Environment Agency permitting decisions

Bespoke Variation (Substantial)

We have decided to issue the variation for Lake District Creamery operated by The First Milk Cheese Company Limited.

The variation number is EPR/KP3931MS/V003

We consider in reaching that decision we have taken into account all relevant considerations and legal requirements and that the permit will ensure that the appropriate level of environmental protection is provided.

Purpose of this document

This decision document:

- explains how the application has been determined
- provides a record of the decision-making process
- shows how all relevant factors have been taken into account
- justifies the specific conditions in the permit other than those in our generic permit template.

Unless the decision document specifies otherwise we have accepted the applicant's proposals.

Structure of this document

- Key issues
- Annex 1 the decision checklist
- Annex 2 the consultation and web publicising responses

Key issues of the decision

1 Proposed Changes

Installation of an anaerobic digestion (AD) plant to enable liquid feed stock including waste streams currently generated at the facility to undergo AD treatment with the production of biogas. The biogas will be used to directly power a new Combined Heat & Power (CHP) unit with a thermal input of 1.3MW with the remainder being injected into the National Grid Transmission System.

Changes to the effluent treatment plant (ETP) are also proposed to minimise the phosphorus release into the River Ellen. This reduction in phosphorous will result in a significant improvement in water quality in the River Ellen, helping this water body to achieve the Water Framework Directive objective of Good Ecological Status as identified in the Northwest River Basin Management Plan.

1.1 AD Plant & ETP

Whey Permeate Transfer

Permeate Silos - Whey permeate is currently collected on the creamery site in three permeate silos. A new control system will transfer measured volumes from the silos to the ETP.

The transfer will take place in new below ground bunded pipe-work which will be pressure tested polypropylene. The pipe line will be above ground once it reaches the ETP.

Whey Break Tanks (172m^3 each) – Once received at the ETP site, whey permeate will be collected in two whey break tanks.

Process Waste Waters Transfer

Balance Tank (936m^3) - Process waste waters will be transferred via existing pipe work to the ETP into an existing balance tank.

Anaerobic Digestion

Anaerobic Digestors (2 x 5,770m^3) – Whey and process effluent streams will be combined to form the feedstock for the AD plant and will be fed into two anaerobic digestors. The effluent feedstock will be mixed with micro nutrients, sodium hydroxide (pH correction), ferric chloride (control hydrogen sulphide (H_2S)), returned sludge and heated digestor sludge before being fed into a mixer pump to be dispersed within the digestor.

The design details for the digestor tanks were provided and are in accordance with indicative BAT measures contained in our 'How to Comply Anaerobic Digestion' guidance.

Monitoring of the biogas will be undertaken as it flows into the initial gas conditioner unit, to determine the rate of chemical addition.

There will be no by-pass for the AD system, with all effluent passing through the AD plant and then into the existing aerobic ETP. If the AD plant fails effluent will be stored on-site and then tankered off for treatment. If this happens for an extended period then production will be reduced. This contingency measure will be required for inclusion in the site Odour Management Plan (OMP), refer to Section 1.10 below.

As a contingency during commissioning, the existing process for treating whey permeate will be retained on-site for 12 months. This process uses a permeate evaporator to concentrate whey material and remove water. We have secured this by inclusion of an improvement condition for the Operator to confirm their intention for this kit at the end of the 12 month period.

Cavitational Air Flotation (CAF) / Dissolved Air Flotation (DAF)

Following digestion, effluent will be pumped from the digestors to a CAF/DAF plant for solids separation. Each digestor has its own dedicated CAF/DAF plant, where ferric chloride and CAF polymer are added to flocculate the biomass and solids.

Effluent will pass through a 25m^3 precipitation tank and a 10m^3 consolidation tank to further separate water and solids. This will facilitate the removal by precipitation of phosphate.

Removed solids will either be returned to the AD vessels or dewatered for land spreading off-site.

Effluent Treatment (existing aerobic)

The effluent from the CAF/DAF units will pass to the existing aerobic ETP, while the solids will be scraped from the units to be either pumped back to the digestor to reseed incoming effluent or to a sludge storage tank prior to dewatering in a screw press.

An additional 200m^3 sludge tank will be used to collect the sludge.

The aerobic treatment process is essentially a ‘polishing’ process that will reduce Chemical Oxygen Demand (COD) from approximately 1,180mg/l to 100mg/l for permitted discharge to the River Ellen at W1.

Effluent Treatment (upgrade)

The current ‘polishing’ process will be upgraded by improving aeration in the two stage activated sludge process by supplying efficient diffusers and a new standby blower to control air added to the two sludge tanks. This upgrade will improve oxygen transport and the destruction efficiency of COD.

In addition, dosing with magnesium hydroxide and ferric chloride is proposed prior to the first and final settlement tanks. This will cause ammonium phosphate to be precipitated and allow removal of phosphate.

Sludge Production

The proposed changes are expected to produce a larger mass of sludge with a better nutritional value. The larger volume is due to the addition of whey permeate to the process which is currently sent directly off-site for land spreading with no treatment.

There will be an overall reduction in materials spread to land as there will be no need to spread whey directly.

1.2 Biogas Conditioning – Initial Gas Conditioning

The digestor vessels have flexible biodomes for collection of biogas and comprise a two layer cover. The outer cover is inflated by blowers, with the inner one moving independently to accommodate the generated gas volume. A measurement between the two layers indicates when there will be sufficient gas for combustion within the CHP plant. Pressure applied to the outer layer controls the pressure of the biogas exiting the dome.

The biogas produced is expected to comprise nominally 55% - 65% methane (CH_4) and 30 - 40% carbon dioxide (CO_2), with trace hydrogen sulphide (H_2S) and volatile organic compounds (VOCs) levels. To suppress the level of H_2S in the biogas, the gas is treated to precipitate the sulphur as ferric sulphide.

The biogas going to the initial gas conditioner unit from the digesters is monitored to determine its composition (particularly with regard to H_2S), and this feeds back into the dosing of ferric required for the incoming effluent.

The two digesters are protected from severe over-pressurisation by individual pressure relief valves (PRVs), which will vent at a height of 14m. Gas venting is monitored at the vent stack to each digester PRV. Should methane be detected, the monitor will sound an alarm and stop the feed to the plant, along with the digester mixing. This will limit the amount of biogas being produced and consequently being vented through either a lifting or leaking PRV.

