

May 2022

Coal Supplies – Update for HRA Members

It's mid-May and, as far as I can tell, every heritage railway has been able to secure stocks of coal or ovoids to at least begin the season. Some railways with more modest requirements have sufficient to get through the whole summer while others are forced to economise, change operating patterns, mix coal and ovoids, trial different forms of fuel, and so on.

Nonetheless, my sense is, and this is broadly shared by those on the HRA's coal futures working group, is that every railway should be able secure sufficient coal or 'artificial' coal to see them through the season. It may be far from perfect, but we'll get through.

Following my pre-season briefing notes in February and March, this 17-page update (with 3 appendices) now updates you on the current position. However, as I've said before, the situation is fluid and constantly changing so **Please Note! I'm also making some very important requests regarding feedback, sharing information and communication.**

The HRA's current work and thinking places the challenges facing us broadly under four main headings:

- **Supplies:** Securing current and future supplies, UK mining, importing and understanding the realities and all that it entails
- **'Artificial' Coal:** Development work, trials and testing, innovation funding, proper analysis, sharing data ... and understanding that this is an R&D project to develop a solution for small, medium and large steam locomotives many of which are valuable heritage assets
- **'User':** Sharing knowledge among railways and footplate crews to understand how best to use the fuels available
- **Political:** Our approaches and 'asks' to governments on mining and artificial coal innovation, including how we work with the APPG and Heritage Fuels Alliance

In producing this update report, I am indebted to a number of people and organisations from within and outside the sector who are working hard to assist the heritage steam sector and find a way through all our challenges. This does include commercial organisations who are working closely with us to find long-term solutions and, in particular, it includes several individuals from the Advanced Steam Traction Trust (ASTT) and elsewhere who are devoting substantial amounts of time and effort voluntarily.

[When reading this update, please also note that, in some places, information has had to be limited due to certain political and commercial sensitivities.]

I. SUPPLIES

A) Coal

The availability of coal continues to be subject to massive uncertainties both in supply and price.

The UK is experiencing severe shortages, not just for heritage steam, but for the UK's many industrial users of coal. While heritage steam and the remaining domestic market requires lump coal, industrial users require fines/granular coal. Supplies of both are few and far between. For obvious reasons no coal is coming out of, or through, Russia.

When coal is available, its quality is often high-volatile (smoky) and thus usually not ideal for heritage steam.

As of today, there is some coal on the ground in the UK:

- Two importers are holding limited stocks of Columbian and Kazakh coal but what little they have is being retained to fulfil existing commercial and domestic contracts
- A limited supply of c. 30% volatile coal from Poland has recently landed in Belfast

Apart from these, we are not aware of any other lump coal currently on its way to the UK. While importers are monitoring global supplies and prices, they are still very reluctant to buy while prices are so volatile. I understand potential sources are being looked-at in South Africa, South America, Mozambique, Australia and the US.

However, looking ahead:

- CPL have advised they are looking to import from SE Asia. This will primarily supply their own needs but they have stated *"We expect to have some coal available in July, but this is still to be finalised and volume maybe limited"*
- Heyes Fuels have advised that they are actively continuing to look for other available stocks globally to fulfil domestic contracts and to assist the heritage steam market
- Moves to restart supplies of lump coal from Ffos-y-Fran are ongoing and, as of last Friday, (13 May) we can advise that lump coal may be available again from next month. But PLEASE NOTE, there is nothing available at present

B) Ovoids

We are advised that there are ready supplies of ovoids from both CPL and Hargreaves.

In a recent call with Julian Martin, CPL's Sales Director, he advised, *"For 2022, if nothing else there will be a full supply of ovoids. No concerns at all with availability"*.

C) Market Information

As coal and anthracite remain in limited supply, prices remain at historically high levels. The index on which global coal prices are based has remained extremely volatile and just in the past two months has ranged from \$239 per tonne to \$458 per tonne. At the time of writing (16 May) it is \$318. Supply issues of fines/granular coal, together with costs of other raw materials used in manufacturing ovoids, is also impacting on the cost of ovoids.

