

APPLICATION TO VARY A POLLUTION PREVENTION AND CONTROL PERMIT

Reference PPC/A/1032878
Dunbar Energy Recovery Facility (ERF)
Supporting Information Document

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Application to Vary a
Pollution Prevention and
Control Permit
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REPORT

Quality Management

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Prepared by:

RPS


Technical Director

6-7
Lovers Walk
Brighton
BN1 6AH

T 
E 

Prepared for:

Viridor Dunbar Waste Services Limited


Permitting Manager

Pilsworth LFS
Pilsworth
Bury
BL9 8QZ

T 
E 

NON-TECHNICAL SUMMARY

This application to vary a Pollution Prevention and Control (PPC) permit has been prepared by RPS on behalf of the operator, Viridor Dunbar Waste Services Limited (VDWSL), in accordance with the requirements of the Pollution Prevention and Control (Scotland) Regulations 2012 (PPC 2012).

The current activities at the Dunbar Energy Recovery Facility (ERF) are permitted under a Pollution Prevention and Control permit, reference PPC/A/1032878 which allows the incineration of non-hazardous waste in an incineration or co-incineration plant with subsequent electricity generation.

The installation has performed well, and the downtime required for servicing and maintenance of the two lines has been less than anticipated at the time of the application. Improvements in this area indicate that it will be theoretically possible to achieve 100% availability.

This application seeks to vary the PPC permit to increase the annual waste throughput at the permitted facility from 325,000 tonnes per annum to a maximum of 390,000 tonnes per annum. The incoming waste is predicted to have a lower CV than that previously quoted, with improved plastics recycling upstream, there is an expectation that the CV will decrease to around 9.0 MJ/kg. This fall in CV allows more waste to be processed whilst remaining within the thermal capacity of the furnace and is viewed to be the most likely maximum continuous throughput based on the known facts at the time this application is made. There will be no changes to the site plant or infrastructure.

The increase in throughput is partly due to improvements offered by the technology provider to increase the operational envelope via software modifications. These give an increased performance and efficiency allowing an increased capacity and throughput of waste. This is based on evidence from the operation of plant at other facilities which shows a greater operational capacity and output than previously stated. The installed plant has been reviewed and it was concluded that the equipment and plant are suitable for continuous operation at the higher throughput. Trials undertaken in 2019 also confirmed that the plant could successfully operate within current emission limits and the plant noise performance remained within existing guarantees.

The increase is also due to the capacity being calculated on a higher throughput at a lower calorific value and operation for 8,760 hours per annum. The increase in plant availability is based on an expectation that maintenance shutdowns will not necessarily be required every year and therefore some years the plant could operate continuously for a whole year. Where maintenance shutdowns are necessary the plant availability will be reduced and correspondingly the permitted maximum throughput may not be reached in those years.

Due to the increase in waste throughput, the exhaust gas characteristics will change and higher flowrates would be expected. An air quality modelling assessment has been undertaken to establish the effects of the increased throughput. The modelling predicts that there would be no significant impact to human health receptors due to the proposed increase in waste throughput. The assessment also considered impacts at ecological receptors and following consideration of the ecological sensitivities of these receptors by an ecologist it was concluded that impacts would not be significant. A revised Human Health Risk Assessment has also been completed and confirmed that there would be no significant impact from operating the plant with the higher throughput.

The scope of both the air quality and human health risk assessments were agreed with SEPA.

As a result of this variation, it is expected that a net change of 7 additional deliveries (waste, raw materials and residues) per day to the site will be required, this equates to an average of 1-2 vehicle movements per hour. The change to noise impacts from these 7 additional vehicles (14, 2-way movements) is not expected to be significant. Further as above, during plant trials noise levels were confirmed to be within existing guaranteed levels. On this basis no significant change to noise impacts from the operation of the facility is expected and, on this basis existing management measures for noise remain appropriate.

It is considered that the increased input rate will mean that the maximum quantity of waste stored in the bunker at any one time will not change. It is also considered that the current infrastructure is sufficient to safely manage all residues from the process. Indeed, the site operates more efficiently than was initially expected.

There will be no change to the waste types stored, no increase in the capacity of the bunker to hold waste and no increase the duration that waste will be stored. On this basis there will be no significant change to odour impacts and existing controls and management measures for odour will continue to remain appropriate.

Although there is a small increase in vehicle movements these will not significantly increase accident risks. On this basis the existing accident management measures will remain appropriate.

The proposed variation will amend permit conditions 1.1.3(b), 1.1.3(d) and 4.2.1 to the following:

- 1.1.3(b) shall read . two continuous multi-stage air-cooled moving grate incinerators with water-cooled wear zone comprising primary and secondary combustion zones each capable of burning 195,000 tonnes per line per annum, with a total capacity of 390,000 tonnes per annum. Each incinerator is fed from a waste feeding chute and comprises a hydraulically driven feed grate; air-cooled combustion grate with water-cooled wear zone; primary air feed via the underside of the grates; secondary air feed above the grates via a distribution system; hoppers to collect bottom ash and two gas-oil fired auxiliary burners.
- 1.1.3(d) shall read . two heat recovery lines feeding into one common electricity generation system. Each heat recovery line comprising: a waste heat recovery boiler integrated with the incinerator furnace and fitted with three vertical radiant passes and a fourth horizontal convective section including a superheater, evaporator and economiser bundles. The waste heat boiler produces superheated steam which is passed to a condensing steam turbine and generator (one common unit) capable of generating (at the design point of 24 tonnes per hour) a total of 36.34 electrical (MWe) and exporting either 33.72 MWe without heat export, or 30.25 MWe and up to 17.85 MW_{th} of heat as low-pressure steam or hot water;
- 4.2.1 shall read . The aggregate amount of the wastes specified in Condition 4.1.1 that may be incinerated in the permitted installation shall not exceed 390,000 tonnes in any calendar year and shall not exceed an average of 24 tonnes per hour (t/hr) per line in any 24-hour period. The method of recording this data shall be agreed in writing with SEPA at least 6 months prior to the first operation of the Permitted Installation.

