



nature's voice

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21 September 2011

Dear Ms McNeil

**Application under Section 36 of the Electricity Act 1989**

**Erection of a multi-fuel power station at site to south west of Hunterston Coal Yard, Fairlie, Largs  
Ayrshire**

Thank you for consulting RSPB Scotland on the addendum to this application. Please find our detailed assessment of the addendum attached. On 20 August 2010, RSPB Scotland submitted an objection to this application for three reasons. These are not addressed by the addendum and **RSPB Scotland therefore maintains an objection to the application.**

In summary, the reasons for our objection are:

**1. Unacceptable direct biodiversity impacts**

- The proposal would result in the loss of over 30 ha of intertidal habitats. The sandflat, eelgrass bed and mussel bed habitats that would be lost are regionally uncommon and this site is the largest area of these habitats on the Ayrshire coast.

- The site is particularly important for wintering birds, which are likely to be significantly affected by loss of feeding habitat, loss of roost sites and disturbance.
- The loss of habitat would result in a significant impact on the integrity of the Portencross Coast SSSI.
- The addendum submitted in July 2011 does not reduce the direct biodiversity impacts of the proposal as no reduction in land claim and no compensation for habitat loss has been proposed.
- The revised layout included in the addendum may even compromise the small area of habitat creation proposed in the original application.

## **2. Unacceptable climate change impacts**

- Climate change is a major threat to wildlife, including birds. With no action to minimise climate change, there will be a catastrophic effect on natural systems.
- Hunterston power station would represent a significant increase in carbon dioxide emissions. Emissions in 2017, when the power station is proposed to be commissioned, would be equivalent to adding 63% to Scotland's annual power sector emissions.
- The application does not provide sufficient certainty that the plant would be fully carbon capture ready (CCR) or that carbon capture and storage (CCS) technology could be implemented on 300 MW, as required by current Scottish Government policy.
- Government have acknowledged that electricity generation needs to be largely decarbonised by 2030. However, there is currently no clear mechanism that would require the operator to install full CCS and no evidence of technical or economic feasibility is presented. It must therefore be assumed that the plant could operate as a largely unabated power station for its 40-year lifetime. By 2050, emissions from Hunterston could be equivalent to 57% of all the emissions allowed, from all sectors, under the Climate Change (Scotland) Act 2009.
- The addendum provides no further certainty on these issues and the applicant has not been able to provide additional information on the capture technologies that will be used. The feasibility of full CCS remains unproven. No further information is provided on likely transport and storage methods and the full environmental impacts of the development therefore remain unknown.

## **3. Lack of certainty of full environmental impacts:**

- The modelling of thermal pollution from the cooling water system reveals significant warming of the water at Southannan Sands to a temperature that is likely to make the habitat unsuitable

for *Arenicola* and some *Fucus* species. No assessment of the full suite of species that will be affected is provided.

- No assessment is made of the impacts of entrainment on larvae and whether this may have implications for the fish or crustacean populations more widely.
- Biocides levels as a result of the powerstation are predicted to be just below legal maximum levels in parts of the SSSI, with no assessment made of whether baseline levels are zero.
- No assessment is made of temperature effects on the spread of non-native invasive species and the measures proposed to control the spread of invasive species are likely to be ineffective.
- No assessment is made of the cumulative and synergistic effects of this suite of impacts on the marine environment and what impact this will have on birds and other fauna further up the foodchain.
- No assessment is provided on whether the development could result in deterioration in ecological status of the Largs Channel coastal water body. Consideration must be given to the legislative requirements of the EU Water Framework Directive.
- The results of air quality modelling appear to suggest potential for short-term high concentrations of sulphur dioxide and of high levels of dust emissions. The environmental effects of these emissions are unclear.
- Apparent errors in the assessment of acid deposition on the Bankhead Moss (SAC), Cockinhead Moss (SAC), Dykeneuk Moss (SAC) and Renfrewshire Heights Special Protection Area (SPA) raise concern and warrant further assessment by the appropriate body. A revised assessment may suggest emissions would have a more significant role than the applicant suggests in affecting the status of these Natura sites and it is therefore not possible to base a Habitats Regulations Assessment on the data provided.
- Uncertainty remains over the environmental impacts of ash disposal, biomass production and coal production.

Opposition to this development remains widespread and reflects concern about the excessive and unacceptable environmental damage that the proposal would cause locally and the contribution it would make to global climate change. Since submission of the original application, a significant number of objections have been submitted. We understand that the total number now exceeds 16,700, including over 4,000 from RSPB contacts. It should be noted that opposition has been expressed at a local, national and international level, reflecting both the concerns over direct environmental impacts and wider concerns that, if this project was to be consented, Scotland would not be maintaining the ambition to tackle climate change that was established by the Climate Change (Scotland) Act 2009.

