_{TH} Natural Gas fired boiler, or replacing the existing boilers with 2 * 10 MW_{TH} Natural Gas fired, with operation of one on, one standby, as is the case now.

TABLE 1.2 FUTURE STEAM LOADS.

Year	2004	2005	2006	2007
Gelatin production. (tonnes / year)	2,650	3,000	3,500	4,000
Estimated annual steam load. (tonnes / yr)	58,058	66,726	76,680	87,634
Current Design capacity of 2 Boilers (kg/hr)	15,378	15,378	15,378	15,378
Estimated average steam load. (kg/hr)	6,760	7,650	8,925	10,200
Estimated Peak steam load. (kg/hr)	8,744	10,528	12,283	14,038
Plus Kathabar de-humidifying, peak (kg/hr)		2,500	2,500	2,500
Peak Steam load with Kathabar (kg/hr)		13,028	14,783	16,538

Notes.

- 1.2.1 The replacement of the W.W.T.P. steam Heat Exchanger with a biogas / Natural Gas, Hot Water Heater option has not been factored in to the above figures, due to un-availability of heat load data, neither has the use of economizers or other methods of feed water preheat to reduce steam load to de-aerator. Hence magnitude of steam reduction not considered.
- 1.2.2 Table does not include steam load reduction to boiler(s) from cogeneration heat load substitution.
- 1.2.3 No reduction in steam load due to fitting economizers, or reduction due to reduced blow-down wastage has been allowed for in the estimated future loads.

1.3 ESTIMATED FUEL COST COMPARISONS.

Table 1.3 shows the estimated energy cost of each fuel versus the Natural Gas option. It also shows that presently to operate the Maxitherm Boiler costs **\$17.40 / GJ**, *consequently the more dependence on this boiler for steam load, the more costly will be Gelita's operation.*

TABLE 1.3 ESTIMATED FUTURE ENERGY COSTS OF EACH FUEL.

Year	2003	2004	2005	2006	2007
Average cost of Coal as fuel. (\$/GJ)	\$2.17 (history)	\$2.24 (estimate)	\$2.43 (estimate)	\$2.65 (estimate)	\$2.84 (estimate)
Average cost of LPG as fuel. (\$/GJ)	\$16.86 (history)	\$17.40 (estimate)	\$19.47 (estimate)	\$20.05 (estimate)	\$20.65 (estimate)
Current Mix of above. (\$/GJ)	\$2.44	\$2.55	\$2.96	\$4.12	\$6.35
Average cost of N.Gas as fuel. (\$/GJ)	-	\$2.75	\$2.82	\$2.89	\$2.96

- Note.**
- 1.3.1. A CPI index of 2.5% per year was applied to all fuels
 - 1.3.2 Coal costs include extra electricity needed to operate boiler on coal and extra annual maintenance costs of a coal fired boiler over a natural gas fired boiler.
 - 1.3.3 L.P.G cost includes Tank rental

1.4 ENERGY USE OF DEHUMIDIFYING ALTERNATIVES.

Several alternatives to the present refrigeration system of dehumidifying the dryer air were reviewed.

The estimates and results are discussed in **Section 8.**

DEHUMIDIFICATION.

Annual fuel costs and peak loads indicate an extra Natural Gas load of between 6,333 GJ to 15,800 GJ per year depending on method of dehumidifying, whilst if the Kathabar method was opted for, an a peak steam load of 2,500 kg / hr was required from the Boiler(s) & an extra 5,100 tonne of steam per year was required to be generated.

1.5 POWER STATION / COGENERATION.

Refer to **Section 9.0 COGENERATION** & in particular **Table 9.1**

Preliminary calculations show that if cogeneration is utilized on site in conjunction with the proposed Natural Gas supply, then after 3 years operation, & achieving a yearly production of 4,000 tonne of gelatin, \$1,861,000 will have been saved in Electricity & Natural Gas fuel costs if Natural Gas is supplied to site by Arrow Energy.

If the above scenario is compared to current the current energy forms energy forms purchased then after 3 years operation, & achieving 4,000 tonne of gelatin, \$2,792,841 will have been saved in Energy purchases to site.

These savings will be due to the reduction in Boiler steam load of on average, 1,736 kW & total all up cost for electricity of 3.3^c/ kWhr.

Turnkey Project costs ranged from \$2,420,000 to \$4,540,000, on 2001 costs.

1.6 ESTIMATED IMPLEMENTATION COSTS.

Estimated budget costs to implement conversion to Natural Gas to identified plant equipment & various "other options" are shown in Table 1.6.

Refer to **Section 6.7** for comments on estimations.

TABLE 1.6

Item #	Project	Indicative Capital Cost	Potential \$ Saved over 3 years
4.4.1 & 6.0	N.Gas line to site & Boilers including "Natural gas station"	\$236,065 ???	Refer 6.4
6.2	Conversion of Finafire Boiler to Operate on Natural Gas & LPG back up.	\$195,000 plus PLC etc & removal	Refer 6.4
6.2	Conversion of Maxitherm Boiler to Operate on Natural Gas & LPG back up.	< \$12,000	Refer 6.4
6.4	Purchase of New 5 MW _{th} Water tube boiler for operation as per AS2593. Natural Gas fired.	\$450,000 plus PLC	+\$1,126,500 & \$835,700 / yr there after.
6.5	Purchase of New 10 MW _{th} Water tube boiler for operation as per AS2593. Natural Gas fired.	\$691,000 plus PLC	Refer 6.4
6.6	W.W.T.P to Hot Water Heater & Biogas / Natural Gas.	\$126,600	+\$27,300 / year
6.7.7	Purchase 10 MW _{th} Water tube boiler for operation as per AS2593. Coal fired.	\$2,200,000	+\$25,430
8.0	Desiccant options. (installation etc not included)	\$475,000 to \$765,000	Up to \$70,000 to be confirmed.
9.0	Co-Generation	\$2,420,000 to \$4,540,000	+\$2,253,000 & \$1,385,000/yr there after.

1.7 ESTIMATED GREENHOUSE GAS EMISSION COMPARISON.

The replacement of coal fuel by Natural Gas, eliminates air born pollutants (dust ant SO₂) & reduces Greenhouse Gas emissions (CO₂) by 33%.

Refer to Section 10, Table 10.1 GREEN HOUSE GAS REDUCTION EQUIVALANCE.

This will be significant reduction.

If Cogeneration is also installed Greenhouse Gas emissions (CO₂) by 58%.

Refer to Section 10, Table 10.2 COGENERATION ESTIMATED TONNE REDUCTION OF CO₂

Both the Australian Federal Government & the Queensland State Government where contacted, for information in regards to assistance / grants / & benefits to Gelita etc concerning coal fuel replacement with Natural Gas and Cogeneration.

After initial contacts were made, further action for clarification & direction was difficult to obtain from Department representatives.

Recommend further follow up.

2.0 OVERVIEW.

Gelita, have been offered a supply of C.S.G by Arrow Energy, at \$2.75/GJ & Electricity at \$6.00 / MW hr.

The offer is for a contract of 5 years, with 100% CPI.

A review was by undertaken by Mr. W. Nicolle, (the author of this report) for Gelita, Josephville, Queensland, to address the following issues rose in the "Natural Gas Feasibility Study"

"Quantify the potential cost / benefits of the proposal by Arrow Energy to supply Natural Gas & Electricity in lieu of existing site supply arrangements. The proposal is to be evaluated against present production levels and future expected production levels"

2.1 PROJECT SCOPE.

2.1.1 Gas Issues

2.1.1.2 Liaise with potential supplier & ascertain quantity of available gas and ensure quantities are adequate for long term supply.

2.1.1.2 Liaise with potential supplier and identify any additional gas processing (e.g. scrubbing), which may be required to ensure gas supply is suitable for all site applications.

2.1.1.3 Identify the costs (broad-brush only) of piping to any locations identified as potential gas users.

2.1.2 Existing Boilers.

2.1.2.1 Quantify cost of conversion of both main & standby boilers to Natural gas with full evaluation of any performance enhancement or shortcomings.

2.1.3 Other site heat exchange systems.

2.1.3.1 Investigate all site heat exchange systems to evaluate the feasibility of changing to direct natural gas heating and quantify steam savings and conversion costs (broad brush only).

2.1.3.2 Investigate the potential requirements for direct gas heating of proposed future desiccant drying system if the site opts for this method of dehumidification (broad brush only).

2.1.4 Power Station.

2.1.4.1 Identify location of proposed power station site and any (broad-brush only) spin off benefits / penalties to the site (e.g. Water heating, noise etc.)

2.1.4.2 If no specific site is preferred by supplier, the best location from stand point of Gelita.

2.1.5 Health & Safety Issues.

2.1.5.1 Identify potential hazardous zoning and associated issues which maybe created by piping gas to various locations.

2.1.6 Environmental Issues.

2.1.6.1 The makeup of the proposed gas should be examined and any potential contaminants / pollutants and their associated issues identified.

2.1.6.2 Plant atmosphere is harsh on ferrous, copper and silver and is the cause of high corrosion levels.

3.0 REVIEW OF ARROW ENERGY OFFER.

A list of questions / options, (refer to **Appendix 12.1**), was sent to Arrow Energy & a subsequent meeting was held with at Gelita, on Tuesday 5th October. To explain discuss issues arising from their offer.

3.1 MEETING SUMMARY.

- 3.1.1 They confirmed the Gelita consumptions / prices where estimates only, i.e. 400 tonne coal / month (8,000 GJ/mth @ 20GJ / tonne) at a cost of \$50 / tonne delivered &
- 3.1.2 Electricity based on 1,300 MWhrs / month @ \$70 / MWhr.
Note. Gelita's Electricity usage for the year 2003 was 15.8 GWhrs, this will significantly decrease if go to N.G. fired Boiler (by estimated 0.6GWhrs) and a further (estimated 2.2 GW hrs) if go to desiccant drying.
- 3.1.3 They advised that A.J. Bush has come on board. At a subsequent visit to A.J. Bush, they confirmed they had signed the letter of intent.
- 3.1.4 At present there is no plan to connect to the Brisbane distribution network. This is not to say in won't be in the future.
- 3.1.5 Arrow Energy's short term goal doesn't include the township of Beaudesert.
- 3.1.6 They state gas commencement date of 1 Dec. 2004. Gelita advised that this time frame was not possible to implement.
- 3.1.7 Arrow Energy indicated they were aiming to "firm things up by March, 2005"
- 3.1.8 Arrow Energy targeted December, 2006 for electricity supply.
- 3.1.9 Arrow Energy advised that the N.Gas price was a "good one" and applied for all use > 90 TJ / year.
- 3.1.10 Arrow advised that Gelita could accept the N. Gas component only if it decided to.
- 3.1.11 The \$2.75/GJ was current with the offer and each year would increase at 100% of the CPI for that year.

3.2 MEETING OBSERVATIONS & COMMENTS.

- 3.2.1 Arrow Energy were drilling another test site closer to A.J. Bush's site before deciding were to locate the well head.
- 3.2.2 The gas would be distributed to Gelita & A.J. Bush at 200 kPa line pressure.
- 3.2.3 Arrow Energy at the meeting seemed very vague about electricity supply and location of generation site. From the Company Profile on the web, they appear to do a lot of exploration work for CS Energy, owners of Mica Creek Power Station, Mt Isa. It could be, Arrow Energy might be a market player and buy and sell electricity! **Refer to 9.0 Cogeneration**
- 3.2.4 It was the opinion that they wanted to sell Natural Gas. No indication was given by Arrow Energy as to when the Natural Gas line would be available to site.
- 3.2.5 Arrow Energy would run Natural Gas line to Gelita's boundary at no cost.
- 3.2.6 Arrow energy would also provide N Gas line to site if required. They have subsequently been approached to advise cost of underground supply and pipe diameter.
- 3.2.7 As N.Gas will be provided at Well Pressure, there are no gas compressors required, hence reliability is "relatively assured". Events like distribution pipe leakage or rupture were not considered likely by Arrow Energy.

- 3.2.8 Issues like guarantee of supply, or projected / supply failures, what back-up can Arrow Energy provide, were not discussed, it would be prudent for Gelita to retain the LPG tank & contract.
- 3.2.9 Arrow Energy advised Coal Seam Gas fields need to have extended reserves to commercially viable. Supply for >15 years from this field was assured at this stage of testing.
- 3.2.10 Arrow energy advised that the field could supply Gelita's & A.J. Bushes future increased gas needs
- 3.2.11 At this stage Arrow Energy could only supply the results from the Tipton field. They said these were the same as the Beaudesert field. There is no sulphur present in the gas!
- 3.2.12 The Natural Gas samples are independently analyzed.

3.3 POSSIBLE GOVERNMENT GRANTS.

- 3.3.1 The QLD Department of Energy was contacted with regards to Industry Grants available in regards to fuel substitution & Cogeneration, and large reduction in Greenhouse gas emissions, possible NGAP certificates. As yet no tangible assistance, needs follow up.
- 3.3.2 Country Energy contacted in regards to penalties etc for back up electricity or possible they own / build / operate. . As yet no tangible assistance, needs follow up.

4.0 CURRENT STATUS OF ENERGY SUPPLY.

The site use three forms of energy,

1. Electricity, current account with Country Energy.
2. Coal, From New Hope Coal, Australia, Jeebropilly Collieries, is washed steaming export coal. Used for steam generation for process heat.
3. L.P.G from Origin Energy, used on site as back up to coal, if and when required.

4.1 ELECTRICITY.

4.1.1 CURRENT SUPPLY.

Reviewing electricity accounts, from January 2003, electricity consumed on site is typically 15.5 to 15.8 GWhr / year, with a Peak Demand 2,415 kW_e. in February 2004.

Power Factor is low at 0.75

Country Energy, accounts show that for 2003, Gelita where paying \$59.60 / MWhr.

A new 2 ½ year contract, (till 2007) has been just signed with Country Energy, has seen electricity costs drop to \$51.40 MWhr July, 2004 & \$52.40 MWhr August, 2004 indexed, contract to 2007.

4.1.2 ARROW ELECTRICAL OFFER & COMPARISONS.

Arrow are offering \$60.00 / MWhr for >16GWhr/yr, 5 year contract @ 100% CPI

Other Industry Electricity costs to hand are,

- Newcastle \$61.20 / MWhr for 3.3 GW/hr / yr.
- (\$41 / MWhr QLD central coastal >90 GWhr / year 2003

4.1.3 LOAD PROFILE.

For matching of possible Co-Generation installation current daily load profile was not available.

Electrical Load profile is required if Co Generation is considered to be considered, as the electrical load profile controls the waste heat availability.

4.1.3 ELECTRICITY SUMMARY.

Based on the information supplied in the Arrow Offer and comparing to the current contract with Country Energy, Gelita should remain with Country Energy.

It is also recommended that Gelita pursue electrical load profiles for selective periods from Country Energy, to give a accurate approach to Co Generation option.

4.2 COAL.

Reviewing Coal accounts, from January 2003, coal consumed on site was 5,860 tonnes at a cost of \$45 / tonne delivered,

Using an averaged C.V. coal, as received, of 26.82 GJ /tonne the energy cost of coal was \$1.68 / GJ.

The new contract cost of coal, delivered is \$52.00 / tonne, this is effective from 1/8/2004 to 31/7/2005.

Using an averaged C.V. coal, as received, of 25.70GJ /tonne the energy cost of coal is now \$2.02 / GJ.

4.2.1 COAL DISCUSSION.

The Heating Value (C.V.) of the coal under the new agreement is quoted as 27,21 GJ / tonne +/- 10%, air dried. **Refer to Appendix 12.12**, for current coal specifications.

For any Boiler Efficiency or analysis comparisons, the "as received" value (i.e. with moisture) must be used, the variance in the C.V. affects all calculations.

Whilst coal as a fuel is relatively cheap compared to other fuels, the on cost handling and pollution solutions costs, when considered, will show the true Energy cost to be much higher. **Refer to Table 1.3.**

To run the Finafire Boiler on Coal requires up to 95 kWe of motor power, mainly on Fans.

Maintenance issues also are more expensive, with feed system, tube erosion & Filter Bag maintenance cost being more than a comparatively fire Natural gas operated Boiler.

Coal is dirty, and stockpiling on site is not preferred, also routine E.P.A. license agreements must be satisfied. The combustion of this coal also produces SO_x issues, due to the Sulphur present in the coal

4.2.2 COAL ISSUES.

Supplier advises of a probable limit of 2-3 years supply from this Ipswich mine.

Alternative mines supplies would be from the Toowoomba region. It was advised that transport costs up (a function of diesel prices) could be an extra \$15 to \$20.

Allowing for CPI increases this could see the cost of coal energy being at least \$7.91 / GJ by 2007.

Other coal price data to hand, at time of writing this report is for coal used at a N.S.W Government establishment, costing \$69/tonne, (September 2004, for 240 tonne / month)

As mentioned, the Heating value of coal is not constant, making analysis of performance difficult and sometimes inaccurate.

After discussions with A.J. Bush's Mechanical Engineer at Rouse Hill, it was suggested that bag filter costs could increase dramatically, as was their experience.

4.2.3 COAL SUMMARY.

The indicative cost of coals future costs shows that if Gelita's remain on coal firing, yearly operational costs will be more expensive than if the boiler was operated on Natural Gas. Hence this appears an "opportune time" for reviewing current fuel supply alternatives.

However, if the Arrow Energy test drillings prove unsatisfactory, and hence is not proceeded with, then Gelita must act now to review its future fuel supply, especially when the standby boiler will be needed to operate to supply process steam.

4.3 L.P.G.

Reviewing the L.P.G accounts for 2003 shows an averaged consumption of 3,347 GJ for the year.

The cost of L.P.G has risen was \$0.41 / Litre plus tank rental.

In August, 2004 LPG cost have risen to \$0.4779 / litre, plus rental of storage tank.

The present cost of LPG energy delivered, ex tank rental is \$18.81 / GJ.

4.3.1 LPG ISSUES.

At present L.P.G is the standby fuel source for both boilers, and is only used as an alternative if coal system is out of service..

"Normal Operation" on LPG is undesirable, due to the prohibitive costs, however this will become the "norm" when the factory increases production rates.

Refer to Section 7 for discussion on LPG increase.

The Storage tank has enough capacity when full (30 tonne) for the one 5 MWth boiler operation, at current operation, estimated to be, 2.5 days operation.

4.3.2 L.P.G SUMMARY.

Whilst operation of either boiler on LPG fuel is recognized as costly, it provides an excellent back up.

It is recommended that the storage tank and LPG delivery be maintained, as it provides an excellent back up for either coal or Natural gas firing of Boilers.

4.4 NATURAL GAS.

No Natural Gas is presently used on site.

Arrow Energy are offering Gelita \$2.75/GJ for >90 TJ/ year, 5 year contract @ 100% CPI.

It is estimated Gelita, if already using Natural Gas, would be currently using 163,400 GJ / year, i.e. 163.4 TJ / year, which is well in excess of the 90 TJ / year minimum limit set by Arrow Energy.

Other data on Natural Gas prices which include higher distribution costs are..

- (\$3.73/GJ QLD central coastal >1,000 TJ / year 2003
- & Newcastle \$6.50/GJ for 60TJ/yr, September, 2004)
- Origin Energy's web page \$10.1 / GJ for Commercial & Industrial users > 570 GJ / month. (i.e. > 6.84 TJ / year).

The test sample taken to date, indicate no sulphur is present in the gas, and that the gas is basically methane. **Refer to Appendix 12.2 on Gas Analysis.**

4.4.1 NATURAL GAS ISSUES.

- Amount of gas available will be quantified from further testing in November, 2004, by Arrow Energy
- Currently Arrow are proposing to supply only A.J. BUSH & Gelita's with Natural Gas.
- Present indications are supplies (are upwards of 60 years reserves) far in excess of 15 years supply for both A.J. BUSH & Gelita's future usages.
- Arrow although offering a 5 year contract would prefer longer term contract.
- Rate offered @ \$2.75 / GJ with 100% CPI.
- Gas will be scrubbed & supplied to site boundary @ 200 kPag pressure.
- Until further gas test samples are drilled and Laboratory tested supplied "Natural gas condition" is unknown. The Natural Gas could contain moisture & particulate matter that may require allowance for water removal & Natural Gas filtering before use as a fuel. This will be accomplished at the "Gas Station / compound"
- This will also be dependant on intended burner design.
- Gas analysis as per **Appendix 12.2** A comparison to published AGL data on Natural gas is also included for comparison.
- Site Natural Gas route to be advised when Arrow advise of location of boundary supply termination point, it will be a function also of the moist secure & least trafficable route to avoid possible breakage from unauthorized digging in local area.
- It is envisaged the N.G reticulation line on Gelita's land will be nominally 160 mm H.D.P.E, buried to a depth of 1 metre below ground level and will conform to A.G.A & A.S. standards.

- All above ground Natural Gas pipe work is in steel to AS codes.
- The on site above ground " Gas Station for metering any further pressure reduction and isolation will be in steel and located on a concrete pad, possibly on the grassed area opposite the Boiler House. Exact location to be determined.
- Green House gas Abatement issues & estimated reductions are discussed in **Section 10.**
- At present, the time frame for Natural Gas supply is not clear, as it is dependent on drilling results.
- Natural Gas will give a cleaner exhaust gas. and more responsive steam load delivery and more efficient turn down if & when needed.

4.4.2 POSSIBLE SITE NATURAL GAS USERS.

After reviewing the existing steam producing & consuming items on site, the following items would have a cost benefit to Gelita's operations from conversion or replacement by Natural gas.

- Finafire boiler.
- Maxitherm or 2nd Water tube boiler.
- Waste Water Treatment Plant steam / Hot Water Heater with dual biogas fuel . **Refer to Section 5.5.3.3 & section 6.6**

Other potential Natural Gas consumers would be.

- Possible alternative to Screw Compression / refrigeration Air De humidifier plant, i.e. Desiccant Rotary Wheel type or Gas Absorption chiller.
- Possible Co-generation unit.

4.4.3 ENVIRONMENT & SAFETY ISSUES WITH NATURAL GAS.

Natural Gas will provide the following Environmental benefits to Gelita's operation.

- a "cleaner Exhaust" to atmosphere than coal,
- and its use will resultant in a cleaner less congested, environment around the boiler area.
- There will be no more ash disposal.
- There will be no more heavy vehicle deliveries of coal.

The relevant AS codes stipulate the safety procedures and standards required when using either LPG, Natural gas onsite. Gelita would already be aware of this with using LPG as a fuel.

It is assumed that Gelita Management & staff already have a high awareness of working with LPG, and would also have on site gas masks /air bottles, and relevant gas portable & fixed gas safety signs.

Natural Gas, being lighter than air, if escapes to atmosphere, would gravitate upwards.

Several safety points need to be highlighted with the piping of Natural Gas throughout a work place and the use of at the appliance.

5.0 EXISTING PLANT DESCRIPTION.

5.1 FINAFIRE & MAXITHERM BOILERS.

5.1.1 FINAFIRE.

Specifications.	ENERGY EQUIPMENT 30 th August, 1993
Capacity	5,000 kW.
Heat Release	6,173 kW.
Coal feed @ M.C.R.	873 kg/hr
Steam Produced @ MCR.	8,200 kg/hour @ and from 100°C.
Losses: Radiation & Unaccounted Loss	0.30%
	Dry Gas loss 8.18%
	Moisture Loss 5.95%
	Humidity Loss 0.15%
	Unburned Carbon Loss 4.00%
	Solid Loss 0.12%
	TOTAL LOSSES 18.70%.

Note: The above losses based on Oakleigh Coal analysis as given by Davis Gelatin.

Efficiency:	Gross	Calculated	=	81.3%
		Guaranteed	=	80.00%

NOTES.

- 5.1.1.1 Many attempts where made to contact the agents / manufactures Energy Equipment. From Industry sources, and Finafire clients including Fletchers Meats, Dubbo; Meadow Lea, Mascot & A.J. Bush, Rouse Hill. All advise that there is no Company now supply materials or technical back up on this product.
- 5.1.1.2 All three (3) companies contacted, have agreed conversion of their Finafire Boiler to Natural gas has improved the boilers reliability, availability and efficiency (this is difficult to quantify), plus importantly it has kept the E.P.A off there backs! Refer to **Appendix 12.13** for summary of site visit & relevant discussions.
- 5.1.1.3 At current production levels, it has been commented by Gelita, that the Finafire "struggles" to deliver the required steam load.
- 5.1.1.4 Any consideration to "stock pile a coal supply" at site, from a future "bulk load", i.e. train would be difficult to justify environmentally as well as extra cost for site coverage / transportation and other associated issues.
- 5.1.1.5 The existing coal fluidized bed system requires on average 90 kW_e operating the Boiler. This will be reduced to approximately 15 kW_e, if the boiler is converted to Natural gas. **A significant reduction in electricity purchases!**
- 5.1.1.6 The operation manual in the "Method of Operation" section states the over-bed burner has been sized to give 4.85MW output on L.P.G. This implies that the Finafire boiler, whilst running on LPG has its capacity reduced to 97% of MCR, i.e. 7,954 kg/hr of dry saturated steam.
- 5.1.1.7 The Finafire Boiler is has been in continuous operation for 10 years.
- 5.1.1.8 Refer to **Appendix 12.12**, for original coal specifications for boiler design & current coal specifications.

5.1.2 MAXITHERM.

Model.	4.5 MDH / 100, # M-1559
Capacity.	MCR 4.5 MW.
Steam MCR.	7,178 kg/hr @ and from 100°C.
Steam Pressure.	1.05MPa
LPG fueled.	Minimum gas pressure 5 kPa

Built in 23 / 3 / 1976,
Prior History to Service at Gelita unknown.
Duty is stand by as required, always kept warm.

5.2 PROCESS STEAM REQUIRED.

Drawing # 9930P16 Steam & Condensate Pipe-work & General arrangement, 1992 (note, not approved) was used as a basis for the determining the steam distribution system along with "an elementary tracing of the lines", to the following site processes.

It was noted the steam distribution drawing needs updating along with relevant design and other details.

- 5.2.1 Live steam to de-aerator (**Direct Injection**) for heating feed water to nominally 100 °C, typically recorded @ 107 °C. By mass flow and heat balance, was calculated at 550kg/hr with peaks to 800kg/hr. The load being directly proportional to "polished water" make up rate increase during Pan Extraction direct injection and Boiler Blow-down.
- 5.2.2 Steam to Tank Farm for warm water & hot water tanks. (**Direct Injection**). [Note. Flow rate not measured, and hence steam profile unknown, used as required.]
- 5.2.3 Steam to W.W.T.P. Heat exchanger @ Tank Farm. (**Condensate Return**). [Note. Load profile not known.]
- 5.2.4 Steam to 16 off Extraction Pans for initial temperature. Pressure reduced to nominally 100kPag. (**Direct Injection**). Big load instantaneous. (3,600kg/hr for 1 in 20 hours for one (1) batch). Hence as 2 batches. [Note. Load profile & magnitude determined (approximately) from historical reports & confirmed by, Boiler steam profile minus (APV measured flow + De-aerator estimate + Pan top up estimate + WWTP estimate)]
- 5.2.5 Steam to 16 off Pans for top up water @ 60 °C, via 2 separate Heat exchangers. (Condensate Return). (2 * 20 hour batch cycles, steam required 300kg/hr for each set of 8 pans. [Note. Load profile & magnitude determined (approximately) from historical reports & assumed temperature increase with stated "pan top up" flow rate.]
- 5.2.6 APV Etc (Condensate Return). (Relatively continuous load (2,600 to 2,900kg/hr) [Note flow is measured as FT 419S and refer to Appendix 12.5 for a typical daily load profile]
- 5.2.7 Sterilizers (**Direct Injection**).
- 5.2.8 Gelatin Drying system indirectly, heated by Condensate Return from A.P.V. [Ross, is this correct?]
- 5.2.9 Other small consumers as **direct injection**.

NOTE. Only 2 steam flows are measured. Assumed accuracy +/- 1%
Steam flow from boiler. **FT 510B**
Steam flow to APV. **FT 419S**
Boiler steam flow for one (1) week was graphed over a 24 hour period, **Refer to Appendix 12.3**

5.3 CURRENT STEAM OPERATION.

Refer Appendices 12.4 Daily Steam Profile with Maximum Peak Load.

From data downloaded on boiler & A.P.V. operating parameters, of over a weeks readings (30TH Sept to 7th Oct, 2004) at 10 minute intervals, it is established that the average maximum steam flow, under current "steam plant conditions of steam feed heating in the de-aerator & un-insulated surfaces steam & hot water pipe & tanks" for that day was .

- 6,090 kg / hr of saturated steam.

- peak steam flow was 8,277 kg /hr.
- Steam flow to de-aerator for heating feed water to 107°C, (replacing Blow down & Evaporator direct injection) was using on average 550 kg/hr of live steam, with peaks to 870 kg/hr.
- *i.e. on average, 9.4% of the steam generated doesn't make it to process.*
- *An extra 3 % of fuel was needed to replace heat lost in missing / damaged insulation! (this was determined by "a casual observation" of exposed surfaces, recording surface temperatures basic heat loss tables)*

5.4 SITE STEAM HEAT EXCHANGE PROCESSES.

Steam is mainly used through the production process of gelatin manufacture by direct injection or through heat exchange.

The superior feature of Steam as a working fluid, is that it provides "excellent speed of response" to set point & better control of finite temperatures through constant temperature at Latent heat over a liquid.

Steam, being a pressurized gas, it requires smaller supply pipe-work to deliver the same amount of thermal energy, than a hot liquid.

If convert any process from steam to Hot water, then larger distribution pipe-work & insulation & heat exchangers are needed.

This study also reviewed, if Natural Gas was used on site, then the could it be used directly at each process, or if possible Co-Generation source be used i.e. Hot Water, either replace steam?

Reviewing Section 5.3,

- Items 5.2.4, 5.2.6, 5.2.7 & 5.2.9 must be left on direct steam load.
- Items 5.2.1 could be replaced with an economizer fitted to each operating Boilers exhaust gas flue or Cogeneration provide steam (direct) or Hot water, via a heat exchanger. Needs further assessment.
- Item 5.2.2 could be minimized, if not already the practice, by possible Co-Generation Hot Water Heat Exchange. A detailed study would be required to determine the practicality & benefit of this)
- Item 5.2.3 Plate type Heat exchanger, could be replaced by Hot Water Heater fired on Biogas, when available, with Natural Gas back up. Refer to Section 6.6
- Item 5.2.8 could utilize possible Hot water from a Co-generation plant as it is a constant load & already has the water supply return lines. The practicality and cost would need to be investigated further.
- The condensate would now be returned to the de-aerator, hotter, reducing feed preheat!

5.5 SUMMARY.

If Natural Gas is used on site, the only practical and economic uses in the current Gelatin process would be for fuel to

- Finafire Boiler.
- Maxitherm Boiler or replacement.
- WWTP as a back up supplement to Biogas fire small H.W.S.

If Co-generation is installed, the substitution of current steam / condensate use, by using high temperature Hot water @100 to 120°C & Low Pressure Steam in 5.2.1 (if no economizer fitted) & 5.2.8 for Dryer Heating requirements and tank farm and WWTP, 5.2.3 if Hot Water Heater is uneconomic.

6.0 SITE FUEL & BOILER OPTIONS.

As discussed in **Section 4.4.2** the Natural Gas on site reticulation system on Gelita's land will consist of an underground 160 mm N.B. HDPE pipe at 1 meter below ground level.

On reaching the "designated" gas station at a suitable location adjacent to Boilers the underground gas main will enter the above ground station which typically consists of:-

- gas metering & recording device & bypass.
- pressure reduction equipment as required.
- moisture trap / and filter equipment as required.
- Safety isolation as required.

All above ground Natural Gas pipe-work & fittings will be of steel, suitably protected against the environment, and suitably mounted on a concrete pad.

All work will be to the relevant S.S. Gas codes.

From this gas station the Natural gas will be piped to the existing boilers.

If considered appropriate, the Natural Gas supply would be piped to the following locations:-

- W.W.T.P. for Hot Water Heater fired by either Natural Gas or Biogas.
- Cogeneration engines adjacent to coal delivery area.
- Gas Absorption Chillers or Rotary Wheel Desiccant dryers at the existing Air Handling & dehumidifying location.

6.1 STATUS QUO.

If Gelita retain the present fuels of coal & L.P.G, for CPI increases to LPG & CPI increases to Coal plus small transport costs, the estimated annual fuel bill are shown in **Table 1.1**.

As production increases and fuel costs increase (probably > than CPI due to dependence on transport & petroleum industry), this cost difference will become prohibitive.

This report has not investigated the option of purchasing an extra fluidized bed coal burning water tube boiler as its capital cost will be >\$M2.2 and the cost of coal \$/GJ will be greater than Natural Gas.

Refer to Tables 1.1, 1.2 & 1.3

Note. With the conversion to Natural Gas, it is recommended the existing LPG tank, and contract with Origin be maintained, as this will provide back up to Natural Gas as is the case now with coal.

6.2 CONVERT BOTH BOILERS TO N.G & RUN FINAFIRE ON COAL.

This option is not recommended. Saacke have advised, that the option of installing a Natural Gas burner(s) into the Finafire and retaining the coal fired system, presents problems and is not going to be easy to accomplish as the existing gas burner is simply not large enough to carry the load.

Also, to fit two smaller burners to contain the flame geometry, in such a small combustion chamber length presents problems, that that could result in flame impingement on boiler water tubes, which is undesirable.

Another problem is that cool air would be needed to run through the Saacke burners, when on coal firing to provide cooling and prevent deterioration of the gas burner components. This would then create mix &

cooling of the existing stoichiometric air fuel mix, affecting & lowering the boiler's performance

At present, the existing burner shares the main combustion air fan and has very fussy air distribution system, and would require design expertise in any reconfiguration.

The electrical savings would be considerably reduced.

It is considered the best solution is remove all coal firing and install new Natural Gas Equipment. All new burner train and associated works and safety interlocks is to relevant A.S. codes.

6.3 CONVERT BOTH BOILERS TO N.G. & RUN AS NEEDED ON N.G

Saacke's experience in converting Finafire Boilers to Natural Gas, has led them to believe boiler efficiency will increase by about 2 to 3%, due to the clean nature of the combusted gaseous fuel.

With the combustion of coal there must be an increased soot build up on tube surfaces, especially the waste heat boiler, impeding heat transfer, and hence reducing boiler efficiency. Note this efficiency increase has not been allowed for in any cost savings / future fuel cost calculations.

Conversion of the Finafire requires removal of plenum & the bottom of the existing Fluid Bed Tank. The Fluid Bed Tank bottom is now covered with a new steel plate and suitably line with refractory bricks & insulation. The New Natural Gas burners with LPG back up & combustion air & burner registry are mounted into the vertical wall of the Fluid Bed tank, from the waste heat boiler end. The gas supply train & valving and control box are usually mounted on the steel column supporting the Boiler. Refer to Appendix 12.15 for photo of Natural Gas burner installation at Rouse Hill.

The Natural Gas will come via steel pipe, from the distribution & metering compound. Location to be determined, possibly over road on grassed section from Boiler House. Refer to Appendix 12.14 for Photo of Natural Gas Station at AJ Bush, Rouse Hill

The combustion air fan(s) (probably < 5.5 kW_E motor(s)), will be mounted directly under the fluid bed tank, on the concrete floor.

All the existing equipment associated with coal firing can be removed as well as the cyclone and bag filters.

Note. There will probably be a use for all this redundant equipment especially the Bag house Filters, within the Gelita Group operations, which would assist in reducing capital expenditure.

Conversion of the Maxitherm to Natural Gas will require a new burner registry, gas train & possibly new combustion fan.

Maxitherm Efficiency is not known, it should be around 80%.

This boiler is nearly 30 years old, and would be considered near the end of its economic life if its to operate as a duty boiler, which will be the case, as production increases.

It was mentioned in that the Maxitherm could be used elsewhere in the Gelita operations.

NOTE. Calculations based on present data & operation, indicate the 2 existing boilers are close to peak loads @ projected 4,000 tonne of gelatin per year, and under capacity if Kathabar de-humidification option is selected and Co-generation is not considered. Hence a larger boiler than the Maxitherm will be needed.

6.4 CONVERT FINAFIRE TO N.G. & PURCHASE NEW / 2nd HAND LARGER N.G BOILER.

Whilst this option will involve more capital outlay now, it would give the option to alternate the Finafire & the new boiler weekly as duty boiler, and as the steam load increases to "parallel" the boiler operation.

Calculations show that a 5MWth Natural Gas Fired boiler, when run in parallel with the Finafire, will meet the estimated steam load at 4,000 tonne of gelatin per year. To operate at peak load of 85% of M.C.R.

However, it is doubtful and there will be sufficient capacity to supply the possible extra steam load of the Kathabar system for Dryer de-humidifying.

The current installed boiler capacity @ 100% M.C.R. is 8,200 kg / hr from the Finafire & 7,178 kg/hr from the Maxitherm, giving a total of 15,378 kg/hr which is greater than the estimated peak steam flow (14,038 kg/hr), by 1,340 kg/hr, i.e. with 2 boilers operating, peak load is 91% of M.C.R.

If economizers are fitted to both boilers, W.W.T.P Hot Water Heater is implemented & insulation repaired / installed as required then "excess capacity margin" will be increased.

If this is considered too tight, a larger N.G. fired boiler to meet as AS 2593 requirements of un-attended operation, i.e. no greater than 10 MW water tube.

No 2nd Hand Boilers were currently available with Tomlinson. This options could save considerable expenditure if a quality unit can be located.

An Economizer was also included in the purchase of both new boilers. "Foot Print" size of Boiler was not provided by Tomlinsons

6.5 ECONOMISERS.

There are significant Thermal Energy in the Exhaust gases from Water Tube Boilers, in the case of the Finafire typically the exhaust is at 230°C.

Initial calculations indicate if the condensate / fresh water Make up were passed through an "economizer", i.e. a heat exchanger in the exhaust gas pass would increase the Feed water temperature by approximately 22°C.

This would consequently reduce the amount of steam require for the de-aerator, increase steam availability to the plant and reduce fuel consumption.

It is recommended further investigation be undertaken in the detail of using economizers on the current of future installed Boiler(s), and pipe work modifications and controls needed & costs.

There is adequate room for Economizer installation of Finafire, especially if existing Cyclone & Bag House are removed. If fitted duty fans capacity would have to be checked to handle extra Dp across economizer. Should be satisfactory as Dp is probably equivalent to Cyclone & bag Filter.

6.6 W.W.T.P HOT WATER HEATER.

Section 5.2.3 From previous Energy Audit and Feasibility Study on Cogeneration using biogas, 1999 / 2000 undertaken by North Power, the writer recalls the steam flow to the WWTP Plate type Heat Exchanger (in tank farm area), was about 300 kW.

Currently distributed hot water @ 90°C, goes to the reticulation system & is provided by steam/ water Heat exchanger.

Steam / condensate on one side & Hot water on the other.

This current use could be replaced with a small dual fuel Hot Water Heater, (H.W.H), fueled by W.W.T.P. biogas, with N.G back up, the H.W.H. to be located in the W.W.T.P. & to provide W.W.T.P needs, with any excess hot water being fed back through existing pipe work for use in Hot Water or Warm water tank, possibly using the existing heat exchanger @ the tank farm.

Advantages include takes load off Boilers, & utilizes Biogas, currently flared. If the Biogas exhaust temperature is kept >150°C at coldest "pinch point" and flue is

kept in Stainless steel, then corrosion should not be a problem due to the high H₂S content of the biogas.

There maybe some Green house gas reduction benefits.

Note. It was advised that Biogas volume flow rate October, 2004, was possibly considerably less than the flow in 1999 / 2000. Present indications ais that it is 1/3rd of previous flow. Viewing the current flame supports this. The deliverable biogas flow would have to be verified to determine the viability of this particular component of Natural Gas substitution.

6.7 PRELIMINARY COSTINGS.

6.7.1 Notes on Table 1.6

- 6.7.1.1 Saacke, Australia were contacted for a budget price for conversion of the Finafire & Maxitherm Boilers as they were recommended by companies that had undertaken the conversions previously.
- 6.7.1.2 Tomlinson Boilers, Australia were contacted as they had previously supplied quotes recently for a project the author of this report was involved with. I would assume Tomlinson Boilers would use the Saacke Burner system on the LPG & Natural Gas fired boilers.
- 6.1.7.3 Air Solutions were utilized as they have some plant experience from previously conducted Energy Audit in 1999 with North Power.
- 6.1.7.4 All of the de-humidifying alternatives have an unknown installation cost, so I added \$100,000 to the supply estimates.
- 6.1.7.5 No Plumbing firms were contacted for any pricing of Natural Gas or site pipe work.
- 6.1.7.8 All provided prices / costs are indicative (broad-brush) only & the Suppliers advised prices are budget only.
- 6.1.7.9 Items like labour costs, and materials (valves / pipe work / meters etc), equipment hire where based on Rawlinsons Australian Construction Handbook, 15th Edition with appropriate escalation factors. These costs were broad brush.
- 6.1.7.9 No allowance for engineering detail design, drawings or Project Management was allowed for.

The following comments are offered on how each item was costed.

6.7.2 CONVERT FINAFIRE TO N.GAS WITH L.P.G. BACK UP.

Saacke, Australia who have converted at least 2 Finafire Boilers, were contacted, and have inspected boiler site.

For the installed Finafire boiler, they have advised the following, a budget only estimate for supply, installation and commissioning of.

"To supply 1 *Saacke EHG100-BC75 gas only firing burner, remove coal fluidizing system, remove existing Weishaupt burner and modify boiler front to accept the new gas burner unit. Carry out necessary refractory modifications and construct new refractory pave to boiler. Form new refractory quarl, move 1 * existing temperature sensor to rear of boiler to monitor rear end temperature, internally from the boiler to allow installation of gas burner, modify BMS to accept saacke gas BMS & interlock existing water level controls. Commission system upon completion.

Total Budget price would be \$195,000

Not included is the removal of all the coal handling and ash treatment systems and at this stage allowance to remove and modify that which is required to enable gas firing as agreed at recent site visit.

No cost allowance has been made for AS2593 compliance changes within the existing burner control panel .

As yet Saacke have no system data on the existing PLC, nor its program, which will require re-configuring or replacement with a new PLC for gas firing, e.g a new Allen Bradley unit.

It is understood, to assist in defraying capital costs, Saacke assisted / directed the owners in removal of redundant equipment using plant Labour, on the previous jobs.. Saacke indicated this could also be the case at Gelita.

6.7.3 CONVERT MAXITHERM

Saacke advise the Maitherm is fairly simple to convert.

They would fit a set of Natural gas nozzles and a new gas train if necessary.

Otherwise its just about ready to go to Natural gas. A budget figure of a maximum of **\$12,000** was advised. This did not include any repairs to the boiler that might be incurred, that would usually occur under maintenance.

6.7.4 PURCHASE & INSTALL NEW 5 MW_{th} BOILER.

Tomlinson Boilers Australia, where contacted for a budget quote for a 5 MW_{th} water tube, Natural Gas fired to satisfy AS 2593, they also made a site visit.

The budget prices (by way of return figures on my original inquiry) did not allow for a new feed tank, feed pumps or stack, as it was assumed the existing equipment was serviceable for the new boiler. The purchase and installation of an economizer was quoted , and is included in the Budget figure, however no pipe work alterations were budgeted for.

The price also included removal of Maxitherm to a safe site location and install connect commission of new Boiler. The Price given by Tomlinson's was \$384,000, hence I've "allowed" a total cost \$450,000 to cover for a new feed tank, feed pumps, stack and pipe-work modifications.

6.7.4 NATURAL GAS TO BOILER SITE COSTS.

Arrow Energy advised a cost of \$40 / metre for the 160 mm N.B. HDPE supply line, plus connection at either end and the appropriate "Gas Station" and then supply to Boiler. Costs for these components where "guessed" using Rawlinson's. I'm not sure if this price included supply and lay or just supply. That's why I've used Rawlinson's.

I've estimated the total cost to Natural Gas supply to both boilers from the "gate" at \$236,065. As mentioned all above ground pipe work is in mild steel, the photo of AJ bushes Rouse Hill shows a typical Gas Metering station. Price of metering etc is specialist equipment and I don't have an accurate cost on those items.

Also needed for inclusion is design / drawing / certification component

6.7.5 W.W.T.P. HOT WATER HEATER.

Equipment prices provided by Tomlinson's for 750 kW HWH was \$66,900, with using existing stack. Price include supply install commission. Natural Gas supply and modifying the existing Boigas system, plus changes to existing Hot Water plumbing & work at Tank farm end, where all estimated from Rawlinsons. I've "allowed" a total of \$126,600

6.7.6. PURCHASE & INSTALL NEW 10 MW_{th} BOILER.

As a possible alternative to the 5 MW_{th} boiler, Tomlinson's also provided the budget costs for a larger boiler (10 MW_{th} water tube, Natural Gas fired to satisfy AS 2593). The Supply install including feed pumps, feed tank and stack, and blowdown tank and chemical dosing was \$591,000 including economizer, install, commission, & removal of Maxitherm to "safe on site location". I've "allowed" a total of \$691,000.

6.7.7. PURCHASE & INSTALL NEW 10 MW_{th} BOILER. (COAL FIRED).

To assist in decision making and in the event Natural Gas conversion did not proceed, Tomlinson's also provided a budget cost for an equivalent Coal fired boiler to replace the Maxitherm.