The PRVs would not normally be expected to operate during the lifetime of the plant; however venting is required to protect the mechanical integrity of the plant.

From the biodomes, the biogas initially passes through a basic gas conditioner (which will remove excess moisture from the biogas through cooling of the gas to condense out excess water vapour) prior to going to either the CHP, or for further treatment for supply to the grid. The water condensate is directed to the front of the ETP for treatment.

A flare is installed to provide emergency combustion for safety purposes in the event that both the CHP unit and gas-to-grid connection / conditioning unit are out of commission.

1.3 Biogas CHP Plant

The biogas will be used to power the associated new CHP plant that will provide power to the AD plant and existing aerobic ETP.

The CHP gas engine will be capable of running on biogas with just 40% methane content; the biogas produced by the AD plant will have a methane content of 55 – 65%. The CHP will utilise the biogas generated directly in the AD plant, without requiring further clean-up (except for moisture removal via condensation in the basic gas conditioner).

The CHP plant will comprise a 4-stroke spark ignition engine, with a turbo charger and will:

- be fully containerised, i.e. within an acoustic enclosure;
- have full heat recovery from the exhaust gases;
- have a dedicated exhaust flue (Release Point A9);
- will release to atmosphere at a height of 5.6m above ground level. This is in line with the requirements of the Standard Permit for Anaerobic Digestion (SR2010: No15, Table 2.4), which states that flue stacks for gas engines should be a minimum of 3m above ground level.

The emissions from the CHP plant will be compliant with the Emission Limit Values (ELVs) derived from the Standard Rules Permit SR2010 No15. The Operator proposes to monitor the performance of the CHP plant on a weekly basis to ensure that all emissions are within permitted limits.

The CHP unit is designed to achieve emission levels of:

Oxides of nitrogen (NO_x) - 500mg/m^3

Carbon monoxide (CO) - 650mg/m^3

Sulphur dioxide (SO_2) and particulate emissions are proposed to be controlled through the feed gas composition levels.

Residual heat from the CHP exhaust gases will be used to pre-heat the effluent feed into the AD plant and also the water utilised in the AD plant boiler.

Electricity from the CHP will be supplied to a power distribution board and utilised as power to the AD equipment and panel feeds. When the CHP is offline, power will be provided through a 750kW transformer installed at the site.

1.4 Biogas Injection into Grid

The primary output for the biogas generated will be to supply the national gas grid.

From the initial gas conditioning system (see above), the biogas will go through a further Gas Conditioning unit to remove impurities (carbon dioxide, water and hydrogen sulphide) and a booster system (propane addition) to increase the gas calorific value; converting the biogas to biomethane (i.e. a methane content of >97%). The biomethane will then be odorised, by the addition of an odorant, prior to injection into the gas grid.

The expected availability of the conditioning system is 95%. In the event the conditioning system is not available, then biogas would be combusted on the CHP system and the level of biogas generated would be controlled (reduced) to minimise flaring.

Raw biogas comprises a mixture of methane, water, carbon dioxide, hydrogen sulphide and other trace components and is unsuitable for use in the national gas grid. In the grid connection Gas Conditioning unit, biogas is initially passed through activated carbon to remove hydrogen sulphide. Water is removed through heat exchangers, chillers and condensate collection prior to

the gas entering the membrane separation unit. The condensate is recycled back into the ETP for processing.

Compression (through heating) of the gas is then carried out, which creates the driving force for a membrane separation stage. The membrane separation unit works on the basis of separation of the components of a gas mixture using a polymer to create a solution-diffusion potential. The level of separation is determined by the flux of CO_2 through the membrane, which is selectively permeable compared to methane. The separation process generates a waste gas stream of >98% CO_2 and water vapour, which is discharged directly to air through a 6m high stack.

The gas conditioning unit is fully automatic, with a control system ensuring the correct operation of the unit.

Following conditioning, propane is added (a requirement of the National Transmission Service (NTS) connection), to boost the calorific value of the gas and the gas is monitored to confirm that it is suitable for transfer to the NTS.

The areas that handle propane and biogas have been identified as ATEX (explosive atmosphere) zones during the design process and will be appropriately managed.

The Operator provided a Dangerous Substances and Explosive Atmospheres Regulations DSEAR/ATEX Phase 1 Issue report, (v1.0, dated 3 December 2015). This is a pre-commissioning document which includes a number of recommendations for the plant to be compatible with DSEAR.

1.5 Ancillary Plant

AD Plant Boiler

A 1MW thermal input dual fuel boiler, will have the capability to operate on both diesel and biogas. It will be used to heat up the effluent in the digester vessels during periods when the CHP plant is not available (e.g. during start up).

Diesel will be stored in a bunded 5,000 litre mild steel tank. The boiler is only expected to be used as a back-up heat source, supporting the biogas primary fuel. It is anticipated that diesel deliveries will only be required on a very infrequent basis. Delivery will be by road tanker and controlled under a written procedure.

The offloading area for diesel will be on hard-standing with no connection to surface water drains.

Emergency Flare

The flare provides combustion of excess biogas, in the event that the CHP plant and gas-to-grid units are unavailable. The unit is a skid-mounted flare, enclosed system, designed to burn at 850°C, with adjustable air louvres installed to optimise combustion temperature.

The flare will automatically shut-down in the event that the flare moves outside of the defined temperature range, the ignition cycle fails, an

interruption to power supply or failure of the flame. An emergency shutdown button is also provided. Should this be initiated, the gas supply system will be locked out, and the biogas retained within the digester storage system.

This will trigger the reduction of biogas by stopping the feed to the AD plant and also stopping the agitation systems in the digesters, thus limiting the potential for the PRV's to lift.

Flaring will only be applied during periods of non-routine operation or for safety reasons, with sufficient capacity available within the gas recovery systems (gas conditioning up to 1,200m^3/hr, CHP up to 214m^3/hr, plus plant boiler) under normal operation, alongside the application of high-integrity relief valves. The application confirms that operation will be <2% of the operational time for the facility. We have secured this by incorporating into Table S1.2 of the permit.

