CROWN CHICKEN LIMITED

EPR/QP3407PH Denham Feed Mill
Town Farm, Denham Road, Eye, Suffolk IP21 5DB

Environmental Permit Application & Supporting Information
April 2020

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EPF5.0 Letter of delegated authority for the declarations

CROWN

CROWN CHICKEN LIMITED

A division of Cranswick plc

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Norfolk
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Tel No. 01953 887736
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Environment Agency Permitting and Support Centre
Environment Permitting Team
Quadrant 2
99 Parkway Avenue
Parkway Business Park
Sheffield
S9 4WF

15th November 2018

Dear Sirs

Environmental Permitting Regulations 2016

We are pleased to advise Crown Chicken Ltd have appointed a consultant to assist the business towards complying with the Regulations amongst its permitted installations and have delegated authority to them to complete the declarations in the applications for new permits, applications for transfers of environmental permits and applications to vary environmental permits. The Consultant is:-

Mr Karl Collett
Green Inc Solutions Ltd
30 Doune Way
Harleston
Norfolk
IP20 9QB

T: 01379 855045
E: k.collett420@btinternet

Yours Faithfully

Matthew Ward
Company Director

Registered in England No. 4760487. Registered Office: 74, Helsinki Road, Sutton Fields, Hull, HU7 0YW

A5.5c Details of Directors

1. Mr Steven Glover Company Secretary
   Mr John Bottomley Director
   Mr Adam Couch Director
   Mr Barry Lock Director
   Mr David Park Director
   Mr Matthew Ward Director

[redacted]

B2.3d Management system

2. Operator has created their own written environmental management system (EMS) for achieving compliance with Permit conditions in accordance with Process Guidance Note 6/26(13); Statutory guidance for animal feed compounding and https://www.gov.uk/guidance/develop-a-management-system-environmental-permits

3. Staff at all levels whose functions could impact on air emissions from feed compounding activity will be provided the necessary training and instruction in their duties including:

    - awareness of their responsibilities under the permit
    - steps that are necessary to minimise emissions during start-up and shutdown
    - actions to take when there are abnormal conditions, or accidents or spillages that could, if not controlled, result in emissions
    - measures for investigating and recording spillages, accidents or any complaints or breaching any permit conditions.

    EMS includes a statement of training requirements for each post and a record of training for each person.

4. Maintaining a written maintenance programme for all parts of the process including all plant, buildings and equipment concerned with control of emissions to air using professional contractors and employees. Maintenance will be based on manufacturers or supplier's recommendations. Keeping records of maintenance that has been undertaken.

5. EMS will include site infrastructure plans drawn to scale including location of Schedule 1 and directly associated activities, surface water drainage, vulnerable locations and sensitive receptors including watercourses and people in nearby residential property.

6. EMS will include a breakdown of site operations and emissions that might otherwise pose a risk of causing adverse effects on human health, the environment or causing annoyance. Keeping this information up to date in the Denham Mill H1 Environmental Impacts Assessment (e.g. Odour Response Procedure).

7. Keeping the Site Condition Report (SCR) up-to-date and including any measures taken to protect land or groundwater during the life of the Permit.

8. A notice will be displayed for the public at the site entrance with the permit holders name, permit number and contact information for the permit holder and the Environment Agency.

B2.5c Non-technical summary

9. Denham Feed Mill is situated in a rural area approximately 300m east of the village of Denham and 5.0 kilometres east of Eye in Suffolk. The installation is centred approximately on National Grid Reference TM 19716 74709 and covers an area of 0.58 hectares.

10. The Denham Feed Mill has been operational as a feed mill since the 1970s producing meal for pigs. The facility was re-purposed and refurbished in 2019 to manufacture compound animal feedstuffs, mostly pellets for poultry. Improvements increased productivity, efficiency and financial viability of a broader integrated poultry business in the local area supplying chicken to supermarkets, wholesalers and food processors.

11. Treating and processing only vegetable raw materials with a production capacity greater than 300 tonnes per day so the facility must be operated with an environmental permit. Vegetable raw materials include grains, pulses, vitamins, minerals, oils, and fats formulated into nutritionally balanced feeding stuffs. Treatment and processing include receipt of raw materials via production of intermediaries to dispatch of finished products, including treating, handling and storage of all materials and wastes relating to the process.

12. Bulk solid raw materials (e.g. grains, processed pulses) are delivered to site in covered vehicles and tipped into reception hoppers prior to conveyance to silos or bulk bins for storage. Potential fugitive dust emission when tipping grain otherwise bag filters remove most dust for disposal during conveyance. Pulses tipped into a dedicated reception pit with pneumatic dust abatement unit and returned into the hopper. Other bulk powders (e.g. minerals) are delivered by road tankers and blown directly into dedicated storage silos. Bulk liquid raw materials (e.g. lecithin, methionine, lysine) are delivered by road tankers and are pumped into designated storage tanks (enclosed within bunds to limit the potential for fugitive losses). Packed raw materials (e.g. mineral and vitamin supplements, amino acids, enzymes, preservatives) are mostly stored internally.

13. Cereal raw materials are ground and sieved into a uniform particle size to ensure homogeneity in the finished product and the physical attributes required. Grinder operates within a sealed enclosure vented to atmosphere through a dust abatement unit. Once ground the cereal is conveyed into the processing plant by means of enclosed conveyors.

14. Raw materials are fed via load cells into a batch mixer producing homogenous batches to be conveyed to the pressing plant. Low-inclusion ingredients (e.g. minerals, amino acids, vitamin supplements, preservatives) are added into the mixer.

15. Steam is added directly into the mix ‘conditioning’, so all the energy is used in raising the temperature. Conditioning improves the physical characteristic of the mix for the extrusion process and destroys bacteria (e.g. Salmonella). A screw feed forces the hot mix into a press to be extruded through a rotating ring die to form a pellet product.

16. Hot product is passed through a counter flow air cooler to reduce its temperature, causing it to harden and become durable. Cooling involves air at ambient temperature passing directly over the pellets and released into atmosphere. Dust from cooling is abated with a

cyclone and returned into the flow of materials into the conditioner. Cooled pellets are sprayed with vegetable oil and enzymes. Finished product is conveyed into dedicated bulk bins.