Latest pricing information we have is:

- Heyes Fuels
 - Polish coal – from £400 per tonne into lorry ex-Belfast
 - Nationwide delivery available

- CPL
 - Wildfire - £335 per tonne into lorry ex-Immingham
 - Ecoal - £474 per tonne into lorry ex-Immingham
 - Extra for prepack
 - Delivery charges vary depending on volume. Delivery can be a few bags through to full lorry loads (26t prepacked or 29t loose)
 - Nationwide delivery
 - CPL have further stated that, due to significant cost price increases, they will be increasing prices this summer, probably 1st July, but the amount and exact date is TBA. They are costing on an actual cost basis, not replacement cost, so an increase may come at short notice as they try to hold prices down for as long as possible
 - If CPL do have coal available from July, on current indications the price will not be any cheaper than ovoids

- Hargreaves
 - Trevithick Ovoids – c. £350 per tonne into lorry
 - Nationwide delivery

2. 'ARTIFICIAL' COAL

Several railways have tried one or more type of the ovoids on offer. Set-out below is a variety of detailed and anecdotal reports from both standard-gauge and narrow-gauge railways.

A) Trials to Date - Summary of Detailed Reports

You will be aware of the 'controlled' testing and analysis which has been led by the ASTT with trials conducted at the Bure Valley Railway and the Keighley and Worth Valley Railway. Following my update to members in early March, some railways have kindly sent back completed Trial Report Forms. These, together with the summary outputs from the detailed analysis, have been combined into a report from the ASTT.

Their 'Qualitative Assessment of Fuel Performance' – [Appendix I](#) – is included for download with this mailout.

B) Informal and Anecdotal Reports

Set out below are some very helpful comments and verbatim reports from railways that have been trialling.

Hargreaves Trevithick

There are now three types of these and anecdotal feedback includes the following:

From Paul Lewin, Ffestiniog Railway:

- Type 1) Works adequately if mixed 50/50 with coal but not on its own. Creates a lot of ash
- Type 2) Trevithick "TE" devised for traction engine users. Higher volatiles. Performed worse than Type 1
- Type 3) Yet to try. No details

Produces 'birds nesting' on tube ends which needs to be tackled on a daily basis. On smaller narrow-gauge locomotive they can reach it to clean it off. To improve steaming, Paul has opened-up the gaps between the fire bars to 28mm from 13mm.

From Steve Clews, Welshpool & Llanfair Light Rly:

Creates plenty of steam but burns away quickly requiring constant attention. Creates lots of clinker and smokebox char. Birds nesting also noted which needs regular cleaning off. The W&LLR had taken a couple of bars out to increase the gaps. Clinker then formed in sheets which is easier to break up.

Two photos of locomotive Zilertal after 48miles of service using Trevithick Ovoids. Smokebox showing a very large amount of ash and firebox/tubeplate showing birdsnesting and clinker prior to cleaning out.



From Dave Mowat, Clan Line:

Aware that GWSR have trialled Trevithick on their Merchant Navy. The results indicate it is certainly not yet a prospect for Clan Line mainline use.

CPL Ovoids

As reported extensively elsewhere, these have been subject to detailed trials at the Bure Valley Railway and the Keighley and Worth Valley Railway. There are three versions – the commercially available ecoal, Heritage Blend 3 (HB3) and Wildfire.

Detailed Report from Ralph Ingham, KWVR on HB3 12 April 22

“Having done the comparative trial with Shotton, I can say that coal consumption shovelful for shovelful was pretty close. Clinker was forming on the bars even after the first trip requiring Noel to run the iron over them at Oxenhope each time. Clinker fetched off was, however, insufficient to require baling out over the side and overall the steaming rate was pretty consistent with little if any fall off over the 4 trips, unlike the previous trial with HB2.