1.6 Emissions to Air

Release Points

The proposed changes result in additional release points:

Emission Point	Source
A9	CHP 2 Plant Stack
A10	Back-up Boiler Stack (not assessed)
A11	Emergency Flare (abnormal operation)
A12	Gas Conditioning Unit (not assessed)
A13/A14	Digestor PRVs (not assessed)

The impact from the back-up boiler emissions were not assessed as this would not be operational at the same time as the CHP and emissions from the CHP would be greater.

No assessment of emissions from the gas conditioning unit was undertaken as they consist predominantly of carbon dioxide (CO_2) and water vapour.

PRV emissions were not assessed as they would not normally be expected to operate during the lifetime of the plant.

The operator carried out Dispersion Modelling to predict impacts associated with the combined emissions from the existing and the new plant using ADMS5. Our review of the Applicant's assessment leads us to agree with the Applicant's conclusions that the impacts are unlikely to result in significant environmental impacts.

Parameter Concentrations

The concentrations used for the new plant are based on the manufacturer design specification and are tabulated below:

Source	NO_x (mg/m^3)	SO_2 (mg/m^3)	CO (mg/m^3)	H_2S (mg/m^3)	Non methane VOCs(mg/m^3)
New CHP	500	81.7	800	-	75
Emergency Flare	400	10.5	150	5.6	-

Total volatile organic compounds (VOCs) will comprise predominately methane for which there is no Environmental Assessment Level (EAL) and so is excluded from the assessment.

Screening Methodology

PCs are considered **Insignificant** if:

- the **long-term$_{(LT)}$** process contribution is less than **1%** of the relevant EQS/EAL; and
- the **short-term$_{(ST)}$** process contribution is less than **10%** of the relevant EQS/EAL.

EQS – Environmental Quality Standard

EAL – Environmental Assessment Level

For those pollutants which do not screen out as insignificant, we determine whether exceedences of the relevant EQS are likely.

The Process Contributions (PC) and Predicted Environmental Concentrations (PEC) at the **worst case human health receptor** have been compared with the appropriate EQS/EAL.

PEC = PC + background conc. (BC)

Impact Assessment

Assessments were carried out for normal and abnormal operation. Abnormal operation results from emergency operation of the flare which has been assessed for the short term impacts only based on <5% of the total plant availability.

The tables below predict the impacts from both existing and new emissions at the worst case human health receptor, a residential receptor (R12) located 100m north east of the AD & ETP, see below. R13 is a storage container and unoccupied.

Normal Operation

Pollutant	EQS EAL (µg/l)	PC (µg/l)	PC/ EQS EAL	Insignificant?	BC (µg/l)	PEC/ EQS EAL	Not Significant ?
$NO_{x\ ST}$	200	31.2	**16%**	No	16.6	23.9%	Yes
$NO_{x\ LT}$	40	6.4	**16%**	No	8.3	36.8%	Yes
CO ST	30,000	87.0	<1%	Yes	-	-	-
CO 8 hourly av	10,000	83.0	<1%	Yes	-	-	-
SO_2 15 min	266	25.5	10%	Yes	-	-	-
SO_2 1hourly	350	19.9	6%	Yes	-	-	-
SO_2 24 hour	125	13.0	10%	Yes	-	-	-
VOC (non methane) ST	195	10.3	5.3%	Yes			
VOC (non methane) LT	5	0.5	10%	No	0.074	11.5%	Yes

From the table above emissions of CO, and SO_2 can be screened out as insignificant in that the process contribution is < 1% of the long term EQS/EAL and <10% of the short term EQS/EAL.

Therefore we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

Also from the table above emissions of NO_x and non methane VOCs (which were not screened out as insignificant) have been assessed as being unlikely

to give rise to significant pollution in that the PEC is less than 100% (taking expected modelling uncertainties into account) of both the long term and short term EQS.

Abnormal Operation

Pollutant	EQS EAL (µg/l)	PC (µg/l)	PC/ EQS EAL	Insignificant?	BC (µg/l)	PEC/ EQS EAL	Not Significant ?
$NO_{x\ ST}$	200	124.8	**62%**	No	16.6	71%	Yes
CO ST	30,000	130.5	<1%	Yes	-	-	-
CO 8 hourly av	10,000	98.6	<1%	Yes	-	-	-
$SO_{2\ 15\ min}$	266	7.6	3%	Yes	-	-	-
$SO_{2\ 1hourly}$	350	6.2	2%	Yes	-	-	-
$SO_{2\ 24\ hour}$	125	3.5	3%	Yes	-	-	-
H_2S	150	0.45	<1%	Yes			

From the table above emissions of CO, SO_2 and H_2S can be screened out as insignificant in that the process contribution is <10% of the short term EAQ/EAL.

Therefore we consider the Applicant's proposals for preventing and minimising the emissions of these substances to be BAT for the Installation.

Also from the table above emissions of NO_x (which were not screened out as insignificant) have been assessed as being unlikely to give rise to significant pollution in that the PEC is less than 100% (taking expected modelling uncertainties into account) of the short term EQS. This represents a very much worst case impact, with the operation of the flare taking place during the worst case meteorological conditions.

Emission Limits and Monitoring requirements

We have not set limits in the permit for the new CHP 2 stack (A9). This is consistent with the approach taken for CHP 1 (A7) which has a 2.8MWth compared to only 1.3MWth for the new CHP 2.

We have specified the activity in table S1.1 of the permit, such that the CHP shall be configured not to exceed 500 mg/m^3. We have also set an improvement condition requiring monitoring to be undertaken to demonstrate optimisation of the combustion process and to establish concentrations of NO_x and CO.

The emergency flare stack (A11) will normally only be required to operate during periods of non routine operation. It will operate for less than 2% of the year so limits are not required in accordance with our Technical Guidance

Note for monitoring enclosed landfill gas flares, LFTGN05. Notwithstanding this, the Standard rules permit SR2010No15 does not set limits based on its use for short periods during breakdown or maintenance of the facility.

Monitoring at A11 is only required in the event that the flare is operational for more than 10% of the year (876 hours).