17. Bulk product is out-loaded into dedicated delivery lorries for delivery in an enclosed bay to limit potential for fugitive airborne releases of dust and odour.

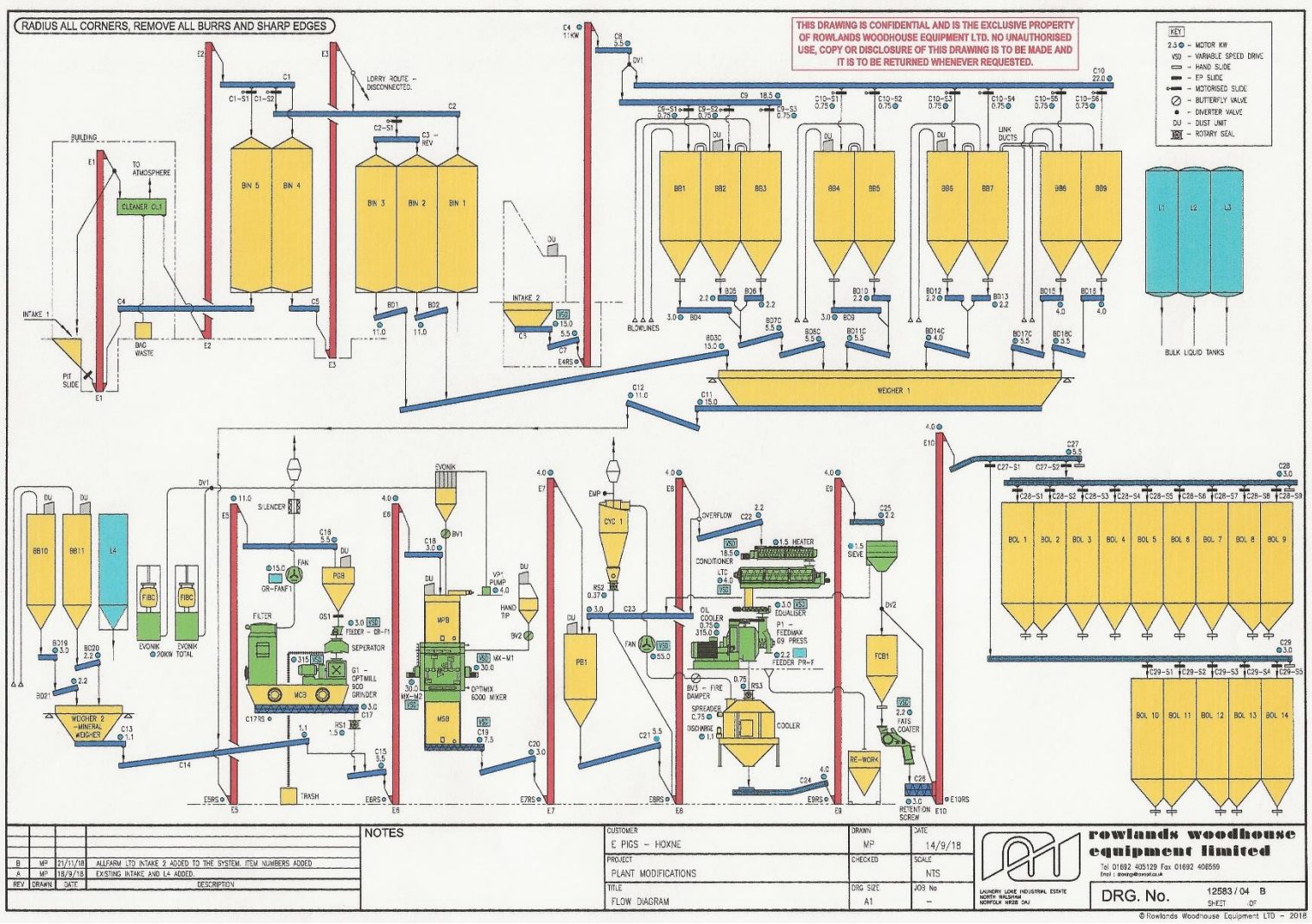
18. Storing raw materials in packaged silos, bulk bins, liquids in packaged vessels including kerosene for raising steam in a 2.835 MW boiler and transport fuel are directly associated.

19. Visible airborne releases of dust from intake tipping are abated. Point source emissions from stacks off a grinder and cooler are limited by a dust abatement unit and a cyclone. Emissions of nitrogen dioxide, sulphur dioxide and carbon monoxide from the boiler stack.

20. No liquid effluent from the process and no provision for vehicle washing within the facility. Most uncontaminated surface water from the site is conveyed through underground pipes then outfalls into an off-site ditch network flowing into Chickering Brook in 2.2km, next Gold Brook in 4.2km, next into the River Dove (classified as a main river) in 5.3km. Some uncontaminated/potentially lightly contaminated water conveyed into an off-site lagoon.

21. There are Sites of Scientific Interest (SSSI) and Local Nature Reserves (LNR) within 10km of the Denham Feed Mill - Hoxne Brick Pit SSSI is closest approximately 2.7km, next The Pennings, Eye LNR, Major Farm Braiseworh SSSI, Gypsy Camp Meadows SSSI and Chippenhall Green SSSI. There are eight Local wildlife sites (LWS) and ancient woodlands (AW) within 2km of the Denham Feed Mill - Hoxne Meadow LWS is closest approximately 0.5km, next Denham Churchyard LWS, Grove Wood LWS, Hoxne Wood AW & LWS, Coldham Wood AW & LWS, Deeperhaugh Wood AW & LWS, Redingfield Wood LWS, The Slades AW & LWS. There are no internationally designated wildlife sites within 10km.