Given that this proposal is contrary to government policy, is clearly no longer necessary, has given rise to thousands of objections and will have significant impacts on a nationally important site we recommend that this application should simply be refused by Scottish Government. In the event that this is not the decision that Scottish Ministers wish to take at this time, a public inquiry must be held to ensure that all the issues are thoroughly assessed.

Further detailed analysis to support our position is contained within the attached annex but please do not hesitate to contact me with any queries on any aspect of our response.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Zoë Clelland', written in a cursive style.

Zoë Clelland  
Senior Conservation Officer

Cc John Michel, North Ayrshire Council  
Ross Johnston, SNH  
June Dawson, SEPA

## **Annex 1 – RSPB Scotland Comments on Hunterston Multi-fuel Power Station Application Addendum, September 2011**

### **Background**

1. The RSPB in Scotland is supported by over 86,000 members (with over 2,000 in North Ayrshire) and employs around 200 staff to promote the conservation of birds and biodiversity. Bird populations reflect the health of the planet on which our future depends. Climate change, agricultural intensification, expansion of urban areas, new transport and energy infrastructure and over-exploitation of our seas all pose major threats to birds. RSPB Scotland's work therefore covers all these areas. We also have practical experience of directly managing land and coast for conservation, farming, forestry and other enterprises.
2. Because of the potential for development to harm birds and other wildlife, we devote considerable efforts to engaging with the planning process. We try to influence national planning policy and legislation and our professional planning and conservation staff are involved with several hundred individual development proposals each year in Scotland.
3. In combination with RSPB staff across the UK, and our international partners in Birdlife International, we have cross-cutting expertise and experience of spatial planning, land use, marine and sustainability issues within Scotland, the UK and internationally.
4. On 20 August 2010, RSPB Scotland submitted an objection to the application for a new multi-fuel power station at Hunterston. The reasons for our objection related to direct biodiversity impacts, climate change impacts and the level of uncertainty over additional biodiversity impacts.
5. The addendum submitted by Ayrshire Power Limited in July 2011 contains almost no information pertaining to direct biodiversity impacts, limited information on climate change impacts but considerable new information of relevance to assessing biodiversity impacts. The degree to which the addendum addresses our original concerns is detailed below. This response should be read in conjunction with our original response, dated 20 August 2010.

### **Need for the Development and Planning Policy**

6. Our response to the application outlined why, despite Hunterston's national development status in National Planning Framework 2, there is no absolute need for the development in terms of Scotland's energy requirements. The addendum does nothing to change this conclusion.
7. The addendum specifies that the original "Need and Alternative" chapter of the ES remains valid. It therefore fails to update the ES in terms of developments in Scottish energy and climate change

policy over the last 12 months. Chapter 2 (Need and Alternatives) and Chapter 7 (Planning Policy Context) of the original ES acknowledge that whilst energy is a matter reserved to the UK government, planning powers are devolved. It is therefore clear that Scottish Government policy on matters such as energy and climate change will have a bearing on the outcome of applications such as Hunterston but changes to this policy have not been recognised or discussed within the addendum.

## Draft Electricity Generation Policy Statement

8. The principle piece of guidance that has been published since submission of the Hunterston application, is the Draft Electricity Generation Policy Statement (DEGS). Published in November 2010, the statement (page 6) makes clear that: *"NPF2 does not set policy in stone and energy policy has moved rapidly in the EU, UK and Scotland during the past year, in line with evolving technologies"*. More specifically, page 28 highlights that, even with the forthcoming closure of Cockerzie coal-fired power station and the Hunterston B nuclear plant, *"As a result of renewable generation ambitions and interconnection upgrades, there is no current need for an increase in overall thermal capacity"*. The statement recognises that replacements or upgrades of existing plants may be needed in the 2020s to maintain existing capacity.
9. The analysis in the DEGS suggests that thermal plant will mainly play a role as backup in an increasingly interconnected system. A study for the European Climate Foundation<sup>1</sup> suggested that the average utilisation rates of such back-up plant could fall to around 15%. Further analysis by Element Energy<sup>2</sup> suggests that *"given the high capital expenditure of coal fired generation, running a new power plant at such low load factors would be uneconomic."* This changing role of thermal plant and the implications for the economic viability of a new thermal plant is not recognised or addressed by the applicant.
10. The DEGS analysis concludes that *"By 2030, fitting full CCS to either upgraded or replacement thermal plant and maintaining a minimum thermal electricity capacity of above 2.5 GW would satisfy security of supply concerns and would be consistent with a long-term path towards decarbonisation."* A subsequent further increase in Scotland's renewables target (from the equivalent of 80% of domestic consumption to the equivalent of 100% domestic consumption, with commensurate increases in transmission capacity) means this minimum could be reduced further. Assuming 2.5 GW thermal capacity remains the required minimum, a new thermal plant at Hunterston is unnecessary. If Longannet and Peterhead power stations succeed in their aspirations to demonstrate CCS on coal and gas respectively, and are therefore upgraded and retrofitted in line with Scottish Government policy, they would provide up to 4 GW of thermal capacity in 2030.