On disposal there was this time ash in the ashpan up to the top of the hoppers. Not a huge amount so clearly the majority of ash from the bed had gone through the tubes. Smokebox char was up to the bottom door lip, 1.75 wheelbarrowfuls. Again, broadly speaking the same quantity as before. The ash was darker in colour and finer, less abrasive in feel than that from the HB2. There was still the blueish tinge to the smokebox inner surfaces. Happily, the fumes whilst emptying the smokebox were far less pungent than that from the HB2.

The inner firebox still had clinker in the form of birds nesting on the stay nuts, side and crown and some clinker had formed on cooling down which will be in the samples taken for analysis.

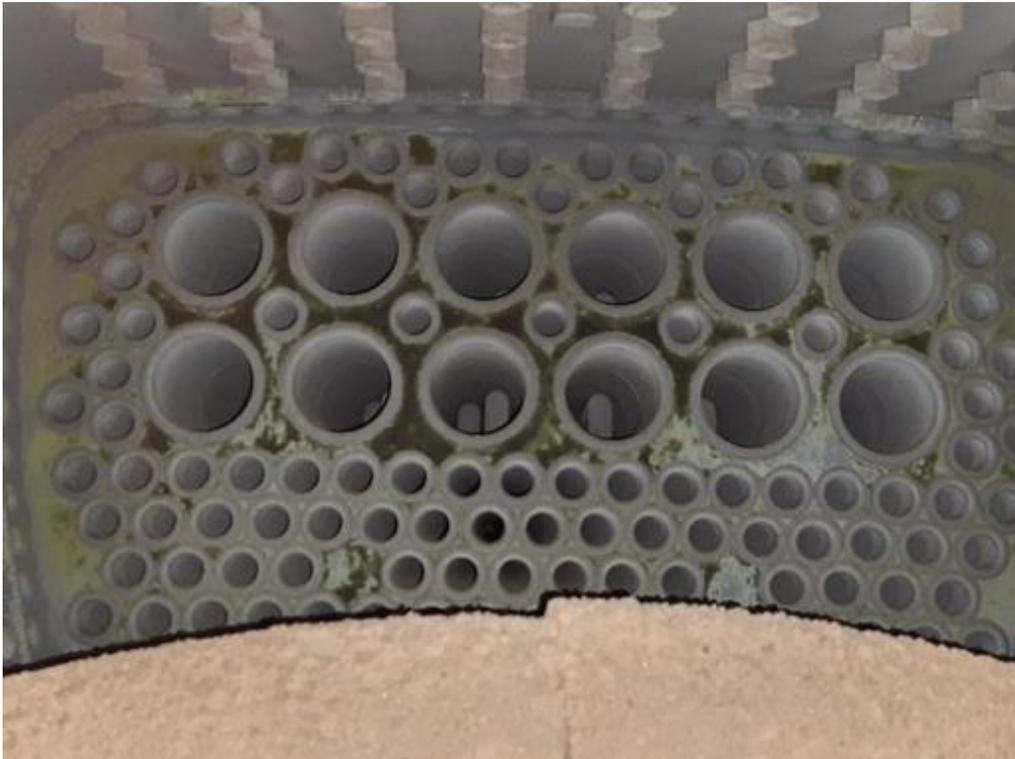
On the other side of the coin, however, is the issue of chlorine.

Knights Analyses info collated into a report circulated by CPL, show the Chlorine values are 0.18% for Wildfire, 0.24% for the HB2 we trialled in Feb and 0.28% for the HB3.

This is ten times higher than the 0.02% of Shotton against the Wildfire and greater still when viewed against the other 2 products and the ecoal. The Kazak is at 0.08 % and the figures I had for Ffos was 0.03%. The Trevithick ovoids are said (in an advert) to be 0.02%.

Looking back through my records, 0.02% to 0.03% is pretty consistent for various coals though I do not have figures going back to the 70's when a batch of Rossington had a combination of higher sulphur and chlorine values and pretty quickly started to damage the inner fireboxes of 41241 and 43924. We caught it in time but the evidence is still there to be seen in the 4F. I have no doubt that the chlorine value there was not as high as seen here however.