1.7 Impact on Habitats sites, SSSIs, non-statutory conservation sites etc.

Sites Considered

The following Habitats (i.e. Special Areas of Conservation (SAC), Special Protection Areas (SPA) and Ramsar) sites are located within 10Km of the Installation:

- Solway Firth SAC
- Clints Quarry SAC
- River Derwent & Bassenthwaite Lake SAC
- Solway Flats & marshes SPA
- Upper Solway Flats & Marshes Ramsar

There are no Sites of Special Scientific Interest (SSSI) within 2Km of the Installation.

The following non-statutory conservation site is located within 2Km of the Installation:

- Ancient Woodland (1,773m from installation)

The emissions to air have been modelled to assess the impacts on neighbouring residential properties. Exceedences of Air Quality Environmental Quality Standards (EQS) are not likely. Under our guidance (AQTAG014) for combustion activities of under 20MW, the screening distance is 2km. With the exception of the ancient woodland, none of the sites fall within this distance, so we are not required to assess these.

We completed an Appendix 11 assessment for the habitats sites to record our assessment and the approach taken. We sent this to Natural England for information only.

We have not required an assessment of the impact on the ancient woodland located to the south east of the facility as it is considered highly unlikely that critical levels and loads will be exceeded. This is based on the prevailing wind direction being from the south west dispersing pollutants primarily to the north east of the facility. This is consistent with the most impacted receptor (R12) being located to the north east of the facility.

1.8 Emissions to Water

Phosphate Limit

Upgrades to the ETP have been designed to decrease the amount of phosphorus released at emission point W1:

Current Phosphate Limit (mg/l)	New Phosphate Limit (mg/l)
10	1.5

We have set this lower limit for phosphate in the permit which is required once the improvements are complete.

Impact Assessment/Emission Limit - Iron

The operator carried out an assessment of the impact from residual iron present from ferric chloride dosing. The following parameters were used in our H1 assessment tool:

Parameter	Bullgill (downstream)	Proposed discharge
Mean flow (m^3/sec)	2.35	0.0167
95% exceedance flow	0.3	n/a
90% iron (mg/l)	-	4
95% iron (mg/l)	-	5

We agree with the river baseline data obtained from the National River Flow Archive website.

The results from the assessment using the methodology in H1 Part A are tabulated below:

Test 1

Release concentration (µg/l)	EQS
4,000	1,000

The release concentration is compared with the EQS

- Release concentration >10% EQS
- Test 1 - **FAILED**

Test 2

Parameter	EQS (µg/l)	PC (µg/l)	%PC of EQS	>4% of EQS
Dissolved iron (long term)	1,000	28.20	2.82	No
Dissolved iron (short term)	-	42.20	-	-

The PC is displayed as a proportion of the EQS

- PC<4% EQS
- Test 2 - **PASS**

The impact from iron is considered to be insignificant and as such there is no requirement to set a limit in the permit.

We have decided to set a limit to ensure that the appropriate controls are in place for ferric dosing. We previously carried out Monte Carlo modelling with the output showing that a 95 percentile limit of 3.37 mg/l will deliver the 10 percent deterioration in current iron quality that meets our ‘no deterioration’ policy. Our Operating Instruction 17_13 ‘Permitting of hazardous pollutants in discharges to surface waters’ states that the permit limit for a trade discharge should be set as an absolute limit at twice the required 95% percentile limit calculated using Monte Carlo. Therefore an absolute limit of 6 mg/l or 6.7 mg/l would be acceptable.

We have set a limit of 5 mg/l which is achievable with the appropriate dosing controls in place.

1.9 Fugitive Emissions – Containment

The operator provided summary tables of tanks showing the volume, construction and containment measures for the 'New' storage tanks and 'Retained' storage tanks. A table was also provided showing the 'Redundant' storage tanks which will be removed from the facility.

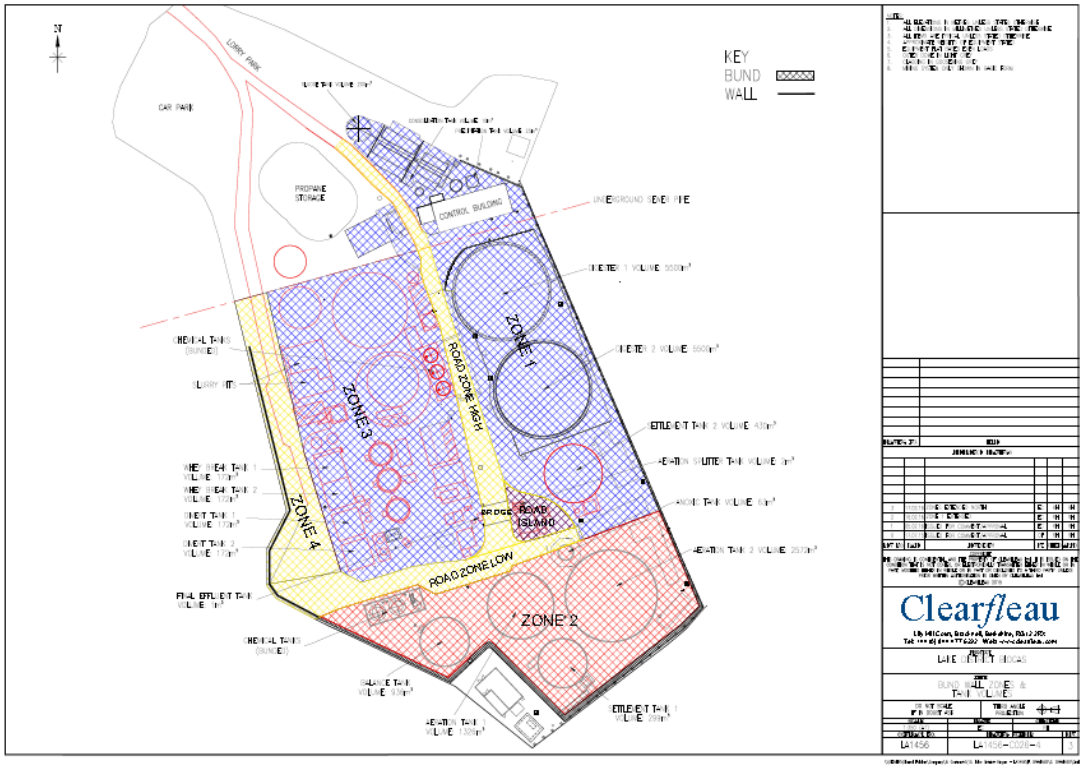
A clay bund has been installed around the lower end of the site to provide temporary containment of a significant failure of treatment plant storage (potentially up to 6050m^3). This is only required for the biodegradable effluent undergoing treatment through the AD and ETP, all chemicals stored at the site have existing dedicated secondary containment.
The site operates a penstock valve which can be used to close off the discharge to the River Ellen and provide additional containment within the site boundary.
The operator recognises that whilst the current containment would only allow capture of significant spills or overtopping; it is not adequate for a catastrophic failure. Fully engineered containment will be undertaken as part of a phased programme of works which will include the removal of redundant tanks. This has been secured by the inclusion of an improvement condition.