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<sup>1</sup> [http://www.roadmap2050.eu/attachments/files/Volume1\\_fullreport\\_PressPack.pdf](http://www.roadmap2050.eu/attachments/files/Volume1_fullreport_PressPack.pdf)

<sup>2</sup> Element Energy (2011) CO2 impact of Proposed Hunterston Coal/CCS Plant. Revised Final report for FoE Scotland, WWF Scotland and RSPB.

## Scottish Government Policy and Renewable Energy Targets

11. The Scottish National Party won an overall majority in the Scottish Government elections in May 2011. This means that there will be a continuation of some existing energy policies but also the introduction of several new targets and objectives. Aspects of the SNP Manifesto 2011 that have a bearing on the Hunterston application include the statement that "*increased renewable generation means we now see no energy need for additional thermal generation plants*" (page 34) and the increase in the renewable electricity target to 100% by 2020 (previously 50% then 80%). In addition, there is continued political support for offshore wind and marine renewables, which will widen the energy supply base and reduce the importance of thermal generation in the energy mix.

## Power of Scotland Secured

12. The Power of Scotland Secured report<sup>3</sup>, prepared by specialist energy consultants GL Garrad Hassan and jointly commissioned by Friends of the Earth Scotland, RSPB Scotland and WWF, was published after the Hunterston application was submitted. This report shows that without endangering important environmental interests, renewable electricity generation in Scotland could grow to comfortably exceed our electricity needs, bring in substantial export revenue and allow for significant electrification of heat and transport sectors. By 2020, renewables could provide over 100% of Scotland's electricity needs, and 185% by 2030. By combining this level of renewable electricity production with moderate efficiency measures, Scotland could decarbonise at least 50% of our total energy needs by 2030. Moreover, with improved interconnection and moderate investments in storage and deferrable demand, Scotland could potentially phase out all conventional thermal generation capacity before 2030 and still deliver a secure and reliable electricity supply. This report must be taken into consideration by decision makers in relation to Hunterston.

## Direct Biodiversity Impacts

### Habitat Impacts

13. The addendum contains no revision of the site layout to reduce the considerable impacts on the Portencross Coast SSSI. These include direct destruction of over 30 ha of intertidal habitat and additional construction impacts on approximately 4 ha. Our comments on habitat loss and the resulting impacts on birds that use this important area remain unchanged and are contained within our response, dated 20 August 2010.

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<sup>3</sup> *The Power of Scotland Secured* – Summary report for policy makers (2010):  
[http://www.rspb.org.uk/Images/POSS\\_FinalReport\\_tcm9-272152.pdf](http://www.rspb.org.uk/Images/POSS_FinalReport_tcm9-272152.pdf)

14. The addendum includes a revision of layout to accommodate the proposal to develop an offshore renewable test facility at the Hunterston construction yard. The boundary for this development includes the area of dry dock in Hunterston Sands that was proposed in the original ES as a habitat creation area where eelgrass translocation would be carried out. Section 1.7 of the addendum states that conflicts in construction activity will be resolved by making more Clydeport land available but no commitment is given to ensuring the habitat creation area is retained. Although we are sceptical about the likelihood of success of the proposed translocation and are clear that this would not provide compensation for the impacts of the development, we are concerned that even this insufficient amount of habitat creation may be compromised by the revised layout.
15. The addendum contains no new proposal for habitat compensation and therefore the applicant has not reduced the net impact on the Portencross Coast SSSI or on intertidal habitats in the Clyde.

### **Impacts on Birds**

16. The addendum contains no changes that would reduce the impacts on breeding and wintering birds outlined in our response of 20 August 2011 and our position contained in that response is unchanged.
17. Although the layout has been changed to accommodate the proposed offshore wind turbine test facility, no attempt has been made to assess the cumulative impacts of the two developments on bird usage of the site, for example as a result of disturbance and shadow flicker reducing the foraging value of the remaining habitat to birds. We acknowledge that current Scottish Planning Policy does not specifically require the consideration of cumulative impacts of wind farm developments until valid applications are received. However, given the very close relationship between these two proposed developments, evidenced by the design changes, we believe consideration of cumulative impact is required.
18. The lack of consideration of cumulative impacts is a major failing of the application and is further exacerbated by the failure to consider the cumulative impact of additional biodiversity impacts, as described in paragraphs 72-75 below. The addendum therefore gives further cause for concern that the applicant has not fully assessed the impacts of the development at Hunterston on birds as a result of direct habitat loss, displacement and reduction in habitat value as a result of changes in food availability.