The attached image taken this morning of the copper tubeplate clearly show the contamination.”



Detailed Report from Ralph Ingham, KWVR on CPL Wildfire 22 April 22

“Graham and Noel Hartley were unavailable for this trial which used 78022 again with a marginally heavier 5 coach rake. I drove, with a fireman of medium experience but no previous other than with Shotton or Killoch. He fired the first 2 and I did the last 2.

The weather was good and warm to the extent that whilst we kept up with the carriage steam heating for consistency in John Hind's numbers, it was turned off for the last round trip as it was getting tropical on the train!

The loco steamed well on the Wildfire. Care was still needed in the preparation and the traditional ovoid shape reintroduced the authenticity experienced by BR firemen chasing them around the floor! A more noticeable effect was the inability to put much of a back end on. It didn't roll down, more a case of the additional weight causing the lower level to be displaced forward. On 78022 that was not in itself a problem so long as early attention was given to the back end and little and often the order of the day. But with locos having a more steeply sloping grate, 85 or 957 for example, this could prove to be a problem.

The HB3 shape had locked together better and allowed Noel to build a up a fire at Keighley up to the firehole door ring, and in one case - which he thought the best trip - up to the top of the flap.

So again, operationally, like the HB3, the product performed well. There was a little clinker each trip which was sufficient to prevent the grate being jiggled but which broke up sufficiently to maintain airflow and good steaming was consistent across all 4 trips.

Inside the firebox the story is the same. If anything, there was more clinker and birds nests fouling the side and crown stays and forming a thin hard crust on the tube beads. The green patina was again evident across the copper tubeplate.

Smokebox ash as before with the same bluey grey colour on the smokebox sides, and ash accumulated in the hopper ashpan about the same as for coal.

In summary, for KWVR I can say that we have a product that works operationally requiring no great expertise but which we cannot afford to use currently because of the adverse effects upon the firebox evident after only 45 miles of running.

Not only is it the chlorine, as shown in the Knights Analyses, but the clinker coming off the firebed and forming on the stays tube ends and also out of reach the superheater element return bends which will prove heavy on maintenance. The two things may well have the same root cause so we look forward with great interest and great hope as to what CPL come up with.”





Detailed Report from Paul Middleton, NYMR – Wildfire 28 to 30 April 22

“We used Wildfire consecutively over 3 days (28th to 30th April) in normal service on Locomotive 80136. Train loading was lighter than test train, at 4 coaches.

The loco had done 23 days in service previously (one day on Wildfire test). The fire box was still in fair condition, with a clear grate and minimal bird nesting.

We had no issues with lighting up and the loco was ready for service in good time. Smoke was minimal and although Wildfire does have a sulphurous smell, we had no complaints.

On the 28th the loco worked well with crews having favourable comments. They soon learned that they had to plan ahead a bit more but soon got the hang of it. Consumption was estimated at a little more than our current material, but not by much.

On the 29th the fireman struggled a little more, having to stop on Grosmont bank for a blow up. The second trip was a little better, but commented he still struggled to make steam.

On the 30th the crew managed the two round trips without stopping but found the Wildfire average performing, struggling to get the heat output.

The loco was then stopped for boiler washout and examination.

I examined the firebox on 3rd May. The grate had a large build-up of clinker, which had run in between the segments cutting off the air flow. One grate segment broke when we disposed of the fire.

The clinker could be chipped off the bars with a hammer but was quite hard.



There was some bird nests on the side stays. Crown stays had plenty of bird nests.



We had several small tubes with bird nests forming, something I have not seen before. Super heater Element ends looked ok though.



All firebox plates were covered in a fine white powder, I couldn't see any shades of green, but this might be due to my LED light.

Overall, the grate had definitely suffered from clinker build-up, it was in quite a poor state and the poor performance on days 2 and 3 could be down to the lack of primary air.