The variation will allow the plant to optimise use of the furnaces, generating additional energy and diverting more residual waste from landfill. There will be no significant impact on emissions to the environment as a result of this change.

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- Appendix C Energy Balance
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1 INTRODUCTION

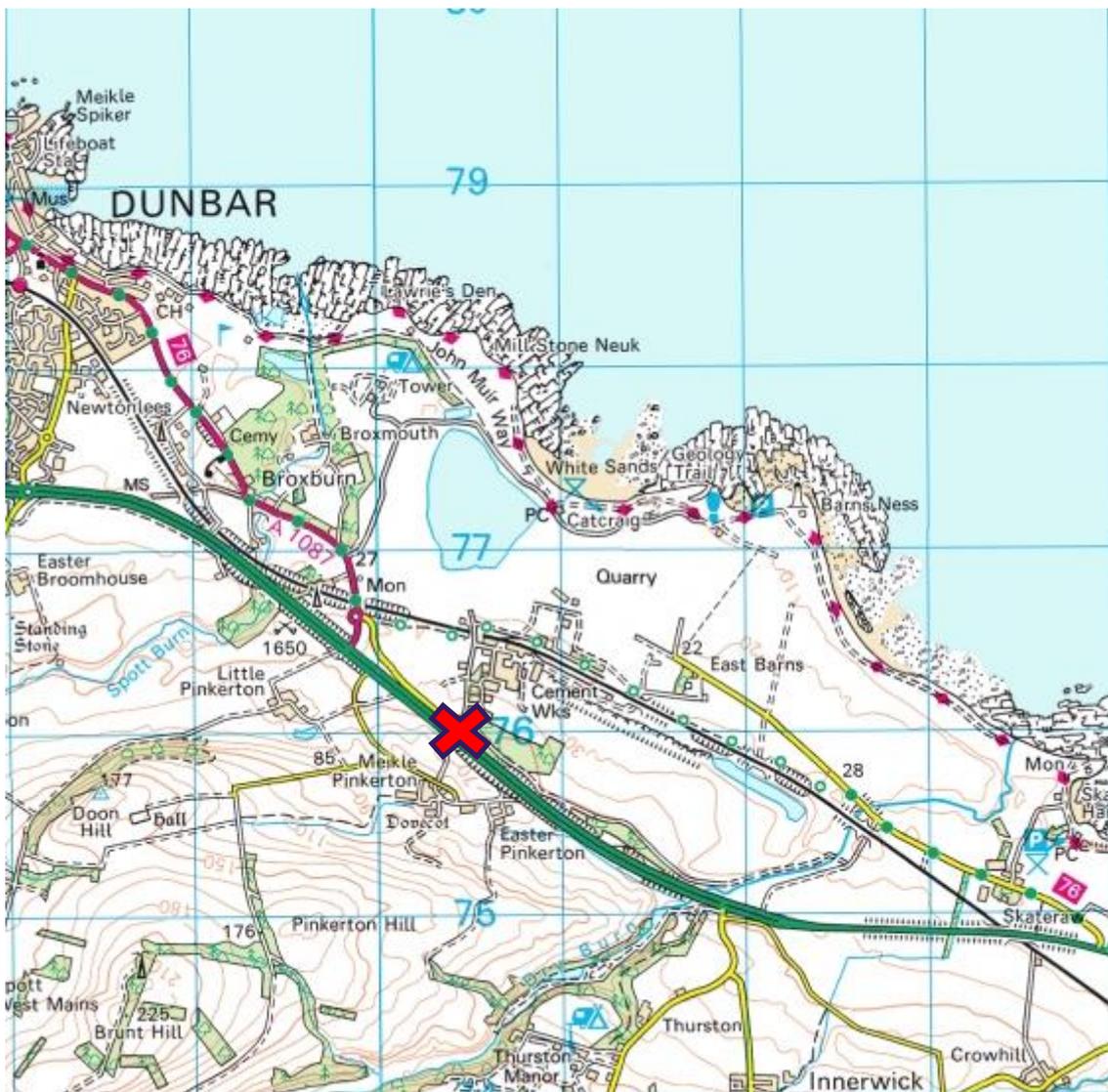
1.1 Background

- 1.1.1 Viridor Dunbar Waste Services Limited (Viridor) was granted a Pollution Prevention Control (PPC) permit (reference PPC/A/1032878) to operate the Dunbar Energy Recovery Facility (ERF) with Combined Heat and Power (CHP). The permit allows the combustion of non-hazardous waste in an incineration plant and subsequent generation of electricity. This document and its supporting appendices form the application to vary the permit.
- 1.1.2 The site is located at Oxwellmains landfill site, Dunbar, East Lothian, EH42 1SW approximately 4.5km to the south east of Dunbar. The site is centred at national grid reference NT 71147 76012.

