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North Lincolnshire Green Energy Park Project – Examination of Development Consent Order

Response to the Applicant's Response to Deadline 5 Submissions and the ExQ2 on behalf of AB Agri Limited
14 April 2023

Planning Inspectorate Ref: EN010116
Interested Party Ref: 20032351

Contents

1 INTRODUCTION

1.1 This submission has been prepared on behalf of AB Agri Limited In response to the Applicant's response to Deadline 5 submissions in respect of AB Agri. This submission also comments on the Applicant's response to the Examining Authority's Second Written Question Q2.15.0.2 in respect of socio economic effects.

1.2 As we noted in our submission at Deadline 6, AB Agri met with the Applicant on 27 February 2023 and the current position on the outstanding matters are as follows:

- With regard to the withdrawal of the temporary acquisition of AB Agri's land, as agreed at the meeting, the Applicant informed AB Agri on 5 April that they will look to remove it from the RLB before the end of the 'cross examination period', subject to their discussion with their engineering team. We offer no further comment on this at this stage, on the good faith assumption that withdrawal will take place, but clearly have to reserve our future position if the Applicant decides to pursue the acquisition. In this context, and for the avoidance of any doubt, until the Applicant's position is clear AB Agri maintains their objections to the temporary acquisition as set out in our previous representations.
- In terms of the additional mitigation measures discussed at the meeting, AB Agri still awaits the Applicant's response in order to reach an acceptable solution – AB Agri still objects to the proposals on biosecurity grounds at this stage.

1.3 We have also considered the Applicant's submission at Deadline 6, and for the reasons set out in this submission, and as confirmed above AB Agri remains extremely concerned with the proposal and is not in a position to withdraw its objection.

2 RESPONSE TO THE APPLICANT'S RESPONSE TO DEADLINE 5 SUBMISSIONS

2.1 At Deadline 6, the Applicant submitted its response to AB Agri's post hearing submission at Deadline 4. In response to AB Agri's concerns, the Applicant provided the following information:

- The methods of the delivery of the RDF based on the RDF Industry Group's Code of Practice and Duty of Care;
- The use of a pest management plan to be prepared based on local circumstances and a risk assessment to be undertaken as part of the Environment Permit application, and
- Potential approaches and controls to dealing with birds and rats are set out, though no commitments are provided.

2.2 In addition, it is noted that the Applicant is undertaking a Preliminary Risk Assessment (PRA) to assess the possible risks of rats and birds entering the tipping hall contacting RDF material containing salmonella and then transmitting the contamination to AB Agri. However, that being the case, the scope of the PRA only appears to deal with rats and birds entering the tipping hall, which is a limited part of the potential risks to AB Agri. The scope of such any PRA should be much wider and include the delivery of RDF and the full operation of the ERF (as all of the "mitigation measures" suggested by the Applicant relates to the handling of RDF within the tipping hall in negative pressure). It should also ensure that the reasonable scenario of negative pressure failure is included.

2.3 In response to the Examining Authority's request for further information relating to the matters raised in earlier representations, AB Agri have instructed SLR to provide an independent technical review of the Applicant's submissions. SLR have extensive "hands on" experience in the operation and commission of ERFs, and are therefore in a position to provide an expert opinion on the effectiveness of the measures put forward by the Applicant. SLR's technical review is appended to this submission. A summary of their review is as follows:

- Notwithstanding good practice as detailed in the RDF industry group code of practice, it is inevitable that waste material leaks, which are potentially mixed with organic materials and food waste (as the Applicant has confirmed that it is not possible to eliminate them from the RDF), will likely occur at all stages of delivery before the RDF reaches the tipping hall. Therefore, leaked materials will attract birds and rodents which pose a significant risk of salmonella being transmitted to AB Agri's facility.
- Notwithstanding the required stringent monitoring, maintenance, cleaning and sanitation regimes inside and outside the tipping hall, in practice there will be RDF spillages outside for certain periods of time.
- The overall cleaning regime of waste delivery contractors is outside of the operator's control and there is an increased risk that residual RDF material left in the trailers will leave the tipping hall.

- The effectiveness of pest control within the bunker requires the site operation team to maintain low bunker levels and crane operations and to ensure that a trench at the front of the bunker is maintained at all times. The operation of the bunker area requires high levels of cleaning and sanitising regimes for the site pest control to be effective. Inevitably, there will be operator errors or attending to plant issues and the high levels of maintenance, cleaning and sanitising regimes may not be undertaken stringently, which would lessen the effectiveness of the pest control regime.
- In order for the negative pressure within the tipping hall and the bunker area of the ERF to be maintained, the operation relies on the combustion air fans and boilers operating at all times. However, even with a robust preventative maintenance programme, these will fail at times.
- Fast acting doors for the ERF would need to remain closed when the RDF is not delivered for the negative pressure to be effective and to prevent RDF materials leaving the ERF. However, in reality, fast acting doors will fail or be left open, as evidenced by a common cause of complaints local to ERFs being related to doors being left open and other factors that relate to a lack of containment of the waste storage and handling infrastructure.
- Whilst the proposal allows for one boiler down at one time in order to have at least one boiler operating at any time (to keep the negative pressure), this cannot be guaranteed as it will be dictated by the written scheme of examination and maintenance requirements of common plant on site. In addition, maintaining safe isolation for one boiler from two operating boilers is notoriously difficult and there is no guarantee that the design of ERF will ensure adequate isolation of high-pressure steam can be achieved between boilers when two boilers remain operational during the remaining boiler's outage.
- Even with the best endeavours of mitigating unplanned outage with robust maintenance, in reality, all ERFs in their initial operational stage will suffer from unplanned outages which will result in one of even all the boilers coming offline, affecting the ability to maintain negative pressure in the tipping hall. Within the usual 2 year warranty period, all ERFs have teething issues which may involve the negative pressure environment.

2.4 SLR's technical review demonstrates that the measures proposed by the Applicant would not be effective in preventing the RDF from being spilled outside the ERF on route or after it enters the tipping hall and birds and rodents being attracted to the spilled waste and transmitting contamination to AB Agri's plant. Put simply, the Applicant is – on its own part - relying on a best case scenario in terms of all of its operational commitments, with no room for breakdown or departures from best practice – this is, in reality, not achievable. Further it is either (and at best) relying on third parties of which it has no control adopting similarly stringent operational measures, or at worst ignoring that this is necessary to make the development acceptable. This is exacerbated by the fact that the Environmental Permitting regime, on which the Applicant places so much reliance (see below), does not extend controls and measures outside the operational area or the operation by third party contractors such as RDF deliveries. The Environmental Permitting regime deals with environmental matters such as noise and odour, but it is not intended to deal with matters such as biosecurity risks, waste spillage from vehicles on route and monitoring of day to day operations including 'housekeeping' of facilities.

2.5 As such, the measures proposed by the Applicant (which are effectively no more than explaining the standard RDF industry and ERF operational practice rather than directly addressing risks to AB Agri) do not reduce biosecurity risks and on-site mitigations (at AB Agri's site) are required.

3 COMMENTS ON THE APPLICANT'S RESPONSE TO EXQ2

3.1 In response to EXQ2 Q2.15.02 in respect of socio economic effects, the Applicant stated that the conclusions of the assessment of socioeconomic effects remain unchanged with regard to the possibility of AB Agri's facility having to close. The Applicant came to this conclusion as they do not consider that this is a likely scenario as it would mean that the Environment Agency would issue an Environmental Permit what would allow the Project to operate in a way that caused off-site pollution impacts to the extent that a neighbouring facility was threatened. The Applicant explains that the Environmental Permit would only be granted by the Environment Agency if it could ensure that such impacts could not arise and therefore there was no possibility of a likely significant consequential social economic effect.

