

Tar Bound Arisings Stage 3 Detailed Testing - Project Progress Update June 2020

1.1 Introduction

In June 2019, SRRB commissioned Jacobs UK Limited (Jacobs) to undertake the third stage (Stage 3) of our research project to determine whether an alternative method could be identified to support the characterisation of tar bound arisings (also known as Asphalt Waste Containing Coal Tar or AWCCT). This followed on from Stage 2 of the SRRB project which was published in January 2018 and recommended that further research was needed to create a more cost-effective testing method, capable of quantifying coal tar concentrations accurately, quickly and definitively.

This summary sets out the progress made in Task 1 of Stage 3 and what lies ahead in the next task. Task 1 was carried out in two steps: Task 1a, a review of the current guidance and approach and Task 1b, the review of the currently available screening/testing methods. Both were completed in February 2020 and a summary presentation was provided to the SRRB board and Institute of Asphalt Technology. Task 2 recently commenced in May 2020.

1.2 Task 1a - Review of Current Guidance and Approaches

1.2.1 Current Guidance

Discussions on current processes and approaches were held with a selection of SRRB's and Jacobs' contacts including SEPA's National Waste Operations Unit, Contractors, Consultants, the UK Streetworks Waste Classification Working Group (UKSW), analytical laboratories, testing equipment suppliers and the Transport Scotland (TS) Pavement Forum.

ADEPT and CDWF released a new revision of their industry guidance "Managing Reclaimed Asphalt" in August 2019 which implies that all asphalt roads can be stabilised using in-situ cold mix processes (Clause 947 of the Specification for Highways Works) regardless of their coal tar content. The identification of coal tar in asphalt intended for use as a Clause 947 material would primarily be required to manage health and safety risks for the workforce and to assess waste disposal classification for any excess arisings.

ADEPT notes that the Clause 948 ex-situ approach for reuse of AWCCT is possible following the EA Regulatory Position Paper 075 and reiterates that only cold mix processes can be used for AWCCT until evidence of the effects of reheating road tar is available. Planings containing coal tar are unsuitable for hot processes because of the health and safety risks associated with volatilisation of hazardous components during the process. In addition, it is flagged that, at present, planings identified as hazardous waste cannot be recycled, only reused.

SEPA is developing a Position Statement on the reuse of AWCCT which is anticipated to largely align with the EA's position statement that allows reuse of AWCCT for ex-situ cold-mix processes in accordance with Clause 948 material. Through dialogue with SEPA, it was confirmed that their position statement was still under consideration and is expected to include a review of the recent 2019 ADEPT guidance update whilst aligning with their regulatory position.

1.2.2 Industry Overview

Representatives of the Scottish Trunk Road Network's Operating Companies suggest that road planings (coal tar containing or otherwise) are being reused as a cold bitumen bound sub-base in accordance with Clauses 947 and 948 of the Specification for Highways Works where applicable to the project requirements/ design.

Feedback from Operating Companies is that a robust site-based tool would allow rapid confirmation of the presence or absence of coal tar during design/optioneering works phases and also during construction works but it is recognised that this would need sufficient correlation with laboratory analysis to give confidence in the technique and gain regulatory acceptance. Whilst field testing could reduce the amount of laboratory testing

required, it is considered unlikely that laboratory testing for identification purposes would be eliminated entirely, and will continue to be required, especially where waste classification for disposal is required.

Discussions with UKSW representatives confirmed the similar challenges of appropriately classifying waste materials (not just asphalt) from emergency repairs and/or small utilities projects. UKSW is preparing a protocol to be used to determine whether or not laboratory analysis for coal tar is routinely required prior to reuse or disposal of arisings. The output from the UKSW study has been delayed following the postponement of the enactment of the Environment Agency's regulatory position statement, RPS 211, "Excavated waste from utilities installation and repair", until 31 October 2020. Following engagement with the UKSW group, it was agreed the SRRB would support their study with the provision of road core analysis results to supplement their dataset.

It is likely that the UKSW study will offer some value to the wider SRRB programme however, given that its focus on emergency works/ repairs this may be somewhat constrained relative to the larger highway surfacing renewal schemes that the SRRB members are involved with and hence alternative approaches may be valid/ appropriate. The SRRB study will however need to consider the outputs of the UKSW to confirm that these do not conflict/ provide a contradictory approach for comparable activities interacting with asphalt materials.

It became clear that operators do not have full confidence in the accuracy of PAK spray testing and also have commercial and technical challenges/concerns around laboratory testing which does not always provide conclusive results. Other areas of concern are the cost benefit associated with reusing AWCCCT on smaller schemes/sites under Clause 947 and 948 where these approaches may not be commercially viable and/or can result in a lesser specification of road surfacing compared to virgin materials.