The final containment design will provide engineered capacity to retain at least 110% of the largest vessel (i.e., an anaerobic digester at 5,770m^3). A zoned approach to developing containment is proposed, focusing initially on the area associated with the AD plant, but extending to cover the remainder of the ETP as appropriate, and in line with removal of redundant plant.

The zoning system timetable for development is as follows:

- Zone 1 (AD): end of December 2016;
- Zone 2: end of March 2017;
- Zone 3: end of June 2017;
- Zone 4: end of September 2017.

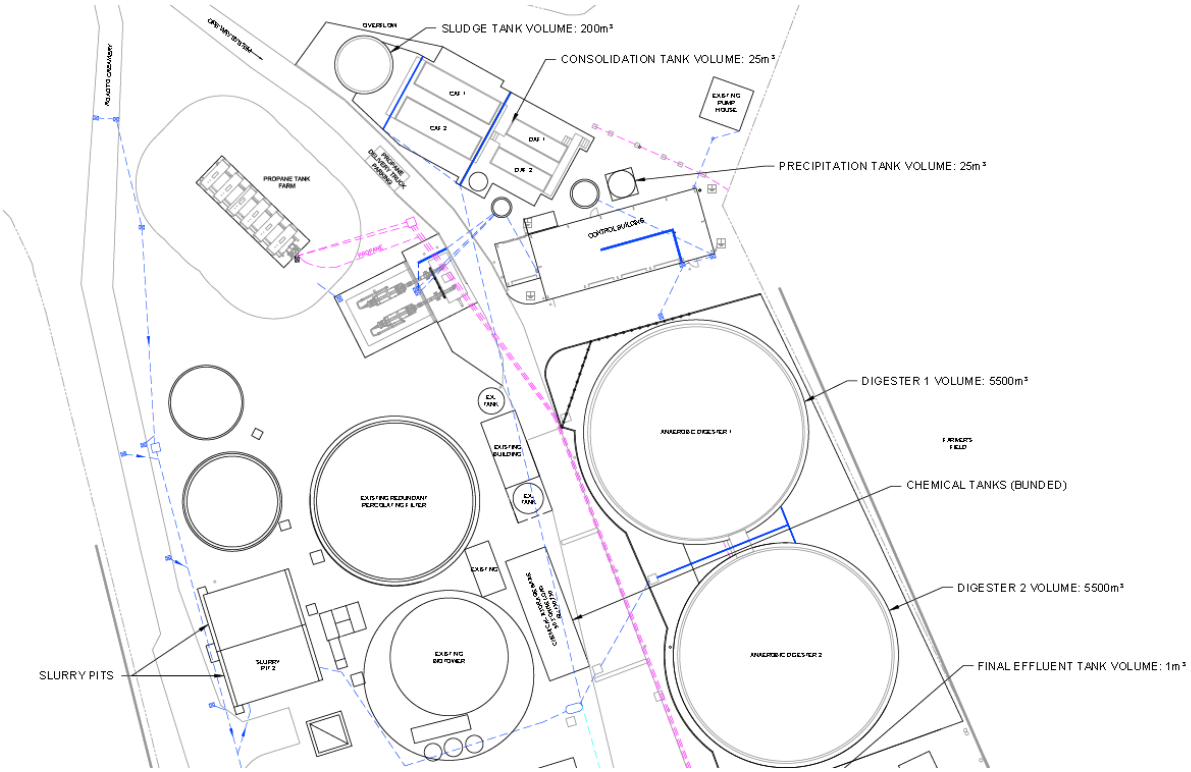
The zones are provided on drawing number LA1456-C026-4 Rev 3 (see below).