3.2 The Applicant relies entirely on an "assumption" on behalf of the Environment Agency that they will ensure that the Environmental Permit would deal with biosecurity risks to AB Agri. However, as demonstrated above, the Environmental Permit regime would not impose sufficient controls and measures necessary to minimise the biosecurity risks to AB Agri, as the permitting system does not extend outside the operational area (ie the ERF facility itself), to the operations of third party or to monitoring of day to day operations including 'housekeeping' of the ERF facility, contractors. This assumption is therefore false and, as such, the Applicant clearly has not considered the potential socio-economic effects of the proposal in the ES.

Appendix 1

Technical Review of the Proposed ERF, prepared by SLR

TECHNICAL REVIEW OF THE PROPOSED ERF

The Practicalities of ERF Operation

Prepared for: AB Agri

SLR Ref: 416.064691.00001
Version No: 1
APRIL 2023

BASIS OF REPORT

This document has been prepared by SLR with reasonable skill, care and diligence, and taking account of the timescales and resources devoted to it by agreement with the AB AGRI (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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Information, advice, recommendations and opinions in this document should only be relied upon in the context of the whole document and any documents referenced explicitly herein and should then only be used within the context of the appointment.

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1.0 Executive Summary

SLR Consulting Ltd (SLR) has been commissioned by AB Agri Ltd (AB Agri) to undertake a technical review of the proposed North Lincolnshire Green Energy Park to provide expert opinion on the effectiveness of the design of the proposed facility and associated mitigations suggested by the Applicant relative to AB Agri's facility.

Whilst the development of this ERF has identified mitigation to the risk of biosecurity associated with the delivery and processing of RDF there also needs to be recognition that this isn't enough and additional measures will be required. As an example, realistically material will be delivered loose in covered vehicles as baling RDF is generally used for exporting RDF and presents additional stages of processing and cost.

The measures proposed by the applicant alone will not control the following risks to AB Agri:

- Vermin;
- Bioaerosols;
- Dust; and
- Odours.

Managing waste volumes on site will be key to mitigating biosecurity risk and this primarily means maintaining low bunker levels as part of a formal bunker management strategy and also ensuring the tipping hall bays and inspection bays are cleared of material, cleaned and sanitised on a regular basis. This also extends to ensuring any litter outside the tipping hall is identified and removed as part of a litter picking strategy. Maintaining high levels of housekeeping is a daily requirement that requires resource in terms of appropriate equipment and dedicated personnel and underpins the proposed measures put forward.

Whilst it is recommended that best practice is implemented for traffic management which will include staggering deliveries in practice there will be occasions of traffic build up outside the tipping hall. This is due to waste contractors arriving at site before opening hours or at delivery times suited to their logistical requirements. There is also the reality that plant issues or breakdowns will impact fuel deliveries and cause delays.

In SLR's experience it is inevitably material leaks will likely occur at all stages of delivery – e.g. access roads, whilst waiting, manoeuvring, tipping and exiting the tipping hall etc due to light materials such as shredded paper and plastics which are potentially mixed with organic materials and food waste which are materials that are potentially contaminated by salmonella and attracts birds and rodents. Notwithstanding the required stringent monitoring, maintenance, cleaning and sanitation regimes inside and outside the tipping hall, in practice there will be RDF spillages outside for certain periods of time

Maintaining high levels of housekeeping is a daily requirement that requires resource in terms of appropriate equipment and dedicated personnel and underpins the proposed measures put forward. Inevitably, there will be operator errors or plant issues to attend and the high levels of maintenance, cleaning and sanitising regimes may not be undertaken stringently, which would lessen the effectiveness of the pest control regime.

Good housekeeping must also be implemented during the construction period when robust waste management controls are required to mitigate the risk of hundreds of contractors consuming and preparing food on site.

Managing waste volumes on site will be key to mitigating biosecurity risk and this primarily means maintaining low bunker levels as part of a formal bunker management strategy and also ensuring the tipping hall bays and inspection bays are cleared of material, cleaned and sanitised on a regular basis.

Maintaining negative pressure in the tipping hall and bunker hall is further reliant on the operator maintaining access doors in good working order, maintaining combustion fans and minimising unplanned plant downtime whilst managing bunker and waste volumes leading up to and during planned outages. Even implementing best practice maintenance protocols for combustion fans they will still on occasions trip i.e inverter high temp trip.

A robust and comprehensive site planned preventative maintenance strategy is vital to ensuring the plant operates reliably and delivers high levels of availability. Operating the plant with one boiler down cannot be guaranteed due to the requirements of the written scheme of examination and Original Equipment Manufacturer (OEM) maintenance requirements of common plant equipment. In addition, maintaining safe isolation for one boiler from two operating boilers is notoriously difficult and there is no guarantee that the design of ERF will ensure adequate isolation of high-pressure steam can be achieved between boilers when two boilers remain operational during the remaining boiler’s outage

2.0 Introduction

SLR Consulting Ltd (SLR) has been commissioned by AB Agri Ltd (AB Agri) to undertake a technical review of the proposed North Lincolnshire Green Energy Park to provide expert opinion on the effectiveness of the design of the proposed facility and associated mitigations suggested by the Applicant relative to AB Agri's facility.

AB Agri operate a feed mill in Flixborough. The Applicant proposes to develop the North Lincolnshire Green Energy Park adjacent to this. The Park would incorporate a 600,000 tonnes per annum Refused Derived Fuel (RDF) Energy Recovery Facility (ERF).

SLR have extensive "hands on" experience in the operation and commissioning of ERF's and are ideally positioned to provide practical expert opinion on the day to day operation of an ERF and expand on best practice employed at the facilities to mitigate biosecurity risk.

This report has been principally authored by Marc Scourfield. Marc has over 20 year's industrial experience and has extensive operational and process engineering experience in Energy from Waste (EfW) and waste treatment technologies. He has implemented operational, engineering and environmental permit compliance improvements via upgrade of plant during his career.

Marc was a lead process engineer on WTI's (now Enfinium) construction and commissioning team for their ERF in Deeside. Prior to working for SLR, Marc was the Plant/Operations Manager for Viridor's Trident Park EfW facility in Cardiff and led the Operations & Maintenance function through commissioning and the 2 years operational warranty period. Both Enfinum and Viridor are leading operators of ERF infrastructure in the UK.

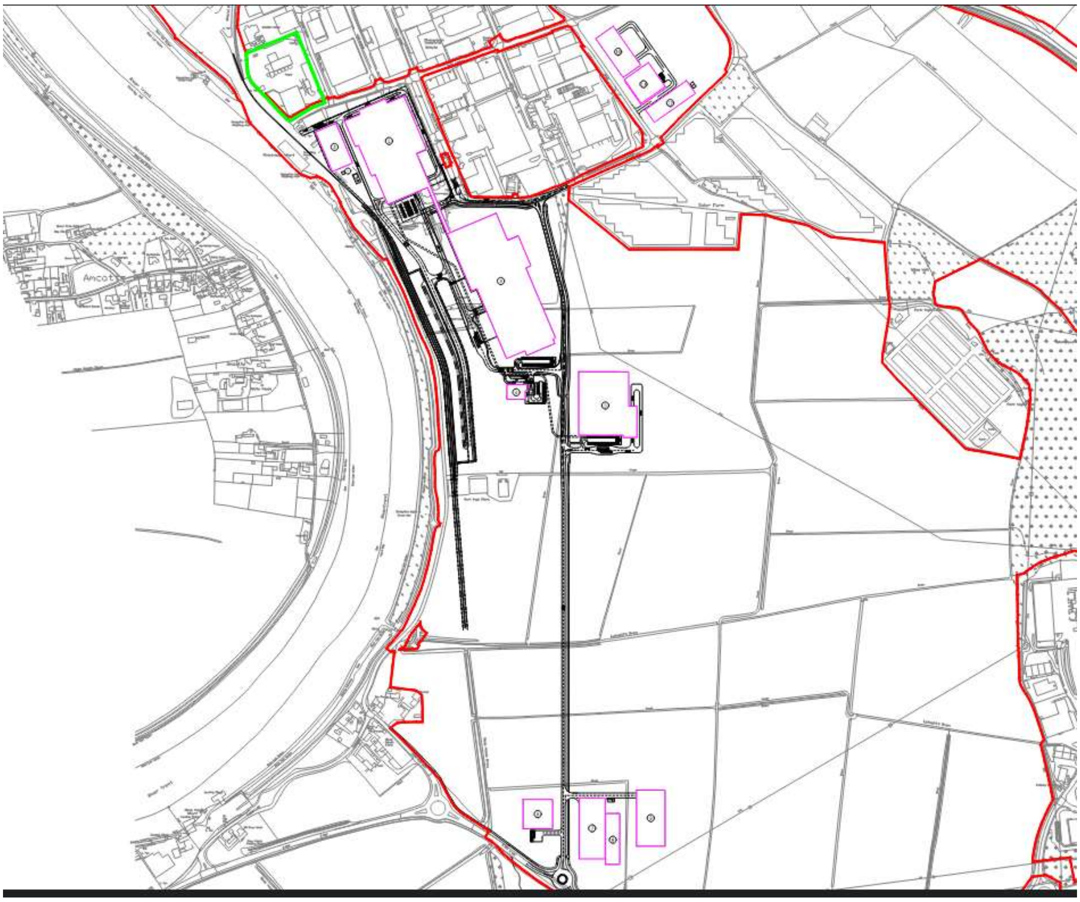
The author has also undertaken many technical reviews of ERF operation as part of technical due diligence requirements for the transaction of ERF infrastructure on behalf of financial institutions.