B3.3a Operating techniques - process flow at Denham Feed Mill



B3.3a Technical Standards - indicative best available techniques (BAT) selected to control emissions from Denham Feed Mill

Schedule 1 activity or directly associated activity description	Release source	Substance	Indicative BAT selected to control emissions in accordance with Process Guidance Note 6/26(13) Statutory guidance for animal feed compounding section 5 pp29-30
S6.8, Part A(1)(d)(ii) - Processing feedstuffs	Physical process operations and application of heat (grinding, extrusion, cooking, etc)	Odour	Within process equipment under negative pressure (e.g. grinder) Optimisation of the process (e.g. enclosed conveyors, steam added directly to mixed ingredients inside the conditioner) Appropriate construction – impervious and easy to clean surfaces.
	Ventilated air	Odour	Containment of odours within process buildings by good design and extract ventilation
	Waste gas from odour arrestment plant	Odour	N/a (No odour arrestment plant)
	Waste gas from odour arrestment plant	Carbon monoxide	N/a
	Waste gas from dryer odour arrestment plant	Nitrogen oxides	N/a
	Dryer and cooling processes	Particulate matter	N/a (No drying and cooling processes)
	Grinding and cooling processes	Particulate matter	Process control Spillage management Dust arrestment with bag filter on the grinder and cyclone on the cooler.
Directly associated activities	Raw material and waste storage (DAA) (no effluent)	Odour	All raw material and waste storage within enclosed silos, tanks, containers, and stores Spillage management including tank level management Good housekeeping and raw material handling practises.
	Loading and unloading processes (DAA)	Odour	Enclosed vehicles and containers Spillage management
	Raw material storage (DAA)	Particulate matter	Potentially dusty materials stored in buildings and appropriate containers
	Silos (DAA)	Particulate matter	Process control on delivery to silos Dust arrestment bag filters

B3.3b General requirements

22. Process Guidance Note 6/26(13); Statutory guidance for animal feed compounding shows emissions of odour, visible emissions (e.g. smoke and condensed water vapour from the boiler and cyclone) and particulates from the whole site will not be controlled by emission limits and are a key issue. Plans for managing them have been presented in Amenity and Accidents in the Denham Mill H1 Environmental Impact Assessment.

23. Particulate emissions from point sources including from stacks from the grinder dust abatement unit and cooler via a new package cyclone will be controlled with statutory emission limits in the Permit. Actual emissions have been measured for the Permit application showing the operator will be complying with the relevant emission limits and monitoring and other provisions in accordance with Guidance Note 6/26(13), table 4.1, pp17-19 and shown in Figure 25.1.

Fig. 25.1 Emission limits and monitoring

Particulate source	Emission limit	Type of monitoring	Monitoring frequency
Grinder	20mg/m3 Actual <0.2 mg/m3 measured on 03/02/20*	Gross filter failure device providing audible/visual alarm on the operating panel in the control room	Continuous (Continuous monitoring is required, exhaust air flow >100m3/min),
		Extractive test	Annual
Cyclone	20mg/m3 (new plant) Actual 2.60 mg/m3 measured on 03/02/20*	Monitor provides visible and audible alarms which activate on cooler/cyclone malfunction; and are interlocked to shutdown process when alarm activates	-
		Extractive test	Annual

*Reference: Fitz Scientific; Emissions to Atmosphere Report No:5260/M13 03/02/20 presented with the Denham Mill H1 Environmental Impact Assessment.

24. Point source emissions of carbon monoxide, nitrogen dioxide and sulphur dioxide from the stack off the kerosene fired boiler will be controlled with statutory emission limits in the Permit. Actual emissions have been measured for the permit application and presented and assessed in the Denham Mill H1 Environmental Impact Assessment.

25. Odour and visible airborne emissions (e.g. dust, smoke, condensed water vapour) from any part of the process will be a key issue. Releases to air have been assessed and presented in Amenity and Accidents in the Denham Mill H1 Environmental Impact Assessment.

B3.3c Operating techniques - types and amounts of raw materials for processing into animal feedstuffs at Denham Feed Mill

Description of raw material and composition material	Description of how the material is used including any main hazards (include safety information sheets)	Storage location	Storage units	Unit size litres/kg	Maximum amount (tonnes/litres/ kg) (See note 1 below)	Annual throughput (tonnes/litres/ kg each year)
ALIPHOS DICAL+, contains a single mono-constituent - calcium hydrogen orthophosphate / dicalcium phosphate, Aliphos Rotterdam BV	EC authorised feed additive: • no hazard classification • crystalline powder, low water solubility • not classified as dangerous for the environment • biodegradability not applicable	Store	1No bulk storage bin & bags	tonnes	40 tonnes	400 tonnes
CLEANAIRBLUE® ADBLUE®, urea solution30-60%, Samuel Banner & Co Ltd	Fuel additive, HGVs fitted with selective catalytic reduction to remove most NOx from exhaust gas using chemical reaction with Cleanairblue / Adblue diesel exhaust fluid added at a rate of approx. 4-6%: • not classified as hazardous • the product is biodegradable • no data available on bioaccumulation	External	Intermediate bulk containers, bunded	1,000 litres	2,000 litres	9,000 litres
CROWN FINISHER (8cc) 301 SACOX V4, mixture containing hazardous components – salinomycin sodium (coccidiostat), zinc oxide, iron sulphate monohydrate, copper sulphate pentahydrate, choline chloride, DSM Nutritional Products (UK) Ltd	EC authorised coccidiostat, vitamins and trace elements for chickens for fattening and laying, used as a substitute with CROWN FINISHER (8cc) 302 MAXIBAN V4 with narasin, not in addition: • serious health hazard classifications • causes serious eye irritation • may damage the unborn child • toxic to aquatic life with long lasting effects • dry powder, water solubility not determined • dispose of contaminated packaging as unused product	Store	Bags	18kg	25 tonnes	600 tonnes

B3.3c Operating techniques - types and amounts of raw materials for processing into animal feedstuffs at Denham Feed Mill

Description of raw material and composition material	Description of how the material is used including any main hazards (include safety information sheets)	Storage location	Storage units	Unit size litres/kg	Maximum amount (tonnes/litres/ kg) (See note 1 below)	Annual throughput (tonnes/litres/ kg each year)
CROWN FINISHER (8cc) 302 MAXIBAN V4, mixture containing hazardous components - narasin (coccidiostat), zinc oxide, iron sulphate monohydrate, copper sulphate pentahydrate, choline chloride, DSM Nutritional Products (UK) Ltd	EC authorised coccidiostat, vitamins and trace elements for chickens for fattening and laying, used as a substitute for CROWN FINISHER (8cc) 301 SACOX V with salinomycin, not in addition: • serious health hazard classifications • causes serious eye irritation • may cause damage to organs through prolonged or repeated exposure • toxic to aquatic life with long lasting effects • dry powder, water solubility not determined • dispose of contaminated packaging as unused product	Store	Bags	18kg	25 tonnes	600 tonnes
CROWN REARER (7cc) 202 MAXIBAN V7, a mixture containing hazardous components - narasin (coccidiostat), zinc oxide, iron sulphate monohydrate, copper sulphate pentahydrate, choline chloride, DSM Nutritional Products (UK) Ltd	EC authorised coccidiostat, vitamins and trace elements for chickens for fattening and laying. • serious health hazard classification • causes serious eye irritation • toxic to aquatic life with long lasting effects • dry powder, water solubility not determined • dispose of contaminated packaging as unused product	Store	Bags	18kg	25 tonnes	100 tonnes