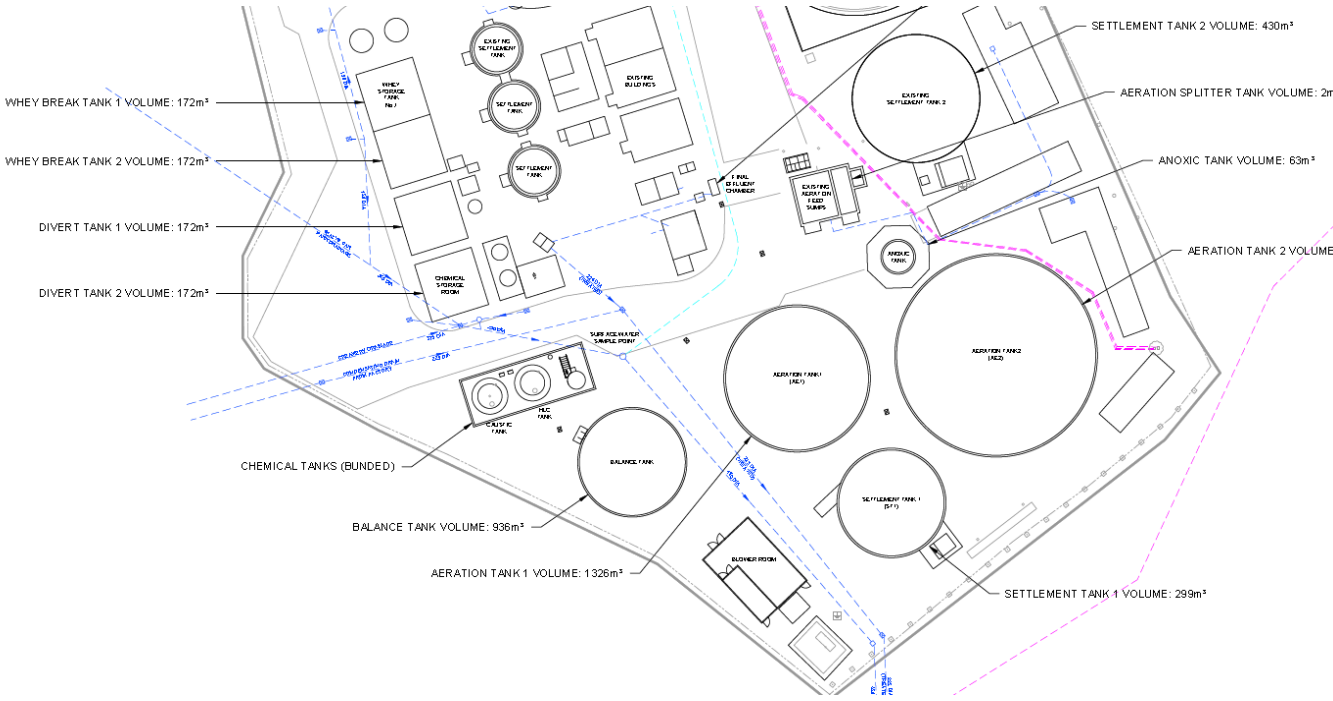


The concept design based on this approach was submitted to us 11 March 2016. Before the detailed design can be completed a comprehensive topographical survey of the site is required, together with a full survey of the existing site drainage. We have secured this by an improvement condition.

There is a septic tank at the facility which is covered by the 'general binding rules' and as such there is no requirement to include in the permit. The Operator has committed to inspect the integrity prior to concrete surfacing in that area, which will help to address concerns regarding potential pollution. Although not specifically included in the permit, we would expect that maintenance / emptying of the septic tank would be included in the management systems which will require review to reflect the new AD plant and changes to the ETP.

More detailed drawings showing individual tanks:





1.10 Odour

In our guidance 'How to Comply', AD is recognised as an activity for which odour is a key issue and as such an odour management plan (OMP) should be in place unless otherwise agreed, in writing, by the Environment Agency.

The operator did not provide an OMP based on the specific nature of the material processed within the AD plant, i.e. whey waste and process effluent from the installation only. We accept their claim that the potential for odour generation is limited, as tighter controls over the process can be maintained. The sludge generated is dried to around 16% solids content, providing a solid material for spreading and resulting in what they describe as an 'earthy' type odour.

They provide a summary of the main odour sources associated with the AD plant, and the measures in place to minimise the generation of odour:

Table 2.1: Odour Sources And Management From The AD Process

Source	Control Measure	Likelihood
Influent	Whey waste and effluent entering the AD plant is transferred through enclosed pipework with temporary storage in break tanks/balancing tanks, limiting exposure to atmosphere.	Low risk – material is of a consistent nature (no third-party waste received), contained and held for short periods only before transfer into the treatment process
AD Digesters	Digesters are sealed tanks with flexible roofing to capture biogas for extraction. Pressure relief valves present which are only triggered in the event of significant overpressure. Process is designed to minimise generation of hydrogen sulphide.	Low
Gas flare	Flaring is a safety mechanism, to only be applied in the vent of failure of both CHP/boiler and gas conditioning (<2% of operational time). Flare operates at minimum 850°C with 0.3sec retention time to ensure destruction of odorous components. Design was chosen to provide a high level of destruction for a consistent gas type with a low flame visibility in an enclosed flare. Gas stream generated will be much more consistent than gas at landfill/multi-stream AD units, providing greater control over destruction.	Low – flaring is expected to occur for less 2% of the operational plant time.
CAF/DAF Plant	Known effluent stream with limited variability. Units are covered to prevent odour escape.	Low
Sludge storage tank	Rapid throughput in tank, with storage limited to <1 day to prevent sludge going septic.	Low

Table 2.1: Odour Sources And Management From The AD Process		
Source	Control Measure	Likelihood
Sludge pit	Currently operating with no significant odour. Handles return sludge and surface water, with regular return into the process to prevent sludge going septic.	Low
Sludge dewatering	Press process is enclosed, and within a building. Dewatered sludge removed within a day of generation to prevent potential for septic sludge. Trailer covers will be applied should storage >1 day on site be required	Low due to containment of process, with additional protection from building
Gas conditioning	Boosting of gas calorific value with propane and addition of odorant all conducted within a self-contained unit. Odorant is added in accordance with gas quality requirements and utilises Schmidt containers and associated pipework to minimise the potential of leaking.	Low, providing gas industry procedures on odorant addition and maintenance are followed.

There is a residential receptor (R12) located 100m north east of the AD & ETP in the direction of the prevailing wind. The operator has committed to carrying out olfactory checks at the boundary nearest to R12 at a frequency to be agreed with the Environment Agency. We have incorporated this into Table S1.2, Operating techniques.

We have also included an improvement condition requiring the submission of an OMP within the first six months of operation. The OMP will need to include contingency measures, for example AD plant failure (Refer to Section 1.1 above).

1.11 Site Condition Report (SCR)

The installation boundary is extended to incorporate the new AD and CHP plants. The Applicant has submitted a site condition report for this area, which includes a report on the baseline conditions. We have reviewed that report and conclude that pollution of land and water is likely. This is based on the following:

- As identified in the Spill Report May 2015, there is a significant absence of hard standing and bunding which could lead to pollution.

- The existing groundwater monitoring network is reported to be in poor condition and the SCR does not address this.

- The condition of the existing pipe work is currently unknown, and groundwater data from the site suggests there may be impacts from the condition of this infrastructure.

We have set an improvement condition to address drainage and containment at the facility, see above.

We have also set an improvement condition requiring submission of an updated SCR and baseline data for the facility.

The baseline report is an important reference document in the assessment of contamination that might arise during the operational lifetime of the Installation and at cessation of activities at the Installation.

1.12 OPRA

We have amended the Operator's Operational Risk Appraisal (Opra) profile that was submitted with the application to include the additional listed activities:

Section 5.4 Part A(1)(b)(i) – AD (2 points)

Section 1.2 Part A(1)(a) - Conditioning of biogas produced by the AD plant (82 points)

As a result the Opra score has increased from 74 to 158 and will be used as the basis for subsistence and other charging, in accordance with our Charging Scheme. Opra is the Environment Agency's method of ensuring application and subsistence fees are appropriate and proportionate for the level of regulation required.