This was price of \$2,200,000 was for a previous installation, no details of date or location provided. The price appears authentic when considering all the extra coal handling & firing, ash removal, and exhaust gas treatment equipment required for coal firing.

6.8 ESTIMATED ANNUAL SAVINGS.

6.8.1 Converting to & running on, Natural Gas.

The estimated savings for conversion to Natural Gas as shown in Table 1.6 were calculated from spreadsheet Appendix 12.5.

It was demonstrated as reliance on LPG as a fuel for the Maxitherm increased with estimated increase in Gelatin production so the annual fuel bill would increase as per Table 1.1 This represented a an estimated savings of \$1,126,548 in 3 years, and if the production was maintained at 4,000 tonne Gelatine per year, each proceeding would have saved \$835,774 a year, if the steam supply system had been left as the "status quo".

6.8.2 Converting WWTP to Hot Water Heater.

It was assumed the average steam load to the WWTP was 250kW, and knowing the average steam load is 6,267 kg/hr, then by proportion, steam power is 3,821 kW.

Proportioning the 250 kW gives 6.5%, and knowing the annual fuel bill for the boiler is \$417,170, if the WWTP heat exchanger is taken off the steam load and run on biogas alone, then savings per year would be 6.5% Of annual fuel costs, i.e. \$27,300 / yr.

It was assumed no Natural Gas was used.

6.8.2 Purchase New Coal fired Boiler, only need LPG as a back up.

If the Natural Gas project did not proceed, and the predicted Gelatin tonnages where produced, then a new coal fired boiler will be needed to produced the required steam loads.

A coal tonne / tonne of Gelatin factor of 2.2253 had been calculate, from historical data, using 2003.

Consequently the coal tonnages for increased gelatin tonnages could be estimated.

Also it was assumed, that LPG usage would remain roughly the same, with annual costs of \$60,000, \$65,000 & \$70,000 used for the years 2005, 2006 & 2007, allowing for increased delivery charges etc.

The estimated purchased coal costs were calculated using data from Table 1.3 & estimated tonnages with a constant heating value of 27.19 GJ/tonne.

Ie. 2005.	$3,000 \times 2.2253 \times 27.19 \times \$2.43 + \$60,000$	$= \$501,000$
2006.	$3,500 \times 2.2253 \times 27.19 \times \$2.65 + \$65,000$	$= \$623,500$
2007.	$4,000 \times 2.2253 \times 27.19 \times \$2.84 + \$70,000$	$= \$730,400$

Hence, the estimated fuel used cost, of Coal & LPG for those 3 years, is \$1,854,900.

If Natural Gas had been used, the estimated fuel cost for those 3 years, is \$1,880,330, from Table 1.1

This means, coal firing with a new coal fired Boiler to AS 2593, will be estimated to have cost \$25,430 less in the 3 years of operation.

Note, however, a new coal fired boiler is required, and the estimated cost of coal \$/GJ has risen to \$2.86/GJ.

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7.0 ANALYSIS & METHODOLOGY FOR FUTURE PLANT REQUIREMENTS.

7.1 ESTABLISH RELIABLE INDICES.

To give some confidence / accuracy in the estimation of future steam loads, and hence fossil & gaseous fuel energy required, requires an accurate Energy Indices to be calculated.

The most accurate Energy Indices for thermal energy is GJ / tonne.
i.e. (GJ of Fuel consumed per year) / (tonnes of gelatin produced per year).

Determining the tonnes of Gelatin produced per year & the GJ's of L.P.G. consumed per year is accurately determined from plant records.

Determination of the coal consumed GJ has an inherent inaccuracy, the heating value (or calorific value) of the washed steaming coal.

The coal energy value quoted has a tolerance of +/- 10% on the contracted figure Air Dried Figure.

For correct analysis we must use the "as received" value, which is affected by the weather in respect to moisture content.

The "as received" value is always < the "air dried" value.

For the purpose of this report, the average, as received, heating value for "New Hope" coal of 27.19 GJ/tonne, (for 2003) has been used.

7.1.1 An Energy indices, (GJ_F / tonne_{Gel})

(Fuel Energy (GJ) per tonne of Gelatin produced),
was calculated based on 2003's historical data of:

- Coal Purchased:- 5,523 Tonnes (from accounts)
- Coal C.V. (Average):- 27.19 GJ / tonne (as received, from monthly account tonnages & monthly data provided by mine.)
- L.P.G purchased:- 2,809 GJ (from Origin Accounts)
- Gelatin Produced:- 2,458 tonnes.
- Hence Energy Index:- 61.66 GJ / tonne.

Consequently, the estimated Fuel Energy requirements for increased gelatin can be calculated. Refer to Appendix 12.5

7.1.2 Steam Index, design:- (Tonne_{steam} / GJ_F)

Based on Boiler Design of 80% guaranteed, a steam index (tonne steam generated per GJ of fuel Energy) was calculated.

- Steam Index, design:- 0.369 tonne steam / GJ fuel energy
- Note the steam Index is for "optimum design" and is for steam produced by Boiler, and not actual steam consumed by the Process.

7.1.3 Steam / coal Index.

Based on Boiler Design of 80% guaranteed, related to coal consumption, steam generated per tonne of coal fired is 9.39 (tonne steam / tonne coal)

Note. To determine accurate actual indices 7.1.2 & 7.1.3, was not possible due to uncertainty of accuracy coal flow rate, and to a lesser extent boiler blow down. Consequently, the future steam estimates, whilst probably higher than for "normal operation" are considered prudent for determining future boiler capacity.

The coal Feed rate & Energy Input, can only be accurately determined over a long duration, preferably using at least a month's coal data.

The above Indices were used for estimating,

- future fuel requirements & costs,
- future steam flows Peak & average.

7.2 ESTABLISH CURRENT OPERATING STEAM LOADS.

7.2.1 Present operation. Refer Appendix 12.4

As mentioned in section 5.5.4 data downloaded on boiler operating parameters of over a weeks readings at 10 minute intervals, established that the average maximum steam flow, under current "steam plant conditions, for that period was,

- 6,090 kg / hr of saturated steam.
- peak steam flow was 8,277 kg /hr.
- Steam flow to de-aerator for heating feed water to 107°C, (replacing Blow-down & Evaporator direct injection) was using on average 570 kg/hr of live steam, with peaks to 870 kg/hr

At the time of writing this report, determination of the actual Boiler Efficiency & Steam delivered was being reviewed to ascertain reliable figures, consequently, it is difficult to calculate, with confidence, the precise boiler efficiency.

Mainly due to the uncertainty of the actual C.V. of the particular batch of coal being burnt, at that instant and the inherent inaccuracy of the density variations of coal per screw revolution. **Refer to Section 7.2.2 BOILER EFFICIENCY CALCULATION.**

The guaranteed efficiency was 80%, with an ideal of 81.7%.

Until the actual boiler efficiency can be accurately determined with some confidence, the indices will be have to be used.

In the data reviewed, the flow balance between Feed water in, (when compensated for higher temperature) as versus Steam out plus blow-down was in inaccurate, possibly due to the method of determining boiler blow down.

Also, there was considerable Blow-down, in an attempt to reduce the indicated T.D.S, which has the affect of considerably reducing the boilers output capacity, increasing boiler fuel consumption.

Messrs Pointing & Nicolle determined the blow-down rate of the condensate, (vapour could not be measured) @ 12 l/min, i.e. 720 kg /hour of "boiler water", which reduces boiler steam delivery capacity, & increases de-aerator steam flow which again reduces boiler steam flow.

Both these matters are under investigation by Gelita.

Hence, due to the uncertainty of accuracy of some data, and the current excessive "boiler blow down", it was considered prudent to use the Finafire design specifications as an optimum.

Note, Natural Gas fired, Water tube boilers are typically quoted as 80%, so the Finafire assumption is valid.

These are, to

"deliver 8,200 kg/hr of dry saturated steam @ & from 100°C requires a heat release rate from the fuel of 6,173 kW".

This equates to and "target" of 0.369 tonne of steam / GJ of fuel. (i.e. a boiler efficiency of 80%).

This Index was adjusted to **0.355 tonne of steam / GJ of fuel** to reflect the probable current position, and used in all calculations for future fuel & steam loads.

7.2.2 BOILER EFFICIENCY CALCULATION.

Refer to Appendix 12.6

Boiler Efficiency is mathematically defined as,

$$= \frac{\text{(Total Enthalpy fluid out – Total Enthalpy of fluid in)}}{\text{Fuel Energy input.}}$$

For the given time period of numerator & denominator.

Kinetic, Pressure & Potential energy flows are neglected as usually insignificant compared to the magnitude of considered energy flows.

Where, in case of Finafire,

- Total Enthalpy fluid out, is Mass of steam generated* specific enthalpy of steam *plus* mass of blow-down water * specific enthalpy of blow down water.
- Total Enthalpy of fluid in, is mass of feed water in * specific enthalpy of feed water.
- Fuel energy is the mass of coal used * Heat Energy of the coal (as received).

The longer the time period, the more accurate the result, hence in the case of a coal fired boiler, data is collected over a day.

The data needed to calculate these energy flows are made up of various parameters and fluid properties, some are measured, others derived or assumed.

e.g. Enthalpy of steam depends on

- Mass of steam, from veribar, **FT 510B**, but it on measures an averaged velocity, which when multiplied by a known flow area, from known pipe diameter, gives a volume flow at some pressure & temperature. The mass flow rate is obtained by multiplying the volume flow by the density. This is obtained from the steam tables, but it assumes at a constant pressure, unless the veribar is pressure compensated. Also the steam is assumed saturated i.e. dry. The specific enthalpy from the steam tables, depends on pressure and temperature. As pressure is trended, that's O.K. however if the steams dryness fraction is less unity and unknown, we are only assuming a specific enthalpy. *Consequently we have three possible errors in the steam energy flow.*
- Present determination of blow down is questionable, and due to the large amount of current blow down, it is advisable not to attempt a "Boiler Efficiency" determination. Also the blow down water temperature is not known. Mass of enthalpy in, i.e. water in, is measured by a meter which records volume flow in litres. Also the temperature in the de-aerator is recorded. The water temperature and pressure allow both the specific enthalpy & density to be determine from the steam tables. *It is considered reliable data.*
- The present determination of coal used is determined over a month, (from deliveries) and whilst indicative is not accurate To assure precise coal usage requires a detailed test.(methodology to be advised, when required). Also the calorific value of the coal used must be known. This can vary +/- 10%). *Hence, we have two major error areas affecting calculations.*

It is recommended, when confidence in the accuracy of flow measuring equipment is confirmed, and current cause of excessive blow down is remedied that a test be undertaken to determine actual operating efficiency of the Finafire Boiler. A detailed data collection required will be supplied if required.

Reviewing downloaded data from 30th September to 7th October, and subsequent energy and mass flow calculations, it is estimated the current boiler efficiency is around 77%.

This is partly verified from using the installed exhaust gas monitoring analyzer averaged readings & exhaust Gas averaged temperatures & using the Victorian Gas & Fuel" combustion charts for anthracite coal. These were adjusted for the lower C.V. of current coal used.

It is assumed design heat losses of 0.3 %, have been maintained, i.e. not increased through deterioration & reduced maintenance.

The steam condition from the boiler is assumed to be dry. To balance the measure & assumed energy flows, dryness fractions of less than 1 were used to balance the Energy Flow Equations.

It was mentioned, during site discussions, that there was evidence of erosion in the steam discharge passages, which indicates possible water carry over, this would be a distinct possibility at high flows.

The condition of the baffles / separator at main boiler take off is not known, and it is possible if these are damaged, then the steam has a small amount of liquid / wet vapour carry over (<3%).

To assist in establishing what the quality of the steam is at different steam loads, a throttling separating calorimeter be obtained and trials undertaken to establish steam quality.

7.3 CALCULATE FUTURE STEAM NEEDS.

It was assumed that for increase in Gelatin production, the steam requirement, fuel, be it Coal / L.P.G / N.G consumption, will increase proportionally.

Consequently expected steam profiles for 3,000 , 3,500 & 4,000 tonnes of gelatin production would be factors of 1.2, 1.4 & 1.6 of the current data, assuming a nominal 2,500 tonnes of Gelatin / year.

It was assumed these production rates would be achieved 2005, 2006, 2007 respectively. Currently, the 2004 Gelatin production current indications look to be 2,650 tonnes

Refer to Appendix 12.7 on steam flows & **Appendix 12.6** spreadsheet on costs.

The method of estimating LPG fire Maxitherm boilers proportion of load, was determined by,

- the difference between the predicted peak load & the Finafire's M.C.R. of 8,200 kg/hr at 10 minute intervals
- Sum the excess difference for each hour for each of the 7 days data. (referred to as Day 1, Day 2, etc.
- Sum the week's excess, then multiply for 51 weeks operation / year.
- This was done for 3,000, 3,500 & 4,000 tonne Gelatin production rates.

Calculations show that, under current "steam plant conditions of steam feed heating in the de-aerator & un-insulated surfaces steam & hot water pipe & tanks" at 4,000 tonne / year of Gelatin production, the average maximum steam flow for the heaviest day will be,

- 10,200kg/hr of saturated steam.
- peak steam flow will be 13,250kg /hr.

- At this production level it means for most cost effective operation at current coal/LPG costs the coal fired Finafire will operate at 100% M.C.R to produce the base load of 8,200 kg/hr of saturated steam, whilst the standby Maxitherm will deliver the remaining 5,043 tonne of steam.
- Based on the estimated fuel costs of Coal / L.P.G (2007) Gelita's fuel bill will be \$1,527,000, as versus an estimated Natural Gas bill of \$687,000 costs at 100% CPI.
- The savings of conversion to Natural gas and operation on, will have reduced the projected fuel bill by \$840,000 for 2007 & each year after.
- It is considered, that in "actual practice" the L.P.G fired Maxitherm will probably have to run more than estimated, to help balance boiler operation.
This will increase the estimated cost difference more in favour of Natural Gas firing.

Refer to Table 7.3, for Summary of steam estimates for each year & predicted Gelatin production.

**Table 7.3,
SUMMARY OF PREDICTED STEAM / FUEL ESTIMATES.**

Estimates	2004	2005	2006	2007
Gelatin tonnage (projected)	2,650	3,000	3,500	4,000
Peak Steam flow (kg/hr)	8,744	10,528	12,283	14,038
Average steam flow (kg/hr)	6,760	7,650	8,925	10,200
Fuel Energy Need. (GJ/yr)	163,400	185,000	215,800	246,600
Steam generated for year. (tonnes)		61,645	71,919	82,193

These above results indicate, that the predicted peak steam load is 85% of capacity of the existing boilers.

Table 7.3 demonstrates the various calculated steam requirements for future production levels.

Even without the Kathabar De-humidification option, purchase of at least one new Natural Gas fired, Water tube Boiler, unattended operation to AS 2593 would be a prudent decision.

7.4 SUMMARY OF FUTURE STEAM DELIVERY.

For the case of No Kathabar system. From the review of the current steam system, and the calculations for future steam loads, the two existing boilers Finafire 5 MW_{TH} & Maxitherm 4.5 MW_{TH}, when converted to Natural Gas, if all measures to reduce steam auxiliary use & possible substitution, (i.e de-aerator use economizers & W.W.T.P replace with H.W.H. on biogas) will possible handle future estimated steam load. However, both boilers will be on duty, with no back up, so if either boiler is O.O.S for a period, production will have to be reduced! Also the Maxitherm is approximately 30 years old.

To provide back up, and consequently assurance of steam availability, a third 5 MW_{TH} Natural Gas Water Tube Boiler is required for service.

An alternative would be to remove both existing Boilers and possibly re-use in other Gelita location & purchase two (2) New Natural Gas fired Water tube boilers with economizers to AS 2593, giving one on & on standby operation.

8.0 DE-HUMIDIFICATION.

The existing Screw refrigeration / de-humidification system, has a large electrical consumption, previously estimated at 21% of the total electrical load.

This report is not intended to address issues in regards to "the best and most cost effective method of de-humidification, only to identify Natural gas or steam requirements.

As the Desiccant Method of de-humidifying results in the 0.008 g /kg moisture content air having an elevated temperature of up to 55°C, the present understanding is that it will require cooling to the present inlet condition of 29 °C.

It is understood a detailed study will be undertaken to address and clarify relevant issues to determine which method of dehumidification is most applicable, reliable and cost effective (both energy efficiency and maintenance issues), and also address what is the maximum temperature that can be admitted to the dryer.

As there are commercially available alternatives to the method, which operate on steam or Natural Gas, with smaller parasitic electrical loads, "budget quotations" and indicated Energy requirements, where requested to assist in the Feasibility Study. Air Solutions International Pty. Ltd & Munters where approached & provided the following indicative data & information.

Available alternatives are:- (Information supplied by Air Solutions)

- A. Existing electrical driven screw compression refrigeration system, with chiller and run around coil system. (Stahl)
- B. Natural Gas fired Absorption chiller, with water bulk air cooler, with post heating Cooling Tower to re-heat air. (market brands include Thermax, Trane, York etc)
- C. Solid Desiccant Wheel, with Cooling Tower post, Natural Gas recharge. (market brands include Seibu Giken, Munters.)
- D. Kathabar, steam / liquid desiccant with Cooling Tower post. (market brand, Kathabar.)
- E. Natural Gas fired Absorption chiller, with run around coil system, and Cooling Tower to re-heat air. (market brands include Thermax, Trane, York etc)

Air Solutions also provided a spreadsheet, refer **Appendix 12.8** summarizing each alternative.

Table 8.1. Provides a summary of dehumidification methods available and indicative energy loads is shown in as well as indicative purchase costs, excluding, installation and associated works.

The estimates of Natural Gas steam use was based on Brisbane annual Ventilation Load data.

Note the indicative annual operating costs *do not* include electrical load.

Prices exclude G.S.T. & have a delivery time of up to 16 weeks.

It should be noted that when Air Solutions approached both Kathabar & Seibu Giken (desiccant wheel), where advised them of the plants atmospheric corrosive compounds & typical concentrations, it was advised that *"Kathene is a very efficient absorber of sulfur compounds, and they eventually react to form Li₂SO₄. At the levels indicated in your memo, the LiCl would be far too high to be practical" and they go on to suggest the best approach is to pass the outside air through a water scrubber before it goes into the cooling coils"*

Seibu – Giken indicated at these high levels would cause corrosion damage to their equipment.

Munters informed that the materials used equipment are basically GRP wheel & metals used in structure & casing is aluminium, and can be additionally coated to protect materials as required, depending on environment.

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Both Munters & Seibu – Giken each rotary wheel desiccant dryer, (2 needed to handle air flow), have a “foot Print of nominally 3.15 m width * 6.5 m length, with a height of nominally 4.5 m.

A possible solution to the possible corrosion effects is for Gelita to purchase a small desiccant wheel dryer, lab-performance tested & start running immediately.

A few months down the track the unit could be returned to the Lab & re-tested to see the effects of the site atmosphere.

Table 8.1
STEAM & NATURAL GAS LOADS FOR ALTERNATIVE
DEHUMIDIFICATION OPTIONS.

Estimated: Peak loads. Annual Fuel load: Budget Costs. Annual Fuel Costs.	B. Gas Absorber with Bulk Air Cooler.	C. Gas Solid desiccant wheel with Tower Post.	D. Kathabar / steam / liquid desiccant with Tower Post.	E. Gas absorber Chiller with run around coils.
Peak Fuel requirement	1,860kW N.G (7 GJ/hr)	1,666kW N.G. (6 GJ/hr)	1,400kWsteam (2,500kg/hr)	750 kW N.G. (2.7 GJ/hr)
Annual Fuel requirement	13,433 GJ/yr of N.Gas	13,755 GJ/yr of N.Gas	5,100 tonne/yr of steam 15,800 GJ/yr	6,333 GJ/yr of N.Gas
Indicative Purchase costs.	\$532,000	\$368,000 to \$427,050	\$665,000	\$375,000
Indicative Fuel costs, exclude electrical.	\$36,940	\$37,830	\$51,000	\$17,416

9.0 COGENERATION.

9.1 DISCUSSION.

With the offer to supply electricity it was assumed that Arrow Energy would be building a small Power station to supply the Electricity needs of Gelita and A.J.Bush.

Logically the new Power Station would use Natural Gas.

It is considered most likely that the generators would be driven by either "Spark Ignition" reciprocating engines or Gas Turbines, rather than a Rankine Cycle Boiler / steam turbine Gen-set.

If either of the "engine / turbine" methods are used, then there is a significant amount of "Waste Heat" available @ temperatures suitable for process heating as on site at Gelita.

A high proportion of "waste heat" can be recovered through heat exchangers, and utilized in as "process heat", where applicable.

Typically, for "Spark Ignition" reciprocating engines of the Natural Gas fuel Energy input,

- 36 % is converted to Electrical Energy.
- 18 % is reclaimed as Hot Water @ < 125°C, &
- 16 % is reclaimed as Low Pressure steam or Hot Water.
- This gives a thermal efficiency of 70%.

This is called Cogeneration.

The question is then asked if the Arrow Energy owned Power station was constructed on the Gelita site, at a mutually convenient location, and Heat Recovery units were installed, if Gelita could gain access to the waste heat source, it could replace part of the steam use, and hence reduce Natural Gas purchase. It was assumed the cost of the waste heat would be considerably less than the cost of Natural gas.

As mentioned in Section 3, Arrow Energy's response was vague.

This brief Cogeneration review investigates the benefits if Gelita built, owned and operated & produced its own electricity & waste heat", and is based on material published from the publication:-

"A review of the viability of cogeneration in Australia"
Commonwealth Department of Industry, Science & Resources.
Australian EcoGeneration association.
Ver 2 October, 2001
SINCLAIR KNIGHT MERTZ.

9.2 COGENERATION BENEFITS.

A "broad brush" look at the possible benefits and costs was undertaken.

A spreadsheet was produced using data provided in Ver 2, for various Engine manufacturers / Company's listed as supply "Cogeneration Turnkey Projects, only spark ignition engines were considered. Refer Appendix 12.10

Engines were selected that could deliver the historical "Peak Demand" of 2,415 kW, which would be from the operation of the 2 Refrigeration screw compressors. It is assumed that Gelita would have installed Power factor correction & that it would be near unity.

The Electrical duty (kWhrs / year) from indicative annual electricity usage, then determined the Natural Gas each engine required. (obtained by multiplying the kWhrs by the kJ/kWhr).

The Most Efficient / cost effective unit, from the data presented, appeared to be the Wartsilla.

Total all up cost for electricity is estimated at 3.3^c/kWhr in the first year of operation.

The amount of Hot water & steam that could be generated at peak and average loads was also determined.

Waste heat available to process is:-

Hot Water. averages @ 919 kW (peak to 1,208 kW) of Hot water at less than 125^oC, if used directly, or approximately 100^oC, if used indirectly.

Steam. averages @ 817 kW (peak to 1,073 kW) of Low pressure steam at about 300 kPa.

Process users would need to be at a relatively constant heat load, to be practical e.g. part load to APV Heat Exchangers.

Table 9.2 summarizes the results from the spreadsheet for the current scenario, i.e. screw compressor / refrigeration / dehumidifying system for dryer..

It can be seen that if Natural Gas is supplied to site, and Cogeneration is utilized, then after 3 years operation, & achieving 4,000 tonne of gelatin, \$1,861,000 will have been saved in Electricity & Natural Gas fuel costs if Natural Gas is supplied to site by Arrow Energy.

If the above scenario is compared to current the current energy forms energy forms purchased then after 3 years operation, & achieving 4,000 tonne of gelatin, \$2,792,841 will have been saved in Energy purchases to site.

Turnkey Project costs ranged from \$2,420,000 to \$4,540,000, on 2001 costs. It is not clarified if this included costs to existing process equipment.

Table 9.2 ESTIMATED ANNUAL ENERGY COSTS WITH COGENERATION.

For 15.8 GWhrs / year of Electricity	2005	2006	2007
N. Gas used for Cogeneration. (GJ/yr)	133, 952	133, 952	133, 952
Free Waste Heat for process use. (GJ/yr)	67,150	67,150	67,150
N. Gas needed for Boiler. (GJ/yr)	117,830	148,660	179,490
Annual Cogen & Boiler Energy Costs (\$/yr)	\$842,220	\$946,728	\$1,056,020
Annual Energy Costs "Status Quo" (\$/yr)	\$1,434,781	\$1,761,652	\$2,441,376
Annual Costs with N. Gas & no Cogen. (\$/yr)	\$1,463,416	\$1,565,525	\$1,677,413
Cogen. savings over "Status Quo" (\$/yr)	\$592,561	\$814,924	\$1,385,356
Cogen. savings over N.G & no Cogen. (\$/yr)	\$621,196	\$618,797	\$621,393

9.3 COGENERATION PLANT REQUIREMENTS.

9.3.1 Possible Site Location. In the area adjacent to existing Coal Delivery Area. Approximate Plant Foot Print required for plant building is estimated to be 15 m * 15 m.

- 9.2.2 Access to Cogeneration Plant if owned by other than Gelita, must not interrupt or interfere with Gelita's operations.
- 9.2.3 Engine(s) would be located in a sound proof Plant Room. The proposed location behind the Process Hall will significantly reduce noise emissions.
- 9.2.4 Ensure a secure Natural Gas supply from proposed "Gas Station" to "Spark Ignition" engines.
- 9.2.5 Ability to provide heat sinks from Cogeneration waste heat recovery systems, i.e. steam or hot water from exhaust gas can be bypassed. Jacket Water and Lube Oil will need alternative Cooling Tower heat sinks, suitably sized and located, if and when process heat requirements demand.
- 9.2.6 It is envisaged routine maintenance, requiring engine shut down, would be required approximately every 6 weeks, for 6 hours, with a major service annually.
- 9.2.7 Adequately supported, insulated and secure pipe work distribution system, with surge tanks and pumps and controls as required to recirculate the Hot Water in the reticulation system.
- 9.2.8 If steam is generated, design to conform to AS codes.
- 9.2.9 Power factor on Main boards would be necessary to reduce size of selected generators.
- 9.2.10 Sufficient electrical interlocks to allow instantaneous switching from one electrical supply to the alternative.
- 9.2.11 The Cogeneration plant to operate with minimum supervision, with fail safe operation and fully computerized for ease of problem diagnosis and plant performance & delivery.

9.4 ELECTRICAL SUPPLY ISSUES.

Country Energy was contacted, refer Appendices 9. to assist in giving some indication of possible extra costs or penalties associated with not using the current contracted supply and needing the availability of supply.

The general response was more negotiation discussion is required with network & electricity supplier.

Reading, between the lines, it is understood this means that there will be an extra cost as well as Natural Gas purchase & Maintenance costs.

Country energy advised they would not consider any arrangement or ownership of a BOO scheme, (Build Own Operate), "however they would be able to introduce a potential project proponent to Gelita if acceptable".

9.5 GREEN HOUSE GAS REDUCTIONS.

Green House Gas emissions of CO₂ would be significantly reduced, initially by 58%!

Refer to Table 10.2.

This table shows that there is also great environmental benefit from cogeneration. It is the writer's opinion that if this project is implemented with Australian & Queensland Government knowledge and involvement there will be significant financial and other benefits for Gelita as it again reinforces its commitment in protecting the environment.

The writer is not sure on the Government awareness / implementation process, as the initial contacts where "at the desk" enquiries, and the people attempted to connect me to "someone who knows" often fell in the too hard basket.

10.0 GREEN HOUSE GAS REDUCTION EQUIVALANCE.

10.1 REPLACING COAL WITH NATURAL GAS.

For each tonne of black coal consumed on site,

- 2.1 tonne of CO₂ is generated.
- This equals 0.0775 tonne of CO₂ / GJ of coal fuel energy burnt.

Natural Gas generates,

- 0.0514 tonne of CO₂ / GJ of fuel energy burnt.
- L.P.G. generates 0.0595 tonne of CO₂ / GJ of fuel energy burnt.

The following **Table 10.1** is a summary of **Appendix 12.11**, and shows the estimated Green House Gas CO₂ generated, by combustion of coal & LPG mix as versus Natural Gas for future production levels, and hence the CO₂ tonnage & % reduction each year, by using Natural Gas.

It is of interest as the dependence on LPG increases (and the cost becomes prohibitive), the Green House gas production reduces.

Table 10.1
NATURAL GAS, ESTIMATED TONNE REDUCTION OF CO₂

	2004	2005	2006	2007
Gelatin Production (tonnes)	2,650	3,000	3,500	4,000
Coal & LPG (tonnes CO₂)	13,197	14,827	16,993	18,834
N.G. (tonnes CO₂)	8,399	9,508	11,093	12,677
Difference (tonnes CO₂)	4,799	5,319	5,900	6,157
% reduction / increase	36.4%	35.9%	34.7%	32.7%

10.2 COGENERATION, ESTIMATED TONNES REDUCTION OF CO₂

The following **Table 10.2**, is a summary of estimated Green House Gas CO₂ generated if Gelita used Cogeneration to replace purchased electricity and partial replacement of Natural gas for Boiler fuel.

The Green House Gas factor for CO₂ for Queensland Generated Electricity of 1.078946 Tonnes CO₂ / MWhr is derived from the Country Energy monthly accounts

TABLE 10.2
COGENERATION ESTIMATED TONNE REDUCTION OF CO₂

Tonnes CO₂ / Year	2004	2005	2006	2007
Gelatin Production (tonnes)	2,650	3,000	3,500	4,000
Current Energy supply Mix.	29,649	31,280	33,445	35,286
Cogen & N.Gas supply mix	11,357	12,942	14,526	16,111
Potential tonne CO₂ Reduction / Year	18,292	18,338	18,919	19,175
Potential % CO₂ Reduction / Year	61.7%	58.6%	56.6%	54.3%

As both Scenarios produce a significant reduction in Green House Gas CO₂ it would benefit Gelita to pursue both Federal & State Government involvement / awareness, to maximize the possible financial assistance that could be provided.

11.0 RECOMMENDATIONS.

11.1 RELEVANT TO NATURAL GAS.

After Arrow Energy have completed the test drillings and have confirmed the viability of the Natural Gas supply, it is recommended Gelita proceed to the Project Design Stage to implement substitution of Natural Gas for coal.

In the interim some of the issues addressed in **Section 11.2** could be undertaken.

Arrow Energy advise that the Natural Gas supply line, from the well head to Gelita' "take off" and from the "take off" to Gelita's site have been appropriately sized to handle future estimated production loads, and the possible,

- Cogeneration &
- Alternative dehumidifying process to existing.

options.

Whilst a decision on these two options would be preferably made before the Project Design Stage, it is recognized that considerable research is still required to provide information before an informed decision can be made.

11.2 RELEVANT TO SITE OBSERVATIONS.

During the site visit and subsequent analysis of data, and compilation of this report, it was noted that Gelita could implement various small "projects" to improve the operation of steam and associated users & hence reduce fuel use and costs.

From the following sections it is recommended Gelita undertake studies to evaluate / improve and inform from findings that have become aware from this Natural Gas Feasibility study.

They are listed in order from each section.

Section 1

- 1.1 Review what alternatives and indicative costs are involved if Gelita remains on the current fuels if Natural Gas proposal is not proceeded with.
- 1.2 Once Arrow Energy advise that Natural gas supply is viable and guaranteed and boundary supply location is identified, establish underground route to site.

Section 3.3.

- 3.3.1 Follow up Queensland Department of Energy with respect to Industry Grants available in regards to fuel substitution & Cogeneration, and large reduction in Greenhouse gas missions, possible NGAP certificates.
- 3.3.2 Follow up Country Energy with regards to penalties etc for back up electricity or possible they own / build / operate.
- 3.3.3 Get some indication from Country Energy of when P.F penalty will apply for a low P.F.?
- 3.3.4 Contact Country Energy in peak summer for electrical load profile for Cogeneration matching.

Section 5.

- 5.1 Undertake detailed test to determine what the actual steam load to the WWTP heat exchanger @ tank farm area is, and profile for the week.
- 5.2 Undertake detailed tests on the "Biogas to flare" to determine what flow rate is and profiled & what is C.V. of gas. Determine amount of biogas / hr / day / week / month. Also is the gas constituent the same as 1999. Need all this to determine viability of "stand alone" Hot water Heater in WWTP.

- 5.3 Investigate the practicality of using possible Hot water from a Co –generation plant for heat source for gelatin dryer.

Section 5.5

- 5.5.1 Undertake further investigation in using economizers, on the current & future installed Boiler(s), and pipe work modifications and controls needed & costs. Where does it fit in exhaust gas duct, what is Dp across on Gas side, how much does it preheat the feed water.
- 5.5.2 Undertaken further investigation and tests in determining the steam load, especially for matching to Cogeneration electrical load profile /matching steam water loads waste heat implications, costs.
- 5.5.3 Undertake detailed study on steam break up & identify magnitude of each steam load and monitor were applicable, to assist in 5.5.2. Need metering, hire or purchase and install on significant loads.
- 5.5.4 Establish quality of the steam leaving the boiler at different steam loads, a throttling separating calorimeter be obtained and trials undertaken to establish steam quality.
- 5.5.5 Investigate installing “heat recovery system” on boiler automatic blow-down, especially if water quality is as presently indicated.
- 5.5.6 Continue current investigation into boiler make up water quality, to determine cause of high T.D.S & remedy situation.
- 5.5.7 “Steam Vapour” line to atmosphere from de-aerator redirect into either Hot Water / warm Water tank. (safety & reclaims heat)
- 5.5.8 Trace out all steam & condensate return lines and update drawings. (Also needed for Cogeneration)
- 5.5.9 Trace out & up date all Hot water, Warm Water & Polished water lines and up date drawings. (Also needed for Cogeneration).
- 5.5.10 Undertake detailed review of all un-insulated pipe work and tanks (steam, Condensate Return, Hot & warm water vessels and lines to determine “hit list” for insulation to reduce purchased fuel costs.

Section 7.

- 7.1 Continue checking and refining boiler inputs and outputs for determining Boiler efficiency & conduct accurate data recording, as per section 7.2.2 for 1 month, and the determine actual Boiler Efficiency.
- 7.2 Install condensate flow rate to boiler measurement and recording equipment.
- 7.3 Keep reviewing coal flow calibration versus monthly delivery.
- 7.4 Ascertain and remedy T.D.S measurement and remedy problem to reduce excessive and energy wasteful blow-down.
- 7.5 If T.D.S is accurate, install heat recovery system on boiler blow-down.

Section 8.

- 8.1 Establish accurately what the present annual operating and maintenance cost of the Dehumidifying refrigeration system is. Need recording meters on relevant M.C.C boards to measure, record & profile main compressor loads and all parasitic equipment pumps, cooling towers .
- 8.2 Undertake a more detailed review of other options to determine which method of dehumidification is most applicable, reliable and cost effective (both energy efficiency and maintenance issues.)
- 8.3 Determine the maximum temperature that can be admitted to the dryer, i.e. is it 29°C & what is maximum it could be without effecting product quality.

8.4 If desiccant wheel option is attractive purchase a small desiccant wheel dryer, (as a pilot plant) lab-performance tested & start running immediately.

12 APPENDICES.

Appendix

- 12.1 Questions & Options sent to Arrow Energy.
- 12.2 Typical Natural Gas Analysis from Arrow Energy compared to AGL Gas Handbook.
- 12.3 Graph of current Finafire boiler steam flow profile for 7 days.
- 12.4 Graph of current Finafire boiler steam flow, maximum 24 hour load profile.
- 12.5 Spreadsheet Summary of Calculations.
- 12.6 Spreadsheet, Boiler Efficiency Calculations.
- 12.7 Graph of "estimated steam flow profile" for future increased production tonnages.
- 12.8 Air Solutions spreadsheet on possible alternatives for dehumidifying dryer air.
- 12.9.1 Munters Quotation to supply Desiccant Wheel Dryers.
- 12.9.2 Munters correspondence on estimated annual operating parameters.
- 12.9.3 Munters product range.
- 12.10 Cogeneration calculations spreadsheet.
- 12.11 Green house gas spreadsheet.
- 12.12 Coal analysis & specifications.
- 12.13 Summary of relevant Finafire users comments on conversion to Natural Gas.
- 12.14 Photo of Natural gas "Gas Station" @ Rouse Hill, AJ Bush.
- 12.15 Photo of Saacke Burner Installation @ Rouse Hill, AJ Bush.

Appendix 12.1

ALTERNATIVES FOR CONSIDERATION.

GELITA assumes that Arrow Energy will have to build a "Natural Gas fueled Power Station and infrastructure", in some location in the Beaudesert region, and that the generators will most likely be S.I. engine or possibly Gas Turbine sets to deliver the electricity..

GELITA already has the infrastructure in place on site for Space, Cooling Water, Heat Sinks for waste heat reclaim, Electrical transmission lines, access roads, & environment necessary for an Industrial undertaking to accommodate location of a small Power Station of approximately 3 to 6 MW_e size.

GELITA asks for Arrow Energy's response on the following alternatives that GELITA see are possible outcomes of an Energy supply proposal.

NOTE. These alternatives have not been listed in any order of preference.

1.1 ALTERNATIVE A.

The location of a small Power Station, owned and operated by Arrow Energy, to supply GELITA's electrical needs only, at an acceptable GELITA site location , of suitably numbered N.G. fueled S.I engine or Gas Turbine driven generators, with waste heat recovery units for use of hot water in GELITA's process.

The number of Genset's installed to ensure GELITA's electrical needs of 24/7 are met.

1.1.1 What would be Arrow Energy's supply price (\$/GJ) to also supply N.G. required for Boiler operation? **Note**, it is estimated that GELITA's N.G. usage to site could then be about 40 TJ/ year.

1.1.2 What would be Arrow Energy's offered electricity price (\$/MWhr)?

1.1.3 What would be the cost, if any to GELITA, of a 24/7 available supply of waste heat (hot water), from the heat recovery units?

1.2 ALTERNATIVE B.

The location of a Power Station, owned and operated by Arrow Energy, of electrical capacity to supply both GELITA and A.J. BUSH's electrical needs, at an acceptable GELITA site location , of a suitably numbered set of N.G. fueled S.I engine or Gas Turbine driven generators, with waste heat recovery units for use of hot water in GELITA's process.

The number of Genset's to ensure GELITA's electrical needs of 24/7 are met.

1.2.1 What would be Arrow Energy's supply price (\$/GJ) to also supply N.G. required for Boiler operation? **Note**, it is estimated that GELITA's N.G. usage to site would be below 40 TJ/ year.

1.2.2 What would be Arrow Energy's offered electricity price (\$/MWhr)?

1.2.3 What would be the cost, if any, of an available supply of waste heat (hot water), from the heat recovery units?

1.3 ALTERNATIVE C.

1.3.1 What would be the supply price (\$/GJ) to GELITA by Arrow Energy to supply N.G only, at an estimated usage of 150 TJ / year?

Electrical load profile. Use 1999 + adjustment for summer.

Issues. Waste heat sink. Could use Jacket water (120°C) & Exhaust Gas (steam or Hot water) or all hot water. Or Exhaust part Jacket & Cooling Tower.

Outages,

Back up from grid / cost?

4. POWER STATION.

4.1 Have they already selected a site to build the Power Station?

- 4.2 Need to know what ARROW are proposing, i.e. S.I. or Gas or steam Turbine driven generators, they own & on sell GELITA electricity & waste heat, in addition to the N.G. to site.
- 4.3 If it is to be located on GELITA's land and where.
- 4.4 Size of foot print on land.
- 4.5 What services do they expect GELITA to provide? Cooling water etc for Cooling tower on radiator?
- 4.6 What guarantees for hot water?
- 4.7 Need to sought out any issues of O.O.S. Would expect if Arrow are going to have a P.S. then they will be installing sufficient units to assure GELITA of 24/7 supply.
- 4.8 Need options (heat sinks) when GELITA'S process is down for yearly maintenance, or short process problems they need to be isolated.
- 4.9 Has GELITA considered owning the P.S.? with N.G supplied by Arrow and back up or top up electricity from current electricity supplier?

5. OTHER ISSUES.

- 5.1 Possible contaminants in N.G and combustion of to be advised by Arrow.
- 5.6 Need good noise insulation in P.S. What is allowable sound level Db's from site.

APPENDIX 12.12

- Oakleigh colliery coal. (1993) original specifications for Finafire Boiler &
- Current coal Specifications from. Jeebropilly Collieries, Jeebropilly, for Washed steaming coal or other New Hope Export coal.
- Note New Hope Coal update monthly there coal specifications, hence determining boiler efficiency can only done for each month.
- Price \$49.76 / tonne plus delivery, from 1/8/2004 to 31/7/2005

TABLE 12.2 compares the typical coal specifications for Oakleigh Coal 1993 as versus New Hope Export coal, currently 2004.

TABLE 12.2 TYPICAL SPECIFICATION.

	Oakleigh. (1993)	New Hope. (2004)
Total Moisture (as received basis)	10%.	Approx 9.3%,12%max
Inherent Moisture (air dried basis)	6%	4.8%
Ash (air dried basis)	14 - 18%	11.9%, 16% max
Volatile matter (air dried basis)	39%	-
Fixed Carbon (air dried basis)	40%	-
Total Sulphur (air dried basis)	0.55%	0.6%
Calorific Value (air dried basis)	26.37 MJ/kg	28.39 history,
New contract Calorific Value (air dried basis)		27,21+/- 10%.
Range	25.53 – 27.63 MJ/kg.	26.97 to 30.27 MJ/kg.
as received basis	25.444 MJ/kg	26.762 MJ/kg.

Appendix 12.2

TYPICAL COMPOSITION OF N.G. & C.S.G. (% by volume)

Gas Analysis ASTM 1945-96	Source (A.G.L)	Source (Arrow). Tipton #478	Source (Arrow). Tipton #471
Composition	N.G.	CBM gas	CBM gas
Methane	94.1%	97.9%	97.79%
Ethane	2.8%	<0.01%	<0.01%
Propane.	0.1%	<0.01%	<0.01%
I , N Butane.	-	<0.01%	<0.01%
I , N Pentane.	-	<0.01%	<0.01%
Hexanes	-	<0.01%	<0.01%
Heptanes	-		
Octanes & higher hydrocarbons		0.03	0.02
Carbon Dioxide	1.5%	0.77%	0.73%
Nitrogen	1.5%	1.3%	1.46%

Analysis by Amdel to NATA accreditation

Appendix 12.13 SUMMARY OF VARIOUS FINAFIRE DISCUSSIONS / VISTS WITH USERS THAT HAVE CONVERTED TO NATURAL GAS.

12.13.1 CONTACTED MEADOW LEA.

Talked to Mr. Keith Hall, who advised the Finafire unit is 10 MWth. Mr. Hall could not advise of costs, efficiency effects etc as the conversion was done before his arrival.

Very satisfied with reliability and cleanliness of N.G.

12.13.2 VISIT TO A.J.BUSH, Rouse Hill, Sydney. Wednesday, 20th October, 2004.

10MWth Boiler, installed circa 1990, fluidized bed, coal fired, with cyclone and bag filters on exhaust gas.

Converted to N.G. in 1999, see Ministerial Statement.

Reasons advised by site Manager (Mr. Malcom Stead) and site Engineer (Mr. Denis Cavellier).

- Unreliable operation, many outages due to poor quality auxiliary fittings, typically had 0.75 of a fitters weekly time.
- fire tube erosion in waste gas fire tube Boiler in 2nd pass entry section.)Used to order fire tubes in batches of twenty to supply ample "back up"
- Coal feed problems,
- Bag Filters constantly needed replacement (required 0.75 of week of fitter.
- Boiler is attended status. (now only on standby due to larger Danks fire tube boiler handling duty).
- Since conversion to N.G. firing operation is trouble free and availability excellent.
- No data on Boiler thermal efficiency increase/decrease, but said it would have to increase, due to cleaner fuel.
- Gas supply was a 3" mild steel line (colour coded), gas pressure @ 35 kPag.
- Exhaust flue is now direct to atmosphere via a stack.
- Fluidized Bed Chamber is now utilized as the combustion chamber, must be well insulated with refractory.
- Combustion Air Fans are installed under the Fluidized Bed Chamber.
- Only electrical rotating equipment needed is 2 off combustion air fans of 5.5.kWe each.
- They got rid of 130kWe (operating)!!!!
- C.D gives

Cameron.Smeal@gelita.com
Monday, 7 November 2005 8:09 PM
Don Shackel
Fw: progress report 2005

act:



Irrigation
cheduling Program .

Here it is Don
Regards
Cameron Smeal
Environmental Manager
Gelita Australia
(07) 5541 9442

(See attached file: Irrigation Scheduling Program 2005.doc)

GELITA AUSTRALIA

Farm Management Progress Report: October 2005

INTRODUCTION

As a condition of the current license conditions, the environmental management plan includes land application of effluent for plant production and the ability of the system to maintain a level of soil and groundwater nitrogen, salinity and sodicity within specified limits based on individual soil properties and their potential for sustainable management for plant production..

This report is a progress report following from the 2004 Farm Management Annual audit. The final report for 2005 will be submitted by 31 January 2006.

SOIL/EFFLUENT MONITORING

Monitoring of soil and effluent is being undertaken as a means of assessing the best practice management program and the parameters are used to devise suitable irrigation schedule strategies.