This review is informed by the information submitted by the Applicant for its Development Consent Order and Marc's experience in the operation and technical reviews of UK based ERF's.

3.0 Waste Delivery

The proposed development will process 600kt of RDF annually which according to their DCO submission will be delivered to site in shipping container, baled or sealed transport. The main operational deliveries to the ERF will be the RDF, which will be delivered by a mixture of road, rail, and river freight. The illustration below indicates the proximity of the proposed ERF to AB Agri and with the delivery of waste situated to the southeast of the AB Agri site and a rail siding that would require reinstatement further south (IX).

Figure 3-1
Drawing of proposed development relative to existing AB Agri site (site boundary in green)



Whilst a split on delivery modes of transport isn't available it is likely that the applicant would seek the DCO to grant permission for all material to be delivered by highway only if required to provide full flexibility in sources of feedstock; this would be the worst case scenario for AB Agri.

The Overarching National Policy Statement for Energy (NPS EN1) confirms that energy recovery from residual waste has a lower GHG impact than landfill (paragraph 3.3.33). The National Policy Statement for Renewable Energy (NPS EN3) recognises the role of EfW generating stations in taking fuel that would otherwise be sent to landfill (NPS EN3 paragraph 2.5.9).

The ERF will take RDF that would otherwise be destined for landfill and therefore addresses both of these policy aims. However this material, whilst being subject to pre-processing prior to delivery, is unlikely to be baled material. Similar sized ERF's currently operating in the UK that take deliveries by road, rail and river take the material is loose. The Riverside ERF situated in London takes in similar volumes and the majority of the material (MSW) is delivered to site loose in sealed containers. Enfinum's 2 ERF's (Multifuel 1&2) situated in Yorkshire in close proximity to the M1/M62 intersection accepted loose RDF by road and a shared rail and gantry offloading system.

Baling the material introduces additional cost and additional processing to wrap for transport and debale at the ERF. There is no detail of how the material would be debaled on delivery to the ERF and therefore it is assumed if the bales are stored in the bunker there will be a reliance on the gantry crane grab to debale prior to loading. This introduces additional risk to the facility in that bales that haven't been debaled appropriately can present a blockage risk in the loading chute of the plant which in turn can lead to the boiler coming offline if the blockage is severe enough.

Whilst the applicant's application references adhering to good practice as detailed in the RDF industry group code of practice, the document is primarily aimed at exporters of RDF. If RDF is being sourced within the UK to provide fuel to the plant it would be impractical to bale the material for transport unless material is being delivered to site by river, however as previously stated containerised material is already a proven method of delivery by water which can be ejected directly into the bunker.

If RDF is being delivered to site by road, then it is likely the material will either be delivered loose in walking floor trailers with solid canvas sheeting or sheeted tipper vehicles as illustrated below.

Figure 3-2
Example of "walking floor" trailer with canvas cover

Bulk material is loaded via the roof of the trailer and then covered prior to being transported. At the delivery location, the rear doors are opened and the load is gradually moved out of the trailer's rear and onto the surrounding ground. The gradual movement of the load is made possible by the hydraulically controlled floor system's 'planks' performing alternating shifting movements. The trailer discharges the RDF directly into the bunker with an element of spillage when opening the doors initially and cleaning out remaining RDF before closing the trailer and leaving the tipping hall.

Delivery of RDF in bales as previously stated is unlikely due to the additional cost and the introduction of additional process stages. Upon delivery to site the bales will be on curtain side loading trailers that require a fork truck with a specific attachment to unload the bales. This introduces additional risk of the bales being damaged with additional handling and interaction in the tipping hall of unloading trailers with a fork truck unloading and transferred to the bunker. This doesn't represent best practice in that the aim is to ultimately limit the number of vehicles operating on the tipping hall from a safety perspective at one time and therefore eliminating the need to off-load a curtain sided trailer is recommended and priority should be given to RDF delivery trailers that discharge directly into the bunker.

There is ambiguity surrounding the traffic management on site in terms of the vehicle tracking and delivery vehicles utilising the plant road that surrounds the plant buildings compared to an entry/exit layout for the tipping hall with one approaching road with traffic moving in both directions and entry and exit for the tipping hall are side by side.

Figure 3-3 Traffic route around proposed ERF & Figure 3.4 Front elevation of proposed site

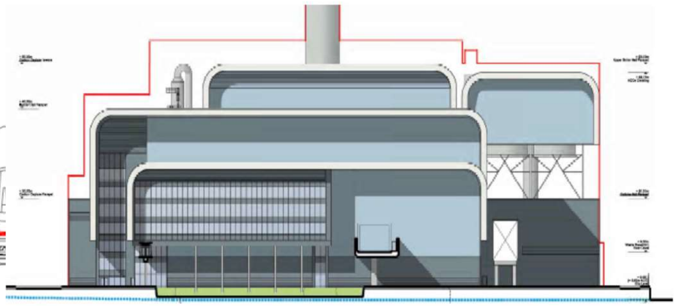
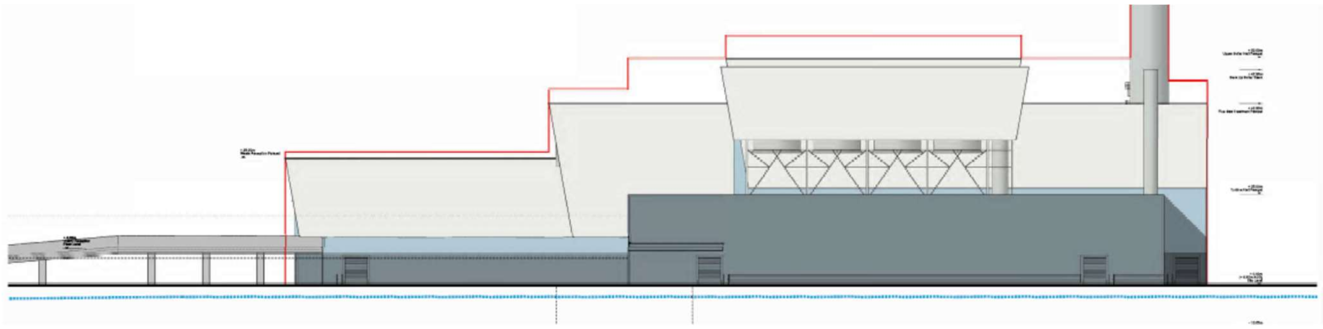


Figure 3-5
Side elevation of proposed site



In terms of fuel delivery, it is considered best practice to isolate the deliveries to the dedicated tipping hall only and not to travel the full circular of the site before entering the tipping hall. Fuel deliveries and associated vehicle movement should be segregated from the rest of the site to avoid the risk of the workforce interacting with vehicles delivering RDF that have yet to enter the tipping hall.