1.2 The Site

- 1.2.1 The site is located to the south east of Dunbar and is surrounded mainly by agricultural land and the coast.
- 1.2.2 The approximate location of the site is highlighted by the red X on the map in Figure 1-1 below.

Figure 1-1: Site Location



1.2.3 There is no change to the site layout plans provided in the previous application.

1.3 Proposed Variation

- 1.3.1 This variation application seeks to permit an increase in the annual waste throughput from 325,000 tonnes to 390,000 tonnes. As a result of this, the electricity production available for export and the heat output from the site will increase.
- 1.3.2 No change to the makeup of the waste or range of calorific values that the plant can accept is proposed, and there will be no change to the plant design or site infrastructure.
- 1.3.3 The waste production will increase proportionately to the increased throughput at the site.
- 1.3.4 The increase in throughput is due to improvements of the thermal rating of the incinerator by the technology provider which gives an increased performance and efficiency allowing an increased capacity and throughput of waste. This is based on evidence from the operation of plant at other facilities which shows a greater operational capacity and output than previously calculated.
- 1.3.5 As well as the above changes, some administration changes for the permit as also included in this variation application.

1.4 Type of Variation

- 1.4.1 A review of SEPA guidance document [IED-TG-03: Identifying a Substantial Change Variation¹](#) has concluded that the proposed changes will lead to the application being classed as a substantial variation.

1.5 Planning Consideration

- 1.5.1 A copy of the planning decision notice is provided in **Appendix F**. The planning consent does not include conditions that limit the throughput of the ERF nor limits on the vehicle movements. There are no specific conditions restricting the volumetric flow of emissions to air from the two flues associated with the ERF. The permission included a total of 17 conditions which are reviewed below.
- 1.5.2 Conditions 1, 2 and 3 relate to the physical arrangement of the ERF, finishes of all components and lighting arrangements. Given there are no changes to the ERF infrastructure this variation will not introduce changes to the submitted and agreed information for these conditions.
- 1.5.3 Condition 4 and 5 cover demonstration of reasonable and practicable efforts to ensure only residual waste is accepted and restrict the areas where waste can be sourced from. This variation does not seek to change the wastes that are currently accepted at the facility or specifically introduce new waste sources.
- 1.5.4 Conditions 6 and 7 relate to energy efficient and introduce a requirement to implement a heat plan. An updated heat plan has been prepared to support this variation and a copy will also be provided to the Council under the terms of these conditions.
- 1.5.5 Condition 8 relates to surface water management and SUDs. The proposals do not change current measures for surface management at the ERF.
- 1.5.6 Condition 9, 12 and 14 cover only the construction/site preparation phase. Construction is complete and no further construction is required.

¹ https://www.sepa.org.uk/media/361879/ied_tg_03_identifying_a_substantial_change_variation.pdf

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- 1.5.7 Condition 10 and 11 requires a landscaping scheme and habitat plan to be approved. The proposals will not introduce changes to landscaping nor the approved habitat plan at the ERF.
- 1.5.8 Condition 13 requires the implementation of an approved odour management plan. As detailed in section 3.7 the proposals will not increase the risk of odour or require modifications to the agreed odour management plan.
- 1.5.9 Condition 15, 16 and 17 concern the provision of a footway/cycleway, maintenance of the railhead and the provision of artwork. These conditions have been discharged and will not be changed by this variation.
- 1.5.10 In conclusion the nature of the changes remain within the scope of the planning consent, as previously established with the last variation issued by SEPA.

2 DESCRIPTION OF THE CHANGES

2.1 Overview

- 2.1.1 This section describes the proposed technical changes to the permit subject to this application and the administrative changes the operator is seeking to make to the permit.

2.2 Percentage MCR, Waste Throughput, Calorific Value and Operating Hours

- 2.2.1 At the time of the original application being made and subsequently when the permit was varied in 2014 to update to the technology now installed, it was assumed that the calorific value (CV) of incoming waste would be approximately 10 MJ/kg. The firing diagram submitted with the 2014 variation shows that this would give a maximum waste input of around 22.63 tonnes per hour on each line at 100% fuel throughput.
- 2.2.2 Operating the plant and optimising its performance with the technology provider has shown that the furnaces could accommodate an additional 5% thermal input on each line, above that shown on the 2014 firing diagram (see **Appendix A**). Whilst the overall operational envelop of the facility has not changed, the continuous operating area of the operational envelop has extended into the overload area. The thermal capacity of each line of the ERF when operating at 105% increases from 53.4 MW to 56.07MW.
- 2.2.3 Going forwards, the incoming waste is predicted to have a lower CV than that previously expected. With improved plastics recycling upstream, there is an expectation that the CV will decrease to around 9.0 MJ/kg. This fall in CV allows further waste to be processed whilst remaining within the thermal capacity of the ERF.
- 2.2.4 Further, the plant was previously permitted using an availability of 8,446 hours allowing for a planned annual shutdown. Viridor has moved to an 18-month outage cycle where it is possible in certain years the facility will be run continuously. It is expected that the plant will not need a major maintenance shutdown every year and therefore the plant availability could increase to 8,760 hours per annum for those years where a maintenance shutdown is not required.
- 2.2.5 The effect of these changes increases the annual throughput of the facility is expected to be 390,000 tonnes based on a CV of circa 9.0 MJ/kg. The maximum throughput in mechanical overload is 25.09 tonnes per annum, however this is purely to manage operational fluctuations and the plant is unlikely to be operated continuously at this throughput. A summary of the operating parameters being sought via this variation is provided in Table 2-1 below.