B3.3c Operating techniques - types and amounts of raw materials for processing into animal feedstuffs at Denham Feed Mill

Description of raw material and composition material	Description of how the material is used including any main hazards (include safety information sheets)	Storage location	Storage units	Unit size litres/kg	Maximum amount (tonnes/litres/ kg) (See note 1 below)	Annual throughput (tonnes/litres/ kg each year)
Diesel – preparation contains diesel, no 2 and up to 0.5% performance additives and / or dyes, ExxonMobil	Derv for diesel engine fuel for HGVs for road transport and red diesel for on-trailer blowers: • Harmful / dangerous to the environment • Toxic to aquatic organisms, may cause long term adverse effects in the aquatic environment • Expected to be inherently biodegradable	External	1No 20,000 litre capacity packaged bunded vessel, 1No 5,000 litre capacity packaged bunded vessel	litres	Derv 20,000 litres & red diesel 5,000 litres	150,000 litres
FREESTON S125 HPH, boiler water treatment - preparation contains hazardous ingredients – sodium sulphate anhydrous, potassium hydroxide, maleic acid co-polymer, Freeston Water Treatment	Boiler water additive – multifunctional product (oxygen scavenger, alkalinity builder, sludge conditioner). Removes residual oxygen from the feed water to protect the boiler and avoid corrosion. Raises feed water pH to protect the hot well and feed line from acid corrosion. Sludge conditioner to prevent scale and ensuring precipitated hardness is converted to a mobile sludge which can be removed by blowdown: • Health hazard/corrosive • Negligible ecotoxicity • Biodegradable, no bioaccumulation potential	Boiler room	Plastic drums	25litres	50litres	500litres

B3.3c Operating techniques - types and amounts of raw materials for processing into animal feedstuffs at Denham Feed Mill

Description of raw material and composition material	Description of how the material is used including any main hazards (include safety information sheets)	Storage location	Storage units	Unit size litres/kg	Maximum amount (tonnes/litres/ kg) (See note 1 below)	Annual throughput (tonnes/litres/ kg each year)
HEMICELL LIQUID, preparation contains enzyme - B-D-mannase (2%), sodium chloride (8%), other non-hazardous components (38.9%), liquid water-based carrier >50%, Elanco Animal Health	EC authorised digestibility enhancer for chickens for fattening, active enzyme is β-mannase for breaking down β-mannans in soybean meal: • serious health hazard classification • may cause allergy or asthma symptoms • liquid, soluble in water • not expected to be harmful to aquatic organisms, • does not contain any substances expected to be bio accumulating	Store	Plastic drums	litres	2,000l litres	10,000 litres
HOSTAZYM®X WSP PREMIX, preparation contains an enzyme endo-1,4-beta Xylanase, benzoic acid, and sodium bicarbonate, Huvepharma NV	EC authorised digestibility enhancer for chickens for fattening and laying hens, active enzyme preparation is endo-1,4-beta Xylanase enzyme for breaking down macromolecules and antinutritional factors such as non-starch polysaccharides (e.g. cellulose in cereals) into absorbable nutrients in feed: • serious health hazard classification • may cause allergy or asthma symptoms or breathing difficulties if inhaled • dry powder or granules, soluble in water • degrades rapidly, not bio accumulative	Store	Bags	5kg	100kg	100kg

B3.3c Operating techniques - types and amounts of raw materials for processing into animal feedstuffs at Denham Feed Mill

Description of raw material and composition material	Description of how the material is used including any main hazards (include safety information sheets)	Storage location	Storage units	Unit size litres/kg	Maximum amount (tonnes/litres/ kg) (See note 1 below)	Annual throughput (tonnes/litres/ kg each year)
EXTRUPRO™, a proprietary blend of rapeseed oil/field beans produced by an extrusion process, 2Agriculture	Feed ingredients	External	2No bulk storage bins	tonnes	100 tonnes	10,000 tonnes
KEROSENE	Boiler fuel for raising steam. • danger classification • flammable liquid and vapour • may be fatal if swallowed and enters airways • causes skin irritation • may cause drowsiness or dizziness • liquid, immiscible in water • toxic to aquatic life with long lasting effects, potential to bioaccumulate • films formed on water may affect oxygen transfer and damage organisms • large volumes may penetrate soil and could contaminate groundwater	External	1No Packaged bunded vessel	litres	2,000 litres	427,380 litres
LECIOL®, Adams & Green	Lecithin based feed ingredient replacing palm-based fat blends and crude soya bean oil	External	1No Packaged bunded vessel	litres	40,000 litres	4,000,000 litres
LIMESTPONE, calcium carbonate	Feed ingredient	Internal	1No bulk storage bin	tonnes	40 tonnes	750 tonnes

B3.3c Operating techniques - types and amounts of raw materials for processing into animal feedstuffs at Denham Feed Mill

Description of raw material and composition material	Description of how the material is used including any main hazards (include safety information sheets)	Storage location	Storage units	Unit size litres/kg	Maximum amount (tonnes/litres/ kg) (See note 1 below)	Annual throughput (tonnes/litres/ kg each year)
MAXI-MIL A LIQUID, preparation contains acetic acid, glyceryl polyethyleneglycol ricinoleate, propylene glycol, Anitox Ltd	EC authorised preservatives to control mould in compound animal feed for all species, surfactant, and lubricant to aid the production of pelleted compound animal feeds and improve moisture retention and minimise fines: • classified as corrosive • liquid, completely water soluble • biodegradable in soil and water and not bio accumulative	External	Intermediate bulk container, bunded	1,000 litres	2,000 litres	25,000 litres
DL-METHIONINE FEED GRADE 99%, Evonik Nutrition & Care Gmbh	EC authorised amino acid: • no hazard classification • powder, soluble in water • no ecological data available	Store	Bags	tonnes	25 tonnes	125 tonnes