Schedule H Table 3 in **ATTACHMENT A** is a summary of the parameters which are being determined for objective assessment of soil and effluent.

Baseline soil sampling to 1.5 metre depth at known sites within soil units will be repeated according to schedule on an annual basis later this year to monitor movement of "salts" and nitrogen through soil profiles. Solution for analysis drawn from FullStop wetting front detectors at 10 and 50 cm for irrigation scheduling and from Longstop wetting front detectors at depths of 1 metre for soil solution extracts have EC values ranging from 3.67 to 6.99 ds/m. Given the absence of substantial (average) rainfall during the past five months, these data show that the current management practises are deemed to be within the compliance range.

IRRIGATION SCHEDULING PROCEDURE

Management of the water balance is the key to the sustainable disposal of the effluent. Irrigation is to be applied to meet plant demand for water and to remove nutrients from soil solution into the plant biomass and to meet the leaching requirement of the soil to remove excess salts to the levels specified above.

Initial estimates of water and nutrient uptake of the proposed Vetiver/ryegrass sward are based on the Medli model (Vieritz 2003). This work reported that minimizing inherent nitrogen levels to 100mg/ kg would reduce the leaching of nitrogen to acceptable levels below the root zone. This would entail growing the vetiver without effluent irrigation to enable the grass to 'mine' the soil nitrogen out of the soil. This would entail cutting and carting the vetiver grass off the soil areas. This practice will be incorporated into the overall management during the establishment phase of the revised program.

Irrigation management to sustain salt levels was found to be exceeded with chloride levels greater than 600 mg/kg. This was exacerbated by the absence of rain for extended periods the extent of which was not anticipated in the initial proposals. Remedial action was taken by shandyng the effluent with bore water.

Since then cleaner production trials have resulted in the use of potassium hydroxide instead of ammonia solution as an alkaline solution used in the ion exchange resin which will reduce the amount of ammonia nitrogen in the effluent. Also potassium chloride is being substituted for sodium chloride in the water softening process which will reduce the sodium concentration in the effluent. Further sampling and monitoring will be undertaken to measure the reduced levels of sodium and ammonia nitrogen in the soil.

The soils mapped at the soil series level (see map below) was deliberate to provide areas of soils with like properties and their use for plant production which can be deemed management units. The operational feasibility of the irrigation schedule is based on management decisions made on past experience of these soils' responses to effluent irrigation. Management constraints due to finite staff and equipment have also been recognized and the areas designated for irrigated plant production are stated in the following Table 2.

The program of rotation of irrigation runs proposed by Hydroplan have been used in part in the first instance of the revised plan. However application rates based on University of Queensland data require confirmation. The infiltration and hydraulic conductivity values which are critical in determining application rates will be rerun on the same sites using a Guelph permeameter which will simultaneously determine field saturated hydraulic conductivity, matric flux potential and soil sorptivity in the field.

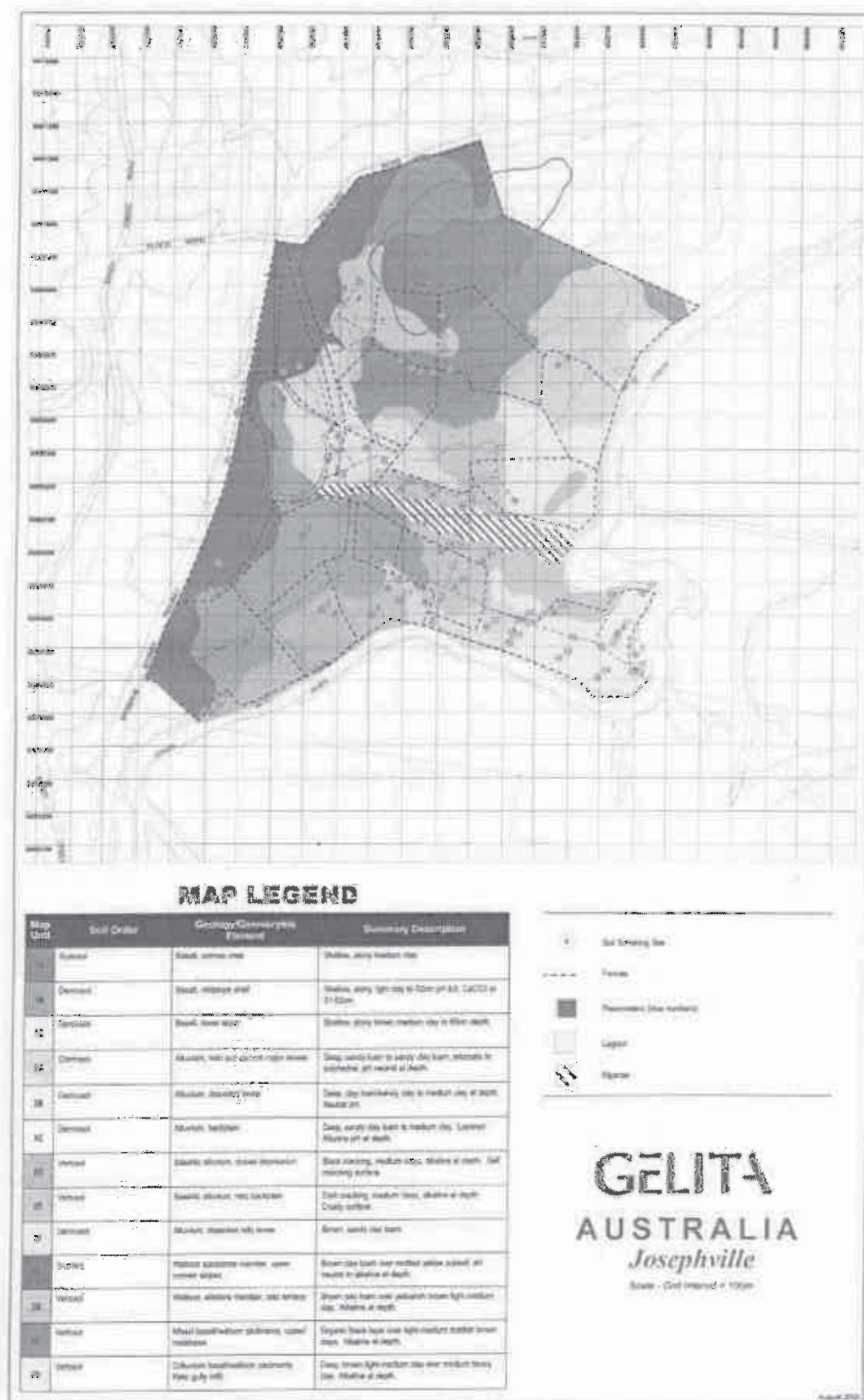
Five benchmark sites will be monitored on a regular basis to measure changes which could result in modification of the initial recommended rates of application. Unknown factors of water requirements of selected trees used in the agroforestry soils area of sodosols (3a soil map unit) and the proposed vetiver pasture areas will require at the most, monthly measurements in relation to climatic variables in the first year. Thereafter annual measurements may be sufficient as recommended in the EPA submission. In combination with the effluent distribution, use of bore water will be necessary to achieve a satisfactory leaching fraction.

On a 12 month basis the average electrical conductivity of the effluent and bore water applied should not be higher than 7 ds/m which will require up to additional 15% (initial reports by RPS and QDPI recommended 12% and 13% respectively) in excess of plant requirement to meet a leaching requirement to sustain soil EC levels as proposed. This will necessitate increasing the water from bores allocated to irrigation by about 80 megalitres per annum. These estimates are based on average annual rainfall of 875 mm and limiting the leaching effect of rainfall resulting in the salts being retained below the root zone in the soil profile in the dermosols soils map units 2a,2b,and 2c and vertosols soil map units 2d,2e, and 3b.

Soil Units an Proposed Use

Soil Order	Description	Soil Unit	Proposed irrigation treatment
Rudisol	Basalt, convex crest. Shallow stony medium clay. Non-irrigation zone.	1a	This area is not suited to any irrigation. Not monitored
Dermosol	Basalt midslope shelf. Shallow stony light clay pH 8.5 at depth. Irrigation zone.	1b	This area has been subject to irrigation in the past and future effluent irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Dermosol	Basalt lower slope. Shallow stony brown medium clay. Irrigation zone.	1c	This area has been subject to irrigation in the past and future effluent irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Dermosol	Alluvium, relic and current levees. Deep sandy loam, pH neutral at depth.	2a	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Dermosol	Alluvium dissected levee. Deep clay/sandy loam. pH neutral. Irrigation zone.	2b	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Dermosol	Alluvium, backplain. Deep layered sandy clay loam. Alkaline pH at depth. Irrigation zone.	2c	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Basaltic alluvium, closed depression. Black cracking clays. Alkaline. Irrigation zone.	2d	This zone will be progressively planted to vetiver and receive effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Basaltic alluvium, relic backplain. Dark cracking medium clays, alkaline. Irrigation zone.	2e	This zone will be subject to drainage channels and the soil flushed. It will receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation. Intensive monitoring as per table 3 required.
Dermosol	Alluvium dissected relic levees. Brown sandy clay loam. Irrigation zone.	2f	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Characteristics of this dermosol are typical of the other dermosols on site. This soil type limited in area. Intensive monitoring as per table 3 not required.
Sodosol	Walloon sandstone, relic terrace, upper convex slopes. Brown clay loam, mottled yellow subsoil, neutral to alkaline. Irrigation zone.	3a	This zone will be subject to irrigated agroforestry and the soil flushed. It will receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation. Intensive monitoring as per table 3 required.
Vertosol	Walloon siltstone, relic terrace. Brown clay loam, yellow brown clay, alkaline. Irrigation zone.	3b	This zone will be retained as irrigated pasture and receive effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Mixed basalt/Walloon sediments. Organic black over red brown clay, alkaline.	3c	This area is not suited to any irrigation. Not monitored
Vertosol	Colluvium basalt/Walloon sediments. relic gully infill. Brown clay, alkaline.	3d	This area is not ideal for effluent irrigation. It will continue to receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation.

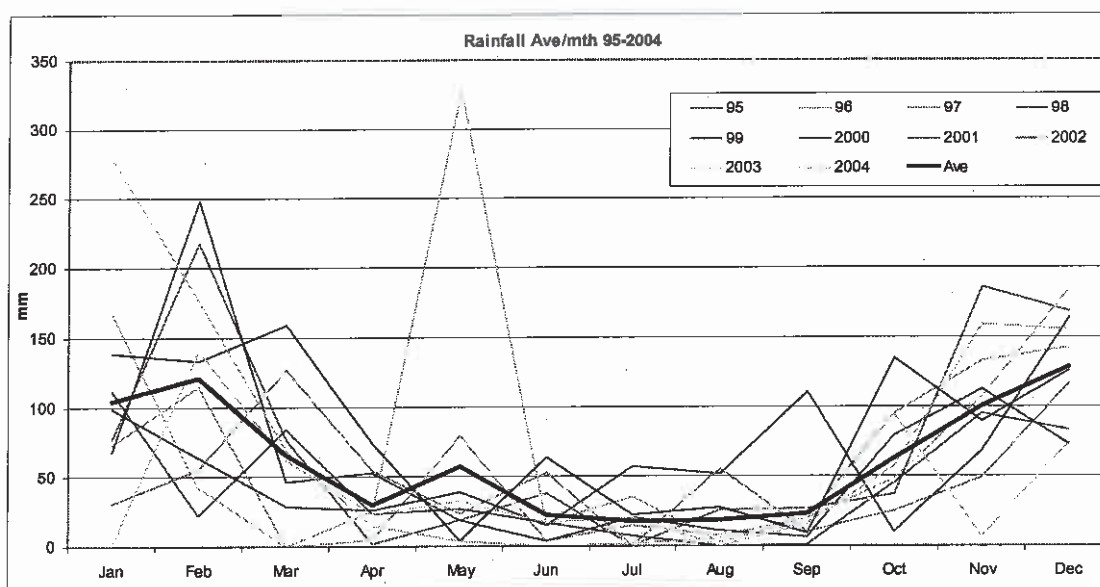
Soil map with hydrants and fence-lines.



On the other hand, in the event of excess rainfall causing leaching salts and nitrate into the aquifer there is no evidence that this will transmit to the Logan river. Limited evidence points to the reverse in that the river water recharges the aquifer and water that is constantly released upstream for domestic supply has been regularly tested for salt levels. There is no evidence to indicate that any salt is transmitted into the river by any means from irrigation practices on the Gelita farmlands during the past ten years.

A worst case scenario of below average rainfall say 450 mm will require additional bore water if the irrigated area remains constant. In these circumstances given that the amount of bore water is limited, the leaching requirement may be met by irrigating a smaller area and concentrating on the dermosols (map units, 2a,2b,2c). Thus the variable in the water balance is the volume of bore water applied. This needs to be handled in relation to effluent feed rate and rainfall incidence and amount.

The rainfall data below is for a neighbouring property and indicates the variability of rainfall in the area.



These data show the importance of varying the irrigation regime according to effluent conductivity and plant water use.

Uptake of nutrients, especially nitrogen will also be monitored to establish the utilization by plants and to determine the amounts leached past the root zone.

Of concern is the logistics used to irrigate the farm. Current practice includes farm staff on shifts whom are responsible for moving the traveling irrigators in a program which is not based on soil/plant water deficit but rather to provide an even distribution of effluent over the designated irrigation areas according in part to the Hydroplan program. Records of volumes of effluent distributed are recorded each time the irrigator(s) are operated together with an approximate location of the irrigators in question.

Whilst this method of management has been adequate for the level of management based on cattle grazing it will not be suitable for meeting the guidelines outlined above which include focusing effluent reuse on whole year irrigated vetiver/ryegrass grass production which is designed to utilize water and nutrients (especially nitrogen) for export from the site and utilized as a green stream in the composting of biosolids resulting from gelatine production.

Furthermore the basis for the license conditions is based on soil properties and the limits deemed as suitable for sustainable production. Consequently the method of effluent application needs to be more precise to give credibility to the soil monitoring program proposed. This will entail a change in management which can be achieved by installation of a centre pivot irrigator on the area of soils designated 2b, 2c shown on map above. Most of the effluent is calculated as being utilized by approximately 12 hectares of vetiver which can be accommodated on these areas of soils located on the southwestern portion of the farm. The soils selected have a permeability sufficient to achieve the proposed leaching fraction of 15 %.. Export of nutrients extracted by the vetiver and rye grass derived from the effluent will minimize the input of salts into the aquifers underlying these soils.

Automation by computer and operation by the Environmental Manager will provide reliable irrigation scheduling based on plant water requirements including a satisfactory leaching fraction to meet guidelines. In addition this new operation will relieve farm staff of irrigation duties and free them to undertake management tasks associated with the production and harvesting of the vetiver- ryegrass production and other management tasks required on remaining areas of the farm.

GROUND WATER MONITORING

Piesometers damaged by cattle and machinery have been refurbished. Measurement of groundwater has been conducted and it has been found that shallow piesometers (less than 6 metres deep are continuously dry. A conclusion has been reached that the supposition of a shallow aquifer is incorrect as the shallow piesometers have never yielded any water. Consequently it is proposed that groundwater monitoring is confined to the deep aquifers (greater than 10 metres deep). Purging to remove contaminants has been found to be necessary and the data collected cannot be assumed to truly represent the status of the underground waters. Further work should be completed for the annual audit report due in 31 January 2006.

AGROFORESTRY

The agroforestry enterprise was established in May. The tree growth has been satisfactory given the below average rainfall. The following plates show the growth of the trees that has occurred from tube stock in five months





SOIL MANAGEMENT ISSUES

The soil unit 2e has been found to be poorly drained and preliminary analyses found that continuing effluent irrigation would have a deleterious effect by virtue of salt and nitrogen accumulation in the upper metre of the soil profile. Consequently the area has been precluded from irrigation with effluent and a scheme to install lateral drains to accentuate drainage and discharging into evaporation ponds is proposed. Installation will depend on summer rainfall incidence that will correct the salt imbalance which currently is still within compliance limits. Reduced irrigation practice by the agroforestry area on the sodosol soils (soil unit 3a) above this area will reduce the incidence of lateral salt movement down-slope onto the 2e unit.

The frequency of irrigation of the agroforestry area upslope will be contiguous with the future management of the 2e soil unit.

REFERENCES

Vieritz, Alison. 2003 "Medli Analysis of Using Vetiver for Effluent Irrigation at Gelita Planrt Beaudesert, Queensland"
Department of Natural Resources, Indooroopilly, Qld.

Signed: B.M. Schafer

October 2005

ATTACHMENT A

GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report

October 2004

INTRODUCTION

The current licence conditions include monitoring of soil and effluent to complement a best practice management program. The following statements are taken from the EMP submission to the EPA made in November 2003.

“The parameters to be monitored and the frequency of monitoring in the Contaminant release Area Monitoring Program shall be in accordance with the parameters and monitoring frequency prescribed in schedule H Table 3.

Schedule H Table 3

Element	Sites	Method	Frequency
Soil Salinity	Within soil units 2a, 2b, 2c, 2d, 2e, 3a, 3b,	Soil sampling and analysis for pH (1:5), EC sat, Cl, NO ₃ , SO ₄ , effective CEC, exchangeable Ca, Mg, Na,	annual
Soil infiltration and hydraulic conductivity	Within soil units, 2a, 3b, 2e	Field instrumentation	annual
Nutrient Status	As Above	Soil Sampling and analysis for Total N, NO ₃ -N, NH ₄ -N, Acid extractable P	bi-annual
Groundwater	Relevant bores with water table within soil units listed above	Tape measurement and EC. Water laboratory analysis	bi-annual
Effluent	Pump out pond outlet	Water laboratory analysis,	monthly

The existing licence conditions include soil and water monitoring requirements. The schedules above are proposed as a continuation of the original conditions and have been extended to meet the requirements of the EMP. *The combined table above is based on the following detailed schedules of monitoring and irrigation response as detailed below.*

Soil infiltration and hydraulic conductivity

Soil Map units for monitoring. 2a, 2b, 2c, 2d, 2e, 3a, 3b, 3d	Sampling Methods	Acceptable Range	Irrigation Response	Testing Frequency
Infiltration and hydraulic conductivity	FullStop Monitor time for distribution of measured amount of applied effluent of SAR 12 mmol/L ^{0.5} through soil to 50cm depth at saturation using constant head infiltrometer.	20 mm/ hour at SAR 12 mmol/L ^{0.5} on dermosols, Soil Map Unit 2a , 2b, 2c 1mm/ hour at SAR 12 mmol/L ^{0.5} on vertosols/sodosols Soil MapUnits 2d, 2e, 3b, 3d, 3a	Irrigate to 50% soil water deficit based on Fullstop indicators placed at 10cm and 50 cm depths.	Annual

Nutrient Status

Soil Salinity

Soil units 2a, 2b, 2c, 2d, 3a, 3b, 3d	Soil solution sampling via FullStop Soil core sampling depth 0-120cm.	Acceptable Range at 10cm depth	Acceptable Range at 50cm depth	Acceptable Range at 120cm depth	Irrigation response	Testing Frequency
pH	(1:5) solution soil extract	4.5-7.0	5.5-7.5	6.0-8.5	pH <5.0 add lime/compost. Field pH test response. pH >8.0 stop lime dosing. Flush neutral pH water.	Annual
ESP (% calculated from sodium and cation exchange capacity)	soil	10	15	20	Flush bore water	Annual
SAR (Calculated from calculated from soil solution cations Ca++, Mg++ Na+)	solution	15	20	40	Flush bore water	Annual
EC sat (dS/m)	solution	3	4	5	EC >5 on clay flushing water/shandy	Annual
Cl ⁻	solution	0-150 mg/kg	0-450 mg/kg	0-600+ mg/kg	Flushing water/shandy	Annual
NO ₃ ⁺	solution /soil	120mg/kg	100mg/kg	20mg/kg (soil sample)	NO ₃ > 100mg/kg at 50 cm irrigate only flushing water. Monitor to depth 150cm Increase pH irrigation water.	Annual
Total sulphate sulphur	Solution- (includes gypsum precipitate)	4000mg/l	5000mg/l	6000 mg/kg (soil sample)	Calcium amendment	Annual

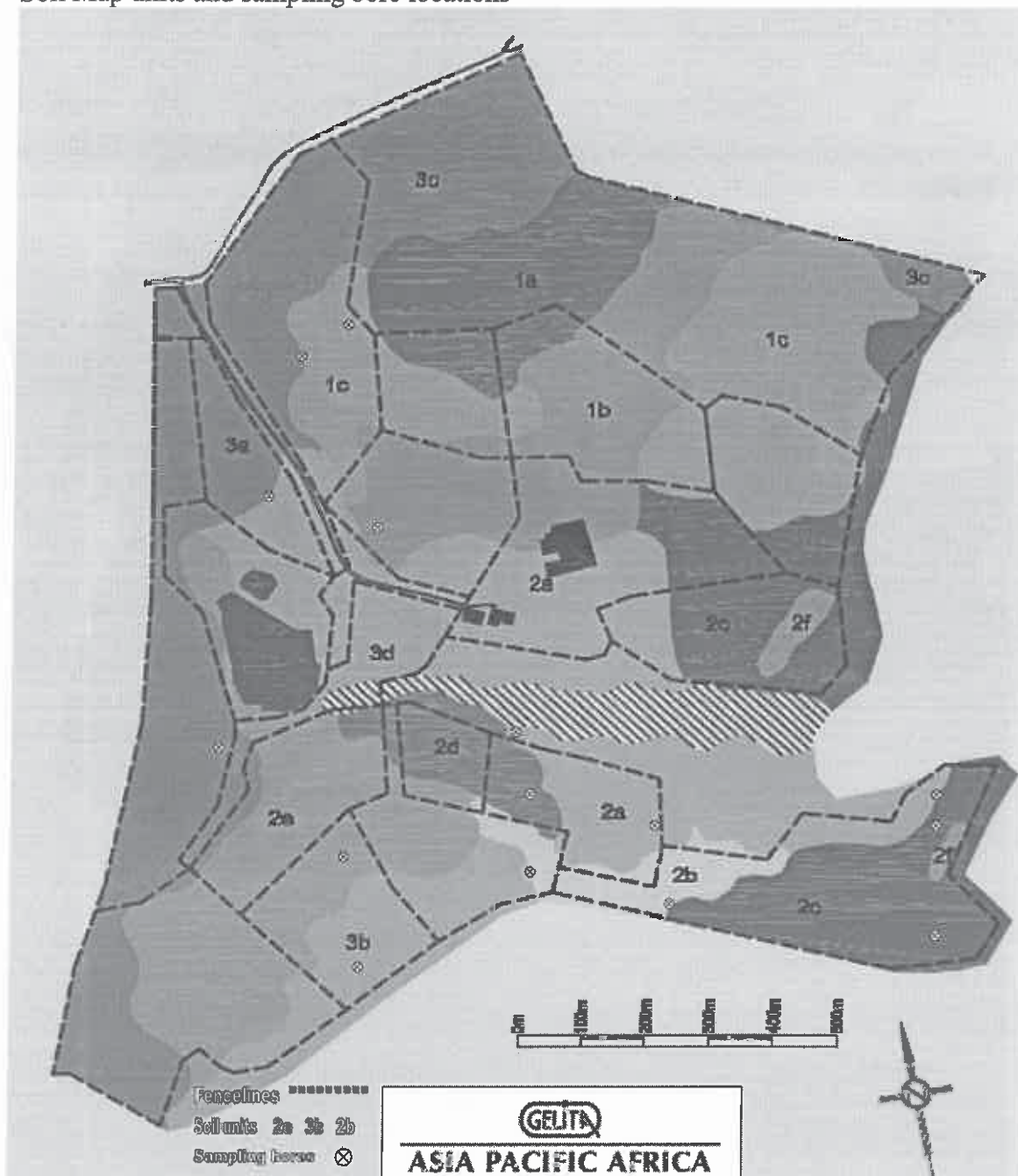
Nutrient	Acceptable Range for Soil Map Units at 10 cm Depth						
	2a	2b	2c	2d	2e	3a, 3d	3b
Total N (%)	0.1-0.25	0.1-0.25	0.1-0.3	0.2-0.5	0.2-0.5	0.2-0.4	0.2-0.5
NO ₃ -N (mg/Kg)	10-120	10-120	10-120	10-120	10-120	10-120	10-120
NH ₄ -N (mg/Kg)	20-450	20-450	20-450	20-450	20-450	20-450	20-450
Acid Extractable P (mg/Kg)	10-450	10-450	10-450	10-450	10-450	10-450	10-450
Bicarbonate Extractable P (mg/Kg)	10-100	10-100	10-100	10-100	10-100	10-100	10-100

The schedules above are proposed as a continuation of the original licence conditions and have been extended to meet the requirements of the EMP. Soil sampling shall be conducted to 1.5 metre depth across soil units on an annual basis to establish benchmarks and monitor movement of "salts" and nitrogen through soil profiles. Solution for analysis shall be drawn from FullStop wetting front detectors at 10 and

50 cm for irrigation scheduling and also at depths of 1 and 1.5 metres for soil solution extracts.

Soil Order	Description	Soil Unit	Proposed irrigation treatment
Balkosol	Basalt, convex slope. Shallow stony medium clay. Non-irrigation zone.	1a	This area is not suited to any irrigation. Not monitored.
Dermosol	Basalt midslope shelf. Shallow stony light clay pH 8.5 at depth. Irrigation zone.	1b	This area has been subject to irrigation in the past and future effluent irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Dermosol	Basalt lower slope. Shallow stony brown medium clay. Irrigation zone.	1c	This area has been subject to irrigation in the past and future effluent irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Dermosol	Alluvium, relic and current levees. Deep sandy loam. pH neutral at depth.	2a	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Dermosol	Alluvium dissected levee. Deep clay/sandy loam. pH neutral. Irrigation zone.	2b	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Dermosol	Alluvium, backplain. Deep layered sandy clay loam. Alkaline pH at depth. Irrigation zone.	2c	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Basaltic alluvium, closed depression. Black cracking clays. Alkaline. Irrigation zone.	2d	This zone will be progressively planted to vetiver and receive effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Basaltic alluvium, relic backplain. Dark cracking medium clays, alkaline. Irrigation zone.	2e	This zone will be subject to drainage channels and the soil flushed. It will receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation. Intensive monitoring as per table 3 required.
Dermosol	Alluvium dissected relic levees. Brown sandy clay loam. Irrigation zone.	2f	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Characteristics of this dermosol are typical of the other dermosols on site. This soil type limited in area. Intensive monitoring as per table 3 not required.
Sodosol	Walloon sandstone, relic terrace, upper convex slopes. Brown clay loam, mottled yellow subsoil, neutral to alkaline. Irrigation zone.	3a	This zone will be subject to irrigated agroforestry and the soil flushed. It will receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation. Intensive monitoring as per table 3 required.
Vertosol	Walloon alluvium, relic terrace. Brown clay loam, yellow brown clay, alkaline. Irrigation zone.	3b	This zone will be retained as irrigated pasture and receive effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Mixed basalt/Walloon sediments. Organic black over red brown clay, alkaline.	3c	This area is not suited to any irrigation. Not monitored.
Vertosol	Colluvium basalt/Walloon sediments relic gully infill. Brown clay, alkaline.	3d	This area is not ideal for effluent irrigation. It will continue to receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation.

Soil Map units and sampling bore locations



Soil units for monitoring purposes are described in this table and presented in map format above. Fence lines and groundwater monitoring bores are also detailed on this map.

The bores listed for monitoring are detailed in the map above. Therefore Condition H33 should be expanded to include the additional bore monitoring sites proposed by GELITA.

The proposed Schedule H Table 3 does not seek any changes to the parameters within the current licence conditions regarding groundwater quality monitoring other than a reduced frequency from bi-monthly to bi-annual. Condition H34 c would require amendment to reflect this proposed change.

Groundwater monitoring parameters and reporting requirements are further proposed to constitute an integral aspect of the Annual Audit process. This process will comprise an analysis and interpretive report of the monitoring program by an

external consultant; and shall include an annual modeling exercise.. The MEDLI model will be a major predictive tool in long-term management of the site and shall form part of the annual reporting requirement.

GELITA will also continue to regularly monitor the following effluent quality characteristics for irrigation management purposes as required by our ISO 14001 procedures. The proposed changes to the licence are designed to achieve an outcome based reporting format and do not preclude the continuation of the GELITA waste-water monitoring program.

The following parameters are required for data input into the MEDLI model and shall continue to be collected and collated. All such records are maintained on-site indefinitely.

Irrigation Water Quality Monitoring

pH	EC	COD (mg/L)	TSS (mg/L)	BOD (mg/L)	TN (mg/L)	TDS (ppm)	NOx (mg/L)
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The initial monitoring program recommended in the Environmental Impact Statement on soil and water monitoring (GHD, 1992) was implemented as policy in the Company (Leiner Davis Gelatin Australia) Environmental Management Plan, 1994.

The revised program of irrigation scheduling (Hydroplan report, September 2003) is aimed to sustain soil conditions for productive growth according to soil properties as determined in the Land Management Study Phase 1, Task A- Soil Sampling and Analysis as reported above.

To meet the requirements of the revised licence proposal more specific sampling will be required to monitor soil conditions according to soil and crop type. The sites for sampling will follow from this report and will be taken from similar locations for comparison over time.

Additional soil and ground water sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity will be monitored on an annual basis during the seven years following establishment of the vetiver/ryegrass production unit.

These data will be used to validate the predictive outcomes of the MEDLI program upon which the vetiver/ryegrass program is based. Corrective actions will be taken if values are deemed to be outside sustainable limits.

This will be effected by:

- modifying the leaching fraction and
- by reducing salt load in irrigation water by shandyng with bore water and
- maintaining physical soil properties by mechanical intervention (eg ripping) and
- controlling nitrogen loads where necessary by chemical means.

These analyses will be used in conjunction with wastewater treatment data to assess compliance with the relevant licence conditions proposed in this submission. “

SAMPLING PROGRAM 2004

The sampling program to establish preliminary baseline data for the current monitoring program began on 29 January 2003. Samples were taken by hand auger to depth from sites within the mapped soil units which were located with GPS coordinates for future reference. Further sampling will be effected to meet the criteria of depth for future monitoring. The samples were submitted to the accredited analytical laboratory, Food and Agriculture Laboratories Australia for analysis. The data are presented in Table 1. below.

These preliminary data are within the acceptable ranges deemed for Soil Salinity and Nutrient Status for the specified soil map units (see Tables under Schedule H Table 3 above). Field instrumentation (FullStop Wetting Front Detectors) are yet to be installed and so soil infiltration and hydraulic conductivity data are not available at this stage.

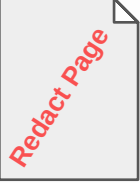
Ground water analyses obtained from samples in September 2004 have been found to be in error. The piezometer boreholes installed in 1992 have variously deteriorated due to age. Later boreholes to replace some of these earlier boreholes in 2000 have also been damaged by farm operations and stock. Consequently some of the bores which are strategic to the new monitoring program are unserviceable. (see photographs attached).

The design of the piezometer above ground casing and caps is unsatisfactory because caps have been knocked off by cattle rubbing against them. This has resulted in the ingress of air and effluent resulting in contamination of the ground water. This was observed in preliminary analyses even after standard purging and sampling procedures. Consequently the data was inconsistent and did not reflect the influence of management on groundwater conditions.

It is recommended that a refurbishment program is implemented to rectify the situation to allow for credible license compliance monitoring .

B.M.Schafer

October 2004



18

Don Shackel

From: Don Shackel [don.shackel@epa.qld.gov.au]
Sent: Friday, 21 October 2005 2:27 PM
To: 'cameron.smeal@gelita.com'
Subject: Re: MORE INFORMATION REQUESTS!

CAMERON,

Thank you for the comprehensive response to my e-mail of 19/10/2005 received following our telephone contact yesterday afternoon (20/10/2005).

To complete my audit Checklist / Report for 18/10/2005, I will need a copy of Brian Schafer's annual compliance report for October 2005 -- as soon as it becomes available.

Also, on Tuesday you indicated that Paul Truong and yourself had authored another VETIVER paper -- if you have copies available, I would appreciate one, when convenient.

Hope you received a few more showers this morning -- although it looks to be clearing this afternoon!

Have a good weekend!!

Regards,

Don Shackel
Senior Inspector
Southern Region - Environmental Operations
Environmental Operations Division
Environmental Protection Agency

Ph: (07) 3225 1040
Fax: (07) 3225 8723
E-mail: don.shackel@epa.qld.gov.au

Visit us online at www.epa.qld.gov.au

Don Shackel

From: Cameron.Smeal@gelita.com
Sent: Thursday, 20 October 2005 9:33 PM
To: don.shackel@epa.qld.gov.au
Cc: Roger.Seach@gelita.com
Subject: Re: 18-10-2005 AUDIT FOLLOW-UP ISSUES

Regards
Cameron Smeal
Environmental Manager
Gelita Australia
(07) 5541 9442

"Don Shackel"
<don.shackel@
epa.qld.gov.a
u>

19/10/2005
04:12 PM

Please
respond to
<don.shackel@
epa.qld.gov.a
u>

To
<cameron.smeal@gelita.com>
CC
<andrew.connor@epa.qld.gov.au>
Subject
Re: 18-10-2005 AUDIT FOLLOW-UP
ISSUES

CAMERON,

I would appreciate your comments, when convenient, concerning a few additional matters which I failed to raise during our audit on 18/10/2005:

1.
The EPA Contaminated Land Unit has indicated the following concerning "Sunny Hills":

Lot 1 & 2 RP 118424 are NOT listed on the EMR/CLR
Lot 3 CP 862699 is the new parcel of the original base parcel site: L2 RP100815 which IS on the EMR: listed for Livestock Dip/Sprayrace.

Does a Cattle Dip / Spray Race still physically exist on site or has it long since been securely buried / sealed under infrastructure / earth?

Don, pls refer our correspondence of approximately 26/11/01 on this matter. I had discussions with Tess Dobinson (Registrar Contaminated Land Unit) and with John Taylor (EPA) at the time and advised both of them that the original spray race was under several hundred tonnes of earth (the aeration pond is believed to have been the approximate location of the original race.) I also advised them at the time that I was unable to locate any evidence that the previous owner had notified the company of the registration of the property on the original contaminated sites register. They subsequently forwarded me a copy of the letter sent to Biggers in 1993

which stated that the site had only been classified as a PROBABLE site.

2.
Does GELITA operate AMMONIA refrigeration plant on site and if so, approximately what volume of liquor maintains the system? My sites running AMMONIA refrigeration plants are being encouraged to CONSIDER developing AMMONIA release emergency response plans, as a DUE DILIGENCE measure, following an number of recent abattoir discharges having the potential to impact residential areas (wind-driven etc.), however, considering the extensive buffer areas surrounding your facility, you may not consider such preparedness to be a priority for GELITA and that is understood.

GELITA currently operates a cooling system for the votators that relies on about 120 kg of ammonia. We will in the future (next year probably) be installing an ice machine with a total fill of around 750kg. It will be the responsibility of the site safety personnel to ensure that the appropriate emergency response plans are amended to the required standards. Installation of the new unit will also done in compliance with the standards.

3.
In view of recent publicity, I have also been highlighting ASBESTOS issues with clients suggesting that a site survey be completed to set up an ASBESTOS material register for the operation, if relevant and where necessary draw the attention of staff to such material, through labelling and/or OH&S awareness training (GED / Duty of Care issue).

Our Engineering Manager has assured me that we do not have asbestos on this site. All boiler lagging is rock wool/fibre and the lagging ropes are composites. We do not have asbestos roofing and the only possible/potential/unconfirmed source of asbestos would be if the old cottage ceiling liner was asbestos cement sheeting.

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Finally, could you please FAX or E-MAIL me a copy of your SR0722 / SR0007DA audit document originally provided to the EPA with your Jan 2005 Annual Return material, my copy of which I left with you yesterday, during the licence conditions review process.

Don, not certain what it is you left as there is nothing on my desk. Could you please clarify? I have also recovered your camera case and spare battery from the paddock. I will forward to you this week.

Just a few more issues to take up your valuable time!

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Don Shackel

PS -- Had good feedback from Wade this morning concerning his visit to GELITA!

Don Shackel
Senior Inspector
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Environmental Operations Division
Environmental Protection Agency

Ph: (07) 3225 1040
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Don Shackel

From: Don Shackel [don.shackel@epa.qld.gov.au]
Sent: Wednesday, 19 October 2005 4:13 PM
To: 'cameron.smeal@gelita.com'
Cc: 'andrew.connor@epa.qld.gov.au'
Subject: Re: 18-10-2005 AUDIT FOLLOW-UP ISSUES

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Don Shackel

From: Cameron.Smeal@gelita.com
Sent: Friday, 21 October 2005 1:15 AM
To: Don Shackel
Subject: Fw: 18-10-2005 AUDIT FOLLOW-UP ISSUES

Regards

Cameron Smeal
Environmental Manager
Gelita Australia
(07) 5541 9442

----- Forwarded by Cameron Smeal/Beaudesert_AU/APA/Gelita/DGF on 20/10/2005 03:14 PM -----

Cameron
Smeal/Beaude
sert_AU/APA/
Gelita/DGF

<don.shackel@epa.qld.gov.au>

To

cc

20/10/2005
11:32 AM

Roger
Seach/Beaudesert_AU/APA/Gelita/DGF@
DGF

Subject

Re: 18-10-2005 AUDIT FOLLOW-UP
ISSUES (Document link: Cameron
Smeal)

Regards

Cameron Smeal
Environmental Manager
Gelita Australia
(07) 5541 9442

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Don Shackel

13/10/2006

GELITA AUSTRALIA FARM MANAGEMENT ANNUAL AUDIT 2005

(DATED AUGUST 2006 - P. 11.)

EXECUTIVE SUMMARY

This annual audit report for the year 2005 assesses the progress of the implementation of new farm technologies to meet licence conditions approved in June 2004.

TreeCorp, a commercial arm of CSIRO, completed the establishment of the agro-forestry enterprise on soil units 3a, and parts of soil units 1a and 2e by the end of April 2005. This enterprise was used to stabilize the soil's natural sodicity and limit further movement of salt down-slope onto soil unit 2e. This latter area has had lateral surface drains installed to collect overland drainage waters for transmission into the existing trap dam system.

Vetiver establishment and concurrent composting trials are progressing. Further areas of vetiver to provide nursery propagation stock were established in February 2005. Future plantings will be made after installation of a centre pivot irrigator on soil unit 2e. This will confine effluent disposal to an area of 12 hectares leaving the remainder of the farm irrigated area for better management and provide flexibility in effluent distribution according to climatic and production variables and more efficient export of excess nutrients including nitrogen. It is envisaged that the vegetative material from this enterprise will be utilized in the composting process of the solid waste material from factory production. This major change in management will enable the removal of livestock and overcome compaction and uneven distribution of nitrogen in animal waste returns.

Chemical treatment of effluent to control the low soil pH values is being investigated further after initial liming trials proved to be inefficient to maintain surface pH values within the defined limits. There is no evidence that the low surface pH is deleterious to plant growth. However the long term effects are unknown and will form the basis of a future research project.

Infiltration and hydraulic conductivity measurements were redone using a Guelph permeameter to overcome the deficiencies in the earlier values provided by the University of Queensland. Acquisition of this equipment will enable regular measurement over time to provide ranges of values for use to vary irrigation scheduling rates to meet crop requirements and the maintenance of a robust sustainable farming system.

FullStop and LongStop equipment have been installed to provide samples for determining salt and nitrate movement past the root zone to a depth of 1.0 metre . These data have not been included in the Schedule H criteria and further work is required to correlate effluent characteristics with soil ESP and SAR values. This should provide a more objective means of determining irrigation scheduling procedures to sustain beneficial soil conditions for plant growth.

Groundwater monitoring will recommence following refurbishment of selected piezometers and purging of contaminants. Dry conditions have resulted in the lowering of the water table below the depths of the boreholes and obviated collection of samples. It is requested that monitoring frequency is changed from monthly to biennial.

The above management changes have been made overcome deviations from the limits defined in Schedule H. Additional soil sampling and analysis was performed in the first six months of 2006 to monitor changes with new management strategies that will provide a reliable data set over the following year.

INTRODUCTION

The environmental management plan (EMP) that forms part of the current EPA licence includes land application of effluent for plant production and the ability of the system to maintain a level of soil and groundwater nitrogen, salinity and sodicity within specified limits based on individual soil properties and their potential for sustainable management for plant production. The introduction of best management practices to achieve sustainability is being implemented over a seven year period commencing in June 2004.

The annual audit date is deemed to fall on January 31 of each year but due to the unanticipated lower than average rainfall, the leaching requirement capacity of irrigation plus rainfall resulted in modification of irrigation management practices to accommodate for the unseasonable conditions. This required detailed monitoring of soil conditions during the past spring, summer and autumn of 2005 and 2006 to provide a basis for assessing outcomes of the current management remedial practices in relation to guidelines given in Attachment 1, Schedule H.

AGROFORESTRY

The agroforestry enterprise of 27 hectares was established in April 2005. The tree growth has been satisfactory given the below average rainfall. The following plates 1 and 2 show the growth of the trees that has occurred from tube stock in five months and 12 months. Irrigation has been limited to watering for tree maintenance only to minimize the additions of salts and to limit lateral flow of water containing salts downslope onto the heavy textured 2e soil unit.



Plate1

Tree Establishment (5 months)on Soil Units 3a and part of Soil Units 1a and 2e



Plate2

Established Agroforestry on Soil Unit 3a (12 months)

IRRIGATION MANAGEMENT

2005 Irrigation Management

The irrigation management was modified during 2005 to counter the rising salinity levels in soil units 3a, 3b and 2e. This resulted in concentrating the irrigation of effluent on the more permeable soil units, 2a, 2b and 2c with limiting irrigation on soil units 2d, 2e and

1b. To ensure that the increased intensity of irrigation on these soils was not deleterious to soil properties, further sampling was carried out in March, April and May 2006.

Given the lower than average rainfall incidence, the leaching requirement was met by “shandying” the effluent with bore water of lower salinity. The results attached indicate that the properties for the more permeable soil units are within the acceptable limits as stated in Schedule H (Table 1.)

Irrigation Management Proposal

A major change to the current irrigation management is proposed to provide a more flexible system to achieve a sustainable long term system. Water that is constantly released upstream for domestic supply has been regularly tested for salt levels by DNR&M and shows that irrigation practices on the Gelita farmlands during the past ten years have not caused leached salts and nitrate via the aquifer to enter into the Logan River. Limited evidence points to the reverse in that the river water recharges the aquifer.

On the other hand salt accumulation in the root zone in below average rainfall status which is concurrent has required ‘shandying’ with additional bore water on the current irrigated area to provide an adequate leaching requirement. In these circumstances, given that the amount of bore water is limited, the leaching requirement can be met by irrigating a smaller area until the higher quality water can be augmented with an additional supply probably from surface catchment. Thus currently, the variable in the water balance is the volume of bore water applied. This needs to be managed in relation to effluent feed rate and rainfall incidence.

Management of the water balance is thus the key to the sustainable disposal of the effluent. Irrigation is to be applied to meet plant demand for water and to remove nutrients from soil solution into the plant biomass and to meet the leaching requirement of the soil to remove excess salts to the levels specified in Schedule H .

Initial estimates of water and nutrient uptake of the proposed Vetiver/ryegrass sward are based on the Medli model (Vieritz 2003). This work reported that minimizing inherent nitrogen levels to 100mg/ kg would reduce the leaching of nitrogen to acceptable levels below the root zone. This would entail growing the vetiver without effluent irrigation to enable the grass to ‘mine’ the soil nitrogen out of the soil and cutting and carting the vetiver grass off the soil areas. This practice will be incorporated into the overall management during the establishment phase of the revised program.

Irrigation management to sustain salt levels was found to be exceeded with chloride levels greater than 600 mg/kg. This was exacerbated by the absence of rain for extended periods the extent of which was not anticipated in the initial proposals. Remedial action was taken by shandying the effluent with bore water.

Since then cleaner production trials have resulted in the use of potassium hydroxide instead of ammonia solution as an alkaline solution used in the ion exchange resin which will reduce the amount of ammonia nitrogen in the effluent. Also potassium chloride is

being substituted for sodium chloride in the water softening process which will reduce the sodium concentration in the effluent. Further sampling and monitoring will be undertaken to measure the reduced levels of sodium and ammonia nitrogen in the soil.

The soils mapped at the soil series level (see map below) was deliberate to provide areas of soils with like properties and their use for plant production which can be deemed management units. The operational feasibility of the irrigation schedule is based on management decisions made on past experience of these soils' responses to effluent irrigation. Management constraints due to finite staff and equipment have also been recognized and the areas designated for irrigated plant production are stated in the following Table 2.

The program of rotation of irrigation runs proposed by Hydroplan have been used in part in the first instance of the revised plan. However application rates based on University of Queensland data require confirmation. The infiltration and hydraulic conductivity values which are critical in determining application rates have been rerun on the same sites using a Guelph permeameter which simultaneously determined field saturated hydraulic conductivity, matric flux potential and soil sorptivity in the field. A revised irrigation schedule using a centre pivot irrigator controlled by computer by the environment manager will overcome most of the current staffing limitations.