Table 2-1 – Summary of Operational Parameters to be Permitted

Parameter	Value
Percentage MCR, percentage (%)	105
Maximum hourly throughput (continuous operation), tonnes per hour (tphr)	24.00
Maximum annual throughput, tonnes per annum (tpa)	390,000
Calorific value, mega joules per kilogram (MJ/kg)	9 MJ/kg
Annual operating hours, hours (hr)	8,760

- 2.2.6 The procedure used for recording plant throughput and operational capacity will continue to be used to demonstrate that the increase tonnage of 390,000 tonnes per annum will not be exceed.

2.3 Assessment of the Installed Plant and Systems

- 2.3.1 A review of the ability of the installed plant to operate at the proposed increased waste throughput has been carried out by Babcock and Wilcox Vølund (BWV), see **Appendix G**. The review considered the installed plant and systems and concluded that the facility was capable of operating at the proposed 105% MCR without the need for plant or equipment changes.
- 2.3.2 The only change required relates to changes to the software. This was limited to modifying the steam set point.
- 2.3.3 Trials with the plant operating at the proposed 105% MCR were carried out by BWV to validate the ERF performance when operating at this rate. A copy of the performance validation test report is provided in **Appendix G**.
- 2.3.4 Whilst the flue gas volume will increase, it should be noted that increased flowrates do not necessarily lead to reduced residence time as at high flows there is greater turbulence and increased path lengths for gases circulating in the qualifying zone. CFD modelling has previously been undertaken to demonstrate that the ERF can operate in compliance with the IED requirement to meet 2 seconds residence time at 850°C and this has subsequently been validated via tests under the most unfavourable conditions.

2.4 Raw Materials and Waste Residues

- 2.4.1 The increased operational capacity and throughput of waste will lead to a proportional increase in the use of raw materials in the process and the resulting waste residues produced at the site. Details of the changes can be found in Table 3.1 below.

2.5 Environmental Management System

- 2.5.1 Site operational procedures for acceptance and management of incoming waste will not change as a result of this proposed variation. The same waste types will be received and there will be only a small increase in daily deliveries, on this basis the existing procedures will remain appropriate. Similarly, procedures for management of deliveries of raw material and removal of residues will similarly remain the same, see section 3.9 for further detail.
- 2.5.2 Environmental risks are discussed in section 3 and concludes that the increased risk from this variation is not significant. On this basis, the existing systems for management of these risks remains appropriate.
- 2.5.3 There will be no change to the in-process control systems or emissions controls systems as part of this variation, with the exception of the update to the steam set point. There will be no other changes to other plant settings, interlocks etc.
- 2.5.4 The proposals will not introduce new emission points or changes to the pollutants released. As part of the management of change for this variation the Babcock and Wilcox Vølund (BWV) undertook a review of the installed plant to confirm the plant design was capable of operating at the proposed 105% throughput, this was further verified via plant trials (see **Appendix G**). Given the plant design is capable to operating at the increased throughput without any physical changes to the plant, plant operating procedures will remain appropriate.
- 2.5.5 The management system will continue to be operated to comply with the requirements of the PPC permit.

3 ENVIRONMENTAL RISKS AND EFFECTS

3.1 Point Source Emissions to Air

- 3.1.1 As a result of the variation, there will be an increase in emissions to air as there will be an increased throughput of waste at the site and thus a corresponding increase in the exhaust gas volumes released from the ERF.
- 3.1.2 An air quality assessment has been undertaken to compare the current and future emissions, this can be found in **Appendix B**. The exhaust gas parameters are detailed in the air quality assessment. The flow rates correspond to measured flowrates when the ERF was operating at 105% MCR during plant tests undertaken in March 2019 and with waste of a CV ranging between 11.1-11.3 MJ/kg. The assessment concludes that overall, there are minor differences in the updated results compared with the previous results and the air quality effects of the revised scheme are not expected to be any more significant than existing effects.
- 3.1.3 The model considered both the potential human health impacts and the impact of emissions to air on protected habitats, demonstrating that both air quality and potential acid or nutrient deposition, would be well within the required limits.
- 3.1.4 The conclusion of the modelling exercise is that the impact of the proposed changes will be negligible with resulting air quality remaining well within the statutory limits and the recommended limits set by the SEPA.
- 3.1.5 A Human Health Risk Assessment (HHRA) was also completed to consider the potential impact of inhalation of emissions from the installation or ingestion of any contaminants from the installation entering the food chain. The report concluded that all impacts were within the limits set for the protection of human health. The HHRA is included as **Appendix D**.
- 3.1.6 Emissions to air will continue to be effectively controlled via the current abatement system. That is, the exhaust gas will be treated with activated carbon and lime before being treated via bag filters to remove particulates. Selective Non-Catalytic Reduction, using ammonia dosed in the furnace, to control NO_x emissions will continue to be utilised. The performance validation report (**Appendix G**) confirms the emissions performance of the abatement plant can meet ELVs when operating at 105% MCR.
- 3.1.7 There will be no changes to the permitted emission limit values for emissions to air, these will remain as detailed in Table 6.1 of the PPC permit.
- 3.1.8 The impact of the variation is that additional activated carbon, lime and ammonia may need to be used, in order to ensure that the species of concern have been fully abated. This increased dosing will be carefully controlled, through continuous monitoring and automatically controlled dosing systems which adjust to the composition of the exhaust gas, as they do currently. The increased use of raw materials is addressed in section 3.9.