B3.3c Operating techniques - types and amounts of raw materials for processing into animal feedstuffs at Denham Feed Mill

Description of raw material and composition material	Description of how the material is used including any main hazards (include safety information sheets)	Storage location	Storage units	Unit size litres/kg	Maximum amount (tonnes/litres/ kg) (See note 1 below)	Annual throughput (tonnes/litres/ kg each year)
OPTIPHO®WSP, preparation contains 6-phytase enzyme, a zootechnical feed additive, Huvepharma NV	EC authorised digestibility enhancer for chickens for fattening, active enzyme preparation is 6-phytase for degrading the phytate phosphorus as well as improving the utilization of other nutrients: • serious health hazard classification • may cause allergy or asthma symptoms or breathing difficulties if inhaled • causes skin irritation • causes serious eye irritation • powder, soluble in water • will degrade in nature, no accumulation will take place	Store	Bags	5kg	100kg	100kg
PURA LM, Cherwell Valley Silos Ltd	Feed ingredient, a heat- treated blend of field beans or peas and rapeseed in meal form, used as substitute for Extrupro	Internal	1No Bulk storage vessel	tonnes	100 tonnes	10,000 tonnes
RHODIMET®AT88, a preparation with DL-2-hydroxy-4-(methylthio)-butyric acid Adisseo France SAS	EC authorised amino acid analogue: • classified as corrosive • viscous liquid, soluble in water • easily biodegradable	External	1No bulk storage vessel, bunded	litres	45,000itres	150,000 litres

B3.3c Operating techniques - types and amounts of raw materials for processing into animal feedstuffs at Denham Feed Mill

Description of raw material and composition material	Description of how the material is used including any main hazards (include safety information sheets)	Storage location	Storage units	Unit size litres/kg	Maximum amount (tonnes/litres/ kg) (See note 1 below)	Annual throughput (tonnes/litres/ kg each year)
ROCK SALT, sodium chloride, Broste		Store	Plastic bags	25kg	25 tonnes	125 tonnes
SEWON L-LYSINE LIQUID 50% Feed, Daesang Corporation	EC authorised amino acid • no hazard classification • liquid, water solubility unknown • no negative ecological effects are expected	External	1No bulk storage vessel, bunded	litres	45,000 litres	400,000 litres
SOYABEAN MEAL, DEFATTED, Archer Daniels Midland Company	Feed ingredient • no hazard classification • contains no substances known to be hazardous to the environment or not degradable in waste water treatment plants, powder, insoluble in waters	Outside	5No bulk storage bins	tonnes	100 tonnes	20,000 tonnes
L-THREONINE FEED GRADE 98.5%, Evonik Nutrition & Care Gmbh	EC authorised amino acid • no hazard classification • powder, soluble in water • do not allow product into groundwater • toxicity data for aquatic invertebrates (water flea)	Store	FIBC	1 tonne	25 tonnes	100 tonnes

B3.3c Operating techniques - types and amounts of raw materials for processing into animal feedstuffs at Denham Feed Mill

Description of raw material and composition material	Description of how the material is used including any main hazards (include safety information sheets)	Storage location	Storage units	Unit size litres/kg	Maximum amount (tonnes/litres/ kg) (See note 1 below)	Annual throughput (tonnes/litres/ kg each year)
ValAMINO® L-Valine, Feed Grade 98%, Evonik Nutrition & Care Gmbh	EC authorised amino acid: • no hazard classification • powder, soluble in water • rapidly biodegradable	Store	Bags	25kg	1000kg	1000kg
lubricating oils, degreasers, etc	Equipment maintenance	Store	Plastic drums	litres	100litres	100litres
WATER (Potable), Essex & Suffolk Water	Feed ingredient	Internal	1No bulk storage vessel	litres	25,000 litres	1,000,000 litres
WHEAT, various local producers	Feed ingredient	External	5No bulk storage silos	tonnes	2,500 tonnes	60,000 tonnes

Notes

1. By 'maximum amount' we mean the maximum amount of raw materials on site at any one time.
2. For 'annual usage' we have used purchasing data at Kenninghall mill pro-rata with 600 tonnes per day finished product capacity at Denham
3. Manufacturer's safety data sheets are appended in Appendix A of the Supporting Information.

Reference

1. European Union; Register of Feed Additives; pursuant to Regulation (EC) No 1831/2003 [online] https://ec.europa.eu/food/sites/food/files/safety/docs/animal-feed-eu-reg-comm_register_feed_additives_1831-03.pdf

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B3.6 Resource efficiency and climate change

26. Provisions for resource efficiency and preventing climate change are in accordance with the Environment Agency; (2002); Horizontal Guidance Note; IPPC H2; Energy Efficiency.

Fig. 26.1 – Breakdown of energy the activities use at Denham Feed Mill

Source	Energy Use
Electricity	Electric motors for the pit intakes, elevators, conveyors, weighing equipment, grinder, conditioner, press, cooler, air compressors, instrumentation and automated process controls, lighting throughout the mill, air conditioning in the control and switchgear rooms, space heating in the weighbridge office, etc.
Kerosene	Kerosene fired boiler for raising steam for applying directly to the mixed feedstuffs in the conditioner.

B3.6a Basic measures for improving how energy efficient the activities are

27. Operator will be implementing **management techniques** in accordance with IPPC H2 at Denham Feed Mill.

28. Cranswick plc is the ultimate parent holding and has written and published an **Energy Policy** demonstrating the commitment of senior management to energy efficiency in Figure 28.1. Crown Chicken Ltd subscribes to the Policy at Denham Feed Mill.

Fig. 28.1 Cranswick plc Energy Policy

CRANSWICK plc

Group Energy Policy

Cranswick was formed in the 1970's by a group of farmers in East Yorkshire to produce animal feed and market pigs, and has subsequently evolved into a business focused on the food sector, joining the Stock Market in 1985. We operate from a number of farms and processing sites that collectively produce fresh pork & poultry, gourmet sausage and bacon, cooked meats, charcuterie, food to go and pastry products which are supplied to leading food retailers, food service companies and other food manufactures.