The build-up birds nesting on tube ends could start to cause problems with further steamings. I could not see any signs of pitting to the copper platework.

My plan is to try Wildfire again once the firebox has been fully cleaned. This way we can carefully monitor the clinker build up and bird nesting formation from day one, rather than after 23 previous steaming's. This should give a more accurate assessment.”

Oil Seed Rape Briquettes

We are aware that some railways – mainly or exclusively narrow-gauge – have been trialling these briquettes.

Apart from one note concerning a potential environmental issue (see below), we do not yet have any formal or anecdotal reports on the use of these. If you are able to supply feedback on use of these, please do send them in to coal@bvrw.co.uk

C) Chlorine

An issue was seen on three trials carried out at the Keighley and Worth Valley Railway with 78022, which has a copper firebox.

John Hind (ASTT) has summarised the position in [Appendix 2](#) which is included for download with this mailout

D) Analysis and Perspective from Julian Martin, Sales Director CPL 6 May 22

“Both Ecoal and Wildfire produce a good level of steam and have proven to cope with the demands of the users. Ecoal seems to be more popular with the narrow-gauge users, with the standard-gauge railways choosing Wildfire. Price may be the obvious determinant here. However, I'm pleased to say we have quite a number of steam engine users/railways ordering and reordering either Ecoal or Wildfire (HB3 has also proved popular, but current trial stocks are exhausted – we can of course make more).

It is clear that, as the Fireman/Driver uses the fuel more, the more they get used to it the better the performance and lower the usage. Noel Hartley is the obvious example here.

Different engines, tracks and fireman have different requirements, but Wildfire and Ecoal produce a good level of steam and Wildfire proved very successful at the recent NYMR trial.

Combustion Issues

Whilst performance has been proven, we are aware of the concerns that have been expressed about chlorine and some other deposits (whitening on the steelwork), blue smoke, acidity in the ash, birds nesting. Our chemists and engineers are working on finding some answers to the origins and potential risks (or not) of these deposits and we are looking externally for answers as well. We want to understand if chlorine (in particular) is a problem and if so what is a safe level and/or how do we combat it (easily and cost effectively for both parties).

Chlorine is coming from the molasses binder, not the wash or the other raw materials. As you know the molasses binder brings significant advantages in terms of strength, durability, reduced degradation, improved yield, moisture control and is a carbon so aids combustion. Using an alternative binder is possible but may bring other challenges.

Using lime in the blend to reduce chlorine levels was mooted, but unfortunately, this is not possible as it will interfere with the chemical reaction in the curing process and we'll get soft, uncured briquettes.

Next Steps

We will manufacture a new fuel blend using a resin binder which will reduce the chlorine levels. We will finalise the blend and hope to be able to issue theoretical proxy results (based on the feedstock).

This alternative fuel will use a resin binder, similar to Trevithick. However, unlike the Trevithick product we will add two ingredients. One aims to lock in moisture and the other acts as a coating to repel external moisture. These two ingredients are unique to CPL and help improve strength, durability and reduce breakage.

[STOP PRESS! – Julian has just phoned (17-5-22) to advised that CPL have now produced this revised ovoid using resin binder and initial indications show chlorine at 0.06%. Testing at NYMR, BVR and KWVR will begin shortly.]

Wildfire is a smaller shape than the Ecoal and whilst proven to be successful some have asked if it can be made bigger. We can do this if that is required. I will probably make it in the same shape as Ecoal.

Whilst the 'holy grail' remains finding a 100% biomass fuel (something CPL continues to research), I don't think a suitable 100% biomass fuel is going to be available soon – at least not without significant adjustments to engines. I don't wish that sentence to sound negative or defeatist, CPL are absolutely committed to finding a 100% biomass / renewable fuel, we are making progress, but it will take time."

E) Locomotive Owners

Your railway must obviously progress as you see fit, but it is appropriate to highlight that, as a number of locomotives are privately owned, you should consider whether you need to

appraise owners of locomotives on your railway of the fuel trials and the outcomes when using their locomotives.