Automation by computer and operation by the Environmental Manager will provide reliable irrigation scheduling based on plant water requirements including a satisfactory leaching fraction to meet guidelines. In addition this new operation will relieve farm staff of irrigation duties and free them to undertake management tasks associated with the production and harvesting of the vetiver- ryegrass production and other management tasks required on remaining areas of the farm.

The 2e soil unit has been shown to have low hydraulic conductivity and salt movement has tended to move laterally. To increase salt movement and retention on site, earth works have been instigated to provide lateral collection drains linked to the trap dam system.. A centre pivot irrigator is proposed to irrigate 12 hectares of vetiver grass. Estimates based on Medli program data show that in an average rainfall year that the water and nitrogen can be used by the crop in the summer with the use of rye grass in the winter period utilizing water and nitrogen. In the event of effluent surplus to plant requirement, it can be distributed by traveling irrigator to other parts of the farm by current management methods.

Five benchmark sites have been monitored on a regular basis to measure changes which could result in modification of the initial recommended rates of application. Unknown factors of water requirements of selected trees used in the agroforestry soils area of sodosols (3a soil map unit) and the proposed vetiver pasture areas will require at the most, monthly measurements in relation to climatic variables in the first year. Thereafter annual measurements may be sufficient as recommended in the EPA submission . In combination with the effluent distribution, use of bore water will be necessary to achieve a satisfactory leaching fraction in the absence of rainfall.

On a 12 month basis the average electrical conductivity of the effluent and bore water applied should not be higher than 7 ds/m which will require up to additional 15% (initial reports by RPS and QDPI recommended 12% and 13% respectively) in excess of plant requirement to meet a leaching requirement to sustain soil EC levels as proposed. This will necessitate increasing the water from bores allocated to irrigation by about 80 megalitres per annum. These estimates are based on average annual rainfall of 875 mm and limiting the leaching effect of rainfall resulting in the salts being retained below the root zone in the soil profile in the dermosols soils map units 2a,2b,and 2c and vertosols soil map units 2d,2e, and 3b.



Plate 3.

Construction of Contour Drains below Agro-forestry area on Soil unit 2e

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Plate 4.

Construction of Contour drains on Soil Unit 2e



Plate 5.

Drainage water from lateral flow on soil unit 2e. The milkiess of the water indicates dispersed clay due to sodium and the surface efflorescence of connate salts.

VETIVER ESTABLISHMENT

Vetiver establishment and concurrent composting trials are progressing. Further areas were planted in February 2005 to provide propagation material for expanded areas of planting principally in the proposed irrigation area soil unit 2e.



Plate 6. Vetiver Nursery Area on 2d Soil Unit

Further detail of these activities is provided in separate reports.

SOIL MONITORING

Schedule H in Attachment A. is a summary of the parameters which are being determined for objective assessment of soil and effluent. Baseline soil sampling to 1.5 metre depth at designated sites within soil units was conducted according to schedule in December 2005 to monitor movement of “salts” and nitrogen through soil profiles relative to the baseline soils data attached (See Attachment C., GELITA Baseline Data 2004).

Soil Salinity

In Attachment D., Soil Analysis Report GELITA AUSTRALIA Soil Data December 2005, pH values ranged between 4.5 and 7.0 at 10 cm depth for soil units 2a and 2b which comply with the limits proposed in Schedule H but were depressed in soil unit 2c. To overcome the problem the area was limed at the rate of 15 tonnes per hectare. The benefit of this treatment was not permanent and the pH dropped again after further irrigations with effluent. The reasons for this reaction is unknown since accepted agricultural liming practice would result in a more sustained amelioration. This phenomenon will be a subject for investigation when a suitable worker can be allocated to the task.

ESP values are within specified limits except for the soil unit 2e. Ameliorative measures are being taken to lower the salt levels in this unit with lateral drainage works and use of bore water for irrigation and leaching. Soil unit 3a is excluded from irrigation and is now used for dryland agroforestry.

Total dissolved salts expressed as EC are all within limits. However chlorides which form part of this parameter fall outside the specified limits in soil units 2d, 2e, and 3b. These soils are slowly drained and initial values in the baseline data show high chloride levels. As it does not appear to influence plant growth it is recommended that the criterion is confined to the 0-20 cm soil depth.

Nitrate, total sulphur and forms of phosphate all comply to specified limits.

Soil Infiltration and Hydraulic Conductivity

Changes were made to Schedule H to estimate these parameters. Values initially used were based on data provided in 2001 which has since proved to be inaccurate. Fullstop equipment has not been effective for determining irrigation frequency but is used for sample collection of saturated soil extracts (see below).

A Guelph permeameter was purchased and the soil sites were rerun to provide more comprehensive data. The purposed for the equipment is to monitor the variations caused by effluent irrigation management and to ultimately define relationships between the soil properties specified in the soil salinity table. The values obtained are given in Table 1. below.

Table 1. Hydraulic Conductivity (Davis, 2006)

Soil Unit	2b	2c	2d	2e	3b
Hydraulic Conductivity Cm/sec	0.00016	0.00016	0.00027	0.00015	0.00027

The data are approximately one quarter of the rates previously used which are important when considering rates of application of effluent and minimizing runoff.

Further work is required before these values can be recommended for irrigation scheduling criteria.

Saturated Soil Extracts

Following the report of January 2005 'Fullstop' and Longstop lysimeters were used to collect saturated soil solutions. No criteria were given in the initial EMP submission for soil water extracts and further work is required to determine relationships between effluent, soil and saturated soil solution extracts.

In Table 2.below, solution for analysis drawn from FullStop wetting front detectors at 50 cm (shallow) and 60 cm (deep) and from Longstop wetting front detectors at depths of 1 metre have EC values ranging from 3.67 to 6.99 ds/m. The EC value for 3b Longstop exceeds the values specified which reflects the natural sodicity of the soil.

The data are also indicative of the free salt movement through the soil. Limited analyses were obtained but are sufficient to show that relatively high solute concentrations in the root zone are not deleterious to plant growth. In the 2e soil unit which is central to the proposed centre pivot irrigation management, the nitrate concentrations range from 148 mg/L at 50cm, 27mg/L at 60 cm depth and 1mg/L at 1 metre depth which indicates that nitrate is being utilized by plant growth. The amount of nitrate passing the root zone is negligible. Further work is recommended to correlate total dissolved salts with ground water analyses obtained from piesometer samples. Ultimately these data will be used to estimate a mass salt balance on which irrigation scheduling procedures can be based.

Proposed Mass Balance Procedures

Data to achieve a mass balance for use in irrigation scheduling is currently incomplete. Attempts to measure effluent output in the field will require further refinement of water pressures at spray nozzles as well as metering devices to accurately record volumes distributed. Leakages in underground mains will also require rectification. It is proposed that the Medli model devised in 2003 can be used to provide an integrated base for irrigation of Vetiver grass when the parameters for running the model are available..

Table 2. Saturated Soil Extracts

Sample ID	pH	EC (mS/cm)	Cl (mg/L)	NO3-N (mg/L)	SO4-S (mg/L)
2c Full stop shallow	3.9	5.15	518	334	339
2c Full stop deep	6.8	6.53	595	427	79
2e Full stop shallow	6.7	3.77	422	148	276
2e Full stop deep	7.1	4.43	788	27	340
2e Long stop	6.8	6.83	1347	1	567
3b Full stop shallow	6.6	4.99	564	185	450
3b Full stop deep	6.0	4.56	563	181	327
3b Long stop	7.5	11.89	2863	1	571

Given the absence of substantial (average) rainfall during the past five months, these data show that the current management practises are deemed to be within the compliance range.

GROUND WATER MONITORING

Piesometers damaged by cattle and machinery have been refurbished. Measurement of groundwater has been conducted and it has been found that shallow piesometers (less than 6 metres deep are continuously dry. A conclusion has been reached that the supposition of a shallow aquifer is incorrect as the shallow piesometers have never yielded any water. Consequently it is proposed that groundwater monitoring is confined to the deep aquifers (greater than 10 metres deep). Purging to remove contaminants has been found to be necessary and the data collected cannot be assumed to truly represent the status of the underground waters. Further work should be completed for the annual audit report due in 31 January 2007.

REFERENCES

- Vieritz, Alison. 2003 "Medli Analysis of Using Vetiver for Effluent Irrigation at Gelita Planrt Beaudesert, Queensland"
Department of Natural Resources, Indooroopilly, Qld.
- Davis, S. 2006 "Assessment of Infiltration and Hydraulic Conductivity For Managing Irrigation Scheduling of an Effluent Land Disposal System. GELITA AUSTRALIA.
Thesis , IAP, School of Engineering, Griffith University.

Signed: B.M. Schafer

August 2006

Attachment A.

Schedule H Table I.

Element	Sites	Method	Frequency
Soil Salinity	Within soil units 2a, 2b, 2c, 2d, 2e, 3a, 3b,	Soil sampling and analysis for pH (1:5), EC sat, Cl, NO ₃ , SO ₄ , effective CEC, exchangeable Ca, Mg, Na,	annual
Soil infiltration and hydraulic conductivity	Within soil units, 2a, 3b, 2e	Field instrumentation	annual
Nutrient Status	As Above	Soil Sampling and analysis for Total N, NO ₃ -N, NH ₄ -N, Acid extractable P	bi-annual
Groundwater	Relevant bores with water table within soil units listed above	Tape measurement and EC. Water laboratory analysis	bi-annual
Effluent	Pump out pond outlet	Water laboratory analysis,	monthly

The existing licence conditions include soil and water monitoring requirements. The schedules above are proposed as a continuation of the original conditions and have been extended to meet the requirements of the EMP. The combined table above is based on the following detailed schedules of monitoring and irrigation response as detailed below.

Soil infiltration and hydraulic conductivity

Soil Map units for monitoring. 2a, 2b, 2c, 2d, 2e, 3a, 3b, 3d	Sampling Methods	Acceptable Range	Irrigation Response	Testing Frequency
Infiltration and hydraulic conductivity	FullStop Monitor time for distribution of measured amount of applied effluent of SAR 12 mmol/L ^{0.5} through soil to 50cm depth at saturation using constant head infiltrometer.	20 mm/ hour at SAR 12 mmol/L ^{0.5} on dermosols, Soil Map Unit 2a , 2b, 2c 1 mm/ hour at SAR 12 mmol/L ^{0.5} on vertosols/sodosols Soil MapUnits 2d, 2e, 3b, 3d, 3a	Irrigate to 50% soil water deficit based on Fullstop indicators placed at 10cm and 50 cm depths.	Annual

Nutrient Status

Nutrient	Acceptable Range for Soil Map Units at 10 cm Depth						
	2a	2b	2c	2d	2e	3a, 3d	3b
Total N (%)	0.1-0.25	0.1-0.25	0.1-0.3	0.2-0.5	0.2-0.5	0.2-0.4	0.2-0.5
NO ₃ -N (mg/Kg)	10-120	10-120	10-120	10-120	10-120	10-120	10-120
NH ₄ -N (mg/Kg)	20-450	20-450	20-450	20-450	20-450	20-450	20-450
Acid Extractable P (mg/Kg)	10-450	10-450	10-450	10-450	10-450	10-450	10-450
Bicarbonate Extractable P (mg/Kg)	10-100	10-100	10-100	10-100	10-100	10-100	10-100

The schedules above are proposed as a continuation of the original licence conditions and have been extended to meet the requirements of the EMP. Soil sampling shall be conducted to 1.5 metre depth across soil units on an annual basis to establish benchmarks and monitor movement of “salts” and nitrogen through soil profiles. Solution for analysis shall be drawn from FullStop wetting front detectors at 10 and 50 cm for irrigation scheduling and also at depths of 1 metre for soil solution extracts.

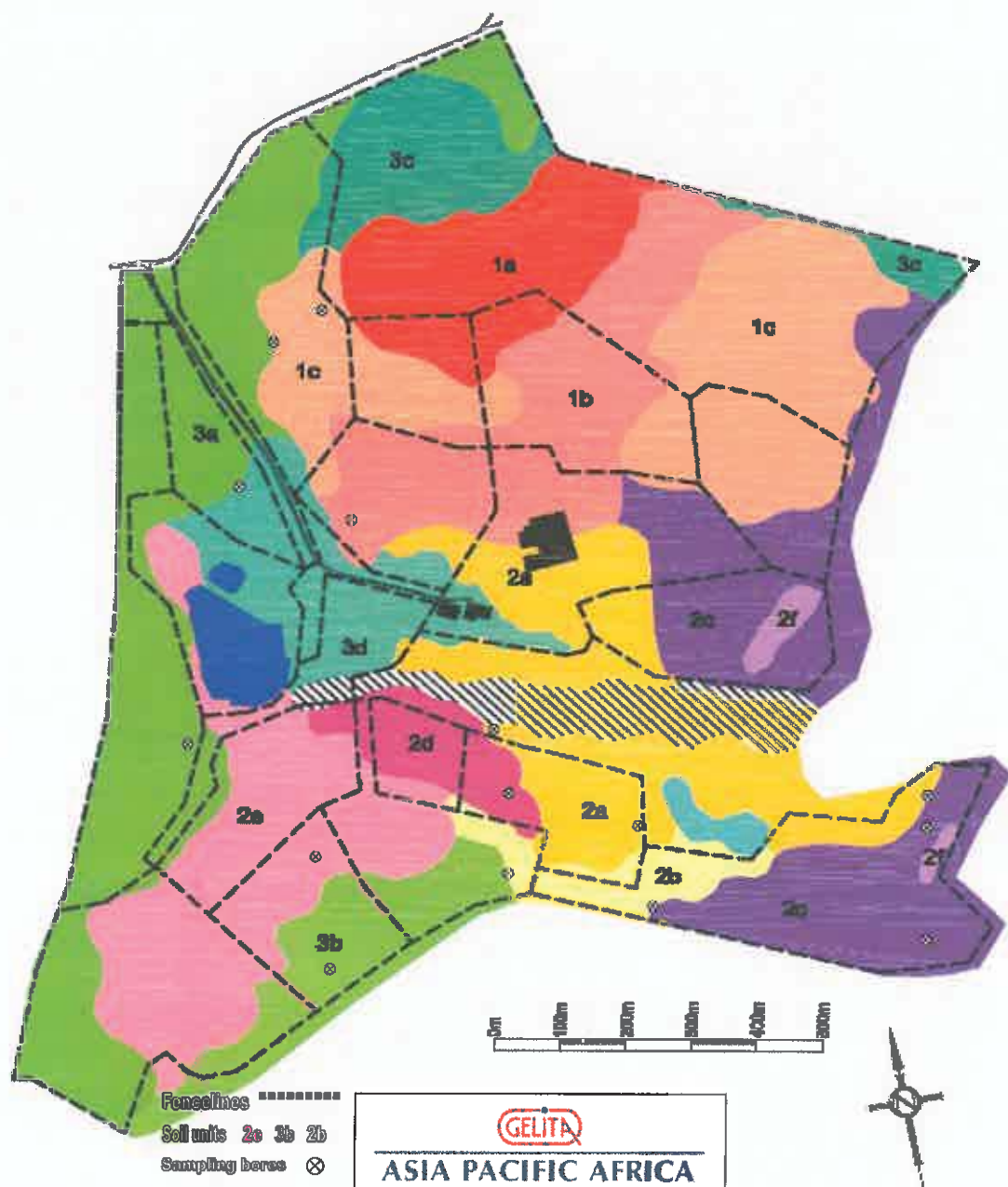
Soil Salinity

Soil units 2a, 2b, 2c, 2d, 3a, 3b, 3d	Soil solution sampling via FullStop Soil core sampling depth 0-120 cm.	Acceptable Range at 10cm depth	Acceptable Range at 50cm depth	Acceptable Range at 120cm depth	Irrigation response	Testing Frequency
pH	(1:5) solution soil extract	4.5-7.0	5.5-7.5	6.0-8.5	pH <5.0 add lime/compost. Field pH test response. pH >8.0 stop lime dosing. Flush neutral pH water.	Annual
ESP (% calculated from sodium and cation exchange capacity)	soil	10	15	20	Flush bore water	Annual
SAR (Calculated from calculated from soil solution cations Ca ⁺⁺ , Mg ⁺⁺ Na ⁺)	solution	15	20	40	Flush bore water	Annual
EC _{sat} (dS/m)	solution	3	4	5	EC >5 on clay flushing water/shandy	Annual
Cl ⁻	solution	0-150 mg/kg	0-450 mg/kg	0-600+ mg/kg	Flushing water/shandy	Annual
NO ₃ ⁺	solution /soil	120mg/kg	100mg/kg	20mg/kg (soil sample)	NO ₃ > 100mg/kg at 50 cm irrigate only flushing water. Monitor to depth 150cm Increase pH irrigation water.	Annual
Total sulphate sulphur	Solution- (includes gypsum precipitate)	4000mg/l	5000mg/l	6000 mg/kg (soil sample)	Calcium amendment	Annual

Attachment B. Soil Unit Descriptions

Soil Order	Description	Soil Unit	Proposed irrigation treatment
Kudusol	Basalt, convex crest. Shallow stony medium clay. Non-irrigation zone.	1a	This area is not suited to any irrigation. Not monitored
Dermosol	Basalt mid-slope shelf. Shallow stony light clay pH 8.5 at depth. Irrigation zone.	1b	This area has been subject to irrigation in the past and future effluent irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Dermosol	Basalt lower slope. Shallow stony brown medium clay. Irrigation zone.	1c	This area has been subject to irrigation in the past and future effluent irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Dermosol	Alluvium, relic and current levees. Deep sandy loam, pH neutral at depth.	2a	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Dermosol	Alluvium dissected levee. Deep clay/sandy loam. pH neutral. Irrigation zone.	2b	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Dermosol	Alluvium, backplain. Deep layered sandy clay loam. Alkaline pH at depth. Irrigation zone.	2c	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Basaltic alluvium, closed depression. Black cracking clays. Alkaline. Irrigation zone.	2d	This zone will be progressively planted to vetiver and receive effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Basaltic alluvium, relic backplain. Dark cracking medium clays, alkaline. Irrigation zone.	2e	This zone will be subject to drainage channels and the soil flushed. It will receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation. Intensive monitoring as per table 3 required.
Dermosol	Alluvium dissected relic levee. Brown sandy clay loam. Irrigation zone	2f	This zone exhibits higher hydraulic conductivity and will be progressively planted to vetiver and receive more effluent irrigation as the plan is implemented. Characteristics of this dermosol are typical of the other dermosols on site. This soil type limited in area. Intensive monitoring as per table 3 not required.
Sodosol	Walloon sandstone, relic terrace, upper convex slopes. Brown clay loam, mottled yellow subsoil, neutral to alkaline. Irrigation zone.	3a	This zone will be subject to irrigated agroforestry and the soil flushed. It will receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation. Intensive monitoring as per table 3 required.
Vertosol	Walloon siltstone, relic terrace. Brown clay loam, yellow brown clay, alkaline. Irrigation zone.	3b	This zone will be retained as irrigated pasture and receive effluent irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertosol	Mixed basalt/Walloon sediments. Organic black over red brown clay, alkaline.	3c	This area is not suited to any irrigation. Not monitored
Vertosol	Colluvium basalt/Walloon sediments relic gully infill. Brown clay, alkaline.	3d	This area is not ideal for effluent irrigation. It will continue to receive some effluent irrigation as the plan is implemented. Over time the zone will be entirely excluded from effluent irrigation.

Soil Map units and sampling bore locations



Soil units for monitoring purposes are described in this table and presented in map format above. Fence lines and groundwater monitoring bores are also detailed on this map.

The bores listed for monitoring are detailed in the map above. Therefore Condition H33 should be expanded to include the additional bore monitoring sites proposed by GELITA.

The proposed Schedule H Table 3 does not seek any changes to the parameters within the current licence conditions regarding groundwater quality monitoring other than a reduced frequency from bi-monthly to bi-annual. Condition H34 c would require amendment to reflect this proposed change.

Groundwater monitoring parameters and reporting requirements are further proposed to constitute an integral aspect of the Annual Audit process. This process will comprise an analysis and interpretive report of the monitoring program by an external consultant; and shall include an annual modeling exercise.. The MEDLI model will be a major predictive tool in long-term management of the site and shall form part of the annual reporting requirement.

GELITA will also continue to regularly monitor the following effluent quality characteristics for irrigation management purposes as required by our ISO 14001 procedures. The proposed changes to the licence are designed to achieve an outcome based reporting format and do not preclude the continuation of the GELITA waste-water monitoring program.

The following parameters are required for data input into the MEDLI model and shall continue to be collected and collated. All such records are maintained on-site indefinitely.

Attachment C.

GELITA BASELINE DATA 2004

(insert from XL file)

Attachment D.

Soil Analysis Report GELITA AUSTRALIA Soil Data December 2005

(insert from XL file)

GELITA AUSTRALIA

Farm Management Progress Report: October 2005

INTRODUCTION

As a condition of the current license conditions, the environmental management plan includes land application of effluent for plant production and the ability of the system to maintain a level of soil and groundwater nitrogen, salinity and sodicity within specified limits based on individual soil properties and their potential for sustainable management for plant production..

This report is a progress report following from the 2004 Farm Management Annual audit. The final report for 2005 will be submitted by 31 January 2006.

SOIL/EFFLUENT MONITORING

Monitoring of soil and effluent is being undertaken as a means of assessing the best practice management program and the parameters are used to devise suitable irrigation schedule strategies.

Schedule H Table 3 in ATTACHMENT A is a summary of the parameters which are being determined for objective assessment of soil and effluent.

Baseline soil sampling to 1.5 metre depth at known sites within soil units will be repeated according to schedule on an annual basis later this year to monitor movement of "salts" and nitrogen through soil profiles. Solution for analysis drawn from FullStop wetting front detectors at 10 and 50 cm for irrigation scheduling and from Longstop wetting front detectors at depths of 1 metre for soil solution extracts have EC values ranging from 3.67 to 6.99 ds/m. Given the absence of substantial (average) rainfall during the past five months, these data show that the current management practises are deemed to be within the compliance range.

IRRIGATION SCHEDULING PROCEDURE

Management of the water balance is the key to the sustainable disposal of the effluent. Irrigation is to be applied to meet plant demand for water and to remove nutrients from soil solution into the plant biomass and to meet the leaching requirement of the soil to remove excess salts to the levels specified above.

Initial estimates of water and nutrient uptake of the proposed Vetiver/ryegrass sward are based on the Medli model (Vieritz 2003). This work reported that minimizing inherent nitrogen levels to 100mg/ kg would reduce the leaching of nitrogen to acceptable levels below the root zone. This would entail growing the vetiver without effluent irrigation to enable the grass to 'mine' the soil nitrogen out of the soil. This would entail cutting and carting the vetiver grass off the soil areas. This practice will be incorporated into the overall management during the establishment phase of the revised program.

Irrigation management to sustain salt levels was found to be exceeded with chloride levels greater than 600 mg/kg. This was exacerbated by the absence of rain for extended periods the extent of which was not anticipated in the initial proposals. Remedial action was taken by shandyng the effluent with bore water.

Since then cleaner production trials have resulted in the use of potassium hydroxide instead of ammonia solution as an alkaline solution used in the ion exchange resin which will reduce the amount of ammonia nitrogen in the effluent. Also potassium chloride is being substituted for sodium chloride in the water softening process which will reduce the sodium concentration in the effluent. Further sampling and monitoring will be undertaken to measure the reduced levels of sodium and ammonia nitrogen in the soil.

The soils mapped at the soil series level (see map below) was deliberate to provide areas of soils with like properties and their use for plant production which can be deemed management units. The operational feasibility of the irrigation schedule is based on management decisions made on past experience of these soils' responses to effluent irrigation. Management constraints due to finite staff and equipment have also been recognized and the areas designated for irrigated plant production are stated in the following Table 2.

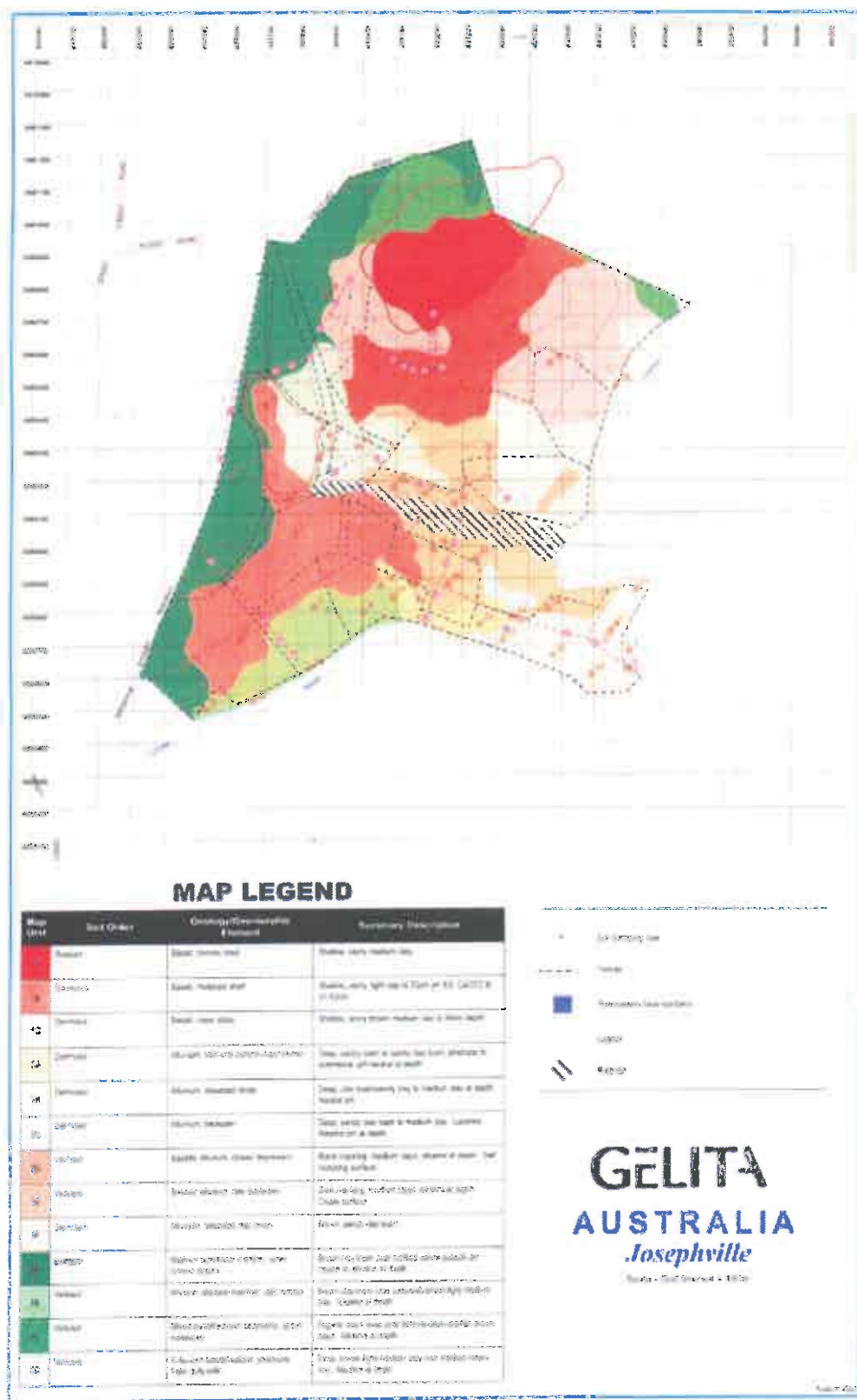
The program of rotation of irrigation runs proposed by Hydroplan have been used in part in the first instance of the revised plan. However application rates based on University of Queensland data require confirmation. The infiltration and hydraulic conductivity values which are critical in determining application rates will be rerun on the same sites using a Guelph permeameter which will simultaneously determine field saturated hydraulic conductivity, matric flux potential and soil sorptivity in the field.

Five benchmark sites will be monitored on a regular basis to measure changes which could result in modification of the initial recommended rates of application. Unknown factors of water requirements of selected trees used in the agroforestry soils area of sodosols (3a soil map unit) and the proposed vetiver pasture areas will require at the most, monthly measurements in relation to climatic variables in the first year. Thereafter annual measurements may be sufficient as recommended in the EPA submission. In combination with the effluent distribution, use of bore water will be necessary to achieve a satisfactory leaching fraction.

On a 12 month basis the average electrical conductivity of the effluent and bore water applied should not be higher than 7 ds/m which will require up to additional 15% (initial reports by RPS and QDPI recommended 12% and 13% respectively) in excess of plant requirement to meet a leaching requirement to sustain soil EC levels as proposed. This will necessitate increasing the water from bores allocated to irrigation by about 80 megalitres per annum. These estimates are based on average annual rainfall of 875 mm and limiting the leaching effect of rainfall resulting in the salts being retained below the root zone in the soil profile in the dermosols soils map units 2a,2b, and 2c and vertosols soil map units 2d,2e, and 3b.

Soil Units an Proposed Use

Soil Order	Description	Soil Unit	Proposed irrigation treatment
Barrenland	Basalt, covers crest. Shallow stony medium clay. Non irrigation zone.	1a	This area is not suited to any irrigation. Not monitored
Barrenland	Basalt, steep slope, shallow stony light clay pit 2.0 m depth. Irrigation zone.	1b	This area has been subject to irrigation in the past and future efficient irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Barrenland	Basalt, lower slope. Shallow stony brown medium clay. Irrigation zone.	1c	This area has been subject to irrigation in the past and future efficient irrigation shall be progressively reduced to zero as the plan is implemented. Minimal monitoring required.
Barrenland	Argillaceous, soft, sand, surface level. Deep sandy loam, pH neutral at depth.	2a	This area exhibits higher hydraulic conductivity and will be progressively planted in vines and receive more efficient irrigation as the plan is implemented.
Barrenland	Argillaceous, flinted loam. Deep clay sandy loam. pH neutral. Irrigation zone.	2b	Intensive monitoring as per table 3 required. This area exhibits higher hydraulic conductivity and will be progressively planted in vines and receive more efficient irrigation as the plan is implemented.
Barrenland	Argillaceous, flinted loam. Deep brown sandy clay loam. Alkaline pH at depth. Irrigation zone.	2c	This area exhibits higher hydraulic conductivity and will be progressively planted in vines and receive more efficient irrigation as the plan is implemented.
Barrenland	Basalt, shallow, closed depression. Dark cracking clay. Alkaline. Irrigation zone.	2d	Intensive monitoring as per table 3 required. This area will be progressively planted in vines and receive more efficient irrigation as the plan is implemented.
Barrenland	Basalt, shallow, open, backwash. Dark cracking medium clay. Alkaline. Irrigation zone.	2e	This area will be subject to drainage channels and the soil flushed. It will receive more efficient irrigation as the plan is implemented. Over time the area will be entirely excluded from efficient irrigation.
Barrenland	Argillaceous, flinted loam. Brown sandy clay loam. Irrigation zone.	2f	Intensive monitoring as per table 3 required. This area exhibits higher hydraulic conductivity and will be progressively planted in vines and receive more efficient irrigation as the plan is implemented.
Barrenland	Wetland, shallow, soft, brown, upper sandy clay. Brown clay loam. Neutral yellow to neutral to alkaline. Irrigation zone.	3a	This area will be subject to irrigated agriculture and the soil flushed. It will receive more efficient irrigation as the plan is implemented. Over time the area will be entirely excluded from efficient irrigation.
Barrenland	Wetland, shallow, soft, brown, Brown clay loam, yellow brown clay, alkaline. Irrigation zone.	3b	Intensive monitoring as per table 3 required. This area will be restricted to irrigated pasture and receive efficient irrigation as the plan is implemented.
Barrenland	Mixed basalt/Wetland sediments. Organic black over red brown clay. Alkaline.	3c	This area is not suited to any irrigation. Not monitored
Barrenland	Colluvium basalt/Wetland sediments. Soft, gully fill, Brown clay, alkaline.	3d	This area is not suited for efficient irrigation. It will continue to receive more efficient irrigation as the plan is implemented. Over time the area will be entirely excluded from efficient irrigation.

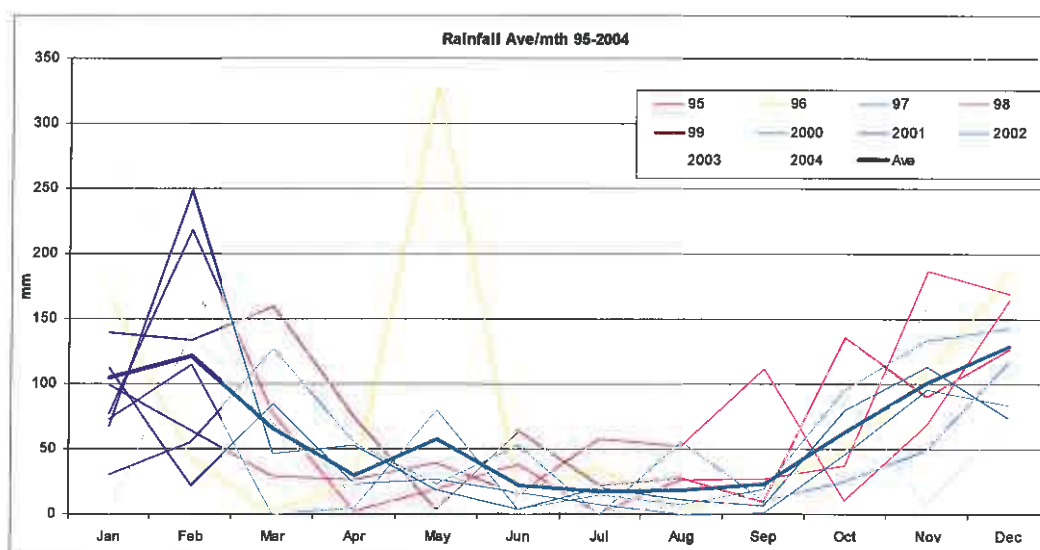


Soil map with hydrants and fence-lines.

On the other hand, in the event of excess rainfall causing leaching salts and nitrate into the aquifer there is no evidence that this will transmit to the Logan river. Limited evidence points to the reverse in that the river water recharges the aquifer and water that is constantly released upstream for domestic supply has been regularly tested for salt levels. There is no evidence to indicate that any salt is transmitted into the river by any means from irrigation practices on the Gelita farmlands during the past ten years.

A worst case scenario of below average rainfall say 450 mm will require additional bore water if the irrigated area remains constant. In these circumstances given that the amount of bore water is limited, the leaching requirement may be met by irrigating a smaller area and concentrating on the dermosols (map units, 2a,2b,2c). Thus the variable in the water balance is the volume of bore water applied. This needs to be handled in relation to effluent feed rate and rainfall incidence and amount.

The rainfall data below is for a neighbouring property and indicates the variability of rainfall in the area.



These data show the importance of varying the irrigation regime according to effluent conductivity and plant water use.

Uptake of nutrients, especially nitrogen will also be monitored to establish the utilization by plants and to determine the amounts leached past the root zone.

Of concern is the logistics used to irrigate the farm. Current practice includes farm staff on shifts whom are responsible for moving the traveling irrigators in a program which is not based on soil/plant water deficit but rather to provide an even distribution of effluent over the designated irrigation areas according in part to the Hydroplan program. Records of volumes of effluent distributed are recorded each time the irrigator(s) are operated together with an approximate location of the irrigators in question.

Whilst this method of management has been adequate for the level of management based on cattle grazing it will not be suitable for meeting the guidelines outlined above which include focusing effluent reuse on whole year irrigated vetiver/ryegrass grass production which is designed to utilize water and nutrients (especially nitrogen) for export from the site and utilized as a green stream in the composting of biosolids resulting from gelatine production.

Furthermore the basis for the license conditions is based on soil properties and the limits deemed as suitable for sustainable production. Consequently the method of effluent application needs to be more precise to give credibility to the soil monitoring program proposed. This will entail a change in management which can be achieved by installation of a centre pivot irrigator on the area of soils designated 2b, 2c shown on map above. Most of the effluent is calculated as being utilized by approximately 12 hectares of vetiver which can be accommodated on these areas of soils located on the southwestern portion of the farm. The soils selected have a permeability sufficient to achieve the proposed leaching fraction of 15 %.. Export of nutrients extracted by the vetiver and rye grass derived from the effluent will minimize the input of salts into the aquifers underlying these soils.

Automation by computer and operation by the Environmental Manager will provide reliable irrigation scheduling based on plant water requirements including a satisfactory leaching fraction to meet guidelines. In addition this new operation will relieve farm staff of irrigation duties and free them to undertake management tasks associated with the production and harvesting of the vetiver- ryegrass production and other management tasks required on remaining areas of the farm.

GROUND WATER MONITORING

Piesometers damaged by cattle and machinery have been refurbished. Measurement of groundwater has been conducted and it has been found that shallow piesometers (less than 6 metres deep are continuously dry. A conclusion has been reached that the supposition of a shallow aquifer is incorrect as the shallow piesometers have never yielded any water. Consequently it is proposed that groundwater monitoring is confined to the deep aquifers (greater than 10 metres deep). Purging to remove contaminants has been found to be necessary and the data collected cannot be assumed to truly represent the status of the underground waters. Further work should be completed for the annual audit report due in 31 January 2006.

AGROFORESTRY

The agroforestry enterprise was established in May. The tree growth has been satisfactory given the below average rainfall. The following plates show the growth of the trees that has occurred from tube stock in five months





SOIL MANAGEMENT ISSUES

The soil unit 2e has been found to be poorly drained and preliminary analyses found that continuing effluent irrigation would have a deleterious effect by virtue of salt and nitrogen accumulation in the upper metre of the soil profile. Consequently the area has been precluded from irrigation with effluent and a scheme to install lateral drains to accentuate drainage and discharging into evaporation ponds is proposed. Installation will depend on summer rainfall incidence that will correct the salt imbalance which currently is still within compliance limits. Reduced irrigation practice by the agroforestry area on the sodosol soils (soil unit 3a) above this area will reduce the incidence of lateral salt movement down-slope onto the 2e unit.

The frequency of irrigation of the agroforestry area upslope will be contiguous with the future management of the 2e soil unit.

REFERENCES

Vieritz, Alison. 2003 "Medli Analysis of Using Vetiver for Effluent Irrigation at Gelita Planrt Beaudesert, Queensland"
Department of Natural Resources, Indooroopilly, Qld.

Signed: B.M. Schafer

October 2005

ATTACHMENT A

GELITA (Asia Pacific Africa) Beaudesert: Preliminary Licence Compliance Report

October 2004

INTRODUCTION

The current licence conditions include monitoring of soil and effluent to complement a best practice management program. The following statements are taken from the EMP submission to the EPA made in November 2003.

“The parameters to be monitored and the frequency of monitoring in the Contaminant release Area Monitoring Program shall be in accordance with the parameters and monitoring frequency prescribed in schedule H Table 3.

Schedule H Table 3

Element	Sites	Method	Frequency
Soil Salinity	Within soil units 2a, 2b, 2c, 2d, 2e, 3a, 3b,	Soil sampling and analysis for pH (1:5), EC sat, Cl, NO ₃ , SO ₄ , effective CEC, exchangeable Ca, Mg, Na,	annual
Soil infiltration and hydraulic conductivity	Within soil units, 2a, 3b, 2e	Field instrumentation	annual
Nutrient Status	As Above	Soil Sampling and analysis for Total N, NO ₃ -N, NH ₄ -N, Acid extractable P	bi-annual
Groundwater	Relevant bores with water table within soil units listed above	Tape measurement and EC. Water laboratory analysis	bi-annual
Effluent	Pump out pond outlet	Water laboratory analysis,	monthly

The existing licence conditions include soil and water monitoring requirements. The schedules above are proposed as a continuation of the original conditions and have been extended to meet the requirements of the EMP. *The combined table above is based on the following detailed schedules of monitoring and irrigation response as detailed below.*

Soil infiltration and hydraulic conductivity

Soil Map units for monitoring. 2a, 2b, 2c, 2d, 2e, 3a, 3b, 3d	Sampling Methods	Acceptable Range	Irrigation Response	Testing Frequency
Infiltration and hydraulic conductivity	FullStop Monitor time for distribution of measured amount of applied effluent of SAR 12 mmol/L ^{0.5} through soil to 50cm depth at saturation using constant head infiltrometer.	20 mm/ hour at SAR 12 mmol/L ^{0.5} on dermosols, Soil Map Unit 2a , 2b, 2c 1mm/ hour at SAR 12 mmol/L ^{0.5} on vertosols/sodosols Soil MapUnits 2d, 2e, 3b, 3d, 3a	Irrigate to 50% soil water deficit based on Fullstop indicators placed at 10cm and 50 cm depths.	Annual

Nutrient Status

Soil Salinity

Soil units 2a, 2b, 2c, 2d, 3a, 3b, 3d	Soil solution sampling via FullStop Soil core sampling depth 0-120cm.	Acceptable Range at 10cm depth	Acceptable Range at 50cm depth	Acceptable Range at 120cm depth	Irrigation response	Testing Frequency
pH	(1:5) solution soil extract	4.5-7.0	5.5-7.5	6.0-8.5	pH <5.0 add lime/com post. Field pH test response. pH >8.0 stop lime dosing. Flush neutral pH water.	Annual
ESP (% calculated from sodium and cation exchange capacity)	soil	10	15	20	Flush bore water	Annual
SAR (Calculated from calculated from soil solution cations Ca ⁺⁺ , Mg ⁺⁺ Na ⁺)	solution	15	20	40	Flush bore water	Annual
EC _{ext} (dS/m)	solution	3	4	5	EC >5 on clay flushing water/shandy	Annual
Cl ⁻	solution	0-150 mg/kg	0-450 mg/kg	0-600+ mg/kg	Flushing water/shandy	Annual
NO ₃ ⁺	solution /soil	120mg/kg	100mg/kg	20mg/kg (soil sample)	NO ₃ > 100mg/kg at 50 cm irrigate only flushing water. Monitor to depth 150cm Increase pH irrigation water.	Annual
Total sulphate sulphur	Solution- (includes gypsum precipitate)	4000mg/l	5000mg/l	6000 mg/kg (soil sample)	Calcium amendment	Annual

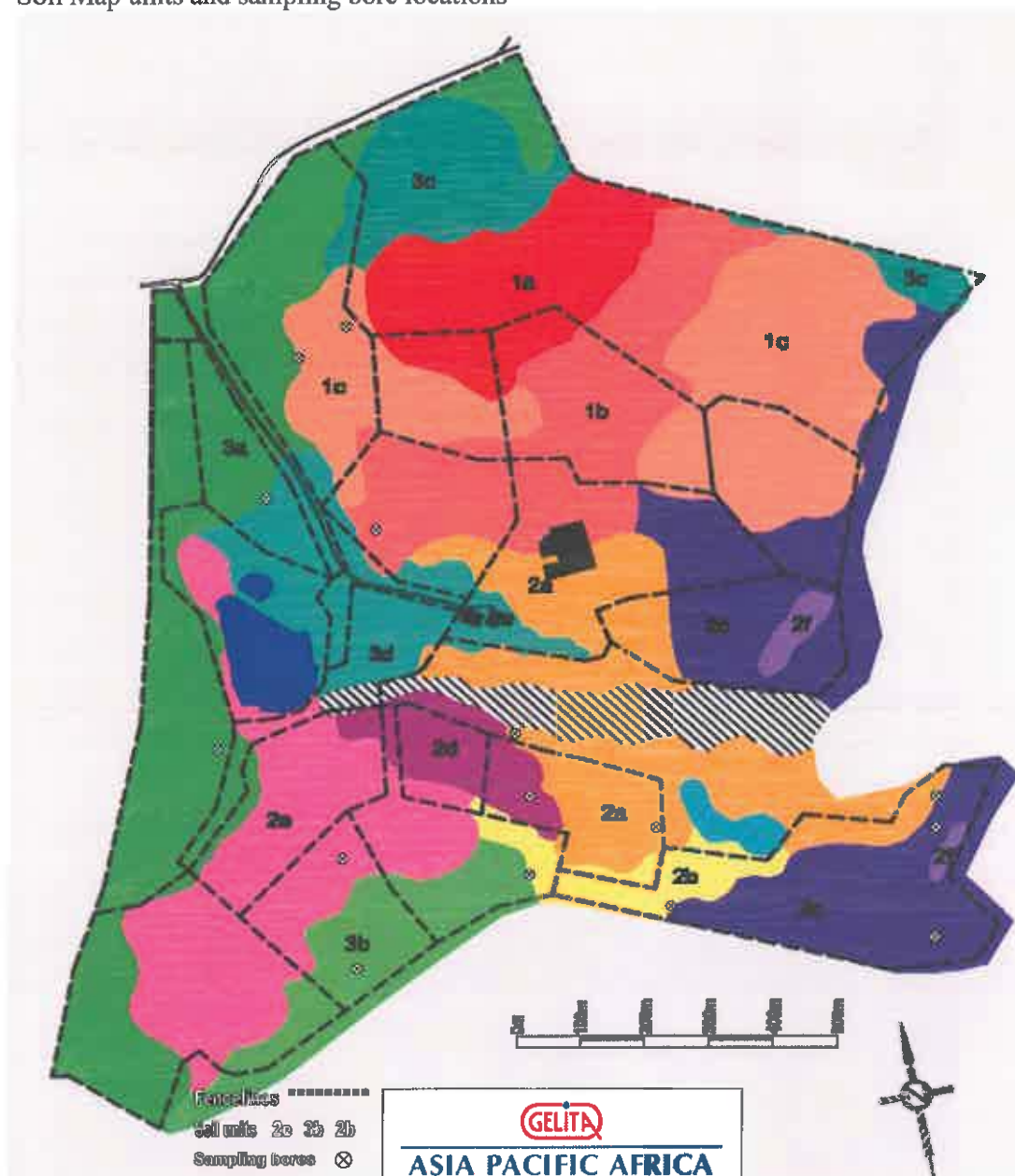
Nutrient	Acceptable Range for Soil Map Units at 10 cm Depth						
	2a	2b	2c	2d	2e	3a, 3d	3b
Total N (%)	0.1-0.25	0.1-0.25	0.1-0.3	0.2-0.5	0.2-0.5	0.2-0.4	0.2-0.5
NO ₃ -N (mg/Kg)	10-120	10-120	10-120	10-120	10-120	10-120	10-120
NH ₄ -N (mg/Kg)	20-450	20-450	20-450	20-450	20-450	20-450	20-450
Acid Extractable P (mg/Kg)	10-450	10-450	10-450	10-450	10-450	10-450	10-450
Bicarbonate Extractable P (mg/Kg)	10-100	10-100	10-100	10-100	10-100	10-100	10-100

The schedules above are proposed as a continuation of the original licence conditions and have been extended to meet the requirements of the EMP. Soil sampling shall be conducted to 1.5 metre depth across soil units on an annual basis to establish benchmarks and monitor movement of "salts" and nitrogen through soil profiles. Solution for analysis shall be drawn from FullStop wetting front detectors at 10 and

50 cm for irrigation scheduling and also at depths of 1 and 1.5 metres for soil solution extracts.