Annex 1: decision checklist

This document should be read in conjunction with the application and supporting information and notice.

Aspect considered	Justification / Detail	Criteria met Yes
Receipt of submission		
Confidential information	A claim for commercial or industrial confidentiality has not been made.	✓
Identifying confidential information	We have not identified information provided as part of the application that we consider to be confidential. The decision was taken in accordance with our guidance on commercial confidentiality.	✓
Consultation		
Scope of consultation	The consultation requirements were identified and implemented. The decision was taken in accordance with RGN 6 High Profile Sites, our Public Participation Statement and our Working Together Agreements (see below).	✓
Responses to consultation and web publicising	The web publicising and consultation responses (Annex 2) were taken into account in the decision. The decision was taken in accordance with our guidance.	✓
Operator		
Control of the facility	We are satisfied that the applicant (now the operator) is the person who will have control over the operation of the facility after the variation is issued. The decision was taken in accordance with EPR RGN 1 Understanding the meaning of operator.	✓

Aspect considered	Justification / Detail	Criteria met Yes
The facility		
The regulated facility	The extent/nature of the facilities taking place at the site have expanded and now include additional activities listed in Part 2 of Schedule 1 to the Environmental Permitting Regulations and additional directly associated activities. - Section 5.4 Part A(1)(b)(i) - Anaerobic Digestion (AD) of liquid feed stock including waste streams produced by the installation. - Section 1.2 Part A(1)(a) - Conditioning of biogas produced by the AD plant. - Combined Heat and Power (CHP) plant - Emergency flare operation - Gas storage - Digestate storage	✓
European Directives		
Applicable directives	All applicable European directives have been considered in the determination of the application.	✓

Aspect considered	Justification / Detail	Criteria met Yes
The site		
Extent of the site of the facility	The operator has provided a plan which we consider is satisfactory, showing the extent of the site of the facility including discharge points. The installation boundary is extended to incorporate the new AD and CHP plants (area shaded red) located adjacent to the existing ETP.  A plan is included in the permit and the operator is required to carry on the permitted activities within the site boundary.	✓
Site condition report	The operator has provided a description of the condition of the site. We consider this description is not satisfactory, see key issues section above. The decision was taken in accordance with our guidance on site condition reports and baseline reporting under IED– guidance and templates (H5).	✓

Aspect considered	Justification / Detail	Criteria met Yes
Biodiversity, Heritage, Landscape and Nature Conservation	The application is within the relevant distance criteria of a site of heritage, landscape or nature conservation, and/or protected species or habitat. See key issues section above. We have not formally consulted Natural England on the application, we sent the completed Appendix 11 for information only. The decision was taken in accordance with our guidance.	✓
Environmental Risk Assessment and operating techniques		
Environmental risk	We have reviewed the operator's assessment of the environmental risk from the facility. The operator's risk assessment is satisfactory.	✓
Operating techniques	We have reviewed the techniques used by the operator and compared these with the relevant guidance notes. The proposed techniques/ emission levels for priorities for control are in line with the benchmark levels contained in the TGN and we consider them to represent appropriate techniques for the facility. The permit conditions ensure compliance with relevant BREFs.	✓
The permit conditions		
Use of conditions other than those from the template	Based on the information in the application, we do not consider that we need to impose conditions other than those in our permit template, which was developed in consultation with industry having regard to the relevant legislation.	✓
Odour	While we consider that the Applicant's proposals represent the appropriate measures to prevent/ minimise odour from the permitted activities, we also consider that it is appropriate to impose a requirement to submit an odour management plan, see improvement conditions below and key issues section above.	✓
Raw materials	We have not specified limits and controls on the use of raw materials and fuels.	✓

Aspect considered	Justification / Detail	Criteria met Yes
Waste types	The AD & ETP will treat waste produced by the installation only, table S1.1 specifies the wastes that can be treated.	✓
Pre-operational conditions	Based on the information in the application, we have imposed a pre-operational condition requiring identification and classification of areas of the Installation where explosive atmospheres may occur and how they will be appropriately managed.	✓
Improvement conditions	Based on the information on the application, we consider that we need to impose improvement conditions. We have imposed improvement conditions to ensure that: ➢ appropriate management systems and management structures are in place and that sufficient financial, technical and manpower resources are available to the operator to ensure compliance with all the permit conditions. ➢ the appropriate measures are in place to prevent fugitive emissions. ➢ the appropriate measures are in place to prevent pollution from odour. ➢ the appropriate controls are in place to prevent emissions to water, air and land.	✓
Incorporating the application	We have specified that the applicant must operate the permit in accordance with descriptions in the application, including all additional information received as part of the determination process. These descriptions are specified in the Operating Techniques table in the permit.	✓

Aspect considered	Justification / Detail	Criteria met Yes
Emission limits	We have decided that emission limits are not required for emissions to air, see key issues section above. We have set a limit for the release of iron to water and reduced the phosphorus limit, see key issues section above.	✓
Monitoring	We have decided that monitoring should be carried out for the parameters listed in the permit, using the methods detailed and to the frequencies specified. These monitoring requirements have been imposed in order to gather information about the performance of the AD plant. Based on the information in the application we are satisfied that the operator's techniques, personnel and equipment have either MCERTS certification or MCERTS accreditation as appropriate.	✓
Reporting	We have specified reporting in the permit to demonstrate compliance with limits imposed and to check performance of the plant.	✓
Operator Competence		
Environment management system	There is no known reason to consider that the operator will not have the management systems to enable it to comply with the permit conditions. The decision was taken in accordance with RGN 5 on Operator Competence.	✓

Aspect considered	Justification / Detail	Criteria met
		Yes
Relevant convictions	The National Enforcement Database has been checked to ensure that all relevant convictions have been declared. No relevant convictions were found. The operator satisfies the criteria in RGN 5 on Operator Competence.	✓
Financial provision	There is no known reason to consider that the operator will not be financially able to comply with the permit conditions. The decision was taken in accordance with RGN 5 on Operator Competence.	✓

Annex 2: Consultation and web publicising responses

We advertised the Application by a notice placed on our website, which contained all the information required by the IED, including telling people where and when they could see a copy of the Application.