It would be prudent to ensure owners are aware and in agreement in case of any repercussions.

3. USER

A) Footplate

In addition to the technical feedback in section 2 above, observations from trials together with reports received so far, suggest the following when firing with ovoids:

- They are generally slower to react
- A thicker firebed appears to work best
- Start preparing the fire earlier than you normally would and rake just in case of clinker
- They generally produce higher quantities of ash
- However, ash and char is finer and there appears to be a reduction in ash ejected, which may reduce chance of lineside fires

If you disagree with any of the above, or have further views and information, please feedback to us using the Fuel Trial Record sheet ([Appendix 3](#)).

B) Environmental Issues

Paul Middleton (NYMR) has reported that green mould was found on HB3 in the builder's bags and is considering whether there might be a health issue. Ralph Ingham (KWVR) had noticed likewise on remaining HB2.

John Hind (ASTT) is passing this back to CPL who had previously advised that brine wash is used to prevent mould in bagged product, so would not expect to see it in outside storage.

Paul Lewin (F&WHR) reported that the biofuel based on rape seed had gone rotten where damp had got in. He noted that in the future, any biomass pellets, briquettes or blends, considered for fuel are going to require more expensive undercover storage and railways will need to consider any biological implications of such use and storage.

Our recommendation is that, if using these products and storing externally, you should undertake appropriate risk assessments.

C) Feedback and Sharing Knowledge

The Fuel Trial Record sheets have been most useful in compiling the trials report. However, disappointingly, only a very few have been returned.

It continues to make very good sense - for the benefit of all steam railways - for knowledge and experiences of using these new products to be shared and to help disseminate best practice:

- The more feedback and real-life experience we can provide to CPL and Hargreaves, the better they can refine and develop their products.
- Similarly, the feedback is immensely useful to the ASTT in continuing their independent analysis and monitoring
- It also helps your footplate crews and your railway! If no-one is sharing information, we're all simply making it up as we go along, rather than learning from each other and sharing the problems, the foibles and all the new techniques required.

Your help is therefore urgently requested please!

The form developed by the ASTT is simple to complete and should be provided wherever possible for all footplate crews and loco ops personnel to record results and observations.

This 'Fuel Trial Record' report sheet – [Appendix 3](#) – has been sent out again for download with this update paper.

When completed it should be returned to Andrew Barnes, Bure Valley Railway MD and Chairman of the HRA Environmental Committee. Andrew is collecting the report forms on behalf of ASTT and CPL. They should be returned to Andrew at coal@bvrw.co.uk

4. POLITICAL

There is a good deal happening here, much of which is sensitive and still very much work in progress. Hence, just a short summary of key activities is given below.

A) Lobbying and Advocacy

- The HRA, together with GMs/chairmen from seven Welsh railways, are meeting Senedd members this week to appraise them of our position regarding coal supplies, our importance to the Welsh and wider UK economy, and our need to secure ongoing coal supplies locally
- A meeting has been arranged with Welsh Cabinet member Eluned Morgan MS (Baroness Ely in the UK House of Lords) to appraise her of our position and to discuss how the Welsh Government can work with us on coal supplies
- I will be attending a meeting with UK Government Minister for Tourism, Nigel Huddleston MP
- The HRA, together with colleagues from the NTET and the Heritage Fuels Alliance, will shortly be meeting with the owners of Ffos-y-Fran

- Responses to the letters from Liz Saville-Roberts and Lord Faulkner to BEIS and DCMS, have now been received and these are being followed-up
- HRA President, Lord Faulkner has secured parliamentary time to ask a question on support for the heritage steam sector on coal supplies

B) Emissions and Clean Air

Heritage railways should be aware of clean air strategies, regulations and statutory requirements.

The UK, Welsh and Scottish governments are considered to be far more focussed on clean air than CO₂. This has been known from as far back as 2018 when DEFRA ran their consultation on solid domestic fuels. One of the key focusses is on particulates especially PM_{2.5}.