3.2 Point Source Emissions to Water

- 3.2.1 There are no proposed changes to the point source emissions to water for the improved operation.

3.3 Point Source Emissions to Groundwater

- 3.3.1 There will continue to be no point source emissions to groundwater.

3.4 Point Source Emissions to Land

- 3.4.1 There are no point source emissions to land.

3.5 Fugitive Emissions to Air, Land and Water

- 3.5.1 The proposed changes will not result in any increased fugitive emissions and the operations on site will continue to be operated using the plans and procedures detailed in the site environmental management systems.

3.6 Accident Management

- 3.6.1 The company operates an accident management plan as part of the environmental management system. There will be no increased risk of accidents at the site as a result of the variation provided the details included in the accident management plan continue to be followed. These are measures such as barriers and the provision of spill kits.
- 3.6.2 As detailed in section 3.8 it is expected that there will be an additional 7 daily movements. This is equivalent to less than 1 vehicle per hour which is not considered to present a significant increase in accident risk associated with vehicle movements onsite. Therefore, the current accident management techniques will be sufficient to manage this small increase in movements.
- 3.6.3 Furthermore, the move to operation 8,760 hours some years is based on operational performance which has demonstrated that annual shutdowns are not needed. Therefore, risk of increased breakdown leading to enforced shutdowns is low. The increase in reagent deliveries is small (see **Appendix H**) and therefore the risk of running out of reagent is similarly low and not significantly different to the risk for the permitted operations. As a result of the small increase in reagent deliveries the increased risk in spillages associated with deliveries is not significant and existing management measures are considered to remain appropriate.
- 3.6.4 Based on the above the existing accident management measures are considered appropriate and an update to the accident management plan will not be required as a result of this proposed variation.

3.7 Odour

- 3.7.1 There is no increased risk of odours as a result of the proposed variation.
- 3.7.2 The bunker area for waste will continue to be under negative pressure with extracted air being used in the combustion process. Due to the increased operational capacity and throughput of waste, it is anticipated that the risk of odour generation from the operations could reduce due to the increased air extraction for the combustion process. There will also be reduced planned maintenance shutdowns when one or both lines are off, providing fewer times when the bunker area has reduced or no air being extracted for combustion. Given the bunker volume is not increasing there will be no increased risk associated with storage of waste during planned or unplanned shutdowns. The volume of waste in the bunker will be no greater than that currently stored during a shutdown and the types of waste stored are not changing. On this basis the current approach of closing the tipping hall doors and maintenance hatches combined with the use of deodorisers within the tipping hall remains appropriate.
- 3.7.3 There will be no change to the storage time of waste in the bunker, increased waste deliveries will result in correspondingly higher waste throughputs.

3.8 Noise

- 3.8.1 There is no change to the plant operated at the site. Although plant availability will increase, the original noise assessment assumed continuous operation and the assessment was made on this basis. The installed plant is not being modified, replaced or upgraded to accommodate this variation and therefore there are no new or modified noise sources to assess from the installed plant. The turbine cannot be operated at higher turbine speeds than it was designed for. The main ID fan and ACC fans will be the same units that are currently installed. All plant items will remain in operation within the duty range they have been designed for. As part of the plant validation tests BWV

undertook noise monitoring to confirm that the noise guarantees for ERF would still be met when operating at 105% MCR, this is confirmed in the performance validation testing report in **Appendix G**.

- 3.8.2 The variation is not expected to significantly increase the likelihood of steam venting. Given the proposals are expected to remove the need for the annual maintenance shut-down and start-up there may even be reduced risk as a result of maintaining normal operations.
- 3.8.3 Although the variation seeks to allow an additional 65,000 tonnes of waste per annum the annual operating hours is also to increasing from 8,446 hours per annum (as currently permitted) to 8,760 hours per annum (as per this variation application) equivalent to an additional 13 days operation per annum. On this basis the daily deliveries will only increase by circa 7 deliveries per day (14 two way movements). Details of the calculations supporting this increase are provided in **Appendix H**. There will be a slight increase in traffic movements at the site, however, these will be minimal and will not result in any noticeable increase in noise impacts.