Whilst SLR appreciate the layout drawings thus far are only indicative the final design decision should consider minimising vehicle movement on site, and this will also eliminate the risk of vehicles laden with RDF circulating the site prior to entering the tipping hall and potentially spilling material. The final decision on traffic access will no doubt consider this aspect but SLR would expect the final design decision to exclude the proposed traffic circular above and design an efficiency pathway in and out of the tipping hall only.

Given the volume of material being delivered to site it is good practice to manage delivery times to avoid peaks during the day when many deliveries occur to avoid build up outside the tipping hall. With this being a merchant site processing RDF from commercial waste companies it is possible to stagger deliveries throughout the day to ensure a more consistent delivery profile is provided and not having to manage traffic build up at specific parts of the day.

Whilst staggering deliveries will avoid peaks it doesn't always happen as waste delivery contractors will invariably arrive at site at times more suited to their requirements as well as plant issues such as breakdowns will impact fuel delivery continuity.There is also the risk that vehicles will load up the previous night and arrive at the facility before delivery can commence so they can turn around the vehicle to deliver another load later in the day.

There also needs to be consideration for managing broken down vehicles which could be laden with material when they breakdown or develop hydraulic leaks outside the tipping hall. Vehicles that have delivered their fuel to the site must not be permitted to park up near the site for lunch breaks or for tachograph compliance. Fast food outlets that set up on industrial estates are a haven for vehicle drivers to park up for something to eat and this must also be prevented.

Summary

In SLR's experience it is inevitable material leaks will likely occur at all stages of delivery – e.g. access roads, whilst waiting, maneuvering, tipping and exiting the tipping hall. These materials are likely to be shredded paper and plastics which are potentially mixed with organic materials and food waste which are materials that are potentially contaminated by salmonella and attracts birds and rodents.

The fuel delivery movements to site must be minimal and limited to the tipping hall only. It is unlikely baled material will be delivered as this represents further work and cost as well as safety implications for offloading in the tipping hall.

4.0 Tipping Hall & Housekeeping

This section provides an insight into best practice regarding tipping hall operation and housekeeping practices to ensure the risk of vermin is managed.

Tipping hall design can vary between ERFs with some incorporating large tipping hall areas under cover which enable vehicles to complete turning circles before reversing into dedicated tipping bays. Other facilities have been designed with the turning area outside and the tipping hall is sized to accommodate a reversing vehicle only into dedicated bays with dedicated fast-acting doors for each lane.

Figure 4-1 multiple entry doors to tipping hall & Figure 4.2 Dual entry to tipping hall

Each design has its pros and cons from a capex and operability perspective but what is constant is the need for a robust traffic management plan for the site.

The Traffic management plan is designed to control vehicle deliveries to site efficiently and safely to ensure minimal environmental impact and maintaining quick vehicle turnaround. Entry in the tipping hall will be controlled by a traffic light system integrated with external induction loops and will co-ordinate what tipping bay is available based on number of vehicle tipping at one time and the activity of the overhead gantry crane.

This enables a smooth transition and fully automated process for entry into the tipping hall and disposal of RDF into the bunker. Entry is controlled by fast acting doors that open and close automatically when a vehicle drives on the external induction loop and conditions in the tipping hall allow entry. The fast acting door will close automatically once the entering vehicle has cleared the entry opening.

The fast acting doors are subject to heavy day to day loading with the opening and closing throughout the day and this does invariably lead to breakdowns that will impact deliveries and leaves the doors open. It is recommended that more than one entry point is included in the design with fast acting door is available to mitigate breakdowns.

A robust service and maintenance programme with the OEM and appropriate spares stored onsite will underpin the performance of these fast acting doors and as discussed in a later section the function of the doors is also intrinsically linked with the ability to maintain negative pressure. It is also common for fast acting doors on the exit of the tipping hall by drivers who do not obey the traffic light system or depending on the vehicle the trailer cover is not in the closed position or a vehicle with a tipping function.

Outside of delivery hours when the fast acting doors are not required, they should remain closed and should also be protected by secondary external roller doors that can provide protection from the elements i.e., high winds which can also potentially damage fast acting doors

Tipping bays can either be open sections, operate doors on the tipping bays themselves in conjunction with tipping hall doors opening and closing. Other configurations that involve freight deliveries via road or rail can use dedicated containers that connect to a hydraulic tipping stage that lifts the container and ejects the RDF into the bunker.

Figure 4-3 Tipping hall with container tipper in each bay & Figure 4.4 Tipping hall with open delivery bays

The proposed layout of the ERF tipping hall has an entry and exit door situated side by side and is serviced by a dual lane ramp road leading up to the front of the building. There is also a suggestion of side entry and exit on traffic route illustrations. The applicant needs to finalise entry and exit points for the tipping hall to optimise vehicle movement as part of the traffic management plan

The tipping hall will be situated at the southern end of the main ERF building and provide a reception area for incoming RDF to the facility, delivered by road transport or by secondary handling vehicle (for example a telehandler) from the Wharf or railhead. Within the tipping hall, delivery vehicles transfer RDF directly to the RDF bunker.

The tipping hall will measure no greater than 87.5m by 60m with 10 dedicated tipping bays to the bunker with access either side. The areas either side of the tipping bays are generally reserved for a back loading area (material removed from the bunker) or a dedicated quarantine and inspection area.

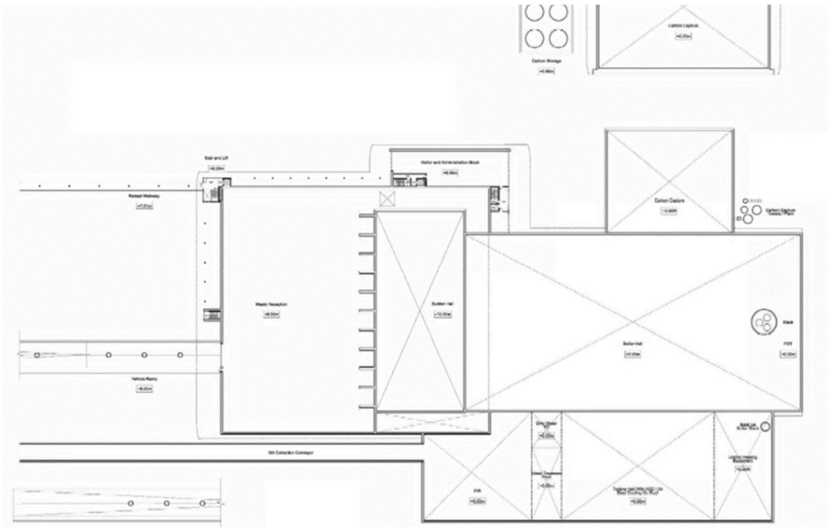
The most important aspect of tipping hall operation following safety is housekeeping as this can have a significant impact on the site operation and the management of vermin and biosecurity. Whilst every endeavour throughout the day is made to tip the material in the bunker there will be spillage from each vehicle that accumulates throughout the day in the tipping bays. This has to be managed and cleaned regularly throughout the day with out of hours reserved for jet washing and sanitising the tipping bay areas. This also extends to areas in the tipping hall used for backloading non-compliant material and the dedicated inspection bay.

It is considered best practice to conduct regular, daily vehicle inspections to ensure the material delivered to site complies with the waste acceptance criteria for the site. This requires a dedicated resource to control vehicles identified for inspection, inspect the discharged material in the dedicated inspection bay and to ensure the bay is cleaned after the material is removed by either backloading into the vehicle if the material is non-conforming or into the bunker for processing.

Inspection campaigns can be random or supplier specific depending on the issue identified at the time and they send the required message to suppliers that fuel quality delivered to site is important and non-conforming material is unacceptable as it can potentially lead to emission issues with the plant or even cause damage to the plant or cause blockages which potentially impacts plant availability.