In order to meet our commitment to the environment, to promote a reduction in carbon emissions and to ensure compliance to the Climate Change Act 2008, the UK Carbon target for 2050 and all associated Regulations, the company will pursue the following energy objectives within its defined scope of the Integrated Quality Management System (QMS):

- To practice energy efficiency throughout all our premises, plant, services and equipment.
- To have continual improvement on our energy performance against the key performance indicators (KPI) detailed within this policy.
- To implement energy management projects that minimise the economic burden on the company through the adoption of efficient environmental and financial management strategies.
- To monitor and reduce our relative carbon footprint by 30% by 2020 (against the 2010 baseline).
- Sign up to the Courtauld 2025 agreement to have a 20% reduction in energy by 2025.
- For all our sites to be approved to ISO50001 by the end of 2019.
- To have continual improvement of the Integrated QMS to ensure that this is reviewed and enhance best practices.
- To establish an energy accounting system that allows for the collection, monitoring and reporting of all data on energy consumption, energy costs, energy savings and KPI's. To use this data to highlight significant energy users (SEU's) and significant deviation within the business so that root cause and preventive actions can be taken to reduce energy usage.
- To reduce consumption of natural resources and assist in the management of the local ecology by maintaining the purchasing 100% of our grid supplied electricity from renewable sources and targeting 100% renewable gas by 2030.
- To establish an Energy Management Team to identify and drive energy efficiency initiatives and to provide an integrated company-wide response to energy management.
- To communicate openly with our employees and other interested stakeholders on Energy impacts and encourage them to take an interest in our Second Nature Initiatives.

Energy progress is reported quarterly at board level against KPI's which are reviewed annually and monitored through internal and 3rd party certification audits. The necessary personnel, information and financial resources will be allocated to assist the company in meeting its energy objectives and business plans to ensure that these remain current and effective to reduce our impact on the environment through a process of continual improvement programmes.

Ref No	Version No	Release Date	Author	Approved by	Tier	Pages
Cwk/EnMS 001	004	22/05/19	Garry Warhurst	Adam Couch	1	2

29. Measures include commitments to practise energy efficiency throughout all premises, plant, services, and equipment, including Denham Feed Mill. Commensurate with the policy, systems and procedures are in place at Denham Feed Mill for **monitoring and targeting (M&T)** with continuous measurement of energy use. The systems enable the collection, analysis, and reporting of data on energy use, energy costs, energy savings and key performance indicators (KPI) and justifying investment in energy efficiency projects in accordance with IPPC H2.

30. Cranswick plc are providing mandatory annual greenhouse gas (GHG) reporting in the Cranswick plc Annual Reports in accordance with The Companies Act 2006 (Strategic Report and Directors' Report) Regulations 2013.

31. Denham Feed Mill will be operated in accordance with conditions in an environmental permit for annual reporting to the Agency on energy usage, specific energy consumption, direct and indirect energy related carbon dioxide emissions.

32. The Operator will be committed to communicating openly with **staff** and anticipates further energy efficiencies as result of staff awareness and involvement in energy efficiency. Ideas are actively encouraged and responded to in a positive manner. Staff are enabled to implement changes themselves where appropriate and once health and safety and business risks have been assessed.

33. The Operator will be implementing the **basic energy requirements (2)** in accordance with IPPC H2 at Denham Feed Mill.

34. The Operator will be establishing relevant **operating and maintenance procedures**:

    - **Minimisation of compressed air leakage through regular checks and maintenance** e.g. turning-off compressor during non-productive hours and checking for leaks, checking pressure set point.

    - **Maintenance of steam distribution systems to reduce leaks and heat loss** e.g. appointed professional contractors for mandatory inspections and servicing of the boiler, including checking oxygen trim to ensure the ratio of oxygen and fuel is regularly corrected, maximising hot condensate return to the boiler in insulated pipework.

    - **Regularly cleaning heat transfer surfaces prone to fouling** e.g. appointed professional contractors for maintaining packaged boiler including continuous dosing with boiler water treatment chemicals - oxygen scavengers to prevent corrosion, scale inhibitors and conditioners to maintain scale in a mobile sludge for blowing down and mandatory regular inspections and servicing.

    - **Switching off equipment when not in use** e.g. individual employees are enabled to switch off lighting and equipment when not required including air conditioning systems in the control room and an electric heater in the weighbridge office, especially out-of-hours at the weekend.

- **Operation and maintenance of motors and drives** e.g. installed a new packaged press with a direct drive transmission from the electric motor - one of the first direct drive presses in UK rather than using pulleys so more energy efficient, implemented sequenced equipment start-up at Denham Feed Mill - especially for grinder and press to reduce start-up load and tripping out at the start of the day and avoids lost time and other equipment running unnecessarily in the meantime, adequate maintenance programmes mostly using professional contractors and employees.

- **Optimised cleaning of filtration equipment** e.g. installed systems with automatic cleaning for the grain cleaner, pit intake and grinder dust abatement unit.

35. The Operator will be implementing **basic physical measures** to avoid gross inefficiencies relating to excessive heating or cooling losses including insulation of the steam and condensation pipework and insulation of the conditioner.

36. The Operator will be optimising the energy efficiency of **building services** that are included in the permitted activities. The processing of pelleted feedstuffs is energy intensive whereas building energy use has a relatively minor impact owing to energy efficient lighting throughout the mill, point-of-use air conditioning in the control and switchgear rooms and point-of-use electric heater in the weighbridge office, etc.

37. Initially facility will not be operated through participation in a CCA, so the operator is obliged to prepare an **energy efficiency plan** as part of the application for a Permit (the operator will be seeking to make an application for a CCA same time as for a permit). The plan must include identifying and appraising all the energy efficiency techniques in IPPC H2 relevant to activities covered by the Permit that have not yet been implemented, estimate the annual carbon dioxide savings of each technique and prioritise them according to their cost in relation to the environmental benefit delivered.