3.9 Raw Materials

- 3.9.1 It is a requirement of the PPC permit that raw material usage is monitored, to ensure that they are being used as efficiently as possible, minimising wastage and their impact on the environment. In addition to the increased tonnage of waste to be processed there will be a need for increased chemical usage at the site, for example to treat the exhaust gases and to treat boiler water.
- 3.9.2 The existing storage capacities for raw materials will remain unchanged. To accommodate the slight increases in raw material consumption a very small increase in raw material deliveries will be required (see detail in **Appendix H**).
- 3.9.3 In tandem with the increased waste throughput the plant is seeking longer operating hours and on this basis the increase in daily deliveries is estimated to be 7 deliveries. The waste bunker will remain appropriate as the increase in waste being delivered will be met by increased waste feed into the ERF.
- 3.9.4 No change to the procedures for the storage and handling of fuels, chemicals and reagents on site are required.
- 3.9.5 The raw materials increase as a result of the proposed variation is detailed in Table 3.1 below:

Table 3-1 – Types and Amounts of Raw Materials

Description of raw material and composition	Current Annual Usage	Proposed Annual Usage	Use of the raw material
Ammonia	970 tpa	1,165 tpa	NOx abatement
Hydrated Lime	4,950 tpa	5,950 tpa	Acid gas abatement
Activated Carbon	110 tpa	130 tpa	Dioxins and Heavy Metals abatement
Mains Water	43,680 m ³	50,200 m ³	All processes: e.g. Water Treatment Installation, Auxiliary cooling, domestic water use
Gas oil (Auxiliary fuel)	410 kg	495 kg	Fuel for supplementary burners

3.9.6 Raw material usage will continue to be monitored and recorded in the annual performance reports. At least once every four years consideration will be given to whether suitable less hazardous alternatives have become available.

3.10 Waste Residues

3.10.1 The permitted activity allows for ash residues treatment and storage comprising hoppers, screw conveyors, bottom ash quench system and storage areas for fly ash (consisting of dust from boiler passes and residues from flue gas treatment) and bottom ash. Collection and storage of blow down water in a process water tank for re-use as ash quench.

3.10.2 As a result of the variation, changes to the amounts of waste residues will be as follows:

Table 3-2 – Types and Amounts of Waste Residues

Residual Waste	Current Annual Production	Predicted Annual Production	Storage Capacity
Bottom ash	91,330 tpa*	83,850 tpa*	60 m ³ for 7 days storage
APCr	14,720 tpa	17,700 tpa	~ 200 m ³ for 4 days storage

* Current annual production was based on that in the original application. The revised predicted annual tonnage has been scaled on actual IBA production tonnage rates.

3.10.3 As shown in Table 3-2 there is an expected reduction in Bottom Ash produced at the site, this is due to the volumes of bottom ash being nearly 10% lower than expected at the time of the original application. The nature of the bottom ash is not expected to change significantly as the proposed wastes to be accepted have not changed and partitioning of potential contaminants will not change. The installed furnace has been designed to accommodate the feed rate that is being applied for whilst achieving effective combustion and ensuring burn out meets IED requirements for LOI or TOC.

3.10.4 Although there will be an increase in APCr production, this will not result in an increased environmental risk as the same control measures will continue to be used for storage and handling. The risks due to handling increased amounts of APCr are not considered significant, a single additional waste collection per day is expected.

3.11 Energy Efficiency

- 3.11.1 In electricity only mode the plant will generate up to 36.34 MWe, of which approximately 33.72 MWe will be exported to the national grid and 2.62 MWe used to meet the plant parasitic load. In this mode, the net efficiency will be approximately 30% (gross 32%), increasing for the maximum heat export scenario to approximately 43%.
- 3.11.2 Updated energy balances are provided in **Appendix C** for both the electricity only and maximum heat export scenarios. Overall the revised proposals provide energy efficiency benefits comparable to the permitted scheme.
- 3.11.3 The existing electrical connection is confirmed as sufficient for the export of electricity at the proposed increased rate. It should be noted that the proposed operating range remains within the envelop that the plant was originally designed for.

3.12 Monitoring

- 3.12.1 Due to the negligible change in emissions as a result of the increase in waste throughput, there will be no change on the abatement techniques and therefore no change to the monitoring programme or reporting.

3.13 Conclusions

- 3.13.1 It has been possible to increase the waste inputs at the Dunbar EfW due to greater availability of the plant, improved efficiency and change to the operational window. This will enable the plant to process up to 390,000 tonnes of waste per year.
- 3.13.2 This will divert up to 65,000 tonnes of waste from landfill compared to the currently approved permit limit when the plant operates at capacity.
- 3.13.3 An Air Quality Assessment has been carried out and this has demonstrated that the increased throughput will not have any significant impact on local air quality which will remain well within the statutory air quality limits and within the recommended limits where no statutory limit applies.
- 3.13.4 The site will continue to operate in accordance with the best available techniques and emissions to the environment will continue to be effectively controlled, preventing any significant impacts as a result of the variation.

4 BEST AVAILABLE TECHNIQUES (BAT) ASSESSMENT

- 4.1.1 The proposed plant and abatement have been demonstrated previously as meeting BAT. A review undertaken by BWV has confirmed that key plant remains appropriate for operation at 105% of the MCR and this is supported by performance validation tests.
- 4.1.2 The proposed changes increase the efficiency of the ERF compared to the permitted scheme. The BAT associated energy efficiency level for existing plant in electricity only is 20-35% (gross). A comparison of the efficiency of the Dunbar ERF with the BAT AEEL, calculated as required by BAT 20 is presented in **Appendix G** and confirms that the efficiency compares well with the BAT AEEL.
- 4.1.3 The original BAT assessment remains valid for the scheme following the proposed variation and no updates are required. A further review of the plant and identification of future changes to enable the plant to meet waste incineration BAT conclusions will be completed in accordance with SEPAs timelines. However, it is confirmed that the proposed changes have not significantly affected the plant emissions performance and therefore its ability to meet BAT Conclusions emissions performance at a further point will not be changed as a result of this variation.