It is regarded as best practice to invest in the appropriate equipment for jet washing and sanitising the area along with utilising road sweepers regularly in the tipping hall and around the site. This can be done with an agreement in place with a 3rd party company who provide the service, or the site can invest in a road sweeping vehicle that also incorporates jet washing equipment.

Figure 4-5
Proposed layout of ERF tipping hall

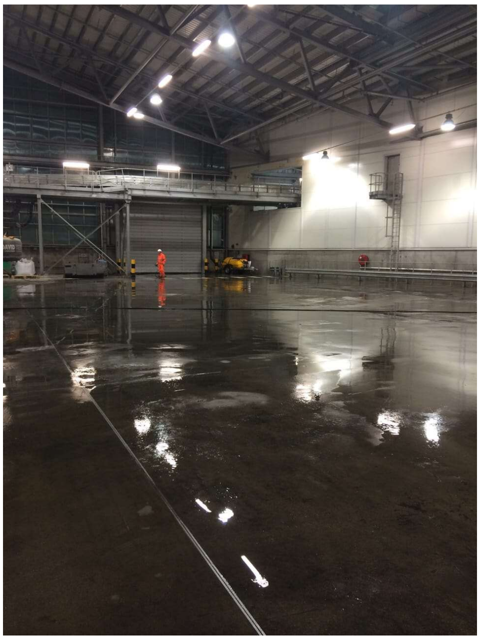


Whilst road sweepers and jet washing are sufficient during the summer periods further degreasing is required in the winter or during times of heavy rain as this can lead to a film building up on the tipping hall floor from incoming vehicles and spilt RDF. Unless this film is removed on a regular basis it will attract vermin and therefore it is considered best practice to utilise a caustic based traffic film remover (TFR) on a regular basis to degrease the tipping hall floor and maintain high levels of cleanliness. Regular litter picking and road sweeping is recommended externally and if required degreasing external roadways if there is a build-up on the site's internal road network.

Whilst wheel wash stations have been suggested for exiting the tipping hall for trailers it is recommended that this option isn't installed on the basis it could compound the issue of film build up on the tipping hall floor and lead to tracks leading out of the exit door that would require regular cleaning.

Vehicular cleanliness is ultimately the responsibility of the waste delivery contractor and not the operator. SLR would suggest the applicant engages with waste delivery companies as they are reliant on the operator ensuring regular cleaning of their vehicles is undertaken. There is an increased risk due to material build up in the trailer as residual waste as the trucks exit the tipping hall and the operator is again reliant on the waste delivery drivers cleaning their vehicles of residual material prior to exiting the tipping hall.

Figure 4-6
Cleaning and degreasing of ERF tipping hall



In conjunction with robust housekeeping strategy a comprehensive pest control plan needs to be implemented with adequate baiting infrastructure installed internally and externally to the tipping hall with regular visits to the site by pest control professionals. Additional services to consider mitigating any fly problem in the summer is to regularly fumigate "smoke bomb" the tipping hall and bunker area outside of delivery hours.

Birds are generally not a problem with ERF plants as the tipping operation is conducted indoors, however there is already a bird issue at the riverside that increases the biosecurity risk and any failure in housekeeping will attract them to a potential food source on site. This is probably more of an issue when the site is being built and whilst waste isn't being delivered. At the peak of construction there can be anywhere between 650-800 contractors on site. The waste management requirements during construction must be planned out as there will be catering services on site and therefore adequate storage, housekeeping and collection arrangements need to be in place to avoid attracting vermin and birds. It is recommended pest control professionals are engaged with (prior to construction) to install the required baiting infrastructure on site.

Summary
The risk to AB Agri with the tipping hall is housekeeping and the need to maintain high levels of cleanliness and sanitisation in the tipping hall daily. Tipping and inspection bays must be cleaned and sanitised and spillage throughout the day must be cleaned up. Regular fumigation of the tipping hall and bunker area is required as part of an overall pest control strategy to mitigate any issues associated with flies

Whilst the tipping hall housekeeping is the responsibility of the applicant during construction the principal contractor must have robust waste management protocols in place. There is a risk to AB Agri in terms of biosecurity due to several hundred contractors working on site and generating food waste from dedicated catering facilities or food they have prepared themselves.

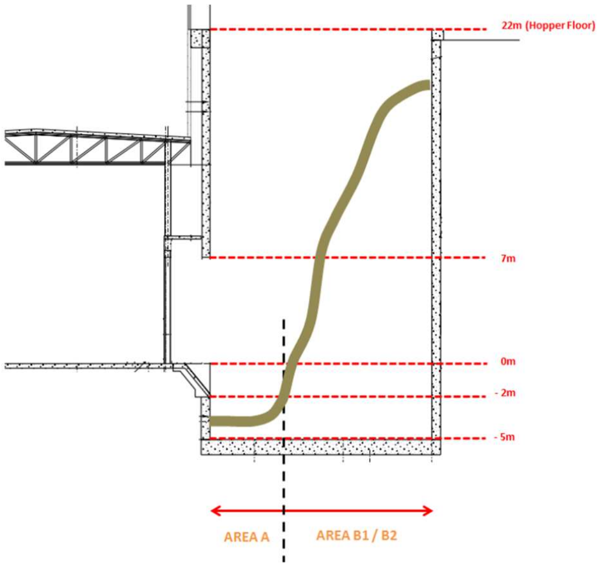
There is an increased risk with residual material left in the vehicles leaving the tipping hall and the overall cleaning regime of waste delivery contractors as this is outside of the operator's control. Notwithstanding the required stringent monitoring, maintenance, cleaning and sanitation regimes inside and outside the tipping hall, in practice there will be RDF spillages outside for certain periods of time.

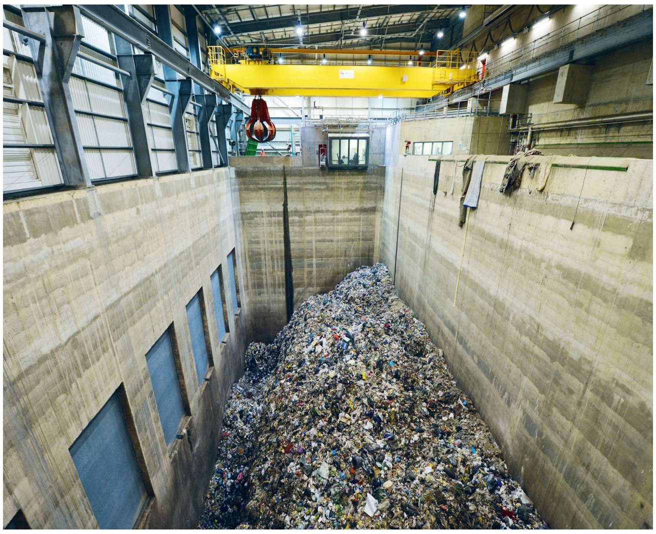
5.0 Bunker Management

This section considers the importance of bunker management for an ERF not only to ensure smooth operation of the plant but to mitigate biosecurity risks from vermin. The common misconception is that the RDF is delivered and just discharged into the bunker when in reality the bunker levels and profile are carefully managed to ensure material is stacked initially prior to mixing and homogenising the material and loading the boilers via high level loading chutes. On modern facilities this is broadly done automatically with gantry cranes that are programmed to operate within the confines of the bunker.

The most important aspect of bunker management is to always maintain a working trench running the width of the bunker under the tipping bays as illustrated below.

Figure 5-1 Bunker hall profile & Figure 5-2 Operational bunker





Maintaining a trench ensures deliveries can be made into the bunker continuously and the material is then cleared by the gantry crane and stacked accordingly. The illustration shows how the bunker can be managed in terms of material throughout the week and having enough stock to process through the weekend. The aim is to maintain bunker levels as low as possible throughout the week with incremental increases each day until the end of the week when there is enough volume for the weekend to maintain operations whilst deliveries have ceased.