## Climate Impacts

19. RSPB Scotland recognises the scale and urgency of the climate change problem, and are mobilising our own resources as an organisation, and the talents, energy and efforts of our membership, to help address it.
20. We welcome the ambitious targets set by Scottish Government in the Climate Change (Scotland) Act 2009 for an 80% reduction in greenhouse gas emission from 1990 levels by 2050 and a 42% reduction in emissions by 2020. We recognise the significant challenge of meeting these targets and therefore welcome the Scottish Government target to provide equivalent of 100% of Scottish electricity demand from renewables by 2020 and to encourage reductions in energy demand.
21. The original ES and the addendum both fail to acknowledge the Scottish Government's interim target of a 42% reduction in greenhouse gases by 2020, only referring to the 2050 target of 80%. The application should assess the greenhouse gas emissions against this interim target but currently it only refers to levels of emissions if full CCS is put in place (after 2020).

## Significance of Climate Impacts of Hunterston Power Station

22. The ES did not present a clear analysis of the increase in carbon emissions that would result from operation of the proposed Hunterston power station and this has not been addressed by the addendum. In our response to the ES, we highlighted several information gaps that remain unresolved by the addendum. In particular, the following information has still not been presented by the applicant:
  - Assessment of emissions from the plant with maximum biomass (14%), no biomass and with an intermediate level of biomass. This would allow the potential role of biomass in reducing emissions to be understood. This assessment should be presented for operation under both a 300MW CCS and full CCS scenario and include for full carbon balance calculations for biomass production and transport.
  - Assessment of the plant's cumulative emissions to 2025 both with and without a full CCS retrofit, as this would allow a more robust assessment of the total (and cumulative) emissions that may result if the proposal were to be consented.
23. The ES failed to present emissions information for a plant operating with CCS at demonstration scale for its lifetime, which must be considered given the lack of any mechanism for decision makers to ensure that full CCS will be fitted in 2025. This is not addressed by the addendum.

## Carbon Capture Capability of Hunterston Power Station

24. Chapter 8 of the addendum contains further additional information on Carbon Capture Readiness and Carbon Capture and Storage but we are disappointed to see that the applicant has addressed very few of the concerns raised at the application stage and the level of detail provided is minimal. Given the critical nature of this aspect of the application, this remains of significant concern.
25. Very worryingly, the language of section 8.5 suggests that the applicant does not fully anticipate that full CCS retrofit will be required, only referring to the "*possible requirement*" to retrofit CCS to the whole power station at a later date. This is despite the fact that Scottish Government Thermal Energy Guidance includes a clear expectation that this will happen:

*"Applications for construction of new coal based stations or existing power-stations upgrading to super-critical technology, will still need to indicate their suitability in terms of carbon capture readiness as the initial requirements for CCS refer to only part of the station capacity. Over time, it is envisaged that such stations covered by this section of the guidance will be expected to fit CCS to their full capacity so an indication of CCR for the station as a whole will be required."*

As we have consistently highlighted, with no current mechanism to enforce retrofit and no detail of approach or willingness demonstrated by the developer, this application must be considered as a largely unabated power station.

26. Given the apparent inconsistencies in the application, RSPB Scotland, WWF Scotland and Friends of the Earth Scotland commissioned consultants Element Energy to undertake an independent review of the climate implications of this proposal<sup>4, 5</sup>. A summary of this research will be published shortly and both the original research and summary report will be submitted as an addendum to this response, however the main conclusions are summarised below:
- Emissions from year one of the proposed power station would be equivalent to adding 63% to Scotland's annual power sector emissions.
  - By 2050 emissions from Hunterston could be equivalent to 57% of all the emissions allowed, from all sectors, under the Climate Change (Scotland) Act 2009.

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<sup>4</sup> In particular to examine the calculations made for Ayrshire Power by Eunomia consultants in their report: Analysis of CO<sub>2</sub> Emissions from Hunterston.

<sup>5</sup> Element Energy (2011) CO<sub>2</sub> impact of Proposed Hunterston Coal/CCS Plant. Revised Final report for FoE Scotland, WWF Scotland and RSPB Scotland.