38. In the autumn of 2019 SLR Consulting Ltd prepared a report on the outputs of the second ESOS audit for Crown Chicken Ltd with energy use and energy saving opportunities at the permitted Kenninghall Feed Mill in accordance with the Energy Saving Opportunity Scheme Regulations 2014 (ESOS) and will be the basis of a process related energy efficiency plan there. Denham Feed Mill will naturally remain outside scope of ESOS owing to not having been an asset on the qualification date 31st December 2014, but recommendations in the Report have been included in an energy efficiency plan here. The energy efficiency techniques are consistent with energy saving opportunities identified in the ESOS audit and provided in Figure 38.1.

Fig. 38.1 - Energy efficiency action plan at Denham Feed Mill

Energy Efficiency Technique	Energy Saving kWh/yr.	CO2 Saving Kg/yr.	CAPEX £	CO2 Saving Kg/£
Fit boiler oxygen trim control @ 5% saving	220,100	54,286	5,000	10.857
Monitoring and targeting including steam	370,655	102,783	12,000	8.562
Fit boiler economiser @ 5% energy saving	220,100	54,286	15,000	3.619
Fit fan control on sack tipping	4,216	1,169	1000	1.169
Fit boiler variable speed combustion fan @ 10% saving	10,445	2896	3,000	0.965
Fit variable speed to air compressor	2,606	723	8,000	0.090
Reduce pressure set point on air compressor	4,730	1,312	0	0

Notes to table:

a) Kerosene use based on projected consumption of 427,380 litres @ 10.3 kW / litre
b) Scope 1 greenhouse gas factor kerosene litres to kgCO2e (2019) = 2.5974
c) Scope 2&3 greenhouse gas factor for delivered electricity kWh to kgCO2e (2019) = 0.2773
d) Tonnes processed = 600 / day x 252 days per year (Mon to Fri) less bank holidays = 151,200
e) Delivered electricity based on 6,022 MWh for 247,514t for Kenninghall (2018) = 0.0243 MWh/t.

39. A boiler economiser will reduce energy consumption by re-using heat contained in vapours by using vapour to preheat inlet water which is then used to raise steam in a boiler. An economiser is best available technique (BAT) for boilers in the additional guidance for The Food and Drink Sector (EPR 6.10).

40. Combustion of natural gas for raising steam at Denham Feed Mill could have released 21.4% fewer CO2 equivalent emissions per kWh versus kerosene, according to government GHG factors for 2019 (Natural gas = 0.20428 kgCO2e, kerosene 0.25974 kgCO2e). There is no mains supply of natural gas in the hamlet of Denham so gas combustion in either the boiler or in a combined heat and power plant (CHP) is not feasible.

41. Cranswick plc is responsible for electricity and committed to purchasing 100% of grid supplied electricity from renewable sources in accordance with an Energy Policy.

42. Initially the facility will not be operated through participation in a CCA so the operator will be operating relevant **further energy efficiency techniques** in accordance with IPPC H2:

- **Motors and drives** e.g. Introducing a motor repair and replacement policy – it is more effective and energy efficient to install new energy efficient motors, rather than repair old motors. Most equipment at Denham Feed Mill is new packaged equipment with energy efficient motors installed during the refurbishment and improvement of the mill and equipment in 2019. Fitting fan controls on sack tipping and variable speed combustion fan on the boiler are included in the energy efficiency action plan.

- **Heat recovery** e.g. fitting a boiler economiser to recover heat is included in the efficiency action plan and recognised as BAT in the additional guidance for The Food and Drink Sector (EPR 6.10).

- **Optimised design and layout** e.g. all the equipment was replaced and reconfigured during refurbishment of the mill in 2019 including optimising the lengths of bucket elevators both into and inside the mill and conveyors, etc. Although compounding animal feed into pellets is inherently more energy intensive than compounding meal.

- **Process control and instrumentation** e.g. using automatic process controls backed up by manual supervision throughout the mill to minimise the frequency of emergency situations and to maintain control during emergency situations. Instrumentation includes microprocessor control, trips, coupled with independent level, temperature, flow and pressure metering and high and low alarms. Fitting a boiler oxygen trim control is included in the efficiency action plan and also recognised as BAT in EPR6.10.

- **Specification of equipment** e.g. energy specification was / will be taken-into-account in the specification and selection of new equipment and implementing further energy efficiency measures, especially electric motors and fitting variable speed to the air compressor is included in the efficiency action plan.

B3.6b Breakdown of energy the activities use

43. The operator will be implementing the **basic energy requirements (1)** in accordance with IPPC H2 at Denham Feed Mill.

44. The operator has provided a breakdown of energy (electricity and kerosene) used for processing pelleted animal feed at its permitted Kenninghall Feed Mill over the six-year period 2013-2018 in absence of data for Denham Feed Mill. The process is similar, and data is taken from annual compliance performance reports supplied to the Agency. Breakdown includes delivered and primary energy, tonnes of CO2 equivalent, specific primary energy per tonne processed (MWhp/tonne) and CO2 equivalent per tonne processed (CO2e/tonne) in each of those years shown in Figures 44.1 and 44.2:

Fig. 44.1– Delivered and primary energy use at Kenninghall Feed Mill

Year	Production tonnes	Kerosene MWh	Delivered Electricity MWh	Total Delivered Energy MWh	Total Primary Energy MWhp
2018	247,514	5,871	6,022	11,893	21,528
2017	232.634	5,498	5,216	10,714	19,060
2016	225,432	5,287	5,015	10,302	18,326
2015	218,469	7,650	5,750	13,400	22,600
2014	209,347	7,402	5,626	13,028	22,030
2013	196,676	6,717	5,612	12,329	21,308

Notes to table:

a) Electricity conversion factor to primary consumption multiply by 2.6
b) Changed from Gas oil to kerosene in 2014

Fig. 44.2 – Energy use & associated carbon dioxide emissions at Kenninghall Feed Mill

Year	Total Delivered Energy Used MWh	Total Primary Energy Equivalent MWhp	CO2 Equivalent Tonnes	Specific Energy Consumption MWhp/tonne	CO2 Released CO2e/tonne
2018	11,893	21,528	3,296	0.087	0.013
2017	10,714	19,060	3,357	0.082	0.014
2016	10,302	18,326	3,553	0.081	0.016
2015	13,400	22,600	4,758	0.103	0.022
2014	13,028	22,030	4,848	0.108	0.023
2013	12,329	21,308	4,573	0.108	0.023

Notes to table:

a) CO2 Equivalent used scopes 1,2&3 emissions for government reporting greenhouse gases

45. Specific energy use per tonne decreased year on year by approximately 19% over 6-year period. The reduction mostly achieved as result of increasing throughput associated energy consumption relative to the base energy load. In addition, smaller improvements as result of replacing equipment with more energy efficient alternatives and staff education and training to continue with the focus on good operating practices. CO2 released per tonne also decreased year on year by approximately 43% - half of which is attributed to the improvements in specific energy used per tonne and remainder solely a result of decreasing government GHG factors year on year owing to a decrease in coal generation and an increase in renewable generation in the UK.