Soil Order	Description	Soil Unit	Proposed irrigation treatment
Redwood	Basalt, cones crest. Shallow stony medium clay. Non-irrigation zone.	1a	This area is not suited to any irrigation. Not monitored
Thickwood	Basalt outcrops crest. Shallow stony light clay pH 5.5 to depth. Irrigation zone.	1b	This area has been subject to irrigation in the past and future efficient irrigation shall be progressively reduced to zero as the plan is implemented. Intensive monitoring required.
Thickwood	Basalt lower slope. Shallow stony brown medium clay. Irrigation zone.	1c	This area has been subject to irrigation in the past and future efficient irrigation shall be progressively reduced to zero as the plan is implemented. Intensive monitoring required.
Thickwood	Shalebank, red soil covered forest. Deep sandy loam, pH neutral to acidic.	2a	This zone exhibits higher hydraulic conductivity and will be progressively planted to native and receive more efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Thickwood	Shalebank forested forest. Deep clay loam. pH neutral. Irrigation zone.	2b	This zone exhibits higher hydraulic conductivity and will be progressively planted to native and receive more efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Thickwood	Shalebank, forested forest. Deep forested sandy clay loam. Acidic pH at depth. Irrigation zone.	2c	This zone exhibits higher hydraulic conductivity and will be progressively planted to native and receive more efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertical	Basalt outcrops, forested depression. Black cracking clay. Shallow irrigation zone.	2d	This zone will be progressively planted to native and receive efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertical	Basalt outcrops, red soil bank. Dark cracking medium clay. Shallow irrigation zone.	2e	This zone will be subject to drainage channels and the soil bank. It will receive some efficient irrigation as the plan is implemented. Once done the zone will be entirely excluded from efficient irrigation. Intensive monitoring as per table 3 required.
Thickwood	Shalebank forested red forest. Brown sandy clay loam. Irrigation zone.	2f	This zone exhibits higher hydraulic conductivity and will be progressively planted to native and receive more efficient irrigation as the plan is implemented. Characteristics of this thickwood are typical of the other thickwoods on site. This soil type limited in area. Intensive monitoring as per table 3 not required.
Thickwood	Shalebank forested, red forest. Upper forested slopes. Brown clay loam. Modified yellow sand. Neutral to acidic. Irrigation zone.	3a	This zone will be subject to irrigation (agribusiness) and the soil bank. It will receive some efficient irrigation as the plan is implemented. Once done the zone will be entirely excluded from efficient irrigation. Intensive monitoring as per table 3 required.
Vertical	Shalebank forested, red forest. Brown clay loam, surface brown clay. Shallow irrigation zone.	3b	This zone will be retained as irrigated pasture and receive efficient irrigation as the plan is implemented. Intensive monitoring as per table 3 required.
Vertical	Mixed forest/Shalebank sediments. Organic black over red brown clay. Shallow.	3c	This area is not suited to any irrigation. Not monitored
Vertical	Shalebank forested Shalebank sediments. Red gully fill. Brown clay. Shallow.	3d	This area is not suited for efficient irrigation. It will continue to receive some efficient irrigation as the plan is implemented. Once done the zone will be entirely excluded from efficient irrigation.

Soil Map units and sampling bore locations



Soil units for monitoring purposes are described in this table and presented in map format above. Fence lines and groundwater monitoring bores are also detailed on this map.

The bores listed for monitoring are detailed in the map above. Therefore Condition H33 should be expanded to include the additional bore monitoring sites proposed by GELITA.

The proposed Schedule H Table 3 does not seek any changes to the parameters within the current licence conditions regarding groundwater quality monitoring other than a reduced frequency from bi-monthly to bi-annual. Condition H34 c would require amendment to reflect this proposed change.

Groundwater monitoring parameters and reporting requirements are further proposed to constitute an integral aspect of the Annual Audit process. This process will comprise an analysis and interpretive report of the monitoring program by an

external consultant; and shall include an annual modeling exercise.. The MEDLI model will be a major predictive tool in long-term management of the site and shall form part of the annual reporting requirement.

GELITA will also continue to regularly monitor the following effluent quality characteristics for irrigation management purposes as required by our ISO 14001 procedures. The proposed changes to the licence are designed to achieve an outcome based reporting format and do not preclude the continuation of the GELITA waste-water monitoring program.

The following parameters are required for data input into the MEDLI model and shall continue to be collected and collated. All such records are maintained on-site indefinitely.

Irrigation Water Quality Monitoring

pH	EC	COD (mg/L)	TSS (mg/L)	BOD (mg/L)	TN (mg/L)	TDS (ppm)	NOx (mg/L)
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The initial monitoring program recommended in the Environmental Impact Statement on soil and water monitoring (GHD, 1992) was implemented as policy in the Company (Leiner Davis Gelatin Australia) Environmental Management Plan, 1994.

The revised program of irrigation scheduling (Hydroplan report, September 2003) is aimed to sustain soil conditions for productive growth according to soil properties as determined in the Land Management Study Phase 1, Task A- Soil Sampling and Analysis as reported above.

To meet the requirements of the revised licence proposal more specific sampling will be required to monitor soil conditions according to soil and crop type. The sites for sampling will follow from this report and will be taken from similar locations for comparison over time.

Additional soil and ground water sampling for determining soil behaviour in relation to infiltration and hydraulic conductivity will be monitored on an annual basis during the seven years following establishment of the vetiver/ryegrass production unit.

These data will be used to validate the predictive outcomes of the MEDLI program upon which the vetiver/ryegrass program is based. Corrective actions will be taken if values are deemed to be outside sustainable limits.

This will be effected by:

- a) modifying the leaching fraction and
- b) by reducing salt load in irrigation water by shandyng with bore water and
- c) maintaining physical soil properties by mechanical intervention (eg ripping) and
- d) controlling nitrogen loads where necessary by chemical means.

These analyses will be used in conjunction with wastewater treatment data to assess compliance with the relevant licence conditions proposed in this submission. “

SAMPLING PROGRAM 2004

The sampling program to establish preliminary baseline data for the current monitoring program began on 29 January 2003. Samples were taken by hand auger to depth from sites within the mapped soil units which were located with GPS coordinates for future reference. Further sampling will be effected to meet the criteria of depth for future monitoring. The samples were submitted to the accredited analytical laboratory, Food and Agriculture Laboratories Australia for analysis. The data are presented in Table 1. below.

These preliminary data are within the acceptable ranges deemed for Soil Salinity and Nutrient Status for the specified soil map units (see Tables under Schedule H Table 3 above). Field instrumentation (FullStop Wetting Front Detectors) are yet to be installed and so soil infiltration and hydraulic conductivity data are not available at this stage.

Ground water analyses obtained from samples in September 2004 have been found to be in error. The piesometer boreholes installed in 1992 have variously deteriorated due to age. Later boreholes to replace some of these earlier boreholes in 2000 have also been damaged by farm operations and stock. Consequently some of the bores which are strategic to the new monitoring program are unserviceable. (see photographs attached).

The design of the piesometer above ground casing and caps is unsatisfactory because caps have been knocked off by cattle rubbing against them. This has resulted in the ingress of hair and effluent resulting in contamination of the ground water. This was observed in preliminary analyses even after standard purging and sampling procedures. Consequently the data was inconsistent and did not reflect the influence of management on groundwater conditions.

It is recommended that a refurbishment program is implemented to rectify the situation to allow for credible license compliance monitoring.

B.M.Schafer

October 2004





13/10/2006

**Proposal for Groundwater Investigations
Gelita Property
Josephville via Beaudesert**

Dr Malcolm Cox
School of Natural Resource Sciences
QUT
4 June, 2006

Background

Following a visit to the Josephville site and discussions with Cameron Smeal there was agreement to progress with a proposal for a Master of Applied Science study focused on groundwater, and some additional studies.

Some general points observed about the site

1. this is a small catchment which probably acts as a hydrological entity, and surface drainage is relatively simple
2. water supply is important for the operation
3. water quality issues are a major factor considering the immediate proximity of the Logan River
4. there is variable geology and also soil type, both in quality and water bearing capacity
5. sub-surface drainage within the area is complex, however, higher parts of this site have low potential to act as groundwater aquifers
6. a strategy to maintain the site as an on going enterprise is essential, especially in regard to disposal and distribution of both solid wastes and effluent
7. there already exists a network of groundwater bores, in various states of repair.
8. preliminary hydrogeological data exists in the form of geological logs from the drilled bores (report of 1992 and 1993).

It was also noted there is a high level of potential to develop the site as a field laboratory, and visualisation of the hydrological system would be encouraged.

Summary of Groundwater Research Projects

Two combined research projects are proposed: A. groundwater flow model (MAppSc) research project of two years duration, commencing in March, 2006, to be conducted by Ms Vivien Rudorfer), and B. groundwater hydrochemistry and isotope investigation (to be conducted by Dr Malcolm Cox, and commence July, 2006). The main components of the projects will be as follows,

1. compilation of existing data on site
groundwater, boreholes, water levels, rainfall, water chemistry, geological and soil; organise data and reassess. In addition, compile available data for the local region around the Gelita site.
2. groundwater bore assessment
inspect the bore network to determine condition, and details such as depth of bore, screened zones, integrity of nets of bores. Measure bore water levels in the full network, examine the results; plan possibly 2-3 more full measurements. Identify a

set of bores (possibly 5) or systematic monitoring of water levels by Gelita (plus EC and pH).

3. rainfall characterisation

Assess local rainfall records for the site and the immediate local area. Develop rainfall distribution plots. Request for the Gelita weather stations to be re-established. Characterise relation of recharge (hydrographs) to rainfall.

4. conceptual hydrogeological model

Develop a conceptual hydrogeological model using existing bores, geological logs and surface elevation. This will provide the physical framework for understanding hydrological processes. Important features: depth to bedrock, bedrock morphology, understanding of sedimentary (alluvial) deposits as thickness, type and distribution, and so their hydrological properties. Significant within this is the siting of bores, and depth of screens.

5. groundwater flow model

(a) develop basic groundwater flow nets, using ground surface topography, and water table surface. This is the basic information for a flow model, but enables visualisation of flow directions. Contours and flow lines developed in Surfer.

(b) develop a numerical groundwater flow model using the industry standard software MODFLOW. This model requires calibration, then verification. We would need confirm if it is required to do some pump tests of bores to determine hydraulic conductivity K, or if existing data is adequate.

Components 1 to 5 are within the Master of Applied Science study.

6. water chemistry

Sampling of groundwater for hydrogeochemistry analyses in laboratory, for major ions, minors and metals, and for nutrients. In field measurements of physico-chemical parameters (EC, pH, Eh, T). The water chemistry provides information of water quality, but provides an effective means of determining source of water, separate bodies, and mixing of waters.

7. stable isotope investigation

stable isotope investigation (d2H and d18O) to support chemical mixing and provide independent support for flow models. This is useful to show source of the groundwaters and some later processes (e.g. evaporation). This will be a parallel study by Dr Malcolm Cox

Reporting

Written summary reports will be provided every 6 months (end of August, 2006; February, 2007; August, 2007; February, 2008). Gelita will be notified of seminars, and copies of seminars given will be provided as ppt on CD. At the end of the investigation, all data will be made available to Gelita and final reports and theses. QUT researchers will aim to write at least two papers for publication; draft manuscripts will be provided to Gelita prior to external submission.

Expected Outcomes

The above study will produce a groundwater flow model using industry standard software (MODFLOW in GMS package). This can be run to test likely recharge areas and discharge areas. We will be able to get an idea of groundwater "compartmentalisation" within the site.

Other aspects to be tested are: potential hydrological to the Logan River, most likely areas and form of recharge, how well connected to the ground surface is the top of the water table (i.e. saturated zone), is there a deeper confined/semi-confined aquifer within the alluvium (and if so, is it connected to the unconfined aquifer).

Water chemical analyses are used as a tool to determine groundwater flow processes, but also the link with surface waters; these data will also provide a good overview to water quality within the site.

This hydrogeological model can also produce plan maps, 3-D views, and cross sections. When completed it will be provided to Gelita and can be used as a basic management tool, and also for testing various scenarios.

**Proposed Budget For
Groundwater Investigations
4 June, 2006**

Item	Year 1 (2006)	Year 2 (2007)	Totals
<i>Gelita funded</i>			
Scholarship	5,000	5,000	10,000
Chemical analyses (@ \$150 per sample)	3,750	1,500	5,250
Stable isotope analyses (@ \$110 per sample)	---	2,750	2,750
Gelita funding	8,750	9,250	18,000
 <i>QUT funded</i>			
Scholarship (ISR-QUT)	5,000	5,000	10,000
Field travel	1,250	1,000	2,250
Consumables	550	200	750
Printing, copy	250	750	1,000
QUT funding	7,050	6,950	14,000
 Total	 15,800	 16,200	 32,000

13/10/2006



ASIA PACIFIC AFRICA

**DEVELOPMENT
OF COMPOSTING OPERATION
AT SUNNY HILLS, BEAUDESERT
2005**

Compiled in May 2006 by

*The Organic
Force*



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EXECUTIVE SUMMARY

The presented report shows the final lay-out of the on-site composting facility that was upgraded in 2004 at a total cost of approximately \$171,000.

During 2005, almost 11,000m³ or 7,850t of feedstock material was processed at the GELITA composting facility. Gelatine by-products, which made up 61.7% of feedstock by weight and 47.8% by volume, were comprised of skutch (2,403t / 2,288m³), sludge (1,232t / 1,311m³) and ash (1,209t / 1,680m³). More than 3,000m³ of Re-Mix material and 2,700m³ of imported products were used as bulking material to facilitate composting of gelatine by-products.

75 windrows were established in 2005 at a rate of approximately 1.5 per week. The First Mix recipe was amended early in 2005 to prevent leachate from occurring. However, only one of the 27 Fresh Mixes contained sludge, and not all of the 48 Re-Mixes, for which nine different mixing recipes were used. It is estimated that, if standard mixing ratios were used, up to 2,200 m³ more sludge could have been composted in 2005, which would have resulted in additional savings of more than \$12,000.

An increase in the average composting periods per windrow from 42 to 52 days resulted in a decrease in the number of windrows that were processed in the second half of the year (30) compared to the first half (45). There was also a declining trend in the frequency windrows were turned in the second part of the year. Some windrows were turned only once or twice. In order to minimise the risk of the compost containing viable pathogens and weed seeds, windrows should be turned at least four or five times, while there is no need to turn more than seven times during a seven week composting period.

For the majority of windrows there was either a lack of temperature records, or recorded temperatures were below the 55 °C threshold. Only 19 of the 75 windrows that were composted during 2005 met the Australian Standard pasteurisation criteria. It would be possible only for these 19 windrows to assert in any way that the finished compost could be expected to be free of pathogens and weeds. GELITA is urged to ensure that regular temperature measurements are carried out in accordance with procedures outlined in the Composting Operations Manual.

Windrow Monitoring Sheets showed that windrows with identical blends had different codes, that some material was re-mixed once, some was re-mixed twice, and some was re-mixed three times without reflection on the windrow code, that some windrows were mislabelled 'Fresh' for 'R-Mix', or vice versa, and that for a number of windrows it was unclear where the material for re-mixing had come from. These record keeping problems may be exacerbated by the fact that windrows do not have identification labels. It is recommended that windrow identification labels be used and that the unsatisfactory state of record keeping be improved.

There is concern however, that the identified problems may be due to underlying staff problems and lacking appreciation for the importance of quality management. These underlying problems should be addressed urgently, in order to ensure that the composting operation is run smoothly and efficiently with minimal risk exposure.

Only one compost sample was analysed in 2005. The tested compost complied with Australian Standard AS 4454-2003 requirements, except for high ammonium levels and a failure to support plant growth (toxicity). Phytotoxic effects were most likely caused by a high concentration of soluble salts (high electrical conductivity). Chloride levels were high in analysed compost samples, but sodium was low. This is one of the advantages of Bio-Blend compost, compared with chicken manure and composted cow manure. However, Bio-Blend compost contains relatively low

phosphorus, potassium and magnesium concentrations, while other characteristics are relatively similar with the compared products.

During 2006, development work should focus on improved quality management and quality assurance, as well as improving compost quality.

During 2005, a total of 3,210 m³, or 2,041 t of compost left the site, most of which was used for soil blending and some for agricultural applications. Returns for the external use of compost were valued at \$11,675.

Total operating costs for the composting facility in 2005 amounted to \$149,837, equating to processing costs of \$26.12 per tonne of input and \$30.93 per tonne of composted gelatine by-product.

The on-site composting of 4,844t gelatine by-products in 2005 saved some \$245,000 based on 2004 disposal and transport charges. However, conditions changed in 2005, which resulted in avoided disposal costs of \$320,000. The cost benefit analysis showed that composting of gelatine by-products resulted in net benefits of \$170,000 if machinery costs cover fuel only, and \$102,000 if all machinery costs are accounted for (on a pro rata basis). Considering an investment of \$171,000, this is an excellent return on investment. Nevertheless, the technical and financial performance of the operation can be improved to further increase annual net benefits.

BACKGROUND

As was outlined in last year's report, 2004 saw a significant up-grade of the composting facility at Sunny Hills, based on a \$171,000 capital expenditure program, which included the expansion of the bottom and top composting areas, establishment of a surface sealed (asphalt), all-weather composting area (bottom area), re-compaction and grading of the gravel based top composting area, and purchase of a tractor-driven windrow turner. A new tractor that was suitable for operating the windrow turner and a new loader were purchased during 2003.

Consequently, in 2005 work concentrated at fine-tuning operational aspects of the facility and ensuring a smooth operation. Furthermore, emphasis was placed on introducing and improving quality management aspects in the composting operation.

SITE DEVELOPMENT

Major development work associated with the composting facility was described in last year's report. However, the report did not show the final outline of the up-graded facility. Therefore, Figure 1 provides an outline and dimensions of the new surface sealed bottom pad composting area. The asphalted composting area is approximately 120 meter (m) long and 38.5m wide and therefore covers some 4,620 square meters (m²).

Figure 2 presents an overview of the entire GELITA Australia composting facility, including the bottom and top pad as well as raw material and other storage areas. Figure 2 provides also an impression of current operational arrangements, i.e. that the bottom pad usually holds seven windrows and the top pad five.

The access road to the composting area was upgraded (gravel base and 'Hot Bitumen Mix') during 2005 to ensure all-weather access to the site. Upgrading of the access road had been delayed by the development and construction of a new hide storage shed in close proximity to the composting area.

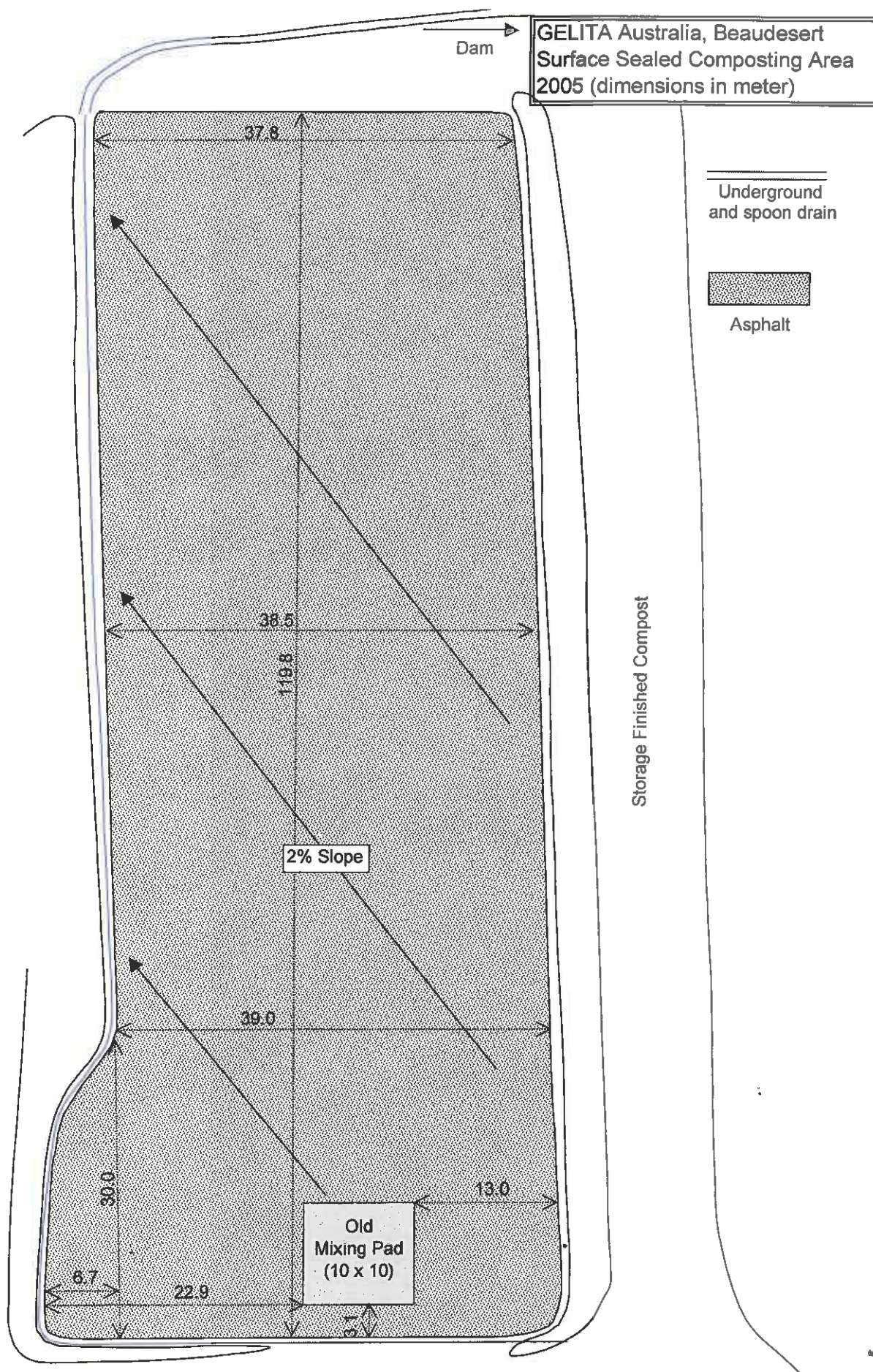


Figure 1 Outline of surface-sealed composting area (bottom pad)

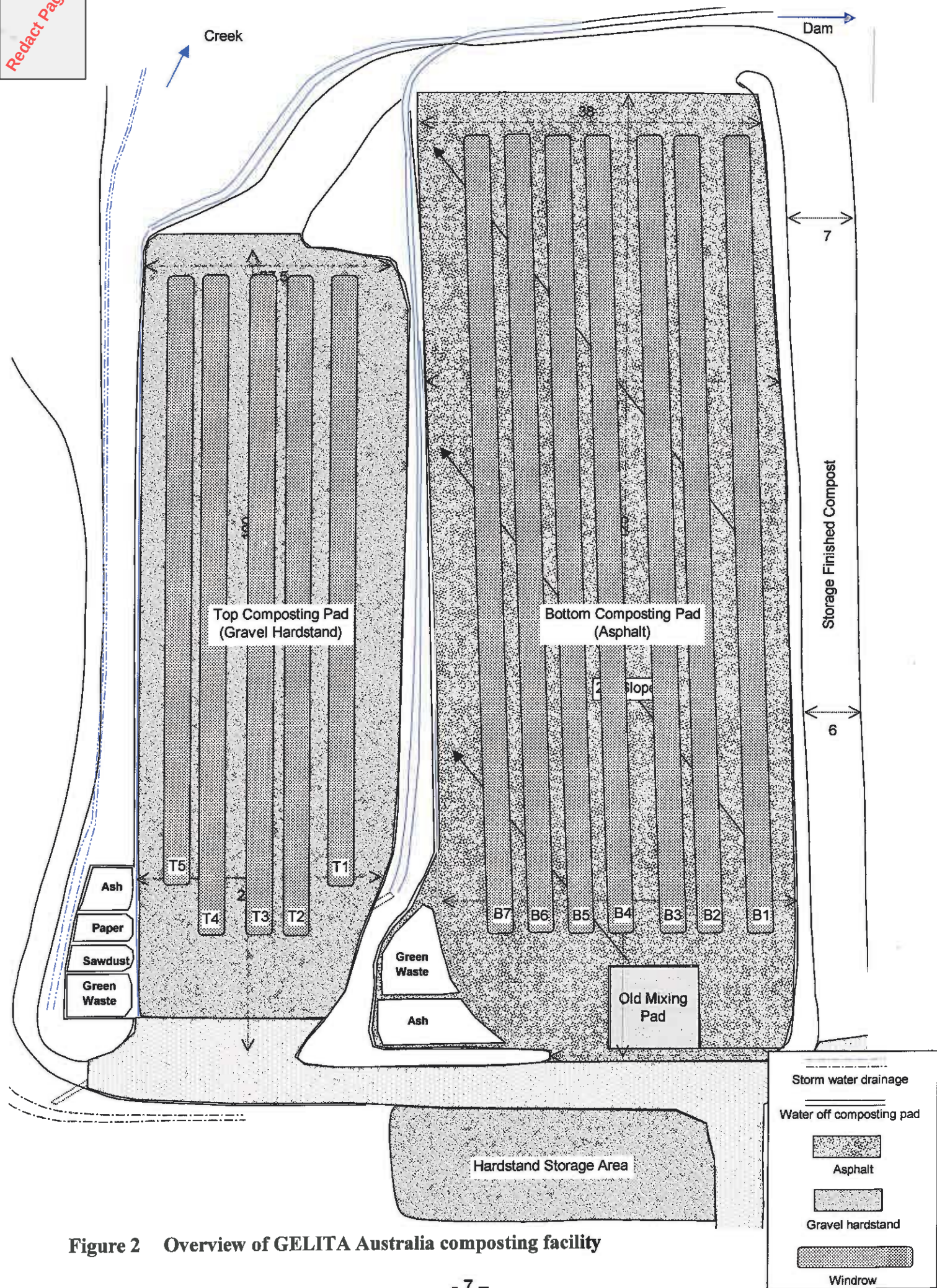


Figure 2 Overview of GELITA Australia composting facility

FEEDSTOCK MATERIAL FOR COMPOSTING OPERATION

GELITA Australia's composting operation processes gelatine by-products (skutch, sludge and ash) and imported bulking materials (shredded garden organics, sawdust / wood shavings and paper manufacturing residues). Accurate records (volume and mass) of all incoming bulking materials were kept during 2005, by means of weighbridge dockets and volumetric carrying capacity of transport vehicles. However, the amount of gelatine by-products that was utilised via composting was estimated based on the following assumptions:

Skutch: The skutch transport vehicle (Billy Cart) has a carrying capacity of 4.50 cubic meter (m^3) and skutch has a bulk density of 1.05 kilogram per litre (kg/L). It is assumed that the first load of skutch per day that is transported to the composting area and added to a mix usually comprises $4m^3$, which represents 88.89% of a full load. This means that 4.2 tonne (t) of skutch are added to each blend with the first load of skutch. With any further load that is taken for composting in any given day, there is an increasing possibility that the transport vehicle is only partially full. Records dating back to 2003/04 show that some skutch loads contained less than 50% of a full load. However, due to the lack of other records it was assumed that each load of skutch taken to the composting site comprised $4m^3$ or 4.2t.

Sludge: A loader with a $1.3m^3$ bucket was used to transport sludge from the sludge disposal bay to the composting site. It is assumed that, on average, each bucket load contained $1.3m^3$ of sludge. At a bulk density of 0.94 kg/L, this equates to 1.22t.

Ash: The same loader with a $1.3m^3$ bucket was also used to transport coal ash. Dried ash has a bulk density of approximately 0.72 kg/L, resulting in the addition of 0.94t of ash per bucket.

The total amount of gelatine by-products that was utilised via composting in 2005 was determined by extrapolating the above data together with information contained in the Windrow Data Sheet (windrow type and number, mixing ratio) to estimate by-product quantities in each windrow, and hence derive approximate values for the whole year.

The means of determining the amount of gelatine by-products that was utilised via composting are obviously relatively crude and inaccurate, and therefore, the reader should regard quantitative figures that relate to gelatine by-products as indicative only. However, weighbridge records were kept for all unprocessed sludge that was transported off-site.

Gelatine By-Products

It is estimated that close to $5,300m^3$ or 4,850t of gelatine by-products were composted during 2005 (Table 1). Utilised gelatine by-products comprised skutch (43.35% v/v), sludge (24.83% v/v) and coal ash (31.82% v/v).

Table 1 Volume and mass of gelatine by-products composted in 2005

Gelatine By-products	Volume m^3	Bulk Density kg/L	Mass t
Skutch	2,288	1.05	2,403
Sludge	1,311	0.94	1,232
Ash	1,680	0.72	1,209
Total	5,279		4,844

All skutch that was generated in 2005 was composted. This was not the case with sludge and coal ash. While there are no accurate records of the quantity of ash that was removed from the ash dams and stored near the composting facility, it was obvious that the stockpile increased significantly during 2005. On the other hand, weighbridge records show that 8,087t of sludge was disposed off-site in addition to the amount that was composted. Monthly off-site sludge disposal quantities during 2005 are shown in Figure 3.

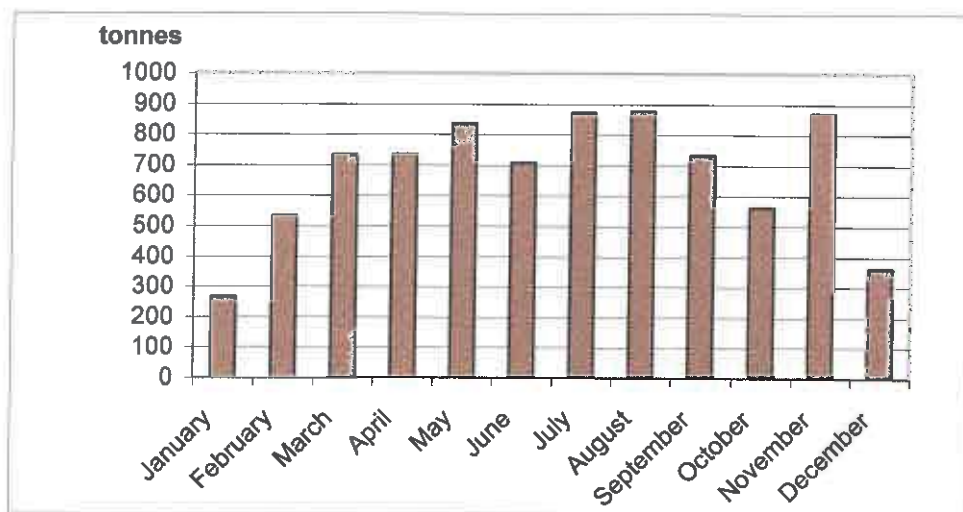


Figure 3 Monthly off-site disposal of sludge in 2005

The fact that a sizable quantity of sludge was disposed off site is largely due to a significant increase in sludge generation over the last few years. The total amount of gelatine by-products generated in 2005 is compared to the quantities generated in 2001 in Table 2. It can be seen that the total amount of gelatine by-products increased by almost 50% between 2001 and 2005. The observed increase was primarily due to significantly higher sludge generation rates (72.6%).

Table 2 Quantities of gelatine by-products generated in 2001 and 2005

Gelatine By-products	2001 t	2005 t	Increase %
Skutch	1,920	2,403	25.2
Sludge	5,400	9,319	72.6
Ash	1,800	1,936 (?)	7.5 (?)
Total	9,120	13,522	48.3

Bulking Materials

Records of incoming materials show that a total of 2,700m³ bulking materials were imported in order to facilitate the composting of gelatine by-products. Imported bulking materials comprised 1,350m³ shredded garden organics (mulch), 620m³ sawdust and wood shavings, and 730m³ paper residues (Figure 4), representing 50%, 23% and 27% of total bulking material supplies, respectively.

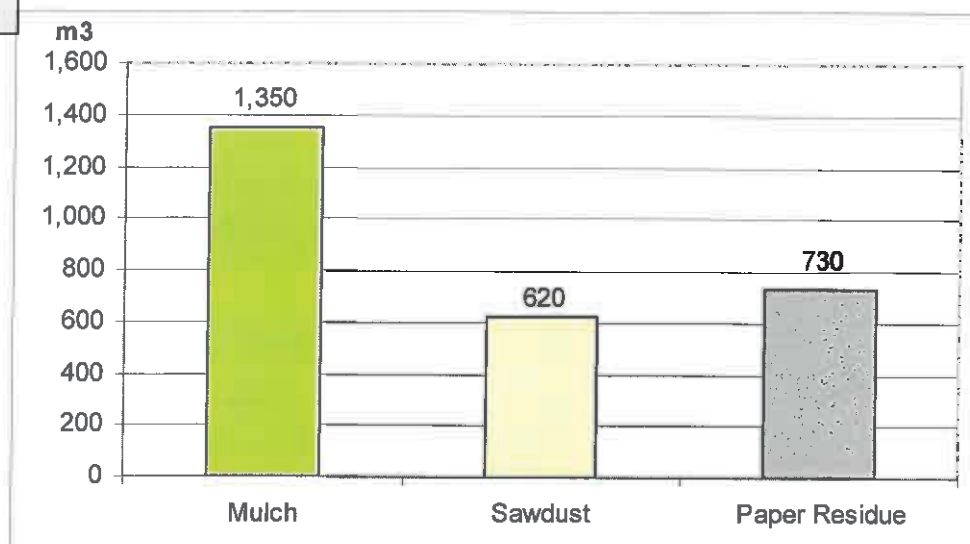


Figure 4 Quantity (m³) of imported bulking materials used in 2005
(note that sawdust includes wood shavings)

Weighbridge records of incoming bulking materials were available only from the middle of April 2005. Therefore, the mass of bulking materials received in 2005 was estimated based on volumetric delivery data and material bulk densities. Table 3 shows that approximately 886 tonnes (t) of bulking materials were utilised in 2005, being comprised of 324t of shredded garden organics, 80.6t of sawdust and wood shavings, and 481.8t of paper residue.

Table 3 Volume and mass of imported bulking materials used in 2005

Bulking Material	Volume m3	Bulk Density kg/L	Mass t
Shredded Garden Organics	1,350	0.24	324.0
Sawdust / Wood Shavings	620	0.13	80.6
Paper Residue	730	0.66	481.8
Total	2,700		886.4

As outlined in the composting manual, partly composted material is 're-mixed' with fresh gelatine by-products, which means that re-mix material is also used as bulking material. Based on an assumed average bulk density of 0.7 kg/L at the time of re-mixing, it is estimated that 3,016m³ or 2,111t of re-mix material was used as bulking material during 2005 in addition to imported materials.

Total Throughput

During 2005 approximately 11,000m³ or 7,850t of feedstock material was processed at the GELITA composting facility (Table 4). Of the total annual throughput, gelatine by-products made up 47.8% on a volumetric basis and 61.7% on a tonnage basis.

Table 4 Amount (volume and mass) of materials processed through composting in 2005

Material	Volume m ³	Percentage % v/v	Mass t	Percentage % w/w
<i>Gelatine by-products</i>				
Skutch	2,288	20.8	2,403	30.6
Sludge	1,311	11.9	1,232	15.7
Ash	1,680	15.3	1,209	15.4
<i>Bulking Material</i>				
Shredded Garden Organics	1,350	12.3	324	4.1
Sawdust / Wood Shavings	620	5.6	81	1.0
Paper Residue	730	6.6	482	6.1
Re-mix	3,016	27.4	2,111	26.9
Total	10,995	100	7,842	100

Quality of Input Materials

Characteristics of input materials have a significant influence on the composting process and even more so on the quality of generated compost products. The Bio-Blend Compost that is currently generated shows some quality characteristics that are not desirable, such as high electrical conductivity, high ammonium content and high chloride levels (see Table 8). These characteristics could have detrimental effects on soil quality or plant growth, which is why the quality of Bio-Blend Compost should be improved and compost production should focus more on end product quality and quality management. Consequently, the Compost R& D Work Program for 2006 concentrates on compost quality and quality management and seeks to develop recipes and operational procedures that ensure the production of high quality compost products. In preparation of these activities planned for 2006, all input materials, i.e. gelatine by-products and imported bulking materials were sampled and analysed in November 2005. Chemical characteristics of all input materials that were analysed between 2002 and 2005 are provided in Table 5 and Table 6.

Table 5 Characteristics of gelatine by-products analysed in 2002 and 2005 (expressed on a dry matter basis)

Material Date of sampling Laboratory	Pond Sludge		Anaerobic Sludge		Skutch		Ash	
	13.5.02 FALA	8.11.05 FALA	13.5.02 FALA	15.11.05 FALA	13.5.02 FALA	8.11.05 FALA	13.5.02 FALA	8.11.05 SGS
pH	7.2	8.1	7.41	8.09	4.72	5.31	6.8	6.61
Conductivity	1.648	1.892	3.66	1.791	2.45	2.6	0.458	0.22
Total solids (TS)	19.1	21.8	27.40	27.4	27.7	28.7	61.6	71.1
Moisture Content	80.9	78.2	72.6	72.6	72.3	71.3	38.4	28.9
Loss on Ignition	63.9				92.1		26.5	
Chloride		0.5		0.9		0.3		0.0228
Calcium (Total)	78,534	127,294	149,635	107,664	24,477	26,321	3,182	2000
Magnesium (Total)	1,361	1,885	1,770	1,299	110	128	951	1500
Sodium (Total)	880	1,862	4,504	1,865	736	380	1,417	2900
Potassium (Total)	1,199	817	606	887	157	90	468	1100
Sulphur (Total)	1.8	1.6	2.8	1.9	2.6	3.7	0	0.26
Sulphate		4.9		5.8		8.1		0.8mg/kg
Aluminium (Total)	1,366	1,202	1,106	741	160	169	11,234	
Arsenic (Total)	0.4		0.3		0.3		0.6	
Boron (Total)	157		91		108		49	73
Cadmium (Total)	0.3		0.2		0.2		0.1	
Cromium (Total)	41		15		2.7		5.6	
Copper (Total)	52	20	25	16	56	3.9	28	55
Iron (Total)	41,152	25,183	31,982	21,420	146	188	5,032	5100
Manganese (Total)	188	155	157	123	2.2	2.7	80	37
Nickel (Total)	33		25		2.4		8.8	
Lead (Total)	1.3		1.8		90		5.0	
Zinc (Total)	576		322		79		14	28
Mercury (Total)	0.7		0.4		0.4		0.0	
Selenium (Total)	0.6						0.1	
Tin (Total)	23.6		31		16		7	
Phosphorus as P (Total)	7,644	4,908	4,263	3,650	1,274	1,582	147	100
Ortho-Phosphorus		5.3		3.2		652		
Total Organic Carbon	40	33	21	41	61	52	1.8	17.1
Ammonia as NH3	4,183	5,046	4,343	5,668	1,892	679	2.0	
Nitrite as NO2	104		11		2.1		0.6	
Nitrate as NO3	22	125	0.8	453	11	4.0	17	
Total nitrogen	7.6		6.1	4.7	11	8.0	0.8	0.70
C/N Ratio	5.2		3.5	8.5	5.3	6.5	2.4	24.4

Table 6 Characteristics of imported bulking materials determined between 2002 and 2005

Material Date of sampling Laboratory	Shredded Garden Organics			Paper Residues		Wood Shavings		Sawdust 7. 6. 04 Collex
	16.4.02 Collex	13.5.02 FALA	7. 6. 04 Collex	30.7.03 ?	8.11.05 SGS	7. 6. 04 Collex	8.11.05 SGS	
pH	6.7	5.8		7.1	6.33		5.06	
Conductivity	1.25	1.71		4.88	0.39		0.16	
Total solids (TS)	79	74.3		43.3	75.8		84	
Moisture Content	21	25.7	15	56.7	24.2	6	16	41
Loss on Ignition		92.3						
Calcium (Total)		6,270		64400	7,200		2,100	
Magnesium (Total)		1,080		1590	1,300		400	
Chloride					1,069		470	
Sodium (Total)	1100	1,090		465	470		1,300	
Potassium (Total)		3,080		155	3,000		800	
Sulphur (Total)		1,096			500		100	
Sulphate					0.1		< 0.1	
Iron					4,500		530	
Boron (Total)	20			<25	11		63	
Arsenic (Total)	<1.0			0.65				
Cadmium (Total)	1			0.06				
Chromium (Total)	33							
Copper (Total)	41			52.1	9		39	
Manganese (Total)	170				110		22	
Nickel (Total)	5.7							
Lead (Total)	45							
Zinc (Total)	140			5.05	63		11	
Mercury (Total)	<1.0			62.6				
Phosphorus as P (Total)	1200	491		0.02	400		100	
P Soluble	20			194				
Ammonia as N	<1.0			189				
Nitrite and Nitrate as N		8.23						
Ammonia as NH3		43.1						
Nitrite as NO2		0.86						
Total nitrogen	1	0.81	0.29	0.48	0.3	0.23	0.1	0.1
Organic Matter	80			46.4				
Total Organic Carbon	47	32.7	27	27.3	49.1	58	55.9	59
C/N Ratio	47	40	93	57	164	252	559	590
Air filled porosity			18.5			46.5		36.5
Water holding capacity			44			39.5		45.5

COMPOSTING OPERATION

The principals and procedures for GELITA Australia's composting operation are outlined in the Composting Operations Manual, which is updated regularly, last in January 2006.

Performance of the composting operation was assessed by analysing information contained in Windrow Monitoring Sheets. This information was used as a tool for

- determining performance of the composting operation,
- assessing compliance with operational procedures provided in the composting manual, and
- gauging conformity with Australian Standards AS 4454 operational requirements regarding pathogen elimination.

Between January and December 2005, a total of 75 windrows (54-R - 129-R) were established, 27 of which were Fresh Mixes and 48 Re-Mixes. This indicates that approximately 1.5 new windrows were established each week and also that most windrows were re-mixed twice.

Mixing Ratios

The Composting Operations Manual provides mixing ratios for First Mixes and Re-mixes, which were developed to achieve the following goals:

- maximising the use of gelatine by-products in the following order: 1. skutch, 2. sludge, 3. ash,
- minimising costs for purchasing of external bulking materials,
- minimising adverse environmental effects, (odour and leachate).

In order to prevent the occasional occurrence of leachate from First Mix windrows, the proportion of shredded garden organics and sawdust in the First Mix was increased by one bucket each. The amended mixing ratio for the First Mix, which was agreed upon and introduced in early 2005 is shown in Table 7. In addition, wood shavings replaced sawdust, which showed varying and often elevated moisture levels. Wood shavings have also an increased capacity for facilitating passive aeration, which makes them more suitable as bulking material for the composting of gelatine by-products.

Table 7 Amended mixing ratios for First Mix and Re-Mix (as of early 2005)

Feedstock	First Mix		Re-Mix	
	Loader Buckets	m ³	Loader Buckets	m ³
Skutch	1 Billy Cart	4	1 Billy Cart	4
Sludge	6	7.8	6	7.8
Ash	2	2.6	2	2.6
Garden organics	7	9.1	0	0
Paper residue	3	3.9	0	0
Wood shavings	3	3.9	0	0
Composted material	0	0	12	15.6
Total volume		31.3		30.0

However, the Windrow Monitoring Sheets showed that, rather than using the two provided mixing ratios, all but one Fresh Mix was comprised of

- 2 Billy Carts of skutch,
- 4 buckets of ash,
- 6 buckets of shredded garden organics,
- 3 buckets of paper residues, and
- 3 buckets of wood shavings.

Only one Fresh Mix contained sludge. These changes to the mixing ratio resulted in relatively little use of sludge and increased use of ash. There was little consistency in re-mixing materials, as is shown by the use of nine different Re-Mix 'recipes', some of which made use of sludge, while others did not.