- Even if the plant is fully retrofitted with carbon capture technology in the 2020s, lifetime emissions will significantly exceed those from a practical alternative portfolio of renewables backed up by gas and pumped storage.
- Co-firing with biomass would not only result in negligible carbon emissions savings but is also contrary to Government policy on the utilisation of biomass.
- The Hunterston proposal is incompatible with the Scottish Government's commitment to decarbonise electricity supply by 2030.
- The proposals could impose unnecessary additional costs on electricity consumers and taxpayers of at least £500m.

The summary report also explains why the development is not needed for Scottish national energy security and why it is unlikely to deliver national economic benefits.

### **Carbon Capture Ready (CCR) Capability**

27. In our response to the application in August 2010, we highlighted several areas where the applicant failed to demonstrate CCR capability of the whole plant, as required by Scottish Government Guidance. It is disappointing to see that the addendum does not address the concerns raised at the time of the original application. In particular, significant uncertainty remains over the capture technology that would be used. No further information is provided on transportation and storage so the feasibility of this is unknown.
28. Given the requirements of the guidance, consent cannot be given unless it can be shown that the plant can successfully be fully retrofitted with CCS at a later date. SEPA have recognised that, given that CCS technologies are not yet sufficiently mature, there is limited data against which the APL proposals can be compared, and therefore they have based their assessment of the CCR aspects of the proposed APL development on whether or not there are '*foreseeable barriers*' to retrofit of the proposed APL power station (section 8.5).
29. The assessment of whether the plant is fully CCR is therefore limited to consideration of available space to locate the necessary plant. SEPA have not commented on the financial viability of retrofit or on the technical feasibility of transport and storage, which will require separate authorisation. SEPA do, however, note that without on site storage, the ability to operate CCS will be reliant on a constant transport mechanism. Without clarity on the ability to capture, transport and store CO<sub>2</sub>, we do not believe that the applicant has demonstrated CCR capability.

## Carbon Capture and Storage (CCS) Capability

30. Scottish Government guidance makes clear that any application for a new coal plant in Scotland will need to demonstrate CCS on a minimum of 300 MW (net) of capacity from its first day of operation.
31. The addendum provides little additional detail on the technology to be used to deliver 300 MW of CCS from day one of operation, either in relation to carbon capture or the storage technique to be used. Indeed, it remains unclear whether this forms an integral part of the application. The application cannot be considered for approval unless it includes provision for operational CCS for a minimum of 300 MW operating capacity from day one. Decision makers must have certainty that the applicant would be able to operate this technology and store the carbon dioxide. It remains our view that this certainty is not provided by the current application and addendum.
32. SEPA identified two major and eighteen other information deficits relating to CCS in APL's application. For these others, SEPA recognise that information may not be available until a Front End Engineering and Design (FEED) study has been completed. The applicant has used this as justification for providing no further information on the large majority of these deficits, saying that "*In the absence of a FEED study it has not been possible to provide definitive answers to some of the specific questions asked by SEPA*".
33. However, the Scottish Government thermal energy guidance (p.53) recommends that "*at this stage, [application stage] operators submit an application to SEPA for a PPC permit*". This would ensure appropriate integration of planning and pollution prevention controls and ensure that a full technical assessment is carried out. We strongly recommend that the application for a PPC permit, including a FEED study, should be progressed as soon as possible and the PPC assessment process used to inform the Electricity Act consent process.
34. The addendum states that SEPA have indicated that "*subject to the provision of certain information*" the APL proposal is "*likely to represent a technically feasible solution for the demonstration of carbon capture for a minimum size requirement of 300 MWe*".
35. One particular aspect of CCS technology that SEPA requested further information on was amine degradation. While the addendum contains further information on this topic, this has been provided by Doosan Power Systems (DPS). DPS conclude that "*the health and environmental impacts caused by amine and amine degradation product emissions are **believed** to be minimal*" (emphasis added). They claim that the concentrations of any emissions, if they occur, are likely to be in the part per million (ppm) to part per billion (ppb) range and most of the amine and amine degradation products which may be produced are known to degrade rapidly in the environment to harmless compounds over a period of between one hour and three days. The report

acknowledges, however, that measurement and monitoring techniques are not yet established, and that there is still a significant knowledge gap regarding the formation, degradation and potential health effects of nitramines.

## **Additional Environmental Impacts**

55. The potential impacts of this development on the environment are complicated and interacting and while the addendum provides further information on several topics, many questions on environmental impacts remain unanswered. In addition to the principle impacts of habitat loss and climate change emissions, we highlighted several other areas of concern in our response of 20 August 2010. The degree to which the addendum addresses these concerns is detailed below.