5 CHANGES TO PERMIT CONDITIONS

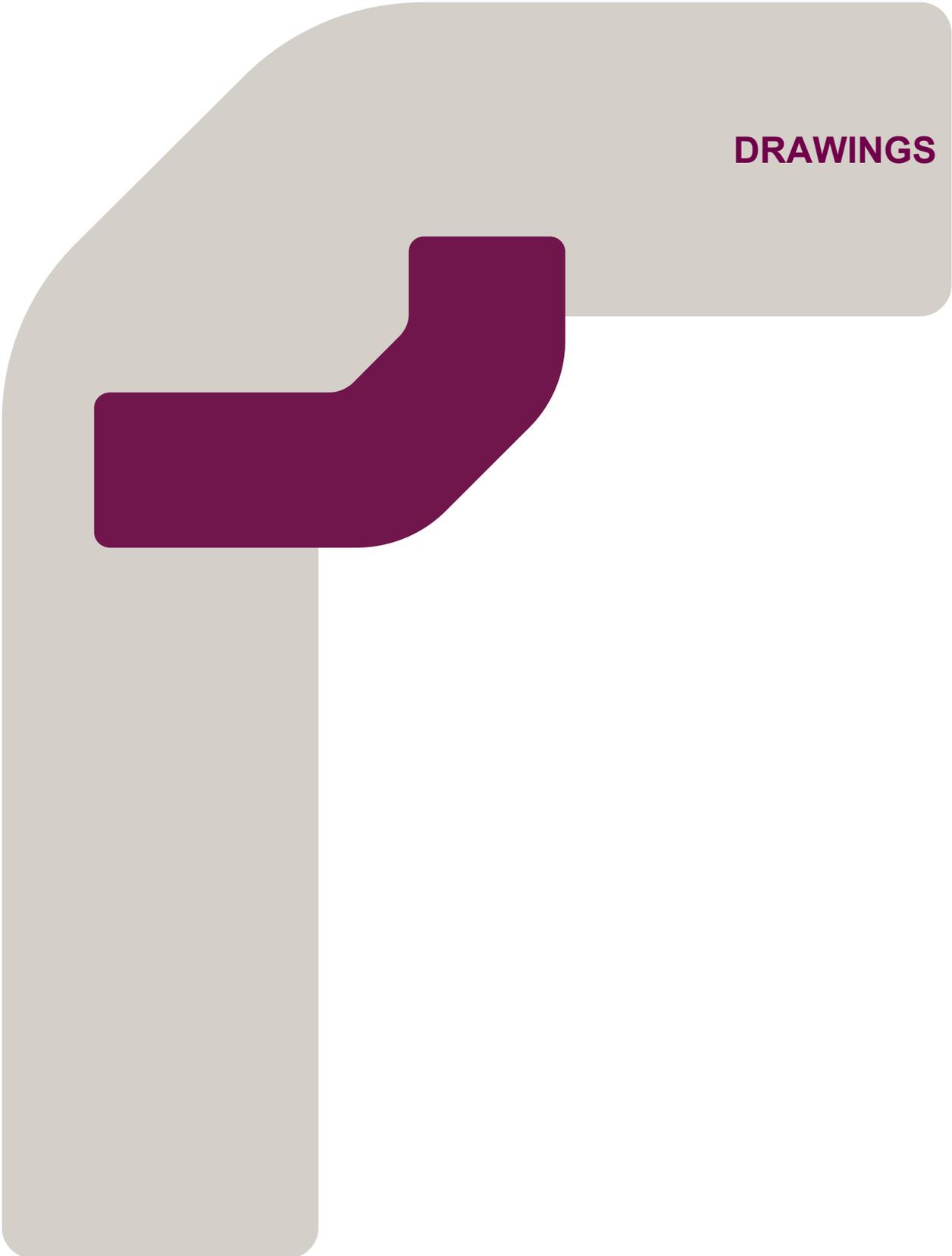
5.1 Changes to Permit Conditions

5.1.1 The proposed variation will amend permit conditions 1.1.3(b), 1.1.3(d) and 4.2.1 to the following:

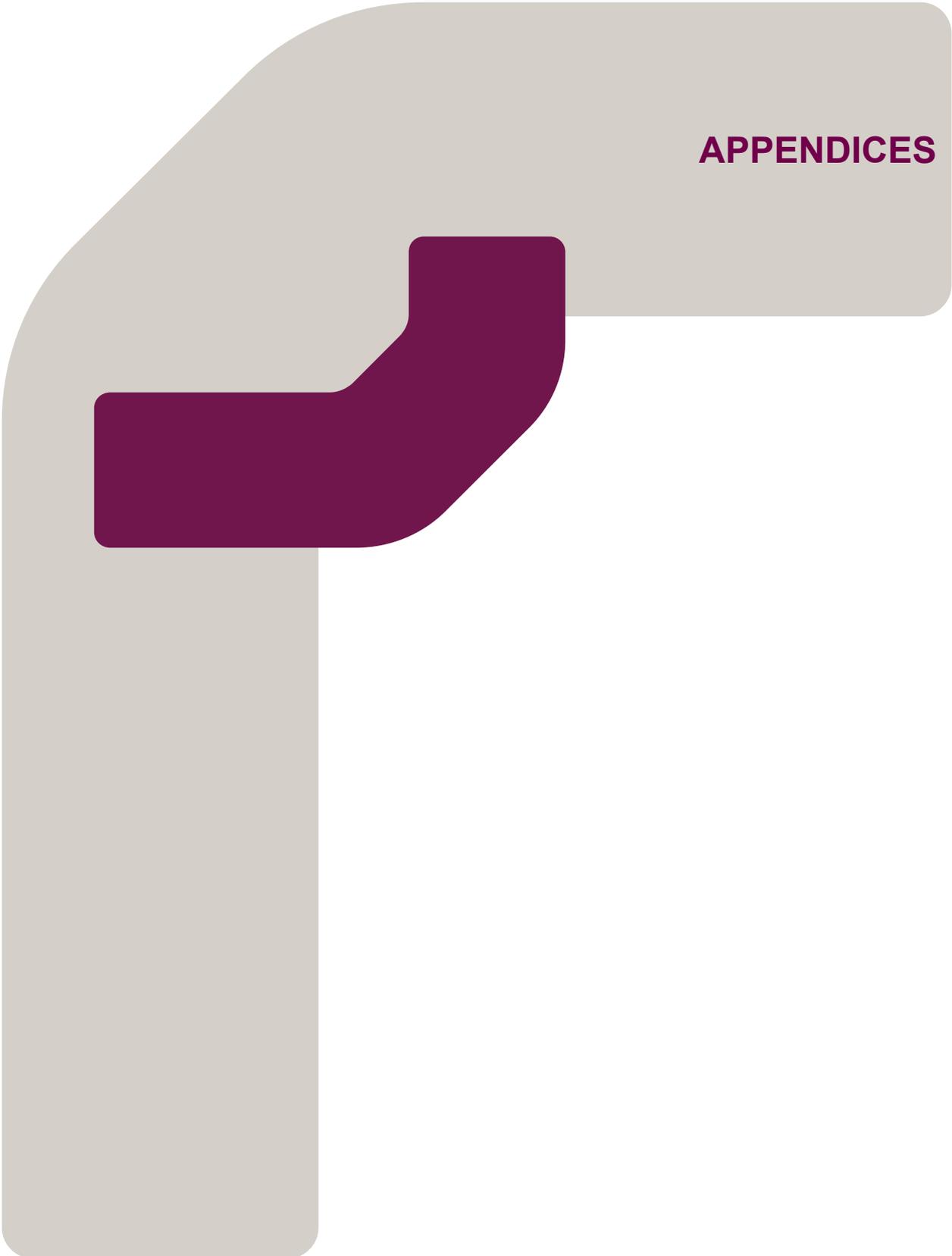
- 1.1.3(b) shall read . two continuous multi-stage air-cooled moving grate incinerators with water-cooled wear zone comprising primary and secondary combustion zones each capable of burning 195,000 tonnes per line per annum, with a total capacity of 390,000 tonnes per annum. Each incinerator is fed from a waste feeding chute and comprises a hydraulically driven feed grate; air-cooled combustion grate with water-cooled wear zone; primary air feed via the underside of the grates; secondary air feed above the grates via a distribution system; hoppers to collect bottom ash and two gas-oil fired auxiliary burners.
- 1.1.3(d) shall read . two heat recovery lines feeding into one common electricity generation system. Each heat recovery line comprising: a waste heat recovery boiler integrated with the incinerator furnace and fitted with three vertical radiant passes and a fourth horizontal convective section including a superheater, evaporator and economiser bundles. The waste heat boiler produces superheated steam which is passed to a condensing steam turbine and generator (one common