The current practice review concluded that the key areas where coal tar identification is critical to the project delivery and hence should be the focus of a testing methodology/protocol are:

- Health and Safety – protection of the workforce from coal tar exposure and management of works programme both during construction (either proactive or reactive to unforeseen conditions) and post-construction during maintenance or other street-works.
- Materials Reuse – determining suitability for asphalt arisings for reuse.
- Management of Excess Arisings – appropriate classification for waste disposal. Scottish waste management facilities cannot accept hazardous waste so mis-classification carries risks.

At present, however, it appears unlikely that a site-based tool will be sufficient to formally characterise asphalt wastes for disposal to the satisfaction of landfill operators in place of laboratory testing. This will require further discussions with the operators. Other areas to consider relate to confirmation of the test /analytes required to make a robust supporting identification of coal tar presence for both reuse and waste disposal options.

1.3 Task 1b - Review of Available Screening/ Testing Approaches

Industry discussions have indicated that the standard process to determine coal tar presence when re-using planings, includes reliance on a PAK spray test on road cores followed by laboratory analysis where the PAK test gives positive results. The variability of road pavement and the potential false positive/ negative results from PAK spray tests means there is an inherent risk of missing areas of coal tar during current site testing. In addition, there is a perception that laboratory coal tar analysis results are relatively costly and can be ambiguous or inconclusive.

Testing and coal tar identification requirements have been discussed with SEPA. Benzo(a)pyrene (BaP) is widely used as an indicator of coal tar, including in WM3 (Technical Guidance WM3: Guidance on the classification and assessment of waste). The WM3 guidance assigns coal tar a hazardous threshold of 0.1% (or 1000mg/kg). If a material is hazardous, it cannot be automatically considered for reuse which therefore impacts upon the potential materials management options available for the asphalt. The ADEPT and current EA guidance are implicit that materials deemed not to be hazardous can be considered for reuse.

Although the WM3 guidance refers to “coal tar”, it is not currently possible to directly measure coal tar within asphalt due to the complex and variable mix of compounds. The WM3 guidance therefore advocates using 0.005% Benzo(a)pyrene (BaP) as an indicator compound within asphalt to determine whether coal tar could be present above the 0.1% hazardous threshold. SEPA were specifically asked if they will accept the use of BaP (where BaP <50mg/kg) as a sole marker compound for the absence of Coal Tar or if they will require more detailed analysis. The response to this query is awaited but is it envisaged that BaP >50 mg/kg will remain acceptable as a first screen. However, exceeding this threshold does not conclusively mean coal tar is present and there can be other explanations for elevated BaP in asphalt.

Discussions with SEPA also suggest hesitancy regarding the adoption of site-based testing methods/ screening where there is not a detailed validation study for the methodology. Furthermore, even with a validated tool, SEPA would likely require a degree of supporting laboratory analysis of the same material to correlate the site-based analysis on a site by site basis. These two factors have implications for developing a site-based screening tool where regulatory decisions are required, such as waste disposal options or when submitting proposals to reuse AWCCT to SEPA for authorisation in advance of works. This requires further exploration in Task 2. This would include discussion of whether there are reasons other than insufficient validation of methodologies to allow a site-based tool to be considered viable for use as an additional line of evidence for larger highways renewal programmes which the SRRB stakeholders would be typically engaged in delivering.

Research into the currently available screening methods used for coal tar identification was completed through internet searches and discussions with industry service providers. This review included alternative field-testing methods to the PAK spray and identified that a UV fluorescence-based method could be a potentially viable screening tool for coal tar identification. Such methods are currently commercially available but not yet widely used in the UK.

Contractors are aware of UV fluorescence approaches but there is an industry reluctance to use these approaches without a better understanding of the approach and up-front costs. Following discussions with suppliers of existing site-based analysis (focussing on UV Fluorescence) and noting the concerns regarding regulatory acceptance of field-based analysis, SRRB/TS have progressed chemical analysis of road cores with two laboratories and a site-based UV fluorescence tool. The processing of these data is ongoing as part of Task 2.

Potential alternative methods to PAK marker spray and UV fluorescence identified for further review included two dimensional gas chromatography coupled with time-of-flight mass spectrometry (GCxGC-TOFMS), bio sensors and microbiological toxin response. These are largely academic study areas that may not yet be sufficiently developed to allow consideration for commercial applications, but this requires further review and discussions with key academic institutions. Other commercial and academic parties may be engaged to support during the progression of Task 2.

1.4 Next Steps – Task 2

The key areas that to be progressed during Task 2 include:

- Review of laboratory testing and UV fluorescence-based field equipment
- Review of the UKSW study; and,
- further liaison and discussions with SEPA following the release of the updated ADEPT approach to shape the regulatory position.

Task 2 was commissioned in May 2020 and is programmed to be completed by late 2020.