46. The Denham Feed Mill maximum design capacity is 600 tonnes per day and projected **energy consumption, specific energy consumption** and CO2 equivalents are based on the benchmarks for the Kenninghall Feed Mill in 2018 and shown in Figure 46.1.

Fig. 46.1 – Projected energy use and carbon dioxide emissions at Denham Feed Mill

Fuel	Projected Maximum Annual Delivered Energy Use MWh	Projected Maximum Annual Primary Energy Use MWhp	Projected Annual CO2 Equivalent Tonnes	Projected Specific Energy Consumption MWhp/tonne	Projected CO2 Released CO2e/tonne
Electricity	3,674	9,552	1,019	0.0632	0.007
Kerosene	4,402	4,402	1,086	0.0291	0.007

Notes to table:

a) Kerosene use based on projected consumption of 427,380 litres @ 10.3 kW / litre Scope 1 greenhouse gas factor kerosene litres to kgCO2e (2019) = 2.54042
b) Scope 2&3 greenhouse gas factor for delivered electricity kWh to kgCO2e (2019) = 0.2773
c) Tonnes processed = 600 / day x 252 days per year (Mon to Fri) less bank holidays = 151,200
d) Delivered electricity based on 6,022 MWh for 247,514t for Kenninghall (2018) = 0.0243 MWh/t
e) Electricity conversion factor to primary consumption multiply by 2.6

B3.6c Climate change levy agreement

47. Initially facility will not be operated through participation in a Climate Change Agreement (CCA) owing to the CCA scheme having been closed to new entrants on 31 October 2018.

48. HM Government started consultation in April 2020 – "Climate Change Agreements: proposal for scheme extension and views on reforms for any future scheme". Consultation includes proposal that facilities not currently in the scheme will be able to join, provided they meet the criteria for an eligible facility. HM Government intends to allow operators to begin applying to the scheme immediately and expects to begin issuing agreements for new facilities by January 2021. Close applications for new entrants on 30 September 2020.

49. Denham Feed Mill meets criteria for an eligible facility and operator will be seeking to make an application to set up a CCA. At current rates and maximum percentage discount for holders of a CCA the discount on electricity bills is valued at approximately £27k per year.

    (3.674MW x 1000 x £0.00811/kWh x 0.92% = £27,412).

B3.6d Justification for the raw materials, other substances and water used

50. Maximum design capacity is 600 tonnes per day and storage quantities and projected annual throughput of raw materials and water for processing is provided in section B3.3c Operating Techniques - Types and Amounts of Raw Materials for Processing into Animal Feedstuffs at Denham Feed Mill. Safety data sheets for relevant materials are provided separately with the permit application pack.

51. In B3.3c Operating Techniques operator is projecting using 1 million litres of potable water each year equivalent to approximately 3,970 litres per day assuming processing for 252 days per year (Mon-Fri and excluding bank holidays). The potable water will be obtained from the local water undertaker from the mains supply.

52. All the water will be used in the boiler for raising steam. Injecting steam directly into the mixed ground feedstuffs in the conditioner to pasteurise the mixture and physically bind the materials together when pressing into pellets so all the energy in the steam is considered fully utilised. The water remains bound inside the pellets, increasing moisture content and making them less dusty, easier for poultry to pick up and avoids waste.

53. Minimal water losses from surface evaporation when cooling the pellets with ambient air. Evidenced by the small plume of condensed water vapour from the stack from the cooler on the roof and losses from boiler blow down. Recycling boiler condensate as boiler feedwater is an indicative best available technique (BAT).

54. There will be no trade effluent from the facility.

B3.6e Avoiding producing waste in line with Council Directive 2008/98/EC on waste

55. Generally little waste arising from animal feed compounding activities, likewise at Denham Feed Mill where waste avoidance, recovery and disposal will be in accordance with the waste hierarchy – reduce, reuse, recycle, recover, disposal.

56. Recycling particulates trapped by abatement filters during tipping raw materials (processed pulses) in pit intake 2, also trapped by the filter for the grinder and cyclone above the cooler for cooling pelleted feeds back into the process. Identified as BAT in food and drink sector.

57. The operator has provided a breakdown of waste in kilogrammes per tonne animal feed at its permitted Kenninghall Feed Mill over the six-year period 2013-2018 from annual compliance performance reports supplied to the Agency. Process at Denham Feed Mill will be similar so a breakdown of waste in kilogrammes per tonne and annual tonnes is projected in Figure 57.1.

Figure 57.1 – Projected annual waste from Denham Feed Mill

Waste	Projected Waste Kg/tonne	Projected Annual tonnes	Disposal or recovery option
Packaging - mostly paper	0.80	121	R3 Recycling/reclamation of organic substances
Mixed waste	0.47	71	R3 Recycling/reclamation of organic substances
Mixed waste - mostly dust from grain cleaning, process waste, etc	0.17	26	D1 Deposit into landfill
Hazardous waste - oils from maintenance, lighting, contaminated packaging, etc	<0.01	<1	R3 Recycling/reclamation of organic substances

58. There will be relatively few product changeovers or clean downs (BAT) during any production day at Denham Feed Mill. Mostly processing feedstuffs for the starting and rearing stages in a multi-phase feeding plan for broiler chickens where rations are adapted to the specific requirements of the production period. Ordinarily clean downs are not required between the feedstuffs and at the end of production. Crumbled pellets for chicks, feedstuffs for broilers and other poultry will mostly be processed at Kenninghall Feed Mill.