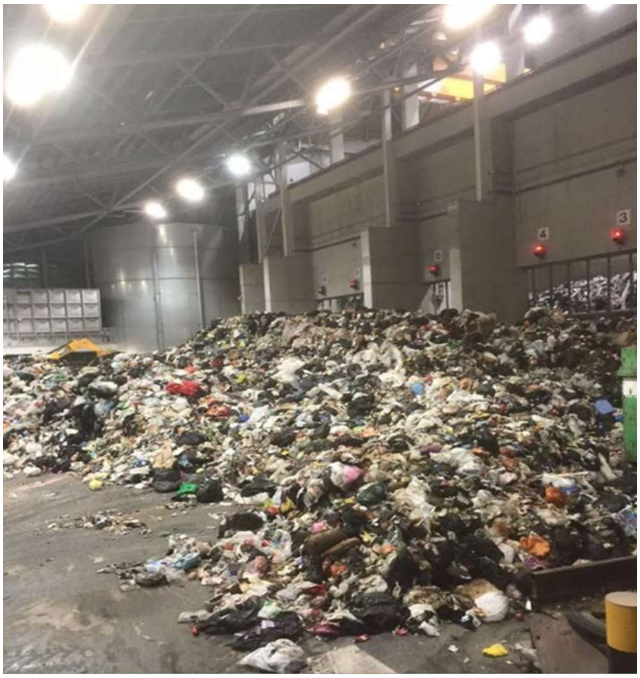
Maintaining low levels also enables the plant to mitigate any short term breakdowns and continue to receive material as some waste contracts can include penalty clauses for stopping waste deliveries. These clauses tend to be associated with local authority waste contracts, however stopping waste deliveries can take time even with commercial waste contracts.

More importantly maintaining low levels of waste and a dedicated trench will ensure that any vermin in the bunker (in the event they are in delivery vehicles) cannot escape as material isn't bridging between the bunker waste and the incline of the tipping bay.

It is also worth noting that comprehensive fire detection and protection infrastructure is installed in the tipping hall and above the bunker. Infra-red cameras operate and are linked to fire cannons which activate on detection of a fire in the bunker which could be caused by smouldering loads being delivered or, a main cause of fire, waste lithium batteries. Maintaining low bunker levels underpins this approach to fire detection and protection with storing the minimum material required at all times.

Below is an operating bunker at an EfW that isn't following best practice and is allowing material to flow out of the bunker and onto the tipping hall floor which will enable any vermin in the bunker to escape.

Figure 5-3
Poor bunker management



Whilst good operational practice dictates low bunker levels should be maintained at all times due to the geometry of the bunker and method of storing RDF there will be a proportional loss in capacity from the moment RDF is delivered and stored in the bunker. The initial reason of capacity loss is due to the gantry crane and how it is installed and ensuring it complies with the requirements of LOLER (The Lifting Operations and Lifting Equipment Regulations 1998).

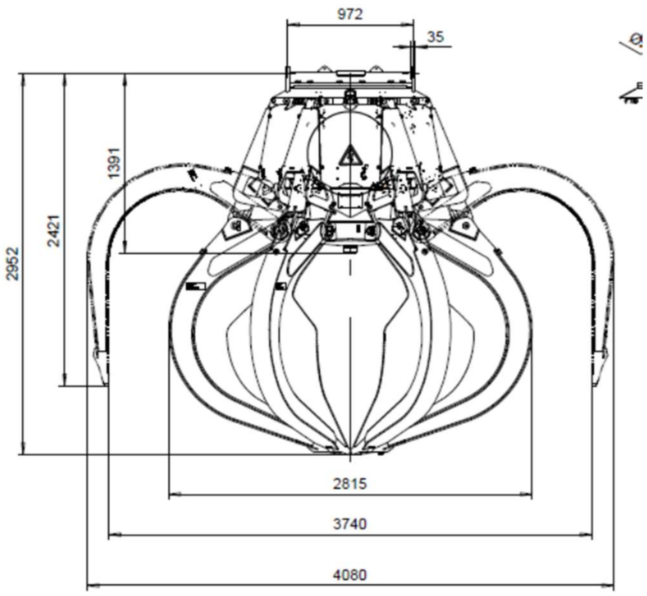
The cranes are programmed so the bottom limit switch prohibits the grab from hitting the base of the bunker and this is required to prevent damage to the grabs as well as to the concrete structure of the bunker floor. Most waste cranes have both encoders on the hoist shaft, to allow the crane to measure and record the heights of the waste around the bunker, as well as Ultrasonic sensors on the grab which are used as a back-up to detect the distance of the waste from the grab. This enables the grab to enter the waste slower, again to prevent damage and tipping over of the grab, which is often overridden when operated in manual mode.

Gantry cranes can be set up with software and hardware lower stop encoder value (close grab tip) of 640mm and 440mm from the bunker floor and final hard stop of 400mm. These values may vary slightly between crane manufacturers but essentially the final hard stop of 400-500mm is required to avoid contact with the bunker floor whilst also to comply with LOLER ensuring the rope drum should have at least three wraps of the rope left on the drum at its lowest point.

This effectively means that 400-500mm of material is unattainable for the duration for the plant life as the crane will not be able to extract it from the bunker. In reality the material that will be difficult to extract can be from 2.5-2m above the bunker floor due to the material compacting in the bunker. The proposed depth of the bunker is 10m below the tipping hall floor which is a deep bunker and comparable to similar sized bunkers where any material under 2.5m from the bunker floor is difficult to extract.

Whilst the crane can extend to these depths and the software and hardware encoder limits can be overridden with the crane operated in manual the material has compacted so much that the bulk density of this material more than doubles and the grab struggles to extract the material due to being compacted.

Figure 5-4 Crane Grab illustration & Figure 5-5 Gantry crane and loading chute level in the bunker hall



Cranes that operate in ERF bunkers are subjected to harsh working environments operating 24/7 to manage the bunker levels, operate in parallel with RDF deliveries whilst in this instance loading 3 boilers operating at full load. The crane and grab attachments must be sized accordingly to ensure waste deliveries are managed and the 3 boilers are loaded with a degree of redundancy included in the design in the event a crane is down for maintenance or a breakdown. If the cranes are not available, then deliveries to site will be impacted with queues developing outside the tipping hall and bunker trenching becomes challenging to maintain as well as keeping up with boiler demand.

ERF cranes required regular cleaning, servicing and maintenance with regular replacement of wear parts, sufficient stock of replacement parts and cognisance of life cycle maintenance replacement. This doesn't consider the impact from operator error when operating the cranes as this would also need to be factored as the workforce become experienced with the plant.

The illustration above also includes the bunker loading chute area which also needs to be maintained from a housekeeping perspective. The cranes are relatively accurate when loading the chute, however spillage will occur on a regular basis and in particular when cranes need to be operated manually. This material needs to be cleaned up regularly and safely whilst negotiating the crane operating. Failure to keep this area clean will result in vermin being attracted to the spilt material and therefore this area also needs to be included in the overall pest control strategy for the site whilst regular cleaning and sanitising of the area also needs to progress regularly.

Summary

The risk to AB Agri is the site operational team not maintaining low bunker levels and ensuring a trench at the front of the bunker isn't maintained at all times as this will increase the risk of vermin escaping from the bunker. There will always be material in the bunker that cannot be extracted due to the crane set up and waste compacting in the bunker. The bunker loading level also needs to be included in the site pest control strategy and high levels of housekeeping must be maintained in this area.

Inevitably, there will be operator errors or attending to plant issues and the high levels of maintenance, cleaning and sanitising regimes may not be undertaken stringently, which would lessen the effectiveness of the pest control regime

6.0 Negative Pressure & Combustion fans

A common approach to controlling bioaerosols, odour, and air borne dust with waste management facilities is to maintain “negative pressure” in the enclosed area where the material is being stored and processed. The principle of maintaining negative pressure in the tipping hall and bunker hall area for ERF is typically and primarily reliant on the combustion air fans operating and therefore the boilers need to be operating for the fans to be in operation.

The general requirement is that air should be extracted from the target area at a rate which prevents any egress of fugitive emissions; when the doors are shut this means that the building is under a slight negative pressure, meaning that any leakage of air is into, and not out of, the building.