### **Thermal Pollution**

56. The ES included limited information on discharge of warmed cooling water and the effects of this discharge. We requested further modelling of the spatial extent of the temperature increases, more detailed analysis of the effects of temperature change on marine fauna and analysis of the effects on marine fauna as a food resource for birds.

57. The addendum does include temperature modelling results but Chapter 5 of the addendum raises further concerns about the methods used to assess temperature impacts, the presentation and analysis of results and the conclusions reached.

58. The assessment is based on temperature effects on a suite of marine species and predicted lethal and behavioural/reproductive limits (Table 5.4). No explanation is given for how this suite of species was selected. No assessment is made of temperature effects on microfauna that are important components of the foodchain.

59. It has not been possible to gain a more detailed understanding of the suite of species that might be affected and how these were surveyed by the applicant as, despite the original ES repeatedly stating that baseline survey methods and results are contained in Technical Annex 16.1, no such annex was provided with the ES.

60. Modelling results are confusingly presented. For example, Figures 5.2 to 5.5 appear to show predicted water temperature, not temperature change, as stated. Figures 5.6 to 5.9 appear to show proportion exceedance time above ambient, not percentage exceedance. This means 0.9 represents 90% of time, not 0.9%.

61. The extent of temperature increases on the seabed and surface are presented in Figure 5.6 to 5.9. Our interpretation of these figures is that they show a 10°C increase above ambient is predicted for up to 10% of the time, all year at Southannan Sands on the seabed. At the surface, a similar effect is predicted in summer but in winter, a much larger area of the SSSI will show this degree of increase. A 5°C increase appears to be predicted over 30% of the time at Southannan Sands all year at the surface and seabed.
62. Chapter 5 assesses the impacts of these temperature changes on ecologically important locations and states that in the *Arenicola* (lugworm) habitat in Southannan Sands, the temperature was maintained above 20°C for the summer period modelled and above 10°C for the winter period modelled. As *Arenicola* reproduction is limited to temperatures below 10°C, this will have a significant effect on the population in this area. Similar increases are predicted for a large proportion of the time in the *Mytilus* (mussel) habitat. Although no reproductive limit is reported in the addendum, it seems possible this scale of increase will affect the *Mytilus* population.
63. The assessment of effects on benthic flora and fauna is inadequate and the applicant has not acknowledged the significance of this impact on other marine life. The addendum states that *Arenicola* and some sublittoral algae are unlikely to be able to survive in the water temperatures predicted but no assessment is made on the resulting impacts on the foodchain. This is not acceptable. *Arenicola* is an important foodsource for birds and the food resource in the remaining intertidal habitat appears likely to be significantly affected by the proposed development. Similarly, no assessment has been made of the effect on the foodchain of removing or significantly reducing the amount of some *Fucus* seaweed species.
64. The addendum does not assess the potential impact of the modelled temperature increase on invasive non-native species. In our previous response we raised particular concerns about the potential of temperature increases to exacerbate the spread of *Didemnum vexillum* and *Sargassum muticum*, particularly in combination with the increase in artificial structures in the water. This has not been addressed and remains a concern.
65. The addendum does include a section on measures proposed to prevent the introduction and spread of alien invasive species (5.7.4). However, the measures proposed are based on using cameras to inspect hulls, followed by cleaning if required. This is not a practical solution as marine larvae will not be detected visually. It is also unclear who would be available with suitable expertise to carry out this inspection or who would regulate and enforce the cleaning and proposed controls on ballast water movements. This cannot be considered an effective mitigation measure for the increased temperature, increase in shipping activity and increase in sub-marine structures out to deep water.

### Physical Impacts on Marine Fauna

66. The addendum includes information on potential impacts of cooling water abstraction and mitigation for fish entrainment through the use of screening. However, no consideration is given to the impacts of entrainment of larvae of fish or crustaceans.
67. Given the proposed location of the cooling water intake pipe in deep water, it is feasible that the water intake will contain benthic larvae that are too small to be screened out. The physical impacts of passing through the cooling water system and the physiological shock of moving from cold deep water to warmed water could kill such larvae.
68. We are concerned that the implications of this impact on populations of fish and other marine life in the wider Clyde has not been considered by the applicant.

### Biocides

69. Figures 5.25 to 5.27 indicate the likely concentrations of biocides predicted by modelling of dilution effects (although the first two appear to be incorrectly labelled; apparently representing high rather than low tides). These show biocide levels above 0.9 times the legal limit of  $10 \mu\text{g l}^{-1}$  occurring on Southannan Sands at high water springs (although the text states that these high levels occur at Hunterston Sands) and just off Hunterston Pier at low water springs.
70. The addendum then provides an assessment of the likelihood of breaching regulatory compliance levels and concludes that the discharge "*should be compliant with statutory EQS*" but biocide concentrations just below EQS are predicted where dilution is constrained by the tidal and morphological conditions. This assessment assumes a background limit of effectively no biocides in the water, without providing any evidence that this is the case. Given the proximity to breaching EQS, it is essential that the current baseline is established.
71. The addendum does not assess the ecological effects of these biocide levels, simply considering whether or not legal maximum levels will be breached. Assuming levels are currently very low, it seems likely that this significant increase to just below legal limits could have a biological effect. No consideration is given to whether or not there could be accumulation of biocides within the sediments at Hunterston Sands. This needs to be addressed.