In March this year, the UK government proposed a new legally binding target to reduce levels of PM_{2.5} to 10 micrograms per cubic metre by 2040. This target is only a proposal at this stage but may be confirmed after a public consultation has been carried out.

Wales consulted on domestic fuels early last year but, to date, the consultation responses have not been published. However, the Welsh Government has stated that they intend to publish a Clean Air Bill during the current Senedd term (which runs to 2025).

Scotland's 'Cleaner Air for Scotland – The Road to a Healthier Future' sets out the Scottish Government's strategy to 2026 and includes a proposal to put in place a national PM_{2.5} monitoring network.

The HRA will of course monitor these proposals and consultations, but please do advise us if you are aware of any related proposals or if you wish to provide input for any consultation responses.

C) Education

It is increasingly apparent that we all have a job to do to 'educate' the public on our use of coal. We need to counter some public perceptions and views held within local authorities and other institutions, and perhaps to challenge what appears to be being taught in schools.

Just today, I was advised of a member having difficulty placing a small add in a 'things to do' section of a local authority publication 'because heritage railways burn coal'!

Even if anecdotal, please do let me have any examples you may have where schools, local authorities or other institutions are misunderstanding our benefits and educational or cultural value and/or presenting a potentially damaging picture.

Please email me at steve.oates@hra.uk.com

D) Communications

A good deal of media coverage on the threat to our sector has been received recently with coverage across BBC TV, radio and online; ITV; Sky; national and regional press; railway mags; and various online publications.

Similarly, the road steam sector has been raising the issue as well.

It's all good stuff but what is important is that our messaging is, wherever possible, aligned. This is particularly important if we want to get consistent messaging across to politicians, the media and other 'influencers'.

The HRA will shortly be preparing a document setting-out the heritage steam sectors' needs and 'asks' moving forward. This will include a communications strategy to help us collaborate and remain aligned in the task ahead.

In the meantime, if you are liaising with MPs, media, etc., we can provide you with briefing notes on the key points and challenges we face, as well as info on our positive economic and cultural benefits.

If this would be helpful, please email Mark (HRA Policy & Comms Manager) at mark.pearce@hra.uk.com

E) Economic and Social Impacts

To help us to help you we need more data, we need more up-to-date data, and we need it fast!

We have held off undertaking an Annual Statistical Return for the past two years, but we will shortly be sending out our 2022 ASR in the form of an online questionnaire.

Your assistance in completing and submitting this promptly will be most appreciated as it will help us to significantly update our economic and related impact assessments.

In the meantime, if you're railway or organisation has any economic impact studies, wellbeing studies or other evidence which we could use to support heritage rail's community, social or cultural value please do let me have copies.

Please email me at steve.oates@hra.uk.com

5. SUMMARY AND RECOMMENDATIONS

As ever, we continue to face a complicated and changing picture as we move through the 2022 season. UK suppliers continue to be very aware of our requirements and they are working to try and fulfil demand.

The HRA's previous recommendations to all our members remain and we would add:

- If you are using or trialling artificial coal and/or biocoals, please share knowledge by completing and returning the Fuel Trial Record sheets, as supplied with this briefing update
- It would be prudent to ensure owners of all locomotives used in trialling any new products are aware and in agreement in case of any repercussions
- Undertake appropriate risk assessments if using ovoids and/or other biocoal products and storing them externally
- To ensure consistency and alignment of messaging, please liaise with the HRA – either myself or Mark Pearce
- Please let me have any studies or other evidence you may have which we could use to support heritage rail's economic, community, social or cultural value

We will continue to work for HRA members on this ever-changing issue and provide further updates as soon as more information is available.

Appendix 1 - 'Qualitative Assessment of Fuel Performance'
Appendix 2 – Chlorine
Appendix 3 - Fuel Trial Record sheet

Steve Oates
Chief Executive
HRA
16-5-22