Changes in the mixing ratio, particularly the exclusion of sludge, resulted in considerably less gelatine by-products being composted in 2005, than was expected. A comparison between the expected outcomes, i.e. use of proposed standard mixing ratios, and actual composting activities suggests that up to 2,200 m³ more sludge could have been composted during 2005. It is estimated that this would have resulted in additional savings of more than \$12,000 (including increased use of external bulking materials).

Operation and Process Control

Once the various feedstock materials were mixed and placed in windrows, they were composted for periods between 27 and 67 days. However, most windrows were composted for between 30 and 50 days. Nevertheless, Figure 5 reveals that windrows tended to be composted for longer during the second half of the year (windrows 100 and later) than during the first six months. The average composting time for windrows 54R to 99SS-R (first half of year) was 42 days, while it was 52 days for windrows 100F to 129R (second half of year). The fact that windrows were composted for longer after the middle of July (windrows 100 and later) is also reflected by the higher number of windrows that were composted in the first half of the year (45), compared to the number processed in the second half (30).

Unnecessarily prolonged composting periods limit the facility's throughput and reduce its efficiency. This will result in increased processing costs per tonne throughput due to the relatively high proportion of fixed costs associated with operating the composting site.

Although the turning frequency varied throughout the year, Figure 5 shows also a declining trend in the turning frequency in the second part of the year. Some windrows were turned only once or twice, although the composted material should be turned at least three times to achieve acceptable pathogen and weed seed elimination. In order to minimise the risk of the compost containing viable pathogens and weed seeds, it is desirable to turn windrows at least four or five times.

Conversely, more than seven turns during a seven to eight week composting period are usually unnecessary and costly. It is anticipated to develop and introduce a new turning regime in 2006, with more frequent turning during the first three to four weeks of composting and a reduced turning frequency during the remainder of the composting process.

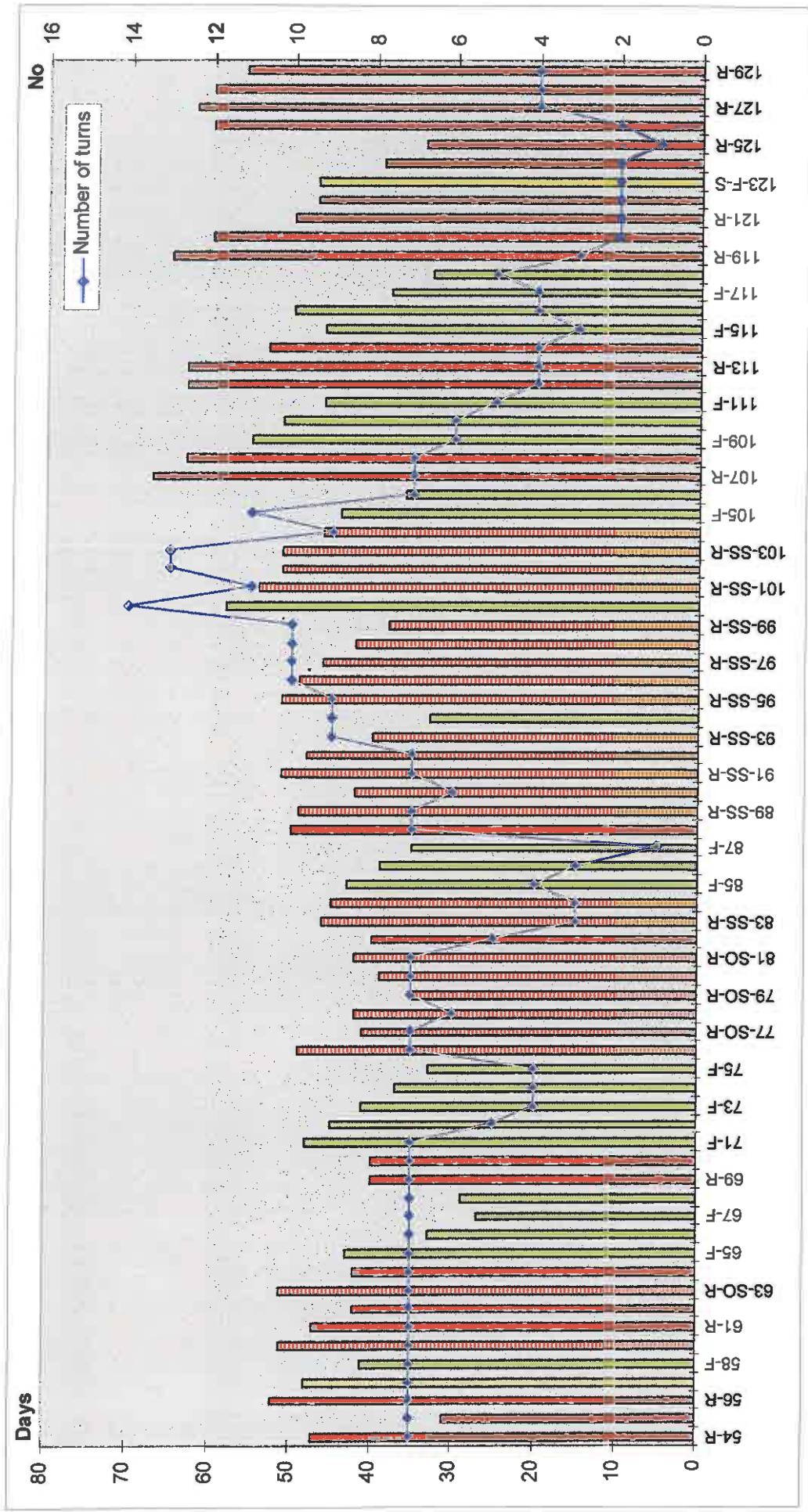


Figure 5 Duration of composting process (days) and turning frequency for all windrows processed in 2005
Note: green/greenish bars represent Fresh Mix (F) windrows, and brown/brownish bars represent Re-Mix (R) windrows

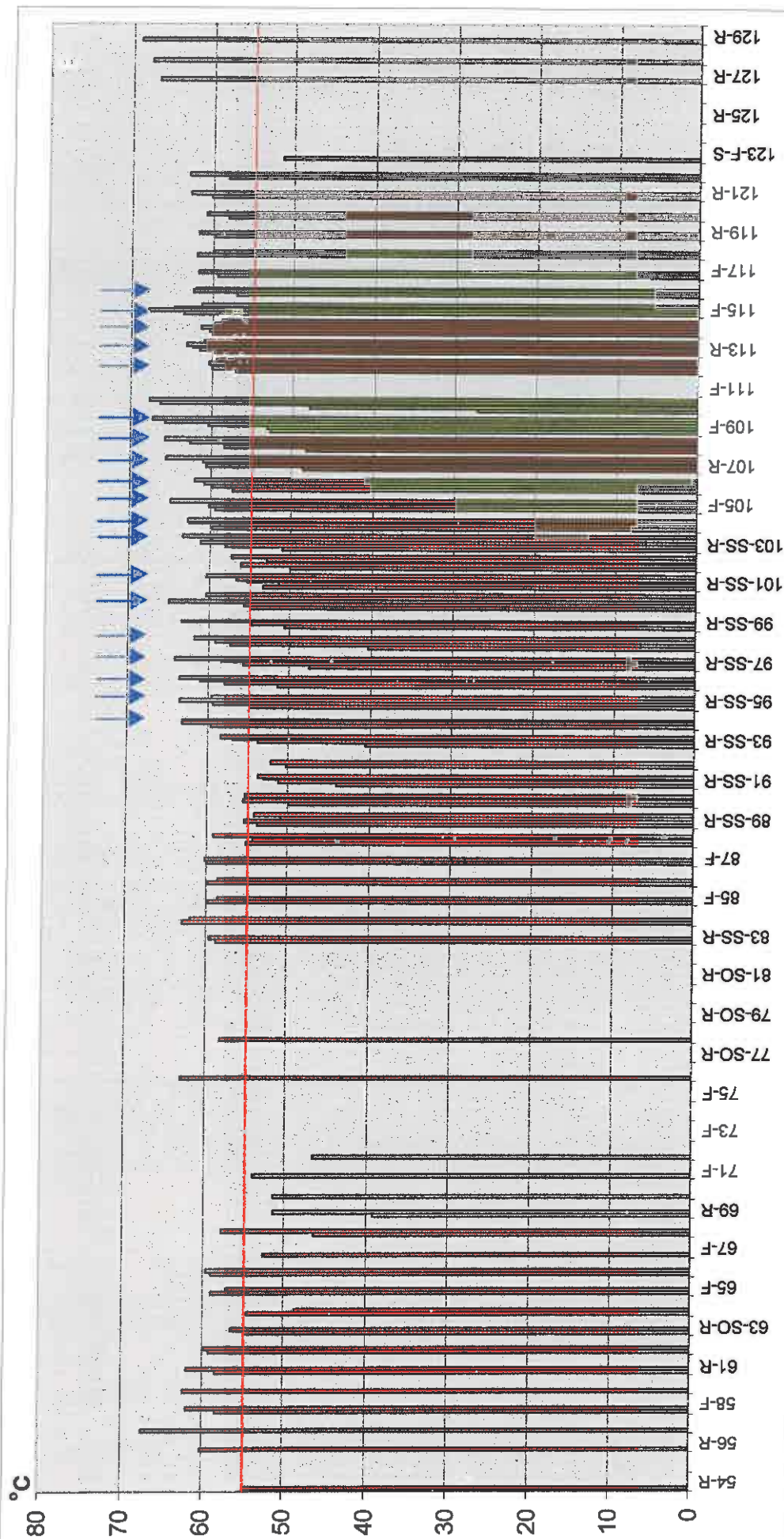


Figure 6 Average windrow temperatures (°C) recorded for each windrows processed in 2005

Note: green/greenish bars represent Fresh Mix (F) windrows, and brown/brownish bars represent Re-Mix (R) windrows

↑ indicates that windrow temperatures above 55 °C were recorded at least three times

Regular temperature measurements, together with an assessment of moisture levels are the key process control points for windrow composting. Adequate temperature records provide a good indication of the progress and status of the composting process, and they provide also an indirect means of gauging the likelihood of achieving pathogen and weed seed destruction (pasteurisation). Minimum requirements for realizing pasteurisation according to the Australian Standard for Composts, Soil Conditioners and Mulches (AS 4454 – 2003) is the appropriate turning of the outer material to the inside of the windrow so that the whole mass is subjected to a minimum of 3 turns with the internal temperature reaching a minimum of 55 °C for 3 consecutive days before each turn. The more frequent windrows are turned and the higher the internal temperature (60 – 70 °C), the lower the risk of pathogens and weeds surviving the composting process. Elimination of pathogens and weeds is primarily a function of time and temperature, although other factors such as moisture, aeration and biological activity play a role also.

Windrow temperature records obtained during 2005 are presented in Figure 6. The records show that temperatures were often above the 55 °C threshold necessary to achieve pasteurisation. However, for the majority of windrows there was either a lack of temperature records (two or less) or recorded temperatures were below the 55 °C threshold. Consequently, only 19 of the 75 windrows that were composted during 2005 met the above Australian Standard pasteurisation criteria. It would be possible only for these 19 windrows to assert in any way that the finished compost could be expected to be free of pathogens and weeds.

Today, regular monitoring and recording of windrow temperatures is a fundamental task that should be performed in every composting operation. If there would be a complaint, or a compensation claim over damages caused by weeds or pathogens contained in Bio-Blend product, GELITA not only would be unable to show temperature and turning records, which demonstrate that it is reasonable to expect that pathogens and weed seeds were eliminated during the composting process, but GELITA may also be found in breach of its duty of care. Therefore, from a risk management point of view, GELITA is urged to ensure that regular temperature measurements are carried out in accordance with procedures outlined in the Operations Manual for the GELITA Composting Facility, or in another satisfactory manner.

Compilation and analysis of the 2005 Windrow Monitoring Sheets revealed further problems with the operation. Apart from the fact that nine different recipes were used for Re-Mix blends, the sheets showed also

- that windrows with identical blends had different codes,
- that some material was re-mixed once, some was re-mixed twice, and some was re-mixed three times without it being reflected on the windrow code,
- that some windrows were mislabelled 'Fresh' for 'R-Mix', or vice versa, and
- that for a number of windrows it was unclear where the material for re-mixing had come from.

To some degree these record keeping problems may be caused by the fact that windrows on the site do not have identification labels, a situation that can easily lead to confusion over the type and status of different windrows, even more so with different staff members working on the site. Therefore, it is recommended once again that removable labels be used to clearly identify individual windrows, in order to prevent problems such as the above.

The above outlined state of record keeping is unsatisfactory and needs to be improved.

However, there is concern that the identified problems regarding mixing ratios, temperature measurements, accurate labelling of windrows and recording of key windrow data, are merely indicators for underlying staff problems. These underlying problems need to be addressed urgently, in order to ensure that the composting operation is run smoothly and efficiently with minimal risk exposure. Solving the underlying problems is even more important if GELITA is serious about

transforming its composting operation from a waste processing facility to a site where valuable soil conditioning and bio-fertiliser products (Bio-Blend) are manufactured. This transformation is necessary to enable the generation of products that show consistently high quality, are acceptable in the market place and generate an adequate financial return.

The current situation makes it near impossible to predict characteristics of compost products, to estimate nutrient concentrations in and nutrient supply from Bio-Blend compost, and to provide users with assurance that there is no risk of the compost adversely affecting soil properties and plant growth.

COMPOST QUALITY

It was mentioned already that the Compost R& D Work Program for 2006 will concentrate on compost quality and quality management and seek to develop recipes and operational procedures that ensure the manufacture of high quality compost products. It was expected that, as a result of the envisaged work, mixing ratios would change, as well as the number and timing of re-mixing. Consequently, end product characteristics would be also different in the future, and therefore, the number of compost analysis was limited to one full product analysis in 2005. Analytical results that describe the characteristics of Bio-Blend Compost produced in windrow 64R are presented in Table 8. It can be seen that the generated compost complies with Australian Standard AS 4454-2003 requirements, except for high ammonium levels and a failure to support plant growth (toxicity). Phytotoxic effects in the tested compost were most likely caused by a high concentration of soluble salts, which is expressed by high electrical conductivity. Ammonia and chloride levels are relatively high, but sodium is not excessive. In order to verify conductivity and sodium concentrations, samples of two more windrows were analysed for these parameter. Table 9 shows that chloride levels were high in both samples, while conductivity varied considerably.

It should be noted that no pathogens or viable weed seeds were found in samples taken from windrow 64R. Temperature records for windrow 64R were not able to predict the elimination of pathogens and weeds (Figure 6). The fact that temperature records are either insufficient or show temperatures below the 55 °C threshold does not necessarily mean that compost products are not pasteurised, but it means that GELITA has little control over and knowledge of the risks associated with the use of Bio-Blend compost. This negates the assurance to existing and potential future users that compost is pathogen and weed free, one of the advantages Bio-Blend compost has over raw chicken manure.

In order to gauge its competitiveness, characteristics of Bio-Blend compost were compared with those of competing products, i.e. chicken manure (stored for 10 weeks) and composted feedlot manure (Table 10). The comparison shows that, while the three products do not differ markedly with regard to organic carbon, pH, nitrogen, calcium and sulphur, there are substantial differences in other important aspects. Bio-Blend compost shows significantly lower phosphorus, potassium and magnesium levels than the other products, as well as markedly lower sodium concentrations. Despite similar or lower salt (nutrient) concentrations in the Bio-Blend compost, its electrical conductivity is still substantially higher than what was measured for the other product. Phosphorus, potassium and magnesium levels in Bio-Blend compost are more in line with what could be expected of a compost generated from shredded vegetation residues.

It should be investigated whether and in which way concentrations of key plant nutrients (phosphorus, potassium and magnesium) can be increased without compromising product quality by further increasing conductivity.

Table 8 Example of characteristics of Bio-Blend compost (Windrow 64R)

Bio-Blend Compost Quality Characteristics

Batch / Windrow ID

64R

Sampled

31. 3. 05

Product characteristic	Unit		Compost Quality Criteria
Moisture	%	21.2	Min. = 25, Max = OM +6/+10
Organic carbon	% dm	29.50	
Organic matter	% dm	50.74	≥ 25
C/N Ratio		11.13	
pH	-	7.37	5.0 - 7.5
Conductivity	dS/m	19	-
Total phosphorus	% dm	0.157	≤ 0.1*
Orthophosphate	mg / L	5.28	
Total nitrogen	% dm	2.65	≥ 0.6**
Ammonium - N	mg / kg	2,933	< 200
Nitrate - N	mg / L	49.6	≥ 10**
Ammonium + Nitrate - N	mg / kg	2,983	> 200**
Potassium (soluble)	mg / kg	700	
Potassium	% dm	0.08	
Boron	mg / kg	< 25	< 200
Calcium (soluble)	mg / kg	15,600	
Calcium	% dm	2.66	
Molybdenum	mg / kg	0.98	
Manganese	mg / kg	209	
Magnesium (soluble)	mg / kg	558	
Magnesium	% dm	0.208	
Sulphur	% dm	1.13	
Sulphate	% dm	3.39	
Sodium (soluble)	mg / kg	761	
Sodium	% dm	0.234	< 1^
Chloride	mg / kg	1,796	
Cation Exchange Capacity	mequiv/100g	87.6	
Toxicity	cm	failed	> 6
Viable seeds and plant propagules	No. / lt (21 days)	Absent	
Pathogens[#]			
E. coli	MPN/g	< 3	< 100 MPN/g
Faecal coliforms	MPN/g	< 3	< 1000 MPN/g
Salmonella	in 25 g	Absent	Absent in 50 g
Heavy Metals[#]			
Arsenic (Total)	mg / kg	4.16	20
Cadmium (Total)	mg / kg	0.06	3
Chromium (Total)	mg / kg	n.d.	100
Copper (Total)	mg / kg	49.8	100
Lead (Total)	mg / kg	7.61	150
Mercury (Total)	mg / kg	0.03	1
Nickel (Total)	mg / kg	4.38	60
Zinc (Total)	mg / kg	33.5	200

* For products which claim to be for phosphorus sensitive plants

** If a contribution to plant nutrition is claimed

^ or at least 7.5 moles calcium plus magnesium for each mole of sodium in the dry matter

^^ for the < 16mm fraction only

pathogen and heavy metal limits represent NSW Biosolids Guideline values for Grade A product

Table 9 Conductivity and chloride levels for two Bio-Blend composts

Batch / Windrow ID		76-SO-R	77-SO-R
Sampled		18. 5. 05	18. 5. 05
Product characteristic	Unit		
Conductivity	dS/m	10.59	18.55
Chloride	mg / kg	1900	1400

Table 10 Comparison of Bio-Blend compost with competing high nutrient organic products

		Bio-Blend	Feedlot manure compost (Enviroorganics, mid 2005)		Chicken manure
Product characteristic	Unit	64R	Compost 1	Compost 2	10wks old (shed cleanout)
Moisture	%	21.2	33.3	44.7	
Organic carbon	% dm	29.50	22.60	27.10	
Organic matter	% dm	50.74	38.87	46.61	
C/N Ratio		11.13	8.07	9.68	
pH	-	7.37	7	7.5	
Conductivity	dS/m	19	12.4	12	15.3
Total phosphorus	% dm	0.157	1.01	1.35	2.46
Orthophosphate	mg / L	5.28			
Total nitrogen	% dm	2.65	2.8	2.8	4.1
Ammonium - N	mg / kg	2933			4750
Nitrate - N	mg / L	49.6			<100 mg/kg
Ammonium + Nitrate - N	mg / kg	2983			
Potassium (soluble)	mg / kg	700	16000	18000	
Potassium	% dm	0.08	2.51	2.67	1.88
Boron	mg / kg	< 25	35	42	
Calcium (soluble)	mg / kg	15600	6900	9000	
Calcium	% dm	2.66	3.32	5.56	
Molybdenum	mg / kg	0.98			
Manganese	mg / kg	209	530	630	
Magnesium (soluble)	mg / kg	558	4700	4800	
Magnesium	% dm	0.208	1.45	1.77	
Sulphur	% dm	1.13	0.89	0.87	0.56
Sulphate	% dm	3.39			
Sodium (soluble)	mg / kg	761	5900	7700	
Sodium	% dm	0.234	0.71	0.78	0.67
Chloride	mg / kg	1796			1887
Exchangeable Calcium	mequiv/100g		34.27	44.82	
Exchangeable Sodium	mequiv/100g		25.6	33.51	
Exchangeable Potassium	mequiv/100g		39.89	47.28	
Exchangeable Magnesium	mequiv/100g		39.33	40.19	
Ca/Mg Ratio			0.9	1.1	
Cation Exchange Capacity	mequiv/100g	87.6	139.09	165.8	

COMPOST USE

During 2005, a total of 3,210 m³, or 2,041 t of compost left the site, most of which was used for soil blending and some for agricultural applications. The external use of compost generated income valued at more than \$11,500.

The compost was generated from 5,730 t of feedstock, comprising both gelatine by-products and bulking material. Input and output quantities for the operation suggest that some 64% of input materials were lost as water vapour (or leachate in rare occasions), CO₂ and other gaseous emissions. Disregarding stockpiled compost and material that was being composted at the beginning and end of the year, only about 35 % of the total input mass ended up as compost in 2005. In reality this figure may be somewhat different because of large stockpiles that are established from time to time.

No activities were undertaken in 2005 to promote the use and sale of Bio-Blend compost, because the author is of the opinion that a high quality, low risk product that provides tangible benefits to end-users should be developed, and its consistent production should be assured, before Bio-Blend is offered and promoted in the agricultural market. Supply of low quality Bio-Blend compost, which shows varying characteristics and differing effects on plant growth, will hamper if not destroy the long-term market prospects for the brand and the product.

However, a two-page brochure was designed, that provides generic information about the production and characteristics of Bio-Blend compost.

ECONOMICS

The upgrade of the composting operation in 2004 required investment of some \$171,000 for the establishment of a bitumen sealed composting area, upgrading of the hardstand composting area and the access road, as well as the purchase of a tractor driven windrow turner, including windrow covers, and hire of external support services.

Operating Costs

Investment costs and other actual and estimated expenses were used to calculate operating costs for the composting facility in 2005. Table 11 shows that total operating costs for the composting facility in 2005 amounted to \$150,000, of which labour costs made up almost 50%. Labour and machinery costs include emptying the skutch tank and transporting skutch to the composting site.

Table 11 Operating costs for composting facility in 2005

Cost categories	Value (\$)
Depreciation on investment	27,863
Maintenance	3,571
Labour	73,702
Machinery costs – fuel for loader and tractor	18,600
Bulking material	24,100
Admin and miscellaneous costs	2,000
Total operating costs	149,837

The operating costs equate to processing costs of \$26.12 per tonne of input and \$30.93 per tonne of composted gelatine by-product. Due to significant volume and mass losses during the composting process, costs per cubic meter and per tonne of compost amount to \$46.68 and \$73.41, respectively.

Compost Sales

During 2005, a total of 3,210 m³, or 2,041 t of compost left the site. Monetary returns and services valued at a total of \$11,675 were received for the compost.

Saved Disposal Costs

The composting of gelatine by-products resulted in significant savings in disposal costs. Based on 2004 disposal and transport charges, it was calculated that the on-site composting of 4,844 t of gelatine by-products saved almost \$230,000 during 2005 (Table 12). It is estimated that more than 700 t of ash is stockpiled on site. Ash was previously also disposed at a cost of \$8/t, resulting in additional, unaccounted savings of \$5,600. However, stockpiling of surplus ash on site is not a long-term solution. Reclassification of the ash under the EPA's Beneficial Reuse Regulation may provide opportunities for selling the ash or at least moving it on a cost neutral basis.

However, disposal costs for sludge and ash increased during 2005 from \$8 to \$10/t. More significantly, one of the potential disposal sites for skutch (Moreshost) declared that they were no longer willing to accept any skutch in the future, leaving only the Thiess landfill near Ipswich as a potential disposal site. Consequently, on-site processing of gelatine by-products saved disposal costs of more than \$300,000 in 2005 (Table 12 – B).

Table 12 Disposal costs saved in 2005

A – based on 2004 charges

	Costs \$/t	Quantity t/year	Savings \$/year
Skutch - Thiess	116.67	113	13,184
Skutch - Moreshost	84.00	2,290	192,360
Skip hire (1 x \$80/week)			4,160
Sludge	8.00	1,232	9,856
Ash	8.00	1209	9,672
Total		4,844	229,232

B – based on 2005 conditions

	Costs \$/t	Quantity t/year	Savings \$/year
Skutch - Thiess	116.67	2,403	280,358
Skutch - Moreshost	84.00	0	0
Skip hire (1 x \$80/week)			4,160
Sludge	10.00	1,232	12,320
Ash	10.00	1209	12,090
Total		4,844	308,928

However, not all gelatine by-products were composted. More than 8,000 t of sludge were shipped off-site for land application at a cost of \$10/t, or a total of \$80,870. If costs for having an enclosed

skip on site that can receive skutch in case of an emergency are added, disposal costs in 2005 remained at \$85,000.

Costs & Benefits

Combining the costs and benefits of establishing and running the on-site composting facility are key to determining the financial viability of the venture. All data provided prior to this report were based on estimates and assumptions; this is the first cost – benefit analysis that is based on actual data. In 2004 it was estimated that the composting of 9,488 tonnes of gelatine by-products would generate an annual net surplus of \$111,500. In comparison, the cost-benefit analysis for 2005 showed that the composting operation delivered net benefits of \$96,000 based on 2004 charges, and \$170,000 when changed conditions for 2005 were taken into account (Table 13). Considering an investment of \$171,000, this is an excellent return on investment.

However, the above costs account only for fuel used by the tractor and loader but not depreciation, repair etc. If all machinery costs are considered (on a pro rata basis) then the annual benefit is more modest at about \$102,000. Nevertheless, the author believes that the technical and financial performance of the operation can be improved markedly, resulting in an annual net benefit of \$115 to \$125,000.

Table 13 Costs and benefits associated with the composting operation in 2005, based on 2004 charges and 2005 conditions

Costs	2004 charges	2005 conditions
Annual operating costs	125,737	125,737
Purchase bulking material	24,100	24,100
Total annual costs, fuel costs only	149,837	149,837
Total annual costs, incl. all machinery costs	(217,862)	(217,862)
Benefits		
Saved disposal costs	229,232	308,928
Compost sale (2,041 t)	11,675	11,675
Total annual benefits	245,835	320,603
Net annual benefits, fuel costs only	95,998	170,766
Net annual benefits, incl. all machinery costs	(23,045)	(102, 741)

OTHER ACTIVITIES

Other activities that were undertaken in 2005 in relation to the composting of gelatine by-products and the subsequent use of compost include the following:

- In August 2005, staff training was provided, focusing on improving the day-to-day operation of the composting facility, the need for accurate record keeping, and the need to focus on quality management and quality assurance, resulting in the manufacturing of high quality compost.
- Poster presentations of compost related work during the Open Day at GELITA, which marked the 10th anniversary of the factory being opened.

Continued co-operation with and support for Masters Student project (Queensland University of Technology) that investigates the 'Use of Compost Products to Improve Soil Properties and Plant Growth in Saline and Sodic Soils'. This project involved pot trials as well as two field trials at the GELITA Farm.

- Presentations at the Waste Q 2005 Conference in Brisbane (7 – 9 September 2005):
 - Cameron Smeal: *Challenges of implementing a zero waste strategy in a commercial business*
 - Johannes Biala and Cameron Smeal: *On-site composting delivers economic benefits and environmental excellence* (Poster)
 - Judith Raue and Johannes Biala: *Use of compost products to improve soil properties and plant growth in saline and sodic soils* (Poster)
- Submission of an application to the Federal Ministry for Agriculture, Fisheries and Forestry for a Natural Resource Innovation Grant, which forms part of the National Landcare Program, to investigate and demonstrate the possibilities of 'Renovating saline / sodic soils and conserving water through compost use'.



Queensland
Government

Enquiries Doug Carey
Telephone (07) 3224 4203
Your reference
Our reference STH ⁴⁹⁵

Environmental Protection Agency

Incorporating the
Queensland Parks and Wildlife Service

9 January 2006

Mr Cameron Smeal
GELITA Australia Pty Ltd
"Sunny Hills" Flood Road
JOSEPHVILLE via BEAUDESERT QLD 4285

Dear Mr Smeal

The Environmental Protection Agency (EPA) has been investigating an incident in which wastewater and materials from the cleaning out of a hide storage building at River Road, Redbank, were released to stormwater drains. During the EPA's attendance at the site on 23 November 2005 it was noted that a workman at the site was cleaning the building by hosing materials from the floor of the building, through an opening in the wall to ground which lead to the stormwater drains from the site.

The activity conducted at River Road was considered to be in breach of the following:

Environmental Protection (Water) Policy 1997

31 Prohibition on deposit or release of certain things:

(1) This section applies to the following things—

(a) rubbish;

(2) A person must not deposit or release a thing to which this section applies—

(a) into a roadside gutter, stormwater drain or a water; or

(b) in a place where it could reasonably be expected to move or be washed into a roadside gutter, stormwater drain or a water.

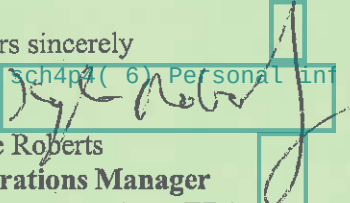
Maximum penalty—

(a) for a thing mentioned in subsection (1)(a) to (d)—40 penalty units.

The EPA has decided to issue Gelita (Australia) Pty Ltd with an Infringement Notice for failing to comply with section 31 of the *Environmental Protection (Water) Policy 1997* on 23 November 2005. Should the EPA obtain evidence indicating that the alleged offence is more serious than first thought, the EPA may withdraw the Infringement Notice within 28 days and may consider taking further action under the Act's provisions. The infringement notice is attached.

If you have any questions regarding this matter please phone Doug Carey on phone (07) 3224 4203.

Yours sincerely


Kyle Roberts
Operations Manager
Southern Region - EPA



STH 495
No. 002172

Alleged offender details

Family/Company name

Given name/s

GELITA (AUSTRALIA) PTY LTD

Residential/Company address

FLOOD ROAD
JOSEPHVILLE VIA BEAUFORT

Postcode 4235

Phone No. 07-55413544

Date of birth

--	--	--	--	--	--

☐ Male

☐ Owner

☐ Passenger

☐ Other (please specify)

☐ Female

☐ Driver

☐ Corporation

Identification details

Licence/Permit (type)

State

Number

Issued by

Expiry date

Vehicle details

Offence involving vehicle

☐ Yes

☐ No

Registration no.

Registration label no.

State

Reg. expires

Month

Year

Commercial ☐

Private ☐

Vehicle make and model

Body type

Distinguishing marks

Colour Trim

Alleged offence details

Time (hours)

Day of week

Date

At

--	--	--	--	--

on

--	--	--	--	--

the

--	--	--	--	--

OR (do not use between dates for offences involving vehicles)

Between

Date

1	5	1	1	0	5
---	---	---	---	---	---

and

Date

2	3	1	1	0	5
---	---	---	---	---	---

Location

LOT 6 ON SP133329, RIVER ROAD, REDBANK

Offence code

Short title of offence

Penalty

EPPW5

RELEASE OF THINGS TO STORMWATER (1A) TO (D))

\$ 300

Nature of alleged offence

RELEASED WASTE MATERIALS BY LEAKAGE AND BY HOISING OUT
MATERIALS FROM HIDE STORAGE BUILDING TO STORMWATER
DRAINS.

Authorised person's name/ID No. (print)

DOUG CAREY

Date of issue

5/1/2006

Authorised person's signature

sch4p4(6) Personal

Carey

Office

BRISBANE



Alleged Breach Report

Incident Investigation - Southern Region

ALLEGED OFFENDER DETAILS:

Name: Gelita (Australia) Pty Ltd
Address: Flood Road, Josephville via Beaudesert
Phone: (07) 5541 3544
Date of Birth: N/A
License # if applicable: N/A - Unregistered activity

DATE OF ALLEGED OFFENCE:

15, 16 and 23 November

LOCATION OF ALLEGED OFFENCE:

17 River Road, REDBANK QLD

BRIEF SUMMARY OF INCIDENT:

15 November 2005

The Environmental Protection Agency (EPA) was notified by the Ipswich City Council (ICC) Environmental Health Department of an activity that may be operating without a current development approval or registration.

- Ipswich Water officers discovered the site while auditing Council infrastructure in the area.
- At approximately 2:30 pm, EPA Principal Environmental Officer Doug Carey and Environmental Officer Adam Burt arrived onsite and met ICC Environmental Health officers Danny Strong and Michael Hadjineophytou.
- Gelita (Australia) Pty Ltd (Gelita) was found to be operating a temporary hide storage facility on site.
- Dark red coloured liquid appeared to cover a large portion of the floor.
- In a number of locations on the concreted apron along the outside of the building there appeared to be deposits of a fatty material or tallow that appeared to have leaked from within the building.
- No odour was detected while approaching the building, however once immediately adjacent to the building (within 3m) a putrid odour was clearly detectable (4-5/6)
- The large doors at the northern end of the building were not locked and it was possible to open them – the odour from the doorway was particularly intense (5-6/6).
- The red liquid had collected beneath the doors at the southern end of the building. There was evidence suggesting that the liquid has in the past passed over the building's concrete apron – depositing a tallow-like material. – There was a small area surrounded by an earthen bund.
- A white length of 'agrippe' (perforated drainage pipe) appeared to drain material from this area into a nearby stormwater system. It was possible to infer this as the agrippe was not completely buried.
- It was then attempted to follow the flow path of the stormwater to a discharge point behind the site. The area behind the site appears to have been used at some point in the past for the disposal of construction/demolition rubble and is unstable in places. The exact stormwater path could not be followed due to the risk of injury.





16 November 2005

EPA officers Doug Carey and Adam Burt returned to the site with Graham Bell (EPA Southern Region Investigations Manager).

- Upon arrival at the site a truck and dog-trailer was seen leaving the building on site. The presence of the vehicle inside the building was confirmed by wet tyre marks leading to the stockpiled material.
- Mr Ian Watson the lessor of the premises confirmed that Gelita is storing excess hide pieces –used as a raw material to produce gelatine.
- Mr Watson then accompanied the EPA officers to the southern end of the building to the small bunded area, where Mr Watson proceeded to remove the white agrippe. At this point it was discovered that the bunded area was deeper than originally thought – it was estimated to be approx 600mm deep rather than 100mm
- Another attempt was made to follow the path of stormwater from the discharge point behind the site. The stormwater appears to join up with a natural stormwater drain that may discharge to the Brisbane River. Again it was decided not to continue due to the risk of injury.

23 November 2005

EPA Officers Doug Carey and Adam Burt returned to the site.

- While on site it was noted that the material stored within the site was in the process of being removed.
- As part of the clean up process, Phil Davies, an employee of Teviot Sands (trucking company based in Woodhill contracted to remove the hide pieces and clean up the site), was seen to be hosing the floors of the storage area. The runoff material was then seen to be running into the bunded area at the rear of the site and then overflowing to stormwater.
- EPA Officer Doug Carey instructed the employee to cease hosing as material was escaping the bund.
- A sample of the runoff material entering the bunded area was taken, as it was thought to be representative of the material entering stormwater and escaping to the environment. It was not physically possible to obtain a sample of the material after it had entered stormwater..
- This material was then delivered to Australian Laboratory Services Pty Ltd for analysis.

ALLEGED OFFENCE(S) - List Act(s) & section(s) involved:

It is alleged that the activity conducted at 17 River Road was observed to be in breach of the following:

Environmental Protection (Water) Policy 1997

31 Prohibition on deposit or release of certain things:

- (1) This section applies to the following things—
 - (a) rubbish;
- (2) A person must not deposit or release a thing to which this section applies—
 - (a) into a roadside gutter, stormwater drain or a water; or
 - (b) in a place where it could reasonably be expected to move or be washed into a roadside gutter, stormwater drain or a water.

Maximum penalty—

- (a) for a thing mentioned in subsection (1)(a) to (d)—40 penalty units.

Offence code and Short title:

EPPW5 - Release of things to stormwater (1(a) to (d))

LIST ELEMENTS OF EACH ALLEGED OFFENCE AND A BRIEF SUMMARY OF AVAILABLE EVIDENCE FOR EACH ELEMENT:

In this instance the operator of the activity will be issued a Penalty Infringement Notice regarding a breach of section 31(2) of the Environmental Protection (Water) Policy 1997 (EPP(Water))

Environmental Protection (Water) Policy 1997**31 Prohibition on deposit or release of certain things:**

(1) This section applies to the following things—

(a) rubbish;

(2) A person must not deposit or release a thing to which this section applies—

(a) into a roadside gutter, stormwater drain or a water; or

(b) in a place where it could reasonably be expected to move or be washed into a roadside gutter, stormwater drain or a water.

“thing”

Thing in this instance is defined under section 31(1)(g) of the EPP (Water) as:

(a) rubbish;

Rubbish is defined by The Concise Macquarie Dictionary as:

1. waste or refuse material; debris; litter.
2. worthless stuff; trash

The material stored in the building would normally be considered regulated waste (food processing waste), however, as this material has a value as a raw material to produce gelatine, an agreement between Gelita and the EPA determined that this material would not technically be considered a regulated waste in this instance. This removes the obligation to track and document the movement of this material. However it is understood that this agreement applied only in the where this material was transported directly from the abattoir where this material was generated to Gelita's facility at Josephville. Additionally the material that was observed to be escaping to stormwater was not the actual hide pieces, but a liquid that consisted of the materials produced by the decomposition of the hide. This decomposed material is composed of mainly organic components (i.e. fats and oils), and as this material has no worth or value as such and was in the process of being discarded as refuse, would be considered to be a waste product or rubbish as defined in The Concise Macquarie Dictionary.

“deposit or release”

Deposit, as defined in schedule 2 of the EPP(Water) includes drop, leave, place or throw.

Release, of a contaminant into the environment, as per schedule 9 of the EP Act, includes:

- (a) to deposit, discharge, emit or disturb the contaminant; and
- (b) to cause or allow the contaminant to be deposited, discharged, emitted or disturbed; and
- (c) to fail to prevent the contaminant from being deposited, discharged, emitted or disturbed; and
- (d) to allow the contaminant to escape; and
- (e) to fail to prevent the contaminant from escaping.

• 15 & 16 November 2005

During the site visits conducted on 15 and 16 November it was noted that there appeared to be some previous leak of liquid to the stormwater drains. At certain points along the wall of the building, near cracks in the wall or missing bricks, it was observed that there was a white fatty deposit resembling tallow had been deposited. These deposits appear to have resulted in water from inside the building escaping to the confines of the building and entering the stormwater drains located along the length of the building. In this instance it would appear that the measures to prevent such releases from the stored products were inadequate and failed to prevent the contaminant from being discharged to stormwater.



- **23 November 2005**

During the site visit conducted on 23 November it was observed that Gelita had contracted Teviot Sands to collect and remove the hide pieces from the site and then clean the interior of the building. During this operation one of the Teviot Sands employees was observed hosing the interior of the building. This action resulted in the runoff containing the material generated by the decomposition of the hide pieces, that had collected around the bottom of the stockpiles, to be released to stormwater. The material was observed flowing out through the doors at the rear of the building collecting in a small bunded area at the rear of the site. The volume of material was too great for the small bund to contain and as a result the material overtopped the bund and escaped into the environment.

"person"

Person includes a body of persons, whether incorporated or unincorporated as defined in section 39 and 81 of the EP Act.

"stormwater drain"

The main stormwater drains for the building were two concrete drains that ran the length of the building on either side of the building. Given the design of the buildings (semi-circular cross section) these drains also acted as the gutters for the buildings. At each end of the drains were small sumps that were noted to discharge to a gully behind the site.

LIST EPA OFFICER/S INVOLVED:

Doug Carey

Principal Environmental Officer – Heavy Industry Group
Environmental Operations - Southern Region EPA

Graham Bell

Manager – Investigations
Environmental Operations – Southern Region

Adam Burt

Environmental Officer – Heavy Industry Group
Environmental Operations - Southern Region EPA

DATE INVESTIGATION BEGAN:

15 November 2005

AGGRAVATING CIRCUMSTANCES:

The security around the site was for all extents and purposes non-existent, during all site visits it was noted that the building had been left unsecured. According to information received from Gelita, this may have resulted in the liquid seen on the floor of the building during the earlier site visits. According to Gelita, this liquid was the result of an unauthorised person entering the building and leaving a tap running.

MITIGATING CIRCUMSTANCES:

Gelita initiated measures to remove the material from the site shortly after being contacted by the EPA. Unfortunately as a result of not supervising the contractors, this action resulted in a further release of material to stormwater. Additionally Gelita have since terminated their lease with the owner of the site, and will in future store all material for processing at the registered site.



General Environmental Duty

S319 of the Environmental Protection Act 1994 outlines General Environmental Duty (GED) which may be argued as a defence by the operator of the activity. S319 states:

319 General environmental duty

(1) A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm (the **general environmental duty**).

(2) In deciding the measures required to be taken under subsection (1), regard must be had to, for example—

- (a) the nature of the harm or potential harm; and
- (b) the sensitivity of the receiving environment; and
- (c) the current state of technical knowledge for the activity; and
- (d) the likelihood of successful application of the different measures that might be taken; and
- (e) the financial implications of the different measures as they would relate to the type of activity.

In this instance it would be difficult for Gelita to argue GED had been met as a defence against these allegations. The reasons for this are as follows:

- Poor security on site – permitted trespass, a direct result of this may have resulted in an earlier release to stormwater.
- An employee of Gelita was supposed to be responsible for checking up on the site. However it does not appear that any actions to prevent the earlier release to stormwater resulted from this.
- Bunding or other means of containment of the site (if any) was compromised – several cracks and missing bricks in the wall allowed material to escape to stormwater.
- During the release to stormwater observed on 23 November 2005, there did not appear to be any employees from Gelita present to supervise the cleanup – a result of which could be seen to be the hosing of contaminants from inside the building to stormwater. This situation may have been more severe had EPA Officer Doug Carey not directed the individual to cease hosing.

IS ANY FURTHER INFORMATION OBTAINABLE?

Not further information is considered necessary at this time.

ATTACHMENTS

1) Copy of notes

Authorised officers Doug Carey (Attachment 1a) and Adam Burt (Attachment 1b) notes of the investigation of the incident.

2) Photographs:

See attachment

3) Analysis Results:

Analysis of the supernatant collected by the EPA, performed by ALS Environmental.

4) Company Extract Documents:

Yes – Extract of information available from the CITEC website.

RECOMMENDATION FOR EACH OFFENCE:



It is recommended that Gelita (Australia) Pty Ltd be issued with a penalty infringement notice for section 31(2) of the Environmental Protection (Water) Policy 1997.

REPORT COMPLETED BY:

Adam Burt
Environmental Officer - Heavy Industry
Southern Region EPA
21 December 2005

REPORT REVIEWED BY:

Doug Carey
Principal Environmental Officer
Southern Region EPA

sch4p4(6) Personal
Doug Carey 5/1/06

REPORT FORWARDED FOR DECISION TO:

Kyle Roberts
Operations Manager - Heavy Industry Group
Southern Region EPA

sch4p4(6) Personal
Kyle Roberts 5/1/06

FINAL DECISION FOR EACH OFFENCE:

PIN issued to Gelita (Australia) Pty Ltd for contravention of section 31(2) of the *Environmental Protection (Water) Policy 1997* as a result of discharge rubbish to stormwater.

: _____

Disclaimer:

While this document has been prepared with care it contains general information and does not profess to offer legal, professional or commercial advice. The Queensland Government accepts no liability for any external decisions or actions taken on the basis of this document. Persons external to the Environmental Protection Agency should not rely on this document and should satisfy themselves independently and by consulting their own professional advisors before embarking on any proposed course of action.

5 June 2002

COPY

The Regional Manager (Environment),
Environmental Protection Agency,
GPO 2771,
BRISBANE. QLD. 4001

Attention: Mr Don Shackel

Dear Don,

Davis Gelatine would like to advise that, in keeping with the Operational Policy for Beneficial use of Biosolids, it is our intent to apply biosolids from the bottom of the pump out pond as a soil conditioner for the improvement of pasture areas limited in organic matter. The material conforms to Contaminant and Stabilisation Grade A requirements and falls under unrestricted use Biosolids Classification.

It is Davis Gelatines intention to pump the biosolids directly to the pasture zone for incorporation into the soil (by disc), in a six-hour period. Soil analysis demonstrates that within discrete soil types on our farm an inadequate organic fraction is available for grazing purposes. Independent advice indicates that application of a biosolids soil conditioner would optimise our pasture production and enhance soil structure.

Davis Gelatine does not intend to proceed with the application of the biosolids until after the Community Consultation Committee has met on the 19th June and final laboratory analyses confirming nutrient status are available. Davis Gelatine has arranged to undertake the task within the seventeen specified measures of the Operational Policy.

This procedure will need to be undertaken in a timely fashion to allow the requisite fallow period of winter to pass prior to reseedling with Callide Rhodes grass in Spring. It is intended to complete the operation by the end of June.