We sent copies of the Application to the following bodies, which includes those with whom we have "Working Together Agreements":

- Local Authority – Environmental Health & Planning
- Food Standards Agency
- Health & Safety Executive
- Public Health England
- United Utilities
- Northern Gas Networks (required to consult due to the injection of gas into the national transmission system through the grid entry unit (GEU)).

Summary of responses to consultation and web publication and the way in which we have taken these into account in the determination process.

Response received from
Northern Gas Networks (NGN), Project Manager (Bio-Methane Projects), response by email 4 March 2016.
Brief summary of issues raised
NGN confirm that the project involvement from their perspective is to inject bio-methane with the correct quality, temperature and pressure into the NGN Network, via the producers Gas Entry Unit. As such they confirm they have no dealings with any works prior to the network entry facility and therefore have no comments to make on the Application.
Summary of actions taken or show how this has been covered
No action required.

Response received from
Health & Safety Executive, HM Inspector of Health & Safety/API, response by email 4 March 2016
Brief summary of issues raised
HSE confirm they have no comments to make.
Summary of actions taken or show how this has been covered
No action required.

Response received from
Public Health England (PHE), Environmental Public Health Scientist, response by letter dated 31 March 2016
Brief summary of issues raised
1) It is noted that we have questioned the operator's proposal to burn the gas flare at a temperature lower than recommended in our guidance. It is recommended that we are satisfied that the proposed burn conditions are BAT. 2) It is noted that we have requested further information relating to the conditioning of the gas to feed into the national gas grid, which falls under a separate Activity listed in Schedule 1 of the Environmental Permitting Regulations. Comments on this will be provided once the additional information has been received. 3) It is noted that we have requested further information relating to spillage containment and releases to surface waters. PHE are supportive of the need to ensure that appropriate measures are in place to control these emissions. 4) Recommend that the accident management plan for the site be updated to reflect the variation. 5) It is noted that the operator proposes to produce an odour management plan during the first six months of operation of the new assets. However, due to the potentially odorous nature of the AD plant and associated activities and the proximity of residential property, we would recommend that an odour management plan be in place prior to operation of the new activities. 6) A noise risk assessment is not included. 7) The application includes a spill investigation report, which is referred to as a SCR bridging report. It is also noted that there is a planning condition to investigate the land prior to development. Recommend that we communicate with the local authority to establish the baseline ground conditions for the site and agree any remedial measures required.
Summary of actions taken or show how this has been covered
1) We have accepted the lower temperature based on the consistent nature of the AD feed stock and hence the biogas produced and its limited use which will be <2% of the operational time for the facility. We have secured this by incorporating into Table S1.2 of the permit. 2) We have sent the additional information provided by the Operator. 3) We have set an improvement condition to address drainage and containment at the facility.

4) We have set an improvement condition requiring an update of the EMS which will include the accident management plan. 5) We have set an improvement condition requiring submission of an OMP within the first six months. We accept the Operators claim that the potential for odour generation is low; refer to key issues section above. 6) It is not anticipated that the changes will result in any increases to noise levels. Permit conditions will ensure that the appropriate controls are in place.

Response received from
Public Health England (PHE), Environmental Public Health Scientist, response by letter dated 18 April 2016
Brief summary of issues raised
1) In relation to point 2 above, we sent the additional information to PHE who suggested that we should either satisfy ourselves that the activities present a low odour risk or whether they are potentially odorous and be documented in an OMP. They note that the Operator stated in the original Application that an OMP would be produced during the first six months of operation; however the additional information states that it will be reviewed within the first year of operation.
Summary of actions taken or show how this has been covered
1) We have set an improvement condition requiring submission of an OMP within the first six months. We accept the Operators claim that the potential for odour generation is low; refer to key issues section above.

Response received from
United Utilities, Trade Effluent Analyst, response by letter dated 04 April 2016
Brief summary of issues raised
Historic incidences of process effluent entering the public sewer and having an adverse impact on the effluent treatment works. Such incidents have been due to damaged process drains allowing the process effluent to enter the foul sewer drain and then entering the public sewer. That the company failed to declare a relevant offence in their application for a prosecution in August 2014 relating to process water entering the public sewer. General concerns around the mapping and monitoring of process drains and their assessment of risk relating to the public sewer. That the operator has not identified the public sewer that runs adjacent to the facility and goes through the existing and new ETP. That there has been no assessment of risk in relation to the public sewer as a result of process failures or planned excavations/construction. That Network/Developer Services must be consulted to approve the line and excavation foot print of the new underground pipe line and hard standing in respect of its proximity and potential impact on the public sewer. Access to the public sewer and public sewer manholes should not be compromised.
Summary of actions taken or show how this has been covered
Prosecution under the Water Industry Act is not a relevant offence for the Environmental Permit application process, therefore there is no requirement to disclose the offence here. Incidents regarding loss of containment have been recognised generally within the Application (including specific references in Section 3.3.8 of the Site Condition Report (SCR), noting that these are in relation to the ETP area only as this is the area of concern for the variation). The investigation into the consequences of an incident in 2013 is presented as an appendix within the SCR. The situation with regard to the approach to integrity and mitigation of risk is being addressed. The Operator completed a drain survey in April and July 2015, (as stated within the application), and an improvement plan for the drainage and surfacing has been presented, with the intention of delivering full containment of the current areas within two years. This approach has been chosen to prevent repeat occurrences of the losses to ground and subsequent contamination issues identified in the past, this will include the risk to the public sewer. The public sewer was identified within the development of the new plant, however the build considerations associated with the public sewer are not required with this application as the environmental permit relates to

operational aspects and not construction of the development – this aspect is covered separately as part of the planning application. We have set an improvement condition to address the deficiencies (see below). Also refer to Section 1.9 in the Key issues above.		
IC13	The Operator shall undertake a detailed topographical survey of the site and a detailed survey of the existing site drainage systems to develop the detailed design for containment at the facility in accordance with the Effluent Treatment Plant, Containment Strategy Outline Design report dated March 2016. The Operator shall submit a proposal for approval for the detailed design containment measures which shall include timescales for implementation. The Operator shall submit reports on progress with implementation of the approved containment measures on a quarterly basis specified by this condition.	Detailed design proposal 31/08/16 Progress reports by 31/12/16 31/03/17 30/06/17 30/09/17 31/12/17