unit) capable of generating (at the design point of 24 tonnes per hour) a total of 36.34 electrical (MW_e) and exporting either 33.72 MW_e without heat export, or 30.25 MW_e and up to 17.85 MW_{th} of heat as low-pressure steam or hot water;
- 4.2.1 shall read . The aggregate amount of the wastes specified in Condition 4.1.1 that may be incinerated in the permitted installation shall not exceed 390,000 tonnes in any calendar year and shall not exceed an average of 24 tonnes per hour (t/hr) per line in any 24-hour period. The method of recording this data shall be agreed in writing with SEPA at least 6 months prior to the first operation of the Permitted Installation.

GLOSSARY

AMP	Accident Management Plan
APCr	Air Pollution Control Residues
BAT	Best Available Technique
ERF	Energy Recovery Facility
EfW	Energy from Waste
IED	Industrial Emissions Directive
PPC	Pollution Prevention and Control
MW	Megawatt
MWe	Megawatt (electrical)
MWth	Megawatt (thermal)
SEPA	Scottish Environmental Protection Agency
tpa	Tonnes per annum
VDWSL	Viridor Dunbar Waste Services Limited



DRAWINGS



APPENDICES

Appendix A
Firing Diagram

Appendix B

Air Quality Assessment Report

Appendix C

Energy Balance

Appendix D

Human Health Risk Assessment

Appendix E

Heat Plan

Appendix F
Planning Consent

Appendix G

OEM Report

Appendix H

Change in Vehicle Movements