Yours faithfully,

sch4p(6) Personal information


Bob Wearne
General Manager



ASIA PACIFIC AFRICA

Davis Gelatine Australia Pty Limited
ACN 000 010 597

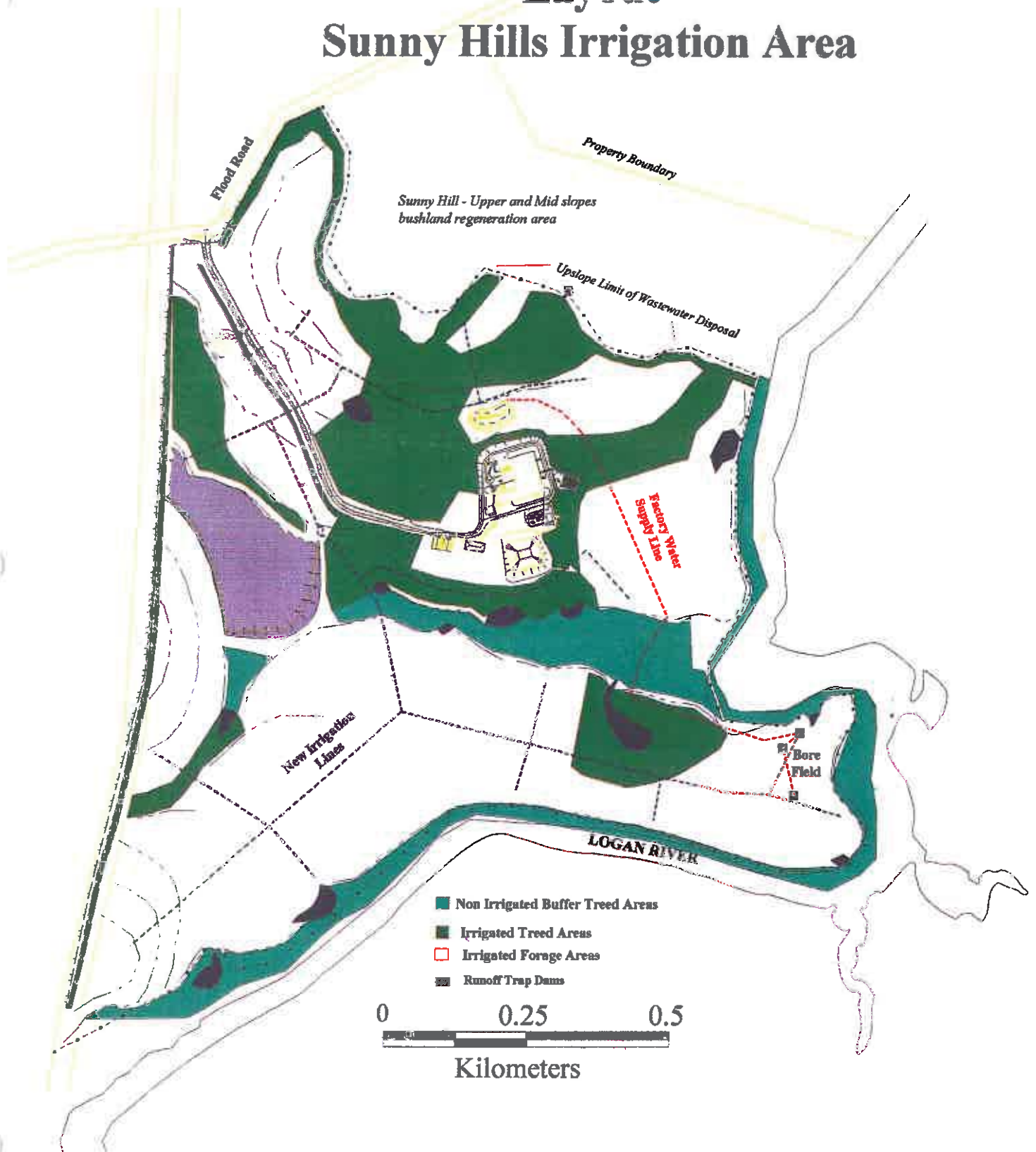
"Sunny Hills", Flood Road
Josephville via Beaudesert Qld 4285

PO Box 409
Beaudesert Qld 4285
AUSTRALIA

Telephone (07) 5541 3544
Facsimile (07) 55413612

RECEIVED/NOTED
6/06/02


Layout Sunny Hills Irrigation Area





**Queensland
Government**

Enquiries Steven Carrick
Telephone 3225 1040
Your reference
Our reference STH495

Environmental Protection Agency

Incorporating the
Queensland Parks and Wildlife Service

28 July 2008

Gelita Australia Pty Ltd
C/-
Piper Alderman Lawyers
Level 9 239 George St
BRISBANE QLD 4000

C/c
Mr Cameron Smeal
Gelita Australia Pty Ltd
PO Box 409
BEAUDESERT QLD 4285

Dear Mr Klaus Hanke, Mr Pablo Sibler and Mr David Van Zeeland,

As you may be aware the Environmental Protection Agency (EPA) has been investigating an incident which occurred on 14 July 2008 that resulted in effluent generated from within Gelita Australia Pty Ltd's (Gelita) gelatine manufacturing site at Josephville discharging into the Logan River.

Through information obtained in Gelita's official notification, EPA's attendance at the site on 16 July 2008 and EPA discussions with the site's Environmental Manager - Mr Cameron Smeal, it is evident that effluent was unlawfully released from a trap dam to waters described as the Logan River. EPA's investigations have revealed that the operator of this activity to which Development Approval IPDE00992208 applies is therefore in breach of condition C1, which states:

Contaminants must not be released or indirectly released from the licensed place to any waters or the bed and banks of any waters except:

- (i) *as permitted under the stormwater management schedule; or*
- (ii) *to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.*

I draw your attention to Section 435(2) of the *Environmental Protection Act 1994* which states that "*A person must not contravene a condition of a development approval*". A copy of this section is enclosed for your information as Attachment 1.

A person who contravenes a condition of a development approval can be prosecuted by the EPA in court in which case the maximum penalty the court can impose is \$124 875 for individuals and \$624 375 for corporations. Alternatively, the EPA can exercise its discretion to issue an Infringement Notice for the offence that requires the payment of a set fine. The infringement notice penalty for contravention of a condition of a development approval is \$1500. You should note that an infringement notice can be issued for each condition of a development approval that is breached.

On this occasion the EPA has decided to issue Gelita with an Infringement Notice (No. 003422) for failing to comply with condition C1 of IPDE00992208 on 14 July 2008. Should the EPA obtain evidence indicating that the alleged offence is more serious than first thought, the EPA may withdraw the Infringement Notice within 28 days and may consider taking further action under the provisions of the *Environmental Protection Act 1994*. The Infringement Notice is attached to this letter.

I acknowledge the proactive actions Gelita took shortly after the event to adequately reduce the risk of future incidents of this type. I am also aware however that this is the third time an incident of this nature has occurred within the last 12 months and would therefore like to advise that any further uncontrolled release may result in more serious enforcement action.

The EPA would like to thank Gelita for its co-operation throughout the investigation and looks forward to continued positive working arrangements.

If you have any questions regarding the content of this letter please phone Steven Carrick on telephone no. 3225 1040.

Yours sincerely

sch4p4(6) Personal infor



Louise Jordan
Team Leader
Brisbane South
Environmental Services

ATTACHMENT 1

Section 435 - Offence to contravene development condition

- (1) A person must not wilfully contravene a development condition of a development approval.
Maximum penalty—2000 penalty units or 2 years imprisonment.
- (2) A person must not contravene a development condition of a development approval.
Maximum penalty—1665 penalty units.
- (3) In a proceeding for an offence against subsection (1), if the court is not satisfied the defendant is guilty of the offence charged but is satisfied the defendant is guilty of an offence against subsection (2), the court may find the defendant guilty of the offence against subsection (2).

No. 003422

Alleged offender details

Family/Company name

Gulita Australia Pty Ltd

Given name/s

Residential/Company address

Piper Alderman Lawyers
Level 9, 239 George St
BRISBANE QLD Postcode 4000 Phone No.

Date of birth

☐ Male

☐ Owner

☐ Passenger

☐ Other (please specify)

☐ Female

☐ Driver

☐ Corporation

Identification details

Licence/Permit (type)

State

Number

Issued by

Expiry date

Vehicle details

Offence involving vehicle

☐ Yes

☐ No

Registration no.

Registration label no.

State

Reg. expires

Month Year

Commercial ☐

Private ☐

Vehicle make and model

Body type

Distinguishing marks

Colour Trim

Alleged offence details

Time (hours)

At 1700

Day of week

on Monday

Date

the 14/07/08

OR (do not use between dates for offences involving vehicles)

Between

Date

and

Date

Location

Lot 3 CP862679 into waters known as the Logan River

Offence code

Short title of offence

Penalty

EPA02 Contravention of Development Condition of DA \$1500.00

Nature of alleged offence

Unauthorized release of contaminants from a trap dam to the Logan River in contravention of development condition 02 of Development Approval number IPDE00992208

Authorised person's name/ID No. (print)

Steven Carrick

Date of issue

28 July 2008

Authorised person's signature

sch4p4(6) Personal informat
Steven Carrick

Office

Brisbane South (outer)



Alleged Breach Report

Incident Investigation – Southern Region

ALLEGED OFFENDER DETAILS:

Name: Gelita Australia Pty Ltd
ACN no: 000 010 597
Registered Address: Gelita Australia Pty Ltd
C-1
Piper Alderman Lawyers Level 9
239 George St
BRISBANE QLD 4000
Phone: 5541 3544
Development Approval no: IPDE00992208
File no: STH495-13
Ecotrack no: CA16882
Pin no: PIN4976 / PIN003422

DATE OF ALLEGED OFFENCE:

14 July 2008

LOCATION OF ALLEGED OFFENCE:

Sunny Hills, Flood Road, JOSEPHVILLE VIA BEAUDESERT on land described as Lot 1 RP118424;
Lot 2 RP 118424 & Lot 3 CP 862699

BRIEF SUMMARY OF INCIDENT:

On 14 July 2008, Gelita's environmental manager – Mr Cameron Smeal telephoned and emailed EPA officer Steven Carrick to report an uncontrolled discharge of treated effluent from Gelita's site into the bordering Logan River.

The collapse of a trap dam wall was the primary cause for the release. This dam is located in the south east corner of the site and is the designed end point of a drainage line that's purpose is to capture overland flow of effluent which would otherwise drain to the Logan River.

On the day of the incident the site had received a substantial amount of rainfall and an irrigator servicing the dam broke down. The combination of these two factors caused the dam to fill to a level beyond its capacity and consequently collapse.

Mr Smeal is unsure what volume of effluent discharged and for how long it occurred before he was alerted to the incident.

ALLEGED OFFENCE(S) - List Act(s) & section(s) involved:

Gelita Australia Pty Ltd hold a registration Certificate under section 73F for Development Approval IPDE00992208 for ERAs including ERA 50(b) Rendering operation – commercially processing or extracting substances, including for example, fat tallow, derivatives of fat or tallow or proteinaceous matter, from animal waste or by-products (other than an operation using wastes solely derived from an activity mentioned in item 32(a) or 47 in works having a design production capacity of 300 tonnes or more per year.

As a result of the uncontrolled discharge to waters, Gelita has breached condition C1 of SR0722 which states: *Contaminants must not be released or indirectly released from the licensed place to any waters or the bed and banks of any waters except:*

- (i) *as permitted under the stormwater management schedule; or*
- (ii) *to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.*

Failure to comply with this condition has resulted in Gelita contravening section 435(2) of the *Environmental Protection Act 1994* which states:

"A person must not contravene a development condition of a development approval"

LIST ELEMENTS OF EACH ALLEGED OFFENCE AND A BRIEF SUMMARY OF AVAILABLE EVIDENCE FOR EACH ELEMENT:

"Person"

A person is defined in schedule 10 of the *Environmental Protection Act 1994*. A person includes a body of persons, whether incorporated or unincorporated and is therefore a person for the purposes of the *Environmental Protection Act 1994*.

A CITEC search has revealed Gelita Australia Pty Ltd as being a registered company and incorporated in NSW (see attached).

"Contravene"

Contravene is defined in the *Macquarie Dictionary* as -- to come or be in conflict with; or go or act counter to; oppose; to violate; infringe; or transgress; to contravene the law.

“Development Approval”

Development approval is defined in the Integrated Planning Act 1997. Development Approval means a decision notice that –

- (a) approves, wholly or partially, development applied for in a development application (whether or not the approval has conditions attached to it); and
- (b) is in the form of a preliminary approval, development permit or an approved combining both a preliminary approval and a development permit in the one approval.

A decision notice is in place which authorises Gelita to have carried out the development works for the rendering operation.

“Development Condition”

Development condition is defined in schedule 3 of the *Environmental Protection Act 1994* as:

Development condition of a development approval, means a condition of the approval imposed by, or imposed because of a requirement of, the administering authority as assessment manager or concurrence agency for the application for the approval.

The relevant development condition is condition C1 which is in the condition of the development approval - IPDE00992208.

Condition C1 states:

Contaminants must not be released or indirectly released from the approved place to any waters or the bed and banks of any waters except:

- (i) *as permitted under the stormwater management schedule; or*
- (ii) *to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.*

“Contaminant”

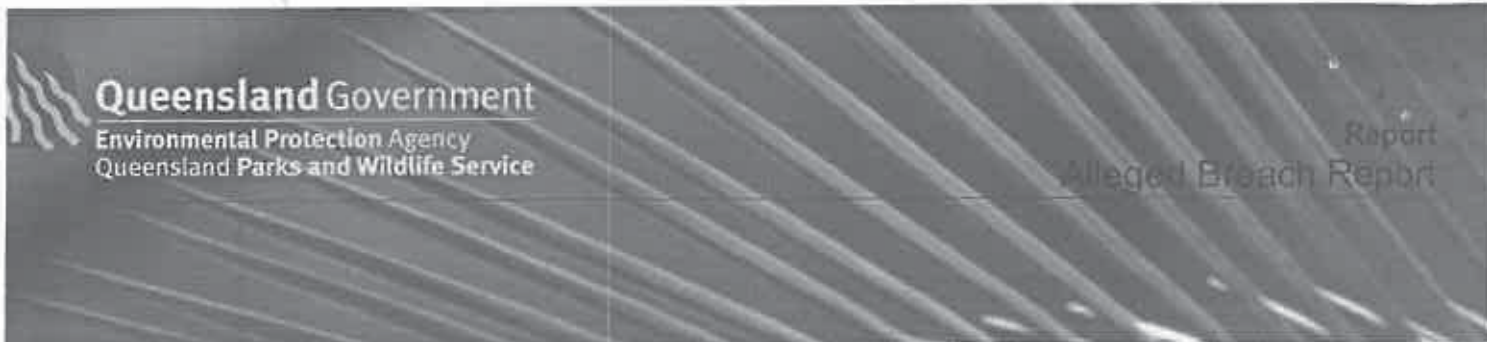
A contaminant is defined in section 11 of the Environmental Protection Act 1994. A 'Contaminant' can be-

- (a) a gas, liquid or solid; or
- (b) an odour, or
- (c)
- (e) A combination of contaminants.

The contaminant released was treated effluent (liquid).

“from the approved place”

There is no contention that the source of the contamination is from the approved place.



“Waters”

Waters is defined in schedule 3 of the Environmental Protection Act 1994. Waters means Queensland waters.

Waters is also defined in schedule 2 of the Environmental Protection (Water) Policy 1997. Waters includes the bed and banks of waters.

The release of effluent flowed into the freshwater reaches of the Logan River which is a water for the purposes of Qld's state legislation”.

“Stormwater management schedule”

The release was not authorised under the stormwater management schedule.

“Sewer”

The release of effluent was not to a sewer.

LIST EPA OFFICER/S INVOLVED:

Louise Jordan

Steven Carrick

DATE INVESTIGATION BEGAN:

14 July 2008

AGGRAVATING CIRCUMSTANCES:

There has been two previous uncontrolled discharges of treated effluent to the Logan River within the previous 12 months. These incidents occurred on the 2 September 2007 and 18 May 2008. The September 2007 incident resulted in a discharge of 1-2 ML while the 18 May 2008 incident resulted in an approximate discharge of 15,000KI. A PIN was issued for the September 2007 incident only.

MITIGATING CIRCUMSTANCES:

- Mr Smeal reported the incident to EPA in accordance with DA conditions as soon as becoming aware.
- Immediate remediation works commenced once Mr Smeal became of the incident and were completed the following day. Mr Carrick conducted an inspection of the dam on the 16 July 2008 and confirmed the completion of those works. This included increasing the capacity of the dam to prevent another discharge should a similar set of "lead up" events occur again.
- The discharged effluent was heavily diluted with rain water
- Regular monitoring of electrical conductivity is conducted 50m downstream of where the effluent discharged into the Logan River. It revealed no increases on the day of the incident.

IS ANY FURTHER INFORMATION OBTAINABLE?

No

ATTACHMENTS

- 1) CITEC search.

RECOMMENDATION FOR EACH OFFENCE:

It is recommended that Gelita be issued with a penalty infringement notice for failing to comply with condition C1 in Development Approval IPDE00992208.

REPORT COMPLETED BY:

Steven Carrick
Senior Environmental Officer
Southern Region
23 July 2008

REPORT REVIEWED BY:

Louise Jordan
Manager
Bris South – Env Services
23 July 2008

REPORT FORWARDED FOR DECISION TO:

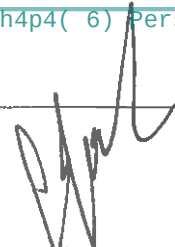
Louise Jordan
Manager
Bris South – Env Services
23 July 2008

FINAL DECISION FOR EACH OFFENCE:

PIN issued to Gelita Australia Pty Ltd for contravention of section 435 of the *Environmental Protection Act 1994* as a result of breach of condition C1 of Development Approval IPDE00992208.

This decision is in accordance with the EPA's Enforcement Guideline.

23
Louise Jordan:
Manager
July 2008

sch4p4(6) Pers


Steven Carrick

From: Louise Jordan
Sent: Tuesday, 8 January 2008 12:54 PM
To: Cameron.Smeal@gelita.com
Cc: Steven Carrick
Subject: RE: Farm after flood

Hi Cameron,
 Thanks for sending through the photos and information in regards to flood water on the property.

Given the circumstances, the EPA does not object to the "release" of the photographed waters back into the Logan River although from the photos, I can't see how practical this will be – there is flood water everywhere and the duration of such pumping will be prolonged.

As discussed, despite the already incurred flood damage to riparian vegetation from the storm, can you please ensure that the pumping of the water does not cause smothering of stream bank vegetation, stream bank erosion and/or visible plume/s in the river channel.

Further to our discussions just now, the EPA advises that further discussions are required to ensure that stormwater flows into the catch dams is being minimised as is reasonable and practicable in accordance with DA conditions and also that we confirm where these catch dams lie in relation to flood level contours. I understand this event was more in the 1 in 100 year event than the 1 in 10 year but nonetheless, confirmation in this regard won't go astray. These dams shouldn't be in any flood prone area. We also discussed resolving, in future, the best suite of parameters to establish whether waters are in fact "contaminated". We will leave this discussion for later in the piece.

Thanks and regards,

Louise Jordan
 Manager - Local Governments Team
 Ph 3224 6885
 Fax 3225 8723

From: Cameron.Smeal@gelita.com [mailto:Cameron.Smeal@gelita.com]
Sent: Tuesday, 8 January 2008 10:56 AM
To: Steven Carrick
Cc: Louise Jordan
Subject: Farm after flood

Steven
 as discussed please find attached sample photos of post flood scenario here.

The farm was inundated to approximately 1991 flood peak level for around 28 hours.

All trap dams on the flat have been completely submerged and are now full of flood water. In order to resume operational capacity, ascertain extent of damage and commence repairs as required we will need to discharge this water as soon as possible. Our

The photos and Ec tests demonstrate that the water is flood water. We request authorisation to discharge this water to the river.

It should also be noted that irrigation had not occurred for at least 2 days prior to the flood event and that the water within the dams prior to the flood was largely rainwater.

As documented by the photographic material submitted it is clear that there is no potential for the water currently trapped on site to be other than flood water, therefore under the licence conditions schedule C we are required to ensure that stormwater does not enter waste water treatment ponds

Release of Contaminants to Waters

(C1) Contaminants must not be directly or indirectly released from the licensed place to any waters or the bed and banks of any waters except:

- (i) as permitted under the **stormwater management schedule**; or
- (ii) to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.

(C5) Suitable banks and or diversion drains must be installed and maintained to **exclude stormwater run-off from entering wastewater treatment ponds.**

Whilst conditions under schedules D & E specifically state that all contaminants associated with the irrigation of treated wastewater must be confined within the property boundaries it is inversely evident that the release of non-contaminated waters is not a breach of licence conditions. Wheresoever the water quality of the stormwater trapped within the property during rainfall or flood events matches that of the river it could be suggested that discharge is a permitted activity.

(D1) The environmentally relevant activities must be carried out by such practicable means necessary to prevent the contact of **incident rainfall and stormwater runoff with wastes or other contaminants.**

Therefore to prevent contamination of the flood water with irrigation water it will be necessary to discharge to waters as permitted from time to time by relevant govt authority ie EPA.

(E6) All **contaminants** must be stored or disposed of on the defined contaminant release areas. There must be no direct or indirect release of **contaminants** to any waters.

Given that there is no possibility for residual contaminants from irrigation water after this force majeure it is within licence condition requirements that the water be returned to whence it came.

On this basis we seek permission to pump the storm/flood water from the property to allow us to meet the other critical operational conditions within the authority eg

(A1) The holder of this environmental authority must:

- (i) install all plant and equipment necessary to ensure compliance with the conditions; and
- (ii) maintain such plant and equipment in a proper and efficient condition; and
- (iii) operate such plant and equipment in a proper and efficient manner.

In this condition, "plant and equipment" includes:

- (i) plant and equipment used to prevent and/or minimise the likelihood of environmental harm being caused;
- (ii) **devices and structures to contain foreseeable escapes of contaminants and waste;**

In order to determine that the contours and trap dams for containment of irrigation waters are in a satisfactory state of repair we need to get rid of the flood water.

In these circumstances, we therefore request the approval of the EPA to allow discharge of incidental floodwater from the site at your earliest convenience. Please note that this is a matter of urgency as there is the possibility of further flooding with current cyclonic weather conditions.

Regards

9/01/2008

Cameron Smeal
Environmental Manager
GELITA Australia Pty Ltd

(07) 5541 9442

6428411642 Per

Steven Carrick

From: Louise Jordan
Sent: Tuesday, 8 January 2008 2:25 PM
To: Steven Carrick
Subject: FW: Farm after flood

Hi Steve,
FYI

Louise Jordan
Manager - Local Governments Team
Ph 3224 6885
Fax 3225 8723

From: Cameron.Smeal@gelita.com [mailto:Cameron.Smeal@gelita.com]
Sent: Tuesday, 8 January 2008 1:38 PM
To: Louise Jordan
Subject: RE: Farm after flood

Louise

thanks for the email. With regard to the prolonged pumping we only have two other options. We could put it back to the Balance Storage Dam with pumps or we could wait for the water to infiltrate the soil. If we put it into the BSD we would then have to pump it out again as irrigation ie double pumping. If we were to wait for the ponded water to seep through the saturated soil it would significantly hamper our endeavours to bring heavy machinery on-site to repair the contours and dams. By pumping out we regain our containment capacity and meet our licence requirements.

I hope this clarifies my intention.

I look forward to meeting with you to discuss the other issues you highlighted in your email.

Thanks again.

Regards

Cameron Smeal
Environmental Manager
GELITA Australia Pty Ltd

(07) 5541 9442

0428 441 642



Enquiries Steven Carrick
Telephone 3225 1073
Your reference
Our reference STH495

Environmental Protection Agency

Incorporating the
Queensland Parks and Wildlife Service

25 September 2007

Gelita Australia Pty Ltd
C-\
Piper Alderman Lawyers Level 9
239 George St
BRISBANE QLD 4000

C/c
Mr Cameron Smeal
Gelita Australia Pty Ltd
PO Box 409
BEAUDESERT QLD 4285

Dear Mr Anthony Akred, Mr Klaus Hanke and Mr Herbert Gareis,

As you may be aware the Environmental Protection Agency (EPA) has been investigating an incident in which effluent generated from within Gelita Australia Pty Ltd's (Gelita) rendering site at Josephville discharged from an irrigation hydrant which resulted in 1 to 2 ML of effluent discharging into the Logan River.

Through information obtained in the Gelita incident report, EPA's attendance at the site on 4 September 2007 and EPA discussions with the site's Environmental Manager - Mr Cameron Smeal, it is evident that effluent was unlawfully released from an irrigation hydrant to waters described as the Logan River. EPA's investigations have revealed that the operator of this activity to which Development Approval SR0722 applies is in breach of condition C1, which states:

Contaminants must not be released or indirectly released from the licensed place to any waters or the bed and banks of any waters except:

- (i) *as permitted under the stormwater management schedule; or*
- (ii) *to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.*

I draw your attention to Section 435(2) of the *Environmental Protection Act 1994* which states that "*A person must not contravene a condition of a development approval*". A copy of this section is enclosed for your information as Attachment 1.

A person who contravenes a condition of a development approval can be prosecuted by the EPA in court in which case the maximum penalty the court can impose is \$124 875 for individuals and \$624 375 for corporations. Alternatively, the EPA can exercise its discretion to issue an Infringement Notice for the offence that requires the payment of a set fine. The infringement notice penalty for contravention of a condition of a development approval is \$1500. You should note that an infringement notice can be issued for each condition of a development approval that is breached.

On this occasion the EPA has decided to issue Gelita with an Infringement Notice (No. 001617) for failing to comply with condition C1 of SR0722 sometime between midday 2 September and midday 3 September 2007. Should the EPA obtain evidence indicating that the alleged offence is more serious than first thought, the EPA may withdraw the Infringement Notice within 28 days and may consider taking further action under the provisions of the *Environmental Protection Act 1994*. The Infringement Notice is attached to this letter.

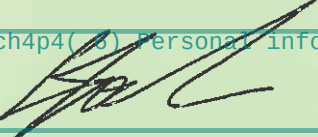
The EPA acknowledges the commitment made by Gelita in its Environmental Incident report to conduct a full operational review of current irrigation practices. Specifically, it is requested that the report includes a risk assessment of the current irrigation practice and details of measures implemented where deficiencies are found. It should also cover staff training, emergency alarms and notification procedures, emergency response and contingency planning. It is requested that this report be submitted to the EPA by 25 November 2007.

The EPA acknowledges the proactive actions Gelita took shortly after the event to adequately reduce the risk of future incidents of this type. However, EPA records indicate that the first notification was by telephone on 4 September 2007 when Gelita had been aware of the incident since the previous day. Accordingly, I draw your attention to condition G7 which requires Gelita to notify the EPA **as soon as practicable** after becoming aware of such an incident.

The EPA thanks Gelita for its co-operation throughout the investigation and looks forward to continued positive working arrangements.

If you have any questions regarding the content of this letter please phone Steven Carrick on telephone no. 3225 1073.

Yours sincerely

sch4p4(28) Personal Informa


Louise Jordan
Operations Manager - Local Governments Unit
Southern Region, EPA

- (2) A person must not contravene a site management plan.
Maximum penalty—835 penalty units.
- (3) In a proceeding for an offence against subsection (1), if the court is not satisfied the defendant is guilty of the offence charged but is satisfied the defendant is guilty of an offence against subsection (2), the court may find the defendant guilty of the offence against subsection (2).

Part 2A Offences relating to conditions

435 Offence to contravene development condition

- (1) A person must not wilfully contravene a development condition of a development approval.
Maximum penalty—2000 penalty units or 2 years imprisonment.
- (2) A person must not contravene a development condition of a development approval.
Maximum penalty—1665 penalty units.
- (3) In a proceeding for an offence against subsection (1), if the court is not satisfied the defendant is guilty of the offence charged but is satisfied the defendant is guilty of an offence against subsection (2), the court may find the defendant guilty of the offence against subsection (2).

435A Offence to contravene standard environmental conditions

- (1) A person carrying out a chapter 4 activity, that is subject to a code of environmental compliance, must not wilfully contravene a standard environmental condition of the code.
Maximum penalty—2000 penalty units or 2 years imprisonment.



Alleged Breach Report

Incident Investigation – Southern Region

ALLEGED OFFENDER DETAILS:

Name: Gelita Australia Pty Ltd
ACN no: 000 010 597
Registered Address: Gelita Australia Pty Ltd
C-1
Piper Alderman Lawyers Level 9
239 George St
BRISBANNE QLD 4000
Phone: 5541 3544
Development Approval no: SR0722
File no: STH495
Ecotrack no: CR39041
Pin no: PIN3722

DATE OF ALLEGED OFFENCE:

2 September 2007

LOCATION OF ALLEGED OFFENCE:

Sunny Hills, Flood Road, JOSEPHVILLE VIA BEAUDESERT on land described as Lot 1 RP118424; Lot 2 RP 118424 & Lot 3 CP 862699

BRIEF SUMMARY OF INCIDENT:

EPA received a call from Cameron Smeal (Site Environmental Manager) of Gelita on 4/9/07 to report an incident which resulted in a breach of conditions contained in Development Approval no. SR0722. The incident occurred sometime between midday - 1/9/07 to midday - 2/9/07. Gelita became aware of the incident on 3/9/07, however Mr Smeal was not on site that day and did not become aware of the incident until the following day which caused the delay in initial notification to EPA.

The incident involved an uncontrolled release of approximately 1 – 2 ML of treated effluent from a break in an irrigation line. The effluent discharged into the bordering Logan River (see attached photo). The majority of irrigation lines run inside bunded areas with overland flow draining to storage ponds. The location of the break in this instance was outside a bunded area. The cause of the break was due to operator error.

No monitoring of the discharged effluent was undertaken, however the quality of effluent is monitored weekly to monthly depending on the contaminant to be monitored. The most recent results are described below.

Test Description	Units	Sampling Point 1	Sampling Point 2
BOD ₅	mg/L	22	40
NH ₃	mg/L	520	500
Total Nitrogen	mg/L	590	510
Total Phosphorous	mg/L	1.8	1.3
Sodium	mg/L	510	570
Calcium	mg/L	200	310

ALLEGED OFFENCE(S) - List Act(s) & section(s) involved:

Gelita Australia Pty Ltd hold a registration Certificate under section for Development Approval SR0722 for ERAs including ERA 50(b) Rendering operation – commercially processing or extracting substances, including for example, fat tallow, derivatives of fat or tallow or proteinaceous matter, from animal waste or by-products (other than an operation using wastes solely derived from an activity mentioned in item 32(a) or 47 in works having a design production capacity of 300 tonnes or more per year.

As a result of the uncontrolled discharge to waters, Gelita has breached condition C1 of SR0722 which states: *Contaminants must not be released or indirectly released from the licensed place to any waters or the bed and banks of any waters except:*

- (i) *as permitted under the stormwater management schedule; or*
- (ii) *to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.*

Failure to comply with this condition has resulted in Gelita contravening section 435(2) of the *Environmental Protection Act 1994* which states:

"A person must not contravene a development condition of a development approval"



LIST ELEMENTS OF EACH ALLEGED OFFENCE AND A BRIEF SUMMARY OF AVAILABLE EVIDENCE FOR EACH ELEMENT:

“Person”

A person is defined in schedule 10 of the Environmental Protection Act 1994. A person includes a body of persons, whether incorporated or unincorporated and is therefore a person for the purposes of the Environmental Protection Act 1994.

A Queensland business search (CITEC) has revealed Gelita Australia Pty Ltd as being a registered company and incorporated in NSW.

“Contravene”

Contravene is defined in the Macquarie Dictionary as – to come or be in conflict with; or go or act counter to; oppose; to violate; infringe; or transgress; to contravene the law.

Gelita has contravened condition C1 of Development Approval SR0722 which states:

Contaminants must not be released or indirectly released from the licensed place to any waters or the bed and banks of any waters except:

- (i) *as permitted under the stormwater management schedule; or*
- (ii) *to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.*

“Development Approval”

Development approval is defined in the Integrated Planning Act 1997. Development Approval means a decision notice that –

- (a) approves, wholly or partially, development applied for in a development application (whether or not the approval has conditions attached to it); and
- (b) is in the form of a preliminary approval, development permit or an approved combining both a preliminary approval and a development permit in the one approval.

A decision notice is in place which authorises Gelita to have carried out the development works for the rendering operation.

“Development Condition”

- 1) Development condition, of a development approval, means a condition of the approval imposed by, or imposed because of a requirement of, the administering authority as assessment manager or concurrence agency for the application for the approval.
- 2) The term includes a reference to a condition referred to in the State Development Act, section 39(1).



The relevant development condition is condition C1 which is in EPA's concurrence response to Beaudesert Shire Council – SR0722. SR0722 is also referred to as the EPA issued Development Approval number.

Condition C1 states:

Contaminants must not be released or indirectly released from the licensed place to any waters or the bed and banks of any waters except:

- (i) as permitted under the stormwater management schedule; or*
- (iii) to a sewer as permitted or otherwise agreed from time to time by the relevant Local Government.*

“Contaminant”

A contaminant is defined in section 11 of the Environmental Protection Act 1994. A 'Contaminant' can be-

- (a) a gas, liquid or solid; or
- (b)
- (e) A combination of contaminants.

The contaminant released was treated effluent which contained a high concentration of nitrogen.

“from the licensed place”

There is no contention that the source of the contamination is from the licensed place.

“Waters”

Waters is defined in schedule 3 of the Environmental Protection Act 1994. Waters means Queensland waters.

Waters is also defined in schedule 2 of the Environmental Protection (Water) Policy 1997. Waters includes the bed and banks of waters.

The release of effluent flowed into the freshwater reaches of the Logan River and is therefore a “water”.

“Stormwater management schedule”

The release was not authorised under the stormwater management schedule.

“Sewer”

The release of effluent was not to a sewer.

LIST EPA OFFICER/S INVOLVED:

Louise Jordan

Steven Carrick



DATE INVESTIGATION BEGAN:

4 September 2007

AGGRAVATING CIRCUMSTANCES:

- Gelita has stated in its investigation report that the incident occurred as a result of "operator error".
- Gelita did not stop the release of effluent on their own accord. Rather the effluent ceased overflowing because it was directed elsewhere as part of the automated system. It was not until approximately 24 hours after the release had ceased that Gelita became aware of this incident.

MITIGATING CIRCUMSTANCES:

Once the incident was brought to the attention of the site's environmental manager – Cameron Smeal, actions were taken to rehabilitate the flow channel and to prevent a further incident of this type. Actions included:

- Removing the irrigation hydrant from that point and relocating it within a bunded area.
- Committing to backfill the channel excised through the sandy bank by the discharge to ensure that an earthen barrier with a 0.5 freeboard is in place.
- Committing to undertake a full operational procedural review of irrigation practices.
- Relieving the operator responsible of operational irrigation duties.

IS ANY FURTHER INFORMATION OBTAINABLE?

- Results of monitoring undertaken in the Logan River both upstream and downstream of the discharge point will be submitted to EPA as soon as they become available.
- EPA has drafted a letter to Gelita which includes a request that it undertakes a risk assessment of its irrigation practice and subsequent measures implemented where deficiencies were found. The risk assessment is to cover staff training, emergency alarms and notification procedures, emergency response and contingency planning.



ATTACHMENTS

- 1) Photo taken during the discharge event. It was taken by an unknown person and delivered to Gelita.
- 2) CITEC search.

RECOMMENDATION FOR EACH OFFENCE:

It is recommended that Gelita be issued with a penalty infringement notice for failing to comply with condition C1 in of Development Approval SR0722.

REPORT COMPLETED BY:

Steven Carrick
Senior Environmental Officer
Southern Region
24 September 2007

REPORT REVIEWED BY:

Louise Jordan
Operations Manager
Southern Region
25 September 2007

REPORT FORWARDED FOR DECISION TO:

Louise Jordan
Operations Manager
Southern Region
25 September 2007

FINAL DECISION FOR EACH OFFENCE:

PIN issued to Gelita Australia Pty Ltd for contravention of section 435 of the *Environmental Protection Act 1994* as a result of breach of condition C1 of Development Approval SR0722.

This decision is in accordance with the ERA's Enforcement Guidelines.

Louise Jordan: _____
Operations Manager
25 September 2007

Issue pin
sch4p4
sch4
sch4p4
25/9/07
Camaron in China - Steve Carrick notified of email via PIN 24/9/07



ATTACHMENT 1.



Photo shows uncontrolled + unauthorized release of treated effluent
from Bellows premises into the Logans River
Breach of C1 in SR0702

ATTACHMENT 2 CITEC SEARCH

www.vedaadvantage.com
VEDA ADVANTAGE INFORMATION SERVICES AND SOLUTIONS LTD
A.C.N. 000 602 862



Service Request ID: 00014628235
Report date: 21 Sep 2007

Company File (Current)

The Company File (Current) contains all data received in an ASIC Direct Current Extract plus it is enhanced with a business name summary and an indication of any adverse information held on the Veda Advantage database. To report any errors or omissions regarding this report please contact Veda Advantage. Company information was obtained from the Australian Securities and Investments Commission database on 21 Sep 2007.

Australian Business Registry Summary

Legal Name: GELITA AUSTRALIA PTY LTD
ABN: 83000010597
ABN Updated: 27 Oct 2003
ABN Status: ACTIVE from 09 Feb 2000
Entity Type: Australian Public Company
Main Location State/Postcode: QLD/4285

Adverse information

Adverse Information present on Veda Advantage file (includes Defaults, Mercantile Enquiries, Judgements, Writs, External Administration and Petitions):

No

Company information

000 010 597 GELITA AUSTRALIA PTY LTD

ASIC DOC NO

Australian Company Number: 000 010 597
Incorporated in: NEW SOUTH WALES
Previous State Number: 00723340
Registration Date: 25/11/1920
Review Date: 25/11/2007
Australian Business Number: 83 000 010 597

Current Organisation Details

Name : GELITA AUSTRALIA PTY LTD 018 943 679
Name Start: 19/05/2003
Status : REGISTERED
Type : AUSTRALIAN PROPRIETARY COMPANY
Class : LIMITED BY SHARES
Subclass : PROPRIETARY COMPANY

Registered Office

PIPER ALDERMAN LAWYERS LEVEL 9 239 GEORGE STREET BRISBANE QLD 4000 1FO 031 040
Start Date: 23/06/2005

Principal Place of Business

FLOOD ROAD JOSEPHVILLE VIA BEAUDESERT QLD 4285 0E4 954 176
(AR (AR)
Start Date: 04/12/1997

Directors

ANTHONY ROBERT AKRED 017 793 098

SCHUTZMAN PARADE COLAROX NSW 2097
Born: 30/07/1952 - REDCLIFFE QLD

Appointment Date: 28/03/2002

KLAUS HANKE

018 776 065

TM ALBISRUEN 67 45275 ETTLINGEN GERMANY
Born: 10/08/1955 - KARLSRUHE GERMANY

Appointment Date: 21/10/2002

HERBERT GAREIS

023 635 758

69419 LM HOHEN GARTEN 15 4 WINGENBERG GERMANY
Born: 18/07/1955 - HOCHSTADT GERMANY

Appointment Date: 15/11/2006

Secretary

PABLO SILBER

023 635 758

28 PRINCETON STREET WEST END QLD 4011
Born: 13/08/1967 - LA PLATA ARGENTINA

Appointment Date: 01/07/2006

Appointed Auditor

ERNST & YOUNG

019 181 685

ERNST & YOUNG BUILDING LEVEL 5 1 EAGLE STREET BRISBANE QLD 4000

(AR (FR)

Start Date: 28/10/1997

Ultimate Holding Company

GELITA HOLDING GMBH

0E6 319 760

(AR (AR)

Start Date: UNKNOWN

Share Structure

Class: A

0E6 319 760

(AR (AR)

A CLASS ORDINARY SHARES

Number of Shares Issued	95000
Total Nominal Value	0.00
Face Value per Share	0.00
Total Paid on Shares Issued	35664.00
Total Unpaid on Shares Issued	0.00
Total Paid on Premiums	0.00
Balance of Share Premium Account	0.00
Number of Shares Entitled to	0
Average Exercised Price per Share:	0.00

Class: ORD2

0E6 319 760

(AR (AR)

ORDINARY SHARES

Number of Shares Issued	822584
Total Nominal Value	0.00
Face Value per Share	0.00
Total Paid on Shares Issued	9964336.00
Total Unpaid on Shares Issued	0.00
Total Paid on Premiums	0.00
Balance of Share Premium Account	0.00
Number of Shares Entitled to	0
Average Exercised Price per Share:	0.00

Share Holders

Class : A No. Held: 95000
Beneficially Held: NO Paid : FULLY
GELITA HOLDING GMBH
GAMMELSBACHER STR.2 69412 EBERBACH GERMANY

021 005 221

Class : ORD2 No. Held: 822584
Beneficially Held: NO Paid : FULLY
GELITA HOLDING GMBH
GAMMELSBACHER STR.2 69412 EBERBACH GERMANY

021 005 221

Note: For each class of shares issued by a company, ASIC records the details of the twenty members of the class (based on shareholdings). The details of any other members holding the same number of shares as the twentieth ranked member will also be recorded by ASIC on the database. Where available, historical records show that a member has ceased to be ranked amongst the twenty members. This may, but does not necessarily mean, that they have ceased to be a member of the company.

Charges Registered and Related Documents Received

Note : a Charge is some form of security given over the property/assets of the company. In order to obtain details of the 'amount secured by a charge', 'the property charged', the property released from a charge or the documents relating to a satisfaction, assignment or change in details, it is necessary to obtain a 'CHARGE EXTRACT'.

ASC Charge No. : 33332 Status : SATISFIED
 Date and Time Registered : 21/11/1921 00:01 Fixed/floating :
 Date Created : 27/10/1921 State/territory Charge No. : 83279
 Chargee/trustee : FRANK EDWARD TILLEY
 Chargee/trustee : HERBERT VIVIAN HORDERN
 DOCUMENTS RECEIVED

FORM	DESCRIPTION	DATE	PROC'D NO.	DOCUMENT NO
TYPE		LODGED	PAGES	
C5	CHARGE REGISTER CARD	NO	5	000 051 158
C5	CHARGE REGISTER CARD	NO	5	000 051 158

ASC Charge No. : 33514 Status : SATISFIED
 Date and Time Registered : 22/09/1926 00:01 Fixed/floating :
 Date Created : 31/08/1926 State/territory Charge No. : 122661
 Chargee/trustee : FRANK EDWARD TILLEY
 Chargee/trustee : HERBERT VIVIAN HORDERN
 DOCUMENTS RECEIVED

FORM	DESCRIPTION	DATE	PROC'D NO.	DOCUMENT NO
TYPE		LODGED	PAGES	
C5	CHARGE REGISTER CARD	NO	5	000 051 158
C5	CHARGE REGISTER CARD	NO	5	000 051 158

ASC Charge No. : 33612 Status : SATISFIED
 Date and Time Registered : 24/09/1931 00:01 Fixed/floating :
 Date Created : 31/08/1931 State/territory Charge No. : 188162
 Chargee/trustee : 000 000 993 TRUST COMPANY FIDUCIARY SERVICES LIMITED
 DOCUMENTS RECEIVED

FORM	DESCRIPTION	DATE	PROC'D NO.	DOCUMENT NO
TYPE		LODGED	PAGES	
C5	CHARGE REGISTER CARD	NO	5	000 051 158
C5	CHARGE REGISTER CARD	NO	5	000 051 158

ASC Charge No. : 33715 Status : SATISFIED
 Date and Time Registered : 08/11/1935 00:01 Fixed/floating :
 Date Created : 05/11/1935 State/territory Charge No. : 242955
 Chargee/trustee : 000 000 993 TRUST COMPANY FIDUCIARY SERVICES LIMITED
 DOCUMENTS RECEIVED

FORM	DESCRIPTION	DATE	PROC'D NO.	DOCUMENT NO
TYPE		LODGED	PAGES	
C5	CHARGE REGISTER CARD	NO	5	000 051 158

ASC Charge No. : 33875 Status : SATISFIED
 Date and Time Registered : 28/08/1946 00:01 Fixed/floating :
 Date Created : 26/08/1946 State/territory Charge No. : 180222
 Chargee/trustee : 000 000 993 TRUST COMPANY FIDUCIARY SERVICES LIMITED
 DOCUMENTS RECEIVED

FORM	DESCRIPTION	DATE	PROC'D NO.	DOCUMENT NO
TYPE		LODGED	PAGES	
C5	CHARGE REGISTER CARD	NO	5	000 051 158

Note : This extract may not contain all charges for corporations registered prior to 1991 and it may be advisable to also search the State or Territory records held by the ASIC.