The combustion air fan configuration can be individual fans for providing primary/under fire air and secondary/over fire air or both can be serviced by a common fan or “total” air fan and with the use of dampers the proportion required for primary and secondary air can be provided. Both configurations draw air from the bunker and tipping hall areas through a filtration system and air heating system before injecting into the boiler under or above the grate.

The principle of negative pressure is also used on the boiler itself with the balance provided by the induced draft fan drawing slightly more air than the cumulative amount of primary and secondary air resulting in the boiler operating under negative pressure. This concept is the same with providing negative pressure for the tipping hall and bunker hall in that the combustion fans are drawing more air than the amount of air than enters the tipping hall which incorporates the operation of the fast-acting doors and any other air leaks into the hall.

It is generally accepted that good practice is to achieve a minimum of 2 air changes an hour for the tipping hall and bunker hall whilst maintaining negative pressure and therefore this needs to be maintained under all operating scenarios. The applicant has stated that only one boiler will be down at any one time which implies the required air changes can be achieved with 2 boilers operating. However, this position would consider only planned maintenance activities – unplanned or forced outages may prevent this being achieved.

It should also be noted that the combustion fans are not operating at fixed speeds and are influenced by conditions in the boiler, fuel quality and fouling of the fans themselves. In order to maintain negative pressure, the combustion fans must ensure sufficient air flow is being achieved whilst conditions in the boiler change i.e. if the grate bed thickness is too thin the primary air fan will decrease in flow rate to control oxygen levels in the boiler and if the bed thickness is too great primary air may increase or secondary air may compensate to mitigate carbon monoxide spikes due to oxygen levels. Ideally oxygen levels of between 5-6% are aimed to be maintained in the boiler.

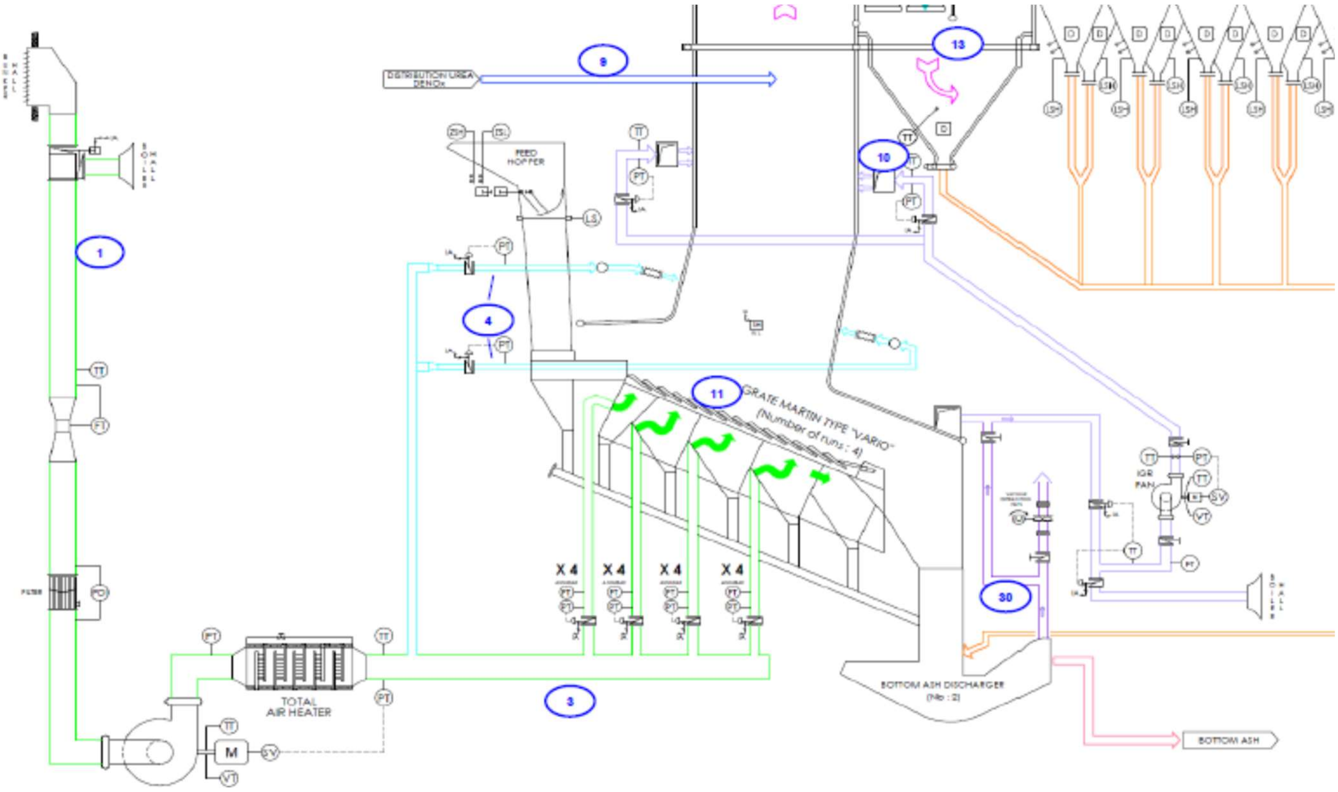
Whilst the plant will benefit from a sophisticated combustion control system that will control air flow and fan loads throughout the boiler it is vital the fans are maintained regularly, and filters are cleaned regularly as part of a preventative maintenance schedule. The air intake for the primary fans is usually located above the loading chutes in the bunker hall and the grills are susceptible to fouling with material. Furthermore, filter cartridges are installed in the duct work leading from the primary air intake to the air pre-heater and then under fire zones under the grate and these also need to be cleaned on a regular basis to avoid fouling.

The main aspect of maintaining negative pressure is ensuring the combustion fans are operating optimally. The fast acting doors that provide access and egress from the tipping hall also need to be kept closed whilst not operating to contain odours, dust particles or bio-aerosols. If the doors remain open then this can result in over pressuring the tipping hall resulting in positive pressure conditions as too much air is being pulled into the area with doors remaining open compared to the flow from the combustion fans.

It should be noted that a common cause of complaints local to ERFs can be related to doors being left open or other factors that relate to a lack of containment of the waste storage and handling infrastructure.

Figure 6-1 Primary air intake in the bunker hall & Figure 6.2 Primary air intake filters

Figure 6-3
Combustion fan configuration for a boiler



SLR

Summary

AB Agri is at risk if the combustion fans on site are not maintained as part of a robust preventative maintenance programme. Boiler operation will also influence how the fans operate, however maintaining and ensuring the intake grills and filters are kept clean on a regular basis will underpin the fan's performance. The reality is whilst a robust preventative maintenance programme will mitigate fan breakdowns there will be occasions when the fans will trip and come offline i.e. inverter trip on high temperature or vibration trips

The fast-acting doors are an integral part of controlling biosecurity risk to AB Agri and it is essential they remain closed when material isn't being delivered to site and they must also be maintained regularly as they are subjected to heavy loading and doors breaking down must be minimised.

Fast acting doors in reality will fail or be left open and primary air combustion fans are subject to regular fouling and therefore negative pressure will not be achieved on occasions and this is further compounded when one or more boiler is not operating.

7.0 Planned Maintenance & downtime

This section details the requirements for planned maintenance for an ERF that requires the plant to come off-line. Every ERF will need to comply with the requirements of The Pressure Systems Safety Regulations 2000 which mandates that any owner/operator of an ERF has a written scheme for the periodic examination, by a competent person, of the following parts of the system.

- all protective devices;
- every pressure vessel and every pipeline in which (in either case) a defect may give rise to danger; and
- those parts of the pipework in which a defect may give rise to danger.

The written scheme of examination is drawn up, or certified as being suitable, by a competent person i.e., the boiler inspector and they determine the inspection frequency and scope which can vary from each site. The written scheme of examination will essentially drive the plant outage strategy; however, operators will also consider maintenance requirements specified by equipment OEM that will also require an outage or plant to come offline.