### Cumulative and Synergistic Effects on Marine Ecology

72. The major failing of the Marine Ecology chapter is its failing to assess the cumulative and synergistic effects of the numerous different impacts on the marine environment. The addendum

and the original application have presented information on the extent of, for example, habitat loss, water warming and biocide pollution. However, these will not occur in isolation.

73. Some changes will, cumulatively, result in greater impacts. For example, direct habitat loss as a result of construction, disturbance of birds and loss of lugworms from Southannan Sands may cumulatively result in a far greater loss of available foraging habitat to birds.
74. Other impacts will have synergistic effects. For example, the combined stresses of water temperature increases, biocide pollution, larval mortality in the cooling water system and increases in populations of non-native species may synergistically result in very significant impacts on the native marine fauna of the area, even if individual changes may be deemed non-significant.
75. By failing to present an analysis of these impacts on marine species, and the resulting impacts on birds and other fauna further up the foodchain, the applicant has failed to present a full picture of the potential ecological impact of the development.

### **Impacts on Ecological Status**

76. The proposed development is located within the Largs Channel (Fairlie Roads) coastal water body<sup>6</sup>, which is currently classified as being in good ecological status under the Water Framework Directive (WFD). The addendum has not provided the necessary assessment of the implications for the status of this waterbody should this development be consented. In particular, the implications of a significant morphological change and the cumulative impacts on ecological receptors have not been addressed.

### **Air Quality**

77. Chapter 3 of the addendum assesses the results of additional air quality modelling. The information contained in this chapter has implications for a range of environmental receptors including human health and impacts on sensitive habitats.
78. The addendum reports modelling of air pollution using meteorological data from the past 10 years. No consideration has been given to how changes in weather patterns as a result of climate change, for example increased rainfall in the west of Scotland, could affect the predictions for deposition. This may significantly affect modelled results over a 40 year period and needs to be addressed.

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<sup>6</sup> <http://apps.sepa.org.uk/rbmp/pdf/200026.pdf>



79. The addendum compares predicted emissions of sulphur dioxide, nitrogen oxides and dust against Industrial Emissions Directive (IED) limits. While the predicted emissions of sulphur dioxide and nitrogen oxides appear to lie well within the IED limits when averaged annually and monthly, the addendum appears to suggest the potential for high short-term levels of sulphur dioxide emissions that will *"have to be managed to safeguard the critical 15-minute average ground level sulphur dioxide concentrations"*.
80. The IED requires that dust emissions cannot exceed the IED limit on a monthly basis or 110% of the IED limit on a daily basis. The limit is 10 mg/Nm<sup>3</sup> meaning that modelled emissions are equal to IED limits when considered on a monthly or daily average (as they are 10 mg/Nm<sup>3</sup> and 11 mg/Nm<sup>3</sup> respectively). Given the potential for modelling error, it appears plausible that recorded emissions could exceed IED limits.
81. The addendum states that 95% of all validated hourly average emission values shall not exceed 200% of the ELV for dust emissions (which would be 20 mg/Nm<sup>3</sup>). As the average hourly value is predicted to be 20 mg/Nm<sup>3</sup>, it seems statistically unlikely that the plant could meet this requirement.
82. It appears that the potential impacts of dust emissions (that would appear to be at or in excess of IED limits) on sensitive habitats such as nearby intertidal mudflats have not been assessed. It is also unclear whether any consideration has been taken of impacts of dust deposition as part of the appropriate assessment on the Natura sites in the wider area. This must be clarified.
83. The results of the air quality modelling are very dependent on the model used, particularly for short term concentrations, with one model predicting emissions in excess of standards for some pollutants and the other giving different conclusions. While not able to comment on the suitability of the models, we are concerned by the uncertainty they suggest.

#### **Impacts of Pollution on Natura 2000 Sites**

84. The addendum compares predicted levels of sulphur-derived acid deposition and nitrogen-derived acid deposition ("acid rain") and nutrient nitrogen deposition with critical loads for sensitive habitats. In particular, Chapter 4: Appropriate Assessment, focuses on the potential impacts on three SACs designated for their bog habitats and Renfrewshire Heights SPA, designated for its breeding hen harrier population. In this case it is relevant to analyse the impacts on dwarf shrub heath, the habitat that supports the breeding harrier population by providing suitable nesting habitat. The analysis presented in Chapter 4 is of crucial importance as it is required to inform a Habitats Regulation Assessment of the proposal.