ASIC Documents Received (except those listed already under Charges)

Date Received	Form Type	Date Processed	No. Pages	Effective Date	
14/05/2007	388	25/05/2007	31	31/12/2006	023 757 902
	388I Financial Report				
	Company That Is	Controlled By a Foreign Company			
29/03/2007	902	02/04/2007	13	05/01/2005	023 592 907
	902 Supplementary Document				
	Alters 021 005 221				
16/03/2007	484	19/03/2007	11	19/03/2007	023 635 758
	484E Change to Company Details				
	Appointment or Cessation of A				
	Company Officeholder				
16/03/2007	902	02/04/2007	12	05/01/2005	023 652 130
	902 Supplementary Document				
	Alters 021 005 221				
19/12/2006	484	04/01/2007	12	19/12/2006	023 503 048
	484E Change to Company Details				
	Appointment or Cessation of A				
	Company Officeholder				
11/12/2006	388	22/12/2006	0	31/12/2005	023 477 225
	388I Financial Report				
	Company That Is	Controlled By a Foreign Company			
21/12/2005	388	09/02/2006	26	31/12/2004	018 543 049

388I	Financial Report	Financial Report	Small Proprietary		
	Company That Is	Controlled By a Foreign Company			
21/12/2005	388	08/02/2006	27	30/12/2003	018 543 047
388I	Financial Report	Financial Report	Small Proprietary		
	Company That Is	Controlled By a Foreign Company			
16/06/2005	484	16/06/2005	6	16/06/2005	1F0 031 040
484	Change to Company Details				
484B	Change of Registered Address				
484A1	Change Officeholder Name or Address				
05/01/2005	484	26/04/2005	13	05/01/2005	021 005 221
484	Change to Company Details				
484B	Change of Registered Address				
484D	Change to Ultimate Holding Company				
484O	Changes to Share Structure				
484N	Changes to (Members) Share Holdings				
	Altered by 023 592 907				
	Altered by 023 652 130				
19/05/2003	304	26/05/2003	2	09/05/2003	019 167 336
304A	Notification of Change to Officeholders of Australian Company				
19/05/2003	205	19/05/2003	2	15/05/2003	018 943 679
205A	Notification of Resolution Changing Company Name				
07/05/2003	388	13/05/2003	29	30/12/2002	019 181 685
388I	Financial Report	Financial Report	Small Proprietary		
	Company That Is	Controlled By a Foreign Company			
18/12/2002	2205	16/01/2003	2	18/12/2002	018 593 577
2205E	Notification of Resolution Relating to Shares Reduction Of Share Capital - Schedule 5				
17/12/2002	2560	16/01/2003	5	17/12/2002	018 929 252
2560B	Notification of Reduction in Share Capital Details For Selective Reduction				
30/10/2002	304	07/11/2002	2	25/10/2002	018 663 491
304A	Notification of Change to Officeholders of Australian Company				
22/10/2002	304	29/10/2002	2	21/10/2002	018 776 065
304A	Notification of Change to Officeholders of Australian Company				
03/07/2002	336C	03/07/2002	1	03/07/2002	017 451 210
336C	Order Granting Relief From Accounting/auditing Requirements				
26/06/2002	304	02/07/2002	2	19/06/2002	018 137 920
304A	Notification of Change to Officeholders of Australian Company				
26/06/2002	203	22/07/2002	1	19/06/2002	018 137 919
203A	Notification of Change of Address				
08/05/2002	2205	20/05/2002	4	07/05/2002	017 829 539
2205F	Notification of Resolution Relating to Shares Financial Assistance - Approval By Company's Own Sharehold				
06/05/2002	2601	14/05/2002	1	23/05/2002	018 035 910
2601	Notification of Intention to Give Financial Assistance				
06/05/2002	2602	14/05/2002	4	06/05/2002	018 035 909
2602A	Notification of Financial Assistance Details Approval By Company's Own Members				
11/04/2002	304	11/04/2002	2	28/03/2002	017 779 126
304A	Notification of Change to Officeholders of Australian Company				
08/04/2002	206	08/04/2002	1	08/04/2002	017 773 970
206B	Application For Change of Company Status Conversion Of Company From Public to Pty				
08/04/2002	205	08/04/2002	1	28/03/2002	017 773 971
205B	Notification of Resolution Converting to a Proprietary Company				
08/04/2002	205	08/04/2002	1	28/03/2002	017 773 973
205A	Notification of Resolution Changing Company Name				
03/04/2002	304	19/04/2002	2	28/03/2002	017 793 098
304	Notification Of				
304A	Change to Officeholders of Australian Company				

304E CHANGE TO ALTERNATE DIRECTOR OF AUSTRALIAN COMPANY					
03/04/2002	203	03/04/2002	1	28/03/2002	017 793 097
203A NOTIFICATION OF CHANGE OF ADDRESS					
20/02/2002	304	25/02/2002	1	20/02/2002	0E7 114 418
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
20/02/2002	304	25/02/2002	1	20/02/2002	0E7 114 419
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
24/10/2001	389	23/11/2001	5	30/06/2001	017 234 024
389B ANNUAL NOTICE BY WHOLLY-OWNED ENTITY ANNUAL NOTICE BY WHOLLY-OWNED ENTITY - COMPANIES					
22/10/2001	316	22/10/2001	3	22/10/2001	0E6 319 760
316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY					
22/10/2001	304	22/10/2001	1	22/10/2001	0E6 319 623
304C NOTIFICATION OF CHANGE OF NAME OR ADDRESS OF OFFICEHOLDER					
18/10/2000	316	15/11/2000	3	18/10/2000	0E4 954 176
316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY					
10/10/2000	389	04/11/2000	5	30/06/2000	016 462 208
389 ANNUAL NOTICE BY WHOLLY-OWNED ENTITY					
27/06/2000	355	28/06/2000	8	27/06/2000	014 839 196
355 REVOCATION DEED RELATING TO CLASS ORDER					
27/03/2000	207	27/03/2000	1	24/03/2000	0E4 389 422
207 NOTIFICATION OF SHARE ISSUE					
09/02/2000	203	15/02/2000	3	01/02/2000	016 044 407
203A NOTIFICATION OF CHANGE OF ADDRESS					
29/10/1999	902	04/11/1999	1	30/09/1999	015 516 676
902 SUPPLEMENTARY DOCUMENT Alters 0E3 541 096					
26/10/1999	389	17/11/1999	6	30/06/1999	015 316 835
389 ANNUAL NOTICE BY WHOLLY-OWNED ENTITY					
06/10/1999	316	04/11/1999	3	30/09/1999	0E3 541 096
316 ANNUAL RETURN 316V APPOINT/CEASE ALTERNATE DIRECTOR 316C CHANGE TO OFFICEHOLDERS 316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY Altered by 015 516 676					
23/06/1999	352	24/06/1999	58	23/06/1999	014 841 463
352 ASSUMPTION DEED RELATING TO CLASS ORDER					
01/12/1998	316	15/12/1998	5	27/11/1998	0E2 530 548
316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY					
18/08/1998	304	18/08/1998	1	12/08/1998	0E2 200 369
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
06/05/1998	304	06/05/1998	1	30/04/1998	0E2 013 897
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
03/12/1997	316	04/12/1997	5	02/12/1997	0E1 574 627
316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY					
07/11/1997	315	12/11/1997	1	29/10/1997	013 517 211
315 NOTICE OF RESIGNATION OR REMOVAL OF AUDITOR					
07/05/1997	207	15/05/1997	2	01/05/1997	012 319 679
207 NOTIFICATION OF ALLOTMENT OF SHARES					
30/12/1996	304	08/01/1997	1	26/11/1996	011 208 103
304C NOTIFICATION OF CHANGE OF NAME OR ADDRESS OF OFFICEHOLDER					
18/12/1996	304	02/01/1997	2	01/12/1996	012 325 087
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
11/12/1996	316	18/12/1996	5	25/11/1996	000 010 59G
316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY					
01/10/1996	304	09/10/1996	1	31/08/1996	011 798 024
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN					

COMPANY

23/08/1996	304	26/08/1996	3	05/01/1996	011 563 316
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
16/08/1996	304	02/09/1996	3	09/08/1996	011 297 615
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
27/05/1996	304	26/08/1996	2	29/04/1996	011 563 315
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
12/12/1995	316	19/12/1995	88	06/12/1995	008 556 036
316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY					
14/12/1994	316	17/01/1995	90	15/11/1994	007 216 399
316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY					
08/07/1994	245	08/07/1994	1	08/07/1994	007 586 372
245 CERTIFICATE OF REGISTRATION ON CHANGE OF NAME					
04/07/1994	205	07/07/1994	1	27/06/1994	007 586 368
205A NOTIFICATION OF RESOLUTION CHANGING COMPANY NAME					
06/06/1994	410	06/06/1994	1	06/06/1994	007 599 588
410B APPLICATION FOR RESERVATION OF A NEW NAME UPON CHANGE OF NAME					
09/05/1994	304	12/05/1994	1	01/03/1994	005 809 050
304C NOTIFICATION OF CHANGE OF NAME OR ADDRESS OF OFFICEHOLDER					
21/02/1994	304	23/02/1994	2	03/02/1994	005 642 138
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
09/12/1993	304	30/12/1993	3	01/07/1993	005 761 379
304 NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
304A CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
304C CHANGE OF NAME OR ADDRESS OF OFFICEHOLDER					
06/12/1993	203	09/12/1993	4	01/12/1993	005 605 727
203A NOTIFICATION OF CHANGE OF ADDRESS					
24/11/1993	316	30/11/1993	84	09/11/1993	000 010 59D
316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY					
24/11/1993	304	29/11/1993	3	12/11/1993	005 839 454
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
10/09/1993	304	22/09/1993	3	25/08/1993	004 188 859
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
09/02/1993	245	09/02/1993	1	09/02/1993	002 267 352
245 CERTIFICATE OF REGISTRATION ON CHANGE OF NAME					
18/01/1993	205	09/02/1993	1	21/12/1992	003 906 947
205A NOTIFICATION OF RESOLUTION CHANGING COMPANY NAME					
22/12/1992	316	08/01/1993	95	16/11/1992	000 010 59C
316G ANNUAL RETURN - UNLISTED PUBLIC COMPANY					
09/12/1992	410	14/12/1992	1	09/12/1992	002 261 723
410B APPLICATION FOR RESERVATION OF A NEW NAME UPON CHANGE OF NAME					
06/07/1992	205	08/07/1992	2	26/06/1992	002 286 635
205K NOTIFICATION OF RESOLUTION ALTERING THE ARTICLES					
29/06/1992	304	01/07/1992	4	04/06/1992	002 590 728
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
25/06/1992	353	30/06/1992	1	25/06/1992	002 374 768
353 NOTICE OF DISPOSAL RELATING TO CLASS ORDER					
25/06/1992	351	29/06/1992	1	25/06/1992	002 374 484
351 DEED RELATING TO CLASS ORDER					
04/05/1992	304	07/05/1992	3	31/03/1992	002 685 736
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
22/04/1992	244	22/04/1992	1	22/04/1992	002 856 430

244 CERTIFICATE OF REGISTRATION ON CHANGE OF NAME AND CONVERSION

06/04/1992	205	22/04/1992	38	20/03/1992	002 856 359
205 NOTIFICATION OF RESOLUTION					
205A CHANGING COMPANY NAME					
205C CONVERTING TO A PUBLIC COMPANY					
205K ALTERING THE ARTICLES					
16/03/1992	410	17/03/1992	1	16/03/1992	002 855 910
410B APPLICATION FOR RESERVATION OF NEW NAME UPON CHANGE OF NAME					
23/12/1991	316	28/02/1992	6	23/12/1991	000 010 59B
316 ANNUAL RETURN					
316E CORRECTIONS					
316K ANNUAL RETURN					
04/07/1991	351	02/09/1991	14	04/07/1991	001 676 231
351 DEED RELATING TO CLASS ORDER					
03/04/1991	304	11/04/1991	4	08/03/1991	001 167 196
304A NOTIFICATION OF CHANGE TO OFFICEHOLDERS OF AUSTRALIAN COMPANY					
25/03/1991	203	03/04/1991	1	21/03/1991	001 107 393
203A NOTIFICATION OF CHANGE OF ADDRESS					
01/01/1991	316	24/01/1991	50	01/01/1991	000 105 9A3
316 ANNUAL RETURN					
316K ANNUAL RETURN					
316E CORRECTIONS					

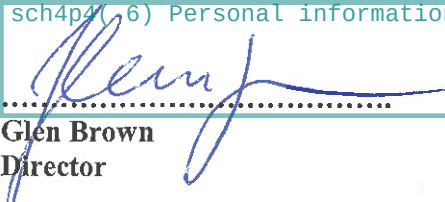
Note : Where no Date Processed is shown, the document in question has not been processed. In these instances care should be taken in using information that may be updated by the document when it is processed. Where the Date Processed is shown but there is a zero under No Pages, the document has been processed but a copy is not yet available.

Note: Where the expression 'Unknown' is shown, the precise date may be available from records taken over on 1 January 1991 and held by the ASIC in paper or microfiche.

*** End of Extract ***

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sch4p4(6) Personal information


Glen Brown
Director

Date: 19/9/07

Director's comment:

*I support appropriate enforcement
action to achieve the outcome
we are after.*

Action Officer: L Jordan
Position: Operations Manager

Director: Glen Brown

ED: Mark Williams

Correspondence No:
File No.: STH495-13
Corro No:
Minister's Reference:

Telephone: (07) 3224 6885

H:\ALL MIN & BN info\Briefing notes\Director Briefing Notes\2007\Gelita treated effluent discharge.doc

ENVIRONMENTAL PROTECTION AGENCY DIRECTOR'S BRIEFING NOTE

Noted / Approved / Not Approved	
sch/p4(6) Pers	
Signature: <i>[Signature]</i>	Date: 19/9/07

Sect
18/9/07
Act
19/9/07

TITLE: Uncontrolled release of treated effluent from Gelita's irrigation line.

Date Prepared: 18 September 2007

1. RECOMMENDATION

- That the Director **note** that between 1ML and 2ML of treated effluent was released from Gelita's irrigation line and discharged into the freshwater reaches of the Logan River at Josephville.

2. ISSUES

- EPA received a call from Cameron Smeal (site environmental manager) of Gelita on 4/09/07 to report an incident which resulted in a breach of its Development Approval conditions.
- The incident occurred sometime between midday (1/9/07) to midday (2/9/07). Gelita became aware of the incident on 3/9/07, however Mr Smeal was not on site that day and did not become aware of the incident until the following day which caused the delay in initial notification to EPA. This suggests poor understanding of environmental incident reporting requirements.
- In accordance with DA conditions, Mr Smeal later submitted a formal investigation report into the incident which was received via email on 7/9/07.
- The release occurred from a break in an irrigation line as a result of operator error.
- Monitoring of the effluent released was not undertaken, however the effluent in general is known to be high in total nitrogen – approx 500 – 600mg/L.
- Some monitoring in the Logan River was undertaken both up and downstream of the discharge point. Preliminary results do not contain sufficient information to make a determination as to the level of environmental harm caused. Results of further sampling results will be sent to EPA as soon as they become available.
- The natural flow dilution factor at the time in question was approximately 70ML per day.
- The 2006 EHMP Report Card graded the Logan River catchment a D+ with particular impacts to nutrient cycling and fish communities.
- EPA has not been notified of any instances of harm (e.g. fish kills) since the incident.
- An "Alleged Breach Report" is currently being drafted recommending a Penalty Infringement Notice be issued for a breach of DA conditions.
- Further to Gelita's commitments, the EPA will be recommending that a risk assessment of its irrigation practice is undertaken and subsequent measures implemented where deficiencies are found. The risk assessment is to cover staff training, emergency alarms and notification procedures, emergency response and contingency planning.

3. BACKGROUND

- Gelita operates ERAs – Fuel burning, Rendering Operation and Sewage Treatment under Development Approval no. SR0722.
- There have been no complaints or compliance issues within at least the previous three years.

4. CONSULTATION

- Gelita for facts and circumstances of incident.

Action Officer: L Jordan
Position: Operations Manager

Director: Glen Brown

ED: Mark Williamsor

Correspondence No:

File No.: STH495-13

Corro No:

Minister's Reference:

Telephone: (07) 3224 6885

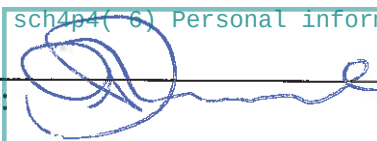
H:\ALB\BN & BN info\Briefing notes\Director Briefing Notes\2007\Gelita treated effluent discharge.doc

B. RESPONSE / INVESTIGATION

sch4p4(-6) Personal inform

Name of investigator: **Cameron Smeal**

Signature:



On the second of September there was an environmental incident which resulted in a breach of GELITA's licence conditions. A maximum discharge of between 1-2 ML of irrigation water to the Logan River resulted. This is not contested.

The physical location of the event has been identified photographically and is highlighted on the attached document. The point is a highly visible aspect of the Logan River bank and is within easy viewing of the members of the public. The event was observed during daylight hours. The discharge resulted from an irrigation overflow within the boundaries of the GELITA property.

The actual duration of the discharge is undetermined but is known not to have commenced before mid-day Saturday and is concluded Sunday morning.

Information received from the DNRW river monitoring telemetry indicates that no negative change in conductivity occurred as a result of this event. Irrigation water conductivity is approximately 7200, whilst river water conductivity for the period was in the order of 143. This high factor of variability provides a very good indicator feature for assessing environmental impact as the monitoring station is within approximately 500m of the incident.

Refer external analysis data for POP (pump out pond) for additional irrigation water quality data.

At GELITAs request DNRW officers have taken water samples both upstream and downstream of the site and results demonstrate higher conductivities are occurring upstream of the site than downstream or below the discharge point. The readings at Josephville Bridge (upstream) were 207 and those below Bromelton Weir were 192.

Further water quality analysis has been submitted by the DNRW to QLD govt health labs and this data will be provided to the EPA upon receipt.

The natural flow dilution factor at the time in question was approximately 70ML per day at the Bromelton Weir/Round Mountain monitoring stations. It is therefore contended that the likelihood of environmental harm having occurred as a result is not substantive. It is not believed that any environmental harm or nuisance has occurred or is likely to occur as a result of this event.

There was no indication available to GELITA operators that this discharge had occurred and the incident was only brought to the company's attention by an anonymous email (photograph) forwarded to the Environmental Manager on the Monday following the weekend. This email was sent approximately 4 pm Monday but was not opened until the Tuesday. Beaudesert Shire Council officers were immediately notified of the incident and this notification is a matter of record.

The EPA was advised verbally and by email of the incident on the Tuesday and an officer was on the site by 3 pm that afternoon to investigate. The officer left the site at approximately 5.30 pm after having determined the location of the discharge.

It appeared from the initial site investigation that a mechanical failure may have been responsible for the incident. GELITA advised the investigating officer at this time that further information to conclusively determine the cause of the incident was required from the off-duty shift operator who was due back on the Thursday.

The subsequent investigation on Thursday revealed that the Farm Officer responsible for the irrigation at the time of the event made an error of judgement that resulted in a discharge to the Logan River.

A meeting of the local Community Consultation Committee was held and the residents and area Councillor formally advised of the event on Thursday the 6th of September. Members of both Beaudesert Landcare and the Logan Albert Catchment Association were advised of the incident at this forum.

In order to prevent any recurrence of this particular sequence of events the following actions are being undertaken.

- The irrigation hydrant is being removed from that point and relocated at a distance within the property. This will be completed Tuesday 11th September by external contractors.
- The channel excised through the sandy bank by the discharge will backfilled to ensure that an earthwork barrier or wall with 0.5m freeboard is in place. This will be completed by GELITA operators by Tuesday 18th September.
- The operator responsible has been relieved of operational irrigation duties.
- A full operational procedural review of irrigation practices will be undertaken as part of ongoing risk assessment process. This will be completed and documented under the ISO audit process by 25th November 2007.
- The outcomes of this audit will also be submitted to the EPA as part of the annual return.

GELITA Australia takes this matter very seriously and will diligently strive to ensure there is no further potential for a recurrence.

For any further details regarding this matter please contact Cameron Smeal.



SAS Laboratory Report

Attention:**Client:****Phone:****Job Name:****Sampling Date:****Sampled By:****Sampling Method:****Sample Matrix:****Batch Number:****Registration Date:****Date of Report:**

Cameron Smeal

Gelita - Environmental Management

PO Box 409

Beaudesert Qld 4285

07 5541 3544

Gelita Analysis

19/07/2007

Client

Not Specified

Aqueous

07/08029

19/07/07

2/08/07

Scientific Analytical Services

ABN 72 002 765 795

Biological Accreditation Number 11085

Chemical Accreditation Number 11750

240 Donaldson Road

Rocklea Brisbane Qld 4106

Telephone 07 3403 2611

Facsimile 07 3403 2646

A unit of Brisbane City Council

ANALYSIS REPORT

Test Description	Units	Method	07/08029/1 BSD 19/07/2007	07/08029/2 POP 19/07/2007
BOD 5 days @ 20°C	mg/L	1.604	22	40
Ammonia N	mg/L	FIA.008	520	500
Total Nitrogen as N	mg/L	FIA.013	500	510
Total Phosphorus as P	mg/L	FIA.011B	1.8	1.3
Sodium as Na	mg/L	5.304	510	570
Calcium as Ca	mg/L	5.304	200	310

[NT] - Not Tested [ND] - Not Detected [NR] - Not Required

sch404 (6)
Sue Mole
Supervising Chemistsch404
John Bratt
Analyst

Please note that for samples not collected by SAS Laboratory, the above results refer only to the samples tested, and not to the batches from which they were drawn.



C. GENERAL REMARKS

It is likely that a combination of the factors discussed within this report have contributed to a situation that could create discharge as reported. The complaint in this case is not contested.

D. AUTHORISED BY GENERAL MANAGER

Name of General Manager:
Pablo Silber

Date: 7/9/07

Signature:

sch4p4(6) Po

Steven Carrick

From: Steven Carrick
Sent: Wednesday, 5 September 2007 5:03 PM
To: 'Cameron.Smeal@gelita.com'
Cc: Louise Jordan
Subject: Discharge Incident - 2/9/07

Good afternoon Cameron,

I refer to the discharge of treated effluent incident from Gelita's site which occurred on 2 September 2007.

Firstly I'd like to thank you for taking the time to show EPA officer Christine Juergensen the location of the incident and for assisting her with the investigation. As you are aware condition (G9) of your Development Approval SR0007 now requires that a written report of the incident be submitted within 14 days of the initial notification which equates to 18 September 2007.

The report must include:

- the location of the emergency or incident;
- the name and telephone number of the designated contact person;
- the time of the release;
- the time the holder of the approval became aware of the release;
- the suspected cause of the release;
- the environmental harm and or environmental nuisance caused, threatened, or suspected to be caused by the release;
- actions taken to prevent further any release and mitigate any environmental harm and or environmental nuisance caused by the release.
- proposed actions to prevent a recurrence of the emergency or incident; and
- outcomes of actions taken at the time to prevent or minimise environmental harm.

Please be aware that the EPA is taking this matter seriously given the preliminary estimated volume which was released into the Logan River, a severely degraded waterway, and that the release may be in contravention of the conditions of Gelita's development approval.

If you have any queries please do not hesitate to contact me.

Regards

+.....+

Steven Carrick
Senior Environmental Officer
EPA - Southern Region
GPO Box 2771 BRIS QLD 4001
ph no. 3225 1040
fax no. 3225 8723

Issued to:

Christine Joergensen

Signature of Recipient

scr 404 (6) Personal

Issued by:

Kimberly Scanlon

Signature of Issuing Officer

scr 404 (6) Personal info

Office or Location

Env CP's - Southern Region

PLEASE PRINT

Date

18 August 2006

NOTE BOOK NUMBER

0623

S. 73

continued: Site visit @ Nufarm,²
Lytton on 13 November 2006.
Check compliance with DA con-
ditions of SR 1480. Nufarm advised
A1) complies. A2) in Justin's office.
A3) complies. A4) Nufarm very
cooperative when EPA requests
documents. A5) Flow metre has
been taken out of scrubber for
maintenance, but Nufarm checked
every three hrs to make sure
scrubber working. Was only taken
out for 1 day. Otherwise no
issues. Ju (C) A6 (C) complies. A6)
Everything that needs calibra-
tion is in computerised main-
tenance management system; actions
are triggered for certain due dates;
complies. B1) complies. B2)
complies. B3) complies. B4) complies
(C)

Official Notebook

Entry Christine

Joergensen

Gelita, Beaudesert

4 September 2007

pp. 91-95

breached during rainfall.
 C2 - Construction requirements.
 PIN C3 - They agree that they are
 in breach because ponds have
 not been constructed to main-
 tain 0.5 m freeboard. Wal
 says freeboard not required to
 have 0.5 m freeboard be-
 cause they are covered, is a
 tank. C4 - M Bush agree.
 C5 - maybe change it so that
 certain ponds must not be
 cancellable. C6 - M Bush agree.
 C7 - ? Pond 1 - SBR. To
 continuous monitoring, which can
 be compared @ optimal temp.
 range. Ask Ernie! C8 - 11
 All captured in a storage tank.
 Anything not there goes to WWTP

Unloading area has screens ^{or}
 on drains (6mm slots). Tome
 C8-11 make sense. Same as 12.
 C8 - Screens must be in place
 (where practicable)
 D1 - M Bush say slw all
 captured fed into maturation
 pond. Have diversion valve.
 I ask for slw maps. Slw goes
 into 6 & 7. 14:36 ph call

^{S. 73}
 From S. Carrick. Gelita overflow.
 I will go & check. Contact:
 Cameron Smeal. Adrienne &
 Wal to continue inspection here.
 4/9/07: 2:45 pm. I arrive @
 Gelita & identify myself as an
 authorised person @ the reception &
 ask for Cameron Smeal. I inform
 receptionist that I'm here because
 Gelita notified us that they had a

(CP)

spill. Cameron aware of
approx. 3:55 pm. Cameron
shows me picture appearing to be
discharge to Logan River on
Sunday. Don't know elevation.
Cameron will have to speak to
Stephen Walmsley on Thursday.
There is a DNR monitoring station
in Logan River - check. Induce
3rd time in 10 yrs. Contour plans
High in N, low in P. Uncontrolled
discharge from Celista site.
Contour bank has been breached.
In past asbestos pipes broke
because of gully activity.
11/07/07 after water been treated
in wwtp. O ash Cameron about
advice from JF Bush. Has nothing
to complain about. Does not
really want to talk about it.

Talked to BSC, Cameron 93
said. Breach Hinch. He recalled
that pic yesterday. 5540 537.
He was not @ work yesterday.
The picture was sent anonymously.
SP0722. Picture sent through
Council. Cameron called Steve
Carnick & Council as trustees of
soon as he came to work to-
day. Approx. 1.5 M, but
Cameron will confirm. Cameron
aware of breach C1 - Release of
contaminants to waters. Possible
E6. Need to have a look to
confirm. Conditions H3 - H8
need to be addressed associated
with this spill. Cameron aware of
that. Paul Martin - Chief
Hydrographer - readings for
DNR monitoring stations. Luke

(07)

Groundwater NRJ Ltd. v. Murray 94
March 2000. West Canadian

Swiss. We can determine impact
on Logan River this way. Go
down to Logan River and find the
location where spill occurred. The
source is an irrigation hydrant
located @ the eastern site boundary.
It appeared that that particular
hydrant was affected by a water
hammer & the top blew. When we
had a look @ the hydrant it looked
like a new pipe had been placed
on the lid. I advised Corrigan to
report the incident according to
licence conditions @ his earliest
convenience or as per licence.

Possible breaches of D/O conditions:
A1, A9 (iii) (f); breach: C1; possible
E6, E7. Conditions H3 ~ H8 apply

regarding the recording &
reporting of the incident.

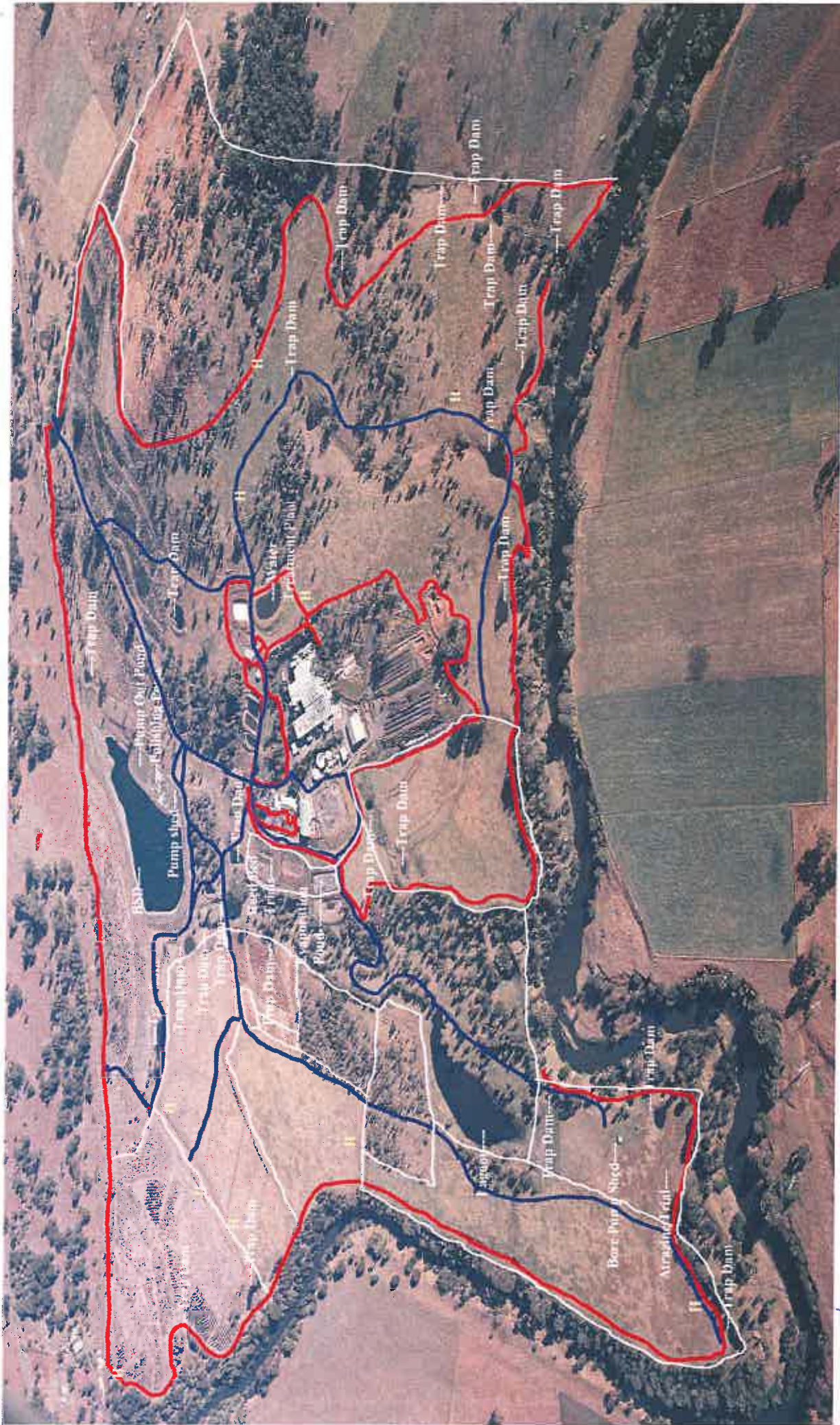
95

(08)

photo of spill taken (person only known to BSC) (elita did not know) on Sunday, 2/9/07



4/9/07 (2)



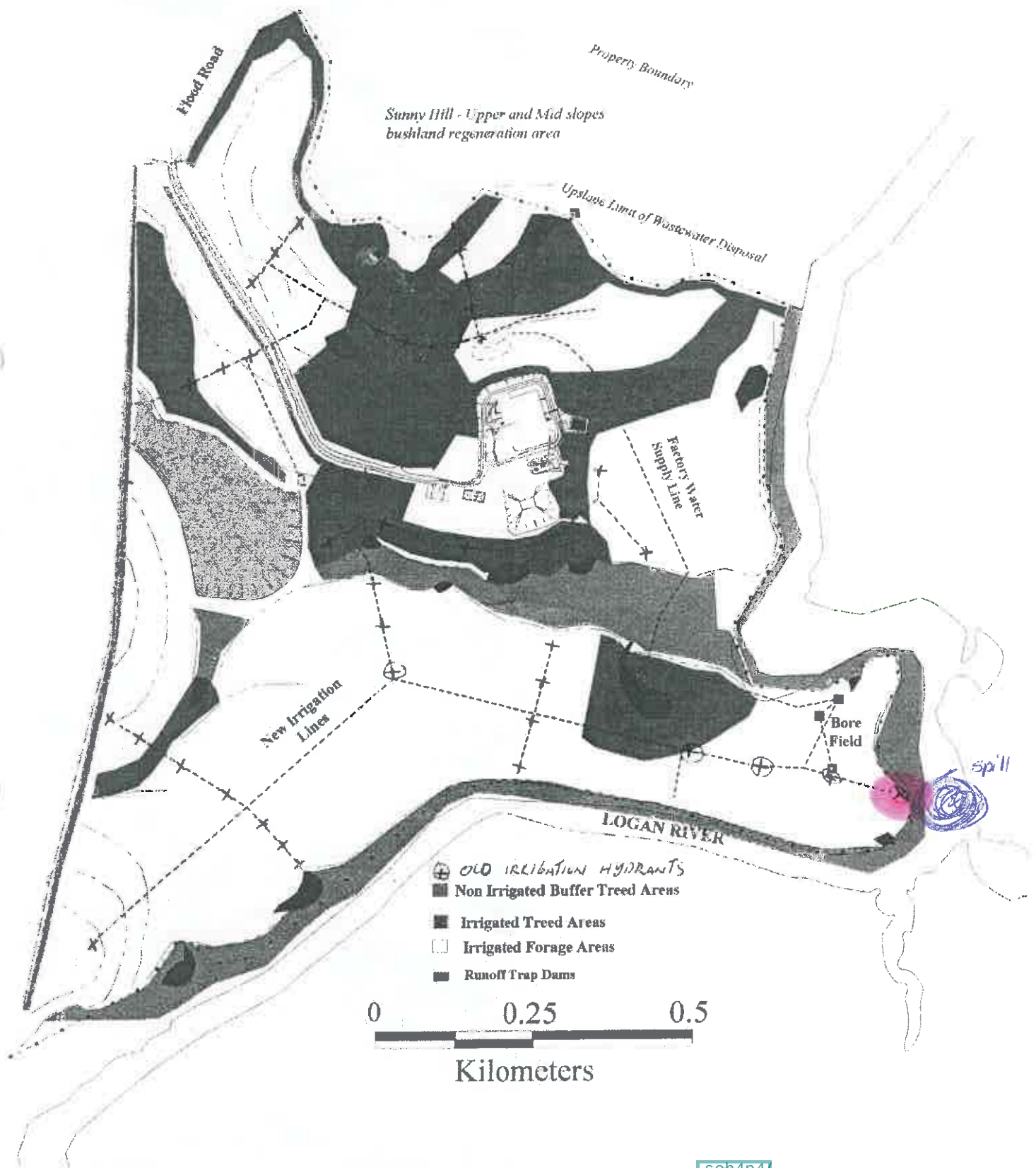
sch4p4(

4/09/07

approximate location of spill

Layout

Sunny Hills Irrigation Area



4/9/07



4/9/07

IRRIGATION DATA

Date: _____

Operator: _____

Totalisers

Irrigation Pump 1 totaliser: _____

Irrigation Pump 2 totaliser: _____

Are any trap dams at 50% capacity or less?

Yes: _____ No: _____

Volume Irrigated BSD:

Pump 1 (ML): _____

Pump 2 (ML): _____
for farm:

TOTAL (ML): _____

Southern Cross (M³): _____

Specify any trap dams above approximately 50% pumped to

Specify trap dams above approximately 50% capacity irrigated

BSD Water Level

Month: _____

Year: _____

Date	Level (m)

Rainfall previous day (mm): _____

Volume of water pumped to BSD from
trap dams (ML): _____

Irrigation from POP _____ BSD _____

BSD to PP Yes _____ No _____

Are all contour banks and storm water management systems in good working order?

Yes: _____ No: _____

If no, which requires maintenance? _____

Please inform Environmental Manager ASAP

FILL IN THE IRRIGATION LINES ON THE BACK OF THIS PAGE

LICENCE CONDITIONS FOR FARM OPERATORS

Must be followed at all times

- No direct release of irrigation water to any water source (gully, dam, river, or groundwater).
- Spray must not drift beyond boundaries of our property.
- Do not irrigate if water is ponding or running off soil surface.
- Buffer distance must be maintained and irrigation water must not come within:
 - 30 meters of any water sources (gully or river).
 - 20 meters of all property boundaries.
- Any water irrigated to farm from trap dams must not have conductivity above 1000um.

IF ANY OF THESE ARE BREACHED THE ENVIRONMENTAL MANAGER MUST BE INFORMED

ENVF 005/D

Page 1 of 2

Q:\Environmental\Forms\ENVF 005 Irrigation Data.doc

4/9/07



Christine Juergensen

From: Cameron.Smeal@gelita.com
Sent: Tuesday, 4 September 2007 3:32 PM
To: Christine Juergensen
Subject: DNR contact

John Riddler
Paul Martin
Mathew Sciacca
Regards
Cameron Smeal
Environmental Manager
GELITA Australia Pty Ltd

(07) 5541 9442

0428 141 642

----- Forwarded by Cameron Smeal/Beaudesert_AU/APA/Gelita/DGF on 04/09/2007 03:30 PM -----

"Bloedel Luke" <Luke.Bloedel@nrw.qld.gov.au>

To <Cameron.Smeal@gelita.com>

cc

19/03/2007 12:35 PM

Subject Sand and Gravel Extraction

G'day Cameron,

Try Graham Swann on 3224 7377. He's the senior officer in the licensing group in the office. He said it's a two step process to get, firstly, an extraction license and then an allotment...or something like that. You'd best talk to him.

Regards,

Luke Bloedel

Project Officer-Water Monitoring Information
Landcentre, Cnr Main and Vulture Sts.
Woolloongabba QLD 4102
Email: luke.bloedel@dnr.qld.gov.au
Phone: (07) 3406 2371
Mobile: 0428 103 879
Fax: (07) 3224 2933
Lat. 27°29'12" South
Long. 153°02'10" East

The information in this e-mail together with any attachments is

intended only for the person or entity to which it is addressed

and may contain confidential and/or privileged material.

5/09/2007
13-130



Complaint/Report Details

Complaint/Report Ref: CR39041

Priority/Sensitive: N

Complainant

Ref	Name	Address	Phone	Mobile	Fax	Email
600441	Unknown,					

Alleged Source

Ref	Name	Address	Phone	Mobile	Fax	Email
400434	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE VIA BEAUDESERT QLD 4285	(07) 5541 9442		(07) 5541 3612	cameron.smeal @gelita.com

Incident Location

Name	Risk Level	Address
"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285	2	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285

Type: Incident - major

Nature: Water : Effluent/Sewage

Received Date: 04-SEP-07

Receiving Officer: CARRICK, Steven

Receiving Office: SouthReg Environmental Operations*

Status: Finalised

Origin: Notification by source

Notification Method: Telephone call - business hours

Project Manager: CARRICK, Steven

Responsible Office: ES - Reg Serv - Bne South - Bne

Description

Event On/From Date:	Event On/From Time:	Received Time:
Event To Date:	Event To Time:	Ongoing: N Print Related Permits:

Description

EPA officer S.Carrick received telephone call from Cameron Smeal - the site environmental manager of Gelita who reported a "major" incident.

CS stated approx 1.5 ML of effluent had discharged into the Logan River over the weekend. He was not sure of the exact cause at this stage as he had only just become aware of the incident, reason being he did not work on the weekend and was out of the office on Monday. CS said a complete incident report will be compiled as in accordance with DA conditions and sent to EPA.

SC stated it was a serious incident and EPA will need to carry out an investigation to determine what exactly happened and if there was any environmental harm caused.

PIN NO: 001617 Sent via registered post 26/09/07.

Enforcement Measure

Type	Ref	Issued/Received Date	Status
PIN	PIN3722	25-SEP-07	Paid in Full

Running Sheet Summary

Accrued Time: 4 hrs 0 mins

First Action	Date Commenced	Due Date	Action Type	Officer Involved	Outcome	Date Completed
Y	04-SEP-07		Site Inspection - Level B	CARRICK, Steven	Action Required - further investigation	04-SEP-07
	25-SEP-07		Enforcement Measure	NICHOLS, Sarah	Enf Measure - PIN	25-SEP-07
	12-OCT-07		PIN - acknowledging payment	MURRAY, Caroline	NFA - payment received	12-OCT-07

Related Complaints/Reports

Ref	Complainant	Alleged Source	Incident Location	Received Date
CR41396	GELITA Australia Pty Ltd	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285	08-APR-08
CR42564	Krahnert, Matthew and Simon Krahnert	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285	21-JUL-08

Related Compliance Activity

Ref	Type	Information Entered	Client	Activity Location
CA13293	Not Applicable	06-DEC-04	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285
CA16882	Activity	17-JUL-08	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285



Complaint/Report Details

Related Compliance Activity				
Ref	Type	Information Entered	Client	Activity Location
CA1869	Licensed Activity	17-MAR-05	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285
CA316	Licensed Activity	22-OCT-04	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285
CA5307	Licensed Activity	07-DEC-05	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285
CA8396	Licensed Activity	09-NOV-06	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285
CA8397	Licensed Activity	09-NOV-06	Leiner Davis Gelatin International Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285



Running Sheet Summary

Complaint/Report Ref: CR39041

Complainant						
Ref	Name	Address	Phone	Mobile	Fax	Email
600441	Unknown,					

Alleged Source						
Ref	Name	Address	Phone	Mobile	Fax	Email
400434	GELITA Australia Pty Ltd	"Sunny Hills" Flood Road JOSEPHVILLE VIA BEAUDESERT QLD 4285	(07) 5541 9442		(07) 5541 3612	cameron.smeal@gelita.com

Incident Location		
Name	Risk Level	Address
"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285	2	"Sunny Hills" Flood Road JOSEPHVILLE QLD 4285

Source Ref: CR39041

Action Source Ref:

Date Commenced: 04-SEP-07

First Action: Y

Officer Involved: CARRICK, Steven

Responsible Office: ES - Reg Serv - Bne South - Bne

Action Type: Site Inspection - Level B

Inspection Type: Reactive - Incident

Enforcement Measure Type:

Referral To:

Action: EPA officer - Christine Jurgensen conducted a site inspection later that day (arrived approx 2:45pm).

Time Spent Hours: 3

Time Spent Minutes: 0

Outcome: Action Required - further investigation

Outcome Description: It appeared the release of effluent occurred due to a break in a irrigation hydrant.

Further details of information collected during the inspection by CJ are on file STH495-13.

Due Date:

Date Completed: 04-SEP-07

Source Ref: CR39041

Action Source Ref: PIN3722

Date Commenced: 25-SEP-07

First Action: N

Officer Involved: NICHOLS, Sarah

Responsible Office: ES - Reg Serv - Bne South - Bne

Action Type: Enforcement Measure

Inspection Type:

Enforcement Measure Type: PIN

Referral To:

Action: PIN issued. For more information, see file STH495-13.

Time Spent Hours: 1

Time Spent Minutes: 0



Running Sheet Summary

Outcome: Enf Measure - PIN

Outcome Description: Will finalise this case (CR39041) once penalty fee is paid.

Due Date:

Date Completed: 25-SEP-07

Source Ref: CR39041

Action Source Ref: PIN3722

Date Commenced: 12-OCT-07

First Action: N

Officer Involved: MURRAY, Caroline

Responsible Office: ES - Reg Serv - Bne South - Bne

Action Type: PIN - acknowledging payment

Inspection Type:

Enforcement Measure Type: PIN

Referral To:

Action: PAYMENT RECEIVED PAID IN FULL PIN 001617

Time Spent Hours:

Time Spent Minutes:

Outcome: NFA - payment received

Outcome Description: Case closed.

Due Date:

Date Completed: 12-OCT-07



SAS Laboratory Report

Attention: Cameron Smeal
Client: Gelita - Environmental Management
PO Box 409
Beaudesert Qld 4285
Phone: 07 5541 3544

Job Name: Gelita Analysis
Sampling Date: 19/07/2007
Sampled By: Client
Sampling Method: Not Specified
Sample Matrix: Aqueous

Batch Number: 07/08029
Registration Date: 19/07/07
Date of Report: 2/08/07

Scientific Analytical Services

ABN 72 002 765 795

Biological Accreditation Number 11085
Chemical Accreditation Number 11750

240 Donaldson Road
Rocklea Brisbane Qld 4106

Telephone 07 3403 2811
Facsimile 07 3403 2846

A unit of Brisbane City Council

ANALYSIS REPORT

*Quality characteristics of
water spilled from Gelita site into
Logan River*

Test Description	Units	Method	07/08029/1 BSD - 19/07/2007	07/08029/2 POP 19/07/2007
BOD 5 days @ 20°C	mg/L	1.604	22	40
Ammonia N	mg/L	FIA.008	520	500
Total Nitrogen as N	mg/L	FIA.013	590	510
Total Phosphorus as P	mg/L	FIA.011B	1.8	1.3
Sodium as Na	mg/L	5.304	510	570
Calcium as Ca	mg/L	5.304	200	310

*→ pump out pond
→ Below Sludge Run*

[NT] - Not Tested [ND] - Not Detected [NR] - Not Required

sch4p4(6)
[Signature]

Sue Mole
Supervising Chemist

sch4p4
[Signature]

John Bratt
Analyst

Please note that for samples not collected by SAS Laboratory, the above results refer only to the samples tested, and not to the batches from which they were drawn.