ERF operator’s outage strategy can vary with some operators preferring a “mini” outage of 5 -6 days per line in the springtime with “major” outage of 12-14 days per line during the summer. Other operators prefer one outage a year which will be 12-14 days per line and depending on how many lines the plant may have the outages are staggered with a 5-6 day overlap to capture common plant.

Maintenance outages require thorough planning several months beforehand to ensure all scopes of work required is agreed. Understanding any interaction of a contractor’s work is important and how appropriate controls can be initiated i.e., boiler cleaning, grate maintenance and scaffolding activities interacting with activities such as grit blasting, Non-Destructive Testing (NDT) x-ray, Inconel overlay welding or even boiler hydraulic testing. It is recommended that combustion fans are serviced, inspected and maintained during outages and underpinned by conditioning monitoring throughout the year.

Figure 7-1
Furnace section of a boiler requiring scaffolding

CDM regulations are applicable to outages, and this is based on the number and duration of contractors on site. Controlling contractors on site is a fundamental part of outage management and managing their environmental impact whilst on site is a fundamental requirement of plant outages.

The applicant has confirmed the new ERF will consist of 3 lines and the plant will only have one boiler off at one time, however there will be a requirement at some point for all 3 lines to come offline to progress common plant inspection requirements detailed in the written scheme of examination for the deaerator, condensate pre-heaters as well as maintenance requirements for the Turbine. This in effect means that negative pressure cannot be maintained when more than one boiler is offline.

Turbine maintenance programmes will vary but generally it involves a mini outage at years 4 and 8 and a major outage at 12yrs with biennial borescopic inspections in between outages to monitor blade condition. A major Turbine outage will be >30 days as it involves removing the casing to inspect the rotor, NDT of blades, overhaul of valves and actuators and alignment checks.

Figure 7-2 Turbine

The potential for grid outages mandated by the DNO (distribution network operator) will be influenced by the age of the surrounding network and any upgrading requirements. This will also result in the plant coming offline as the plant could maintain island mode which is the plant self-generating enough energy to operate the plant, however this is a short term solution that can run the plant for 4-5 hours before coming offline. DNO grid outages programming rarely give long term notice with only the year’s planned maintenance available to operators at the beginning of each year.

Eventually boiler outages will need to include the change out of a heat exchanger like superheater exchanger bundles after 10 years which could extend the duration of a boiler outage. The major challenge of ensuring a boiler can progress its outage whilst the other 2 boiler lines continue to operate is isolating the High Pressure (HP) steam line from one boiler to the other to prevent back-feeding of steam to the superheater that is not operating. Unless a safe isolation can be achieved on the HP steam lines via boiler stop vales then all the boilers would need to come offline. This is a design issue that needs to incorporate a double block and bleed approach to ensure a safe isolation can be made on boiler steam line.

Summary

The risk to AB Agri is more than one boiler not operating at one time and compromising the site's ability to maintain the required negative pressure. Whilst it is planned to only have one boiler down at one time this cannot be guaranteed as it will be dictated by the written scheme of examination and maintenance requirements of common plant on site. This will result in more than one if not all the boilers being off meaning negative pressure cannot be maintained.

In addition, maintaining safe isolation for one boiler from two operating boilers is notoriously difficult and there is no guarantee that the design of ERF will ensure adequate isolation of high-pressure steam can be achieved between boilers when two boilers remain operational during the remaining boiler's outage.

8.0 Commissioning & unplanned downtime

The previous section detailed when the plant will need to come offline to conducted planned intrusive maintenance in line with OEM recommendations and the written scheme of examination. The plant will also experience occasions when the plant or boilers come offline for breakdown or unplanned maintenance during the commissioning period and when the plant is taken over and operated commercially.

8.1.1. Planned Preventative Maintenance

Overall, the appropriate and effective targeting and implementation of preventative maintenance (PM) can be seen as a major factor in reducing mechanical and service failures. Appropriate targeting of PM is itself achieved through the implementation of a regime (intervention actions and inspection frequencies, etc) that combines fundamental plant design good practice (suited to use) to take due account of:

- OEM maintenance recommendations – what to do & when;
- Legislative requirements and guidance;
- Site specific experience e.g., what is seen in situ; and
- Sector wide experience e.g., from events noted in this work or at other relevant sites.

The success or otherwise of PM schemes is eventually seen in the number and severity of incidents which arise, and the reliability of operations achieved. Lower incidence frequency and severity being indicative of good PM practice. In achieving better overall reliability (lower incident occurrence frequency and reduced severity) there is also a “trade off” between investment in design and reliance upon maintenance.

Similar levels of performance may therefore be targeted through increasing capital expenditure (plant and equipment design investment) or with lower capital investment combined with greater O&M attention. A poor level of performance that cannot be addressed with good PM & O&M investment may therefore lead to a conclusion that design change and capital investment is required.

8.1.2. Unplanned breakdown

The EPC contractor will only guarantee the boiler operating for 8000 hours annually which implies the boilers will not be operating at times during the year for planned or unpanned stoppages. In SLR’s experience the first 2 years of operating an Erf are challenging with warranty and reliability issues being addressed the plant availability is unlikely to achieve 8000 operating hours in the year and only after this initial period of teething problems the plant is reliability achieving operating hours in line with the performance guarantee.

Examples of breakdown events that can bring a boiler offline are high temperature inverter trips on combustion fans that usually require a simple re-set. Boiler tube leaks are common events with ERF boilers, and they can happen at any time, however this can be mitigated to an extent with comprehensive boiler mapping with NDT in outages to monitor tube thickness. Boiler tube leaks usually result in a 4-5 day downtime event to replace failed boiler tubes and x-ray welds before bringing the boiler back online. Contributory factors to boiler leaks are waste composition (high chlorine) and fouling of the boiler with operational experience playing an important role in mitigating these contributory factors.

Other minor issues that can lead to boiler trips can be mitigated as previously stated with robust maintenance and operational experience such as fan bearing high temperature trips, boiler level trips, FW pump trips (pressure or vibration), major equipment blockages and compressor trips to name a few.

Whilst this section doesn’t list all the types of unplanned trips and breakdowns it is worth considering that the plant will experience these events during commissioning and the first 2 years of operation (warranty period) as its quite common for ERFs to experience teething problems when commissioned along with factoring in human error whilst the operation & maintenance teams become experienced with the plant.

Summary

The risk to AB Agri of unplanned downtime is with the best endeavours of mitigating unplanned outages with robust maintenance the reality is all ERFs in their initial operational stage will suffer from unplanned outages that will result in one or even all the boilers coming offline, affecting the ability to maintain negative pressure within the tipping hall.

The reality is within the first 2 years of operation there will be teething issues which are addressed by the defect and warranty period for the plant and this results in the plant not achieving 8000 operating hours for the year. Admittedly each plant is different, however in SLR’s experience all ERF’s will have teething problems

9.0 Key findings summary

The main issue identified is the sites ability to maintain negative pressure is compromised by doors being left open or damaged and the combustion fans operating efficiently. This is further compounded by the plant to operating with more than one boiler offline.

There will invariably be material spillage outside of the tipping hall from vehicles arriving and leaving the site and therefore maintaining high levels of housekeeping at all times, ensuring the plant is maintained and managing bunker levels all underpin the increased risk to biosecurity from spillages and attracting vermin and birds.

Whilst the applicant has detailed the mitigation, they will undertake there must be due cognisance that from the point of site development there is an increased biosecurity risk with hundreds of contractors working at its peak all of whom will generate waste including food waste.

Additionally, from the point of commissioning and commercial operation there is reliance on waste contractors loading their vehicles appropriately with material and maintaining a fleet of vehicles that are cleaned and maintained regularly. Delivery by river and rail are options being considered, however the worst case scenario that needs to be considered is the majority of fuel being delivered by road.

In conjunction with pest control mitigation the operator manage deliveries and waste levels on site to minimise the impact of RDF being stored especially in the event of plant breakdowns or maintenance outages.

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