85. Comparison of the analysis presented in Chapter 4 with data on the Air Pollution Information System (APIS) website shows that baseline figures used by the applicant for nutrient nitrogen deposition and nitrogen acidity deposition are very similar. Small differences are likely to be a result of using data from different years. However, the baseline figures used for sulphur deposition appear to be exaggerated by a factor of approximately five (for example APIS reports 0.21 keq/ha/yr while the applicant uses a figure of 1.18 keq/N/ha/yr for Bankhead Moss). The units used are presumed to be a typographical error as acidity is not measured in this way.
86. This apparent difference is fundamental to the analysis because the applicant has argued that critical loads for sulphur and nitrogen acid deposition are currently exceeded at these SACs and therefore the habitats will not be further degraded by additional deposition. In fact the APIS figures appear to show the sites are below critical load for sulphur acidity deposition and that the additional emissions from Hunterston would increase deposition significantly as a proportion of critical load. For comparison, these calculations are presented below, using APIS baseline figures from 2005 and using the applicant's baseline figures (*in italics*). The ecological impact of this increase in deposition on sensitive bog habitats has therefore not been suitably assessed.

Natura Site	Critical Load (keq/ha/yr)	Baseline (keq/ha/yr)	Baseline as % of Critical Load	Baseline & Hunterston as % of Critical Load
Bankhead Moss	0.43	0.26 <i>(1.18)</i>	60.5 <i>(273.9)</i>	72.09 <i>(285.16)</i>
Cockinhead Moss	0.39	0.21 <i>(1.18)</i>	53.8 <i>(307.01)</i>	66.67 <i>(319.64)</i>
Dykeneuk Moss	0.37	0.21 <i>(1.18)</i>	56.8 <i>(316.49)</i>	70.27 <i>(316.49)</i>

87. In the case of the Renfrewshire Heights SPA a similar situation is revealed for nitrogen acidity deposition, as shown below. In the case of sulphur acidity, the deposition would appear to exceed critical load as a result of these additional emissions.

Natura Site	Critical Load (keq/ha/yr)	Baseline (keq/ha/yr)	Baseline as % of Critical Load	Baseline & Hunterston as % of Critical Load
Nitrogen acidity	1.13	0.96 <i>(1.25)</i>	85.0 <i>(110.2)</i>	87.61 <i>(112.59)</i>
Sulphur acidity	0.49	0.35 <i>(1.46)</i>	71.4 <i>(296.3)</i>	104.08 <i>(328.57)</i>

88. The calculations for nutrient nitrogen deposition are sensitive to the critical load figure used. The applicant has used the lower end of the scale (5 keq/ha/yr for bog habitats and 10 keq/ha/yr for Renfrewshire Heights). However, the APIS website states that in areas with high precipitation, the higher end of the scale (10 and 20 keq/ha/yr respectively) should be used. The sensitivity of the calculations to changing these critical loads is not presented and should be. For example, if a

critical load of 20 is assumed at Renfrewshire Heights, the current deposition rate is below critical load, suggesting that emissions may make a significant contribution to reaching critical load.

89. Notwithstanding the figures used, the applicant's approach to assessing the significance of the additional emissions is flawed. Chapter 4 presents the argument that if critical loads are already exceeded, Hunterston would not have an effect because it would not result in a breach of critical load. This does not reflect the fact that deposition has an additive and cumulative effect, changing the health and composition of vegetation to a different extent as it increases and in combination with other pressures, such as land management. To conclude that the effects of additional deposition will not be significant, simply because existing levels are already high, falls far short of the level of appraisal and reasoning required to inform an appropriate assessment.
90. The information presented in Chapter 4 gives cause for concern as to its accuracy and we advise that further advice is required from relevant experts as to the veracity of the figures used and calculations presented. The information presented is not sufficient to inform a Habitats Regulation Assessment of the proposal and to allow Scottish Ministers to take a decision on this application with adequate certainty as to the likely effects on the Bankhead Moss SAC, Cockinhead Moss SAC, Dykeneuk Moss SAC and Renfrewshire Heights SPA.

#### **Raw Material Sourcing and Waste Production**

91. The addendum provides no further information on the potential environmental impacts of sourcing biomass and coal for the plant or on the environmental impacts of alternative ash disposal locations, should no market for waste ash be found. Our comments on these issues in our original response remain unaltered.