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Support Officer
Petitions Committee
Welsh Parliament

Hello [REDACTED]

Please could this be added to the papers for Petitions Committee's meeting 19th September?

On 23rd March 2021 the outgoing Petitions Committee informed Natural Resources Wales that ... *the Committee would welcome a response to the request made for CR-39 testing to be carried out on the material proposed to be dredged and disposed of in the Cardiff Grounds. They added The Committee also agreed to ask its successor committee to consider the issues raised by the petition further in light of the situation once it has been established.*

NRW's response (10th May 2021) states that:

If plutonium were present in the environment around Hinkley Point A, it would be accompanied by a range of other radionuclides such as fission products like caesium-137. These other radionuclides would be readily detectable by gamma spectrometry and could be used to indicate samples on which to undertake radionuclide specific analysis for alpha emitters such as plutonium. This tiered approach was used for the analysis of sediment samples from the Bristol Channel and has been supported by the findings of the independent Hinkley Point C Stakeholder Reference Group.

This paragraph ignores the fact that the core of a reactor is made of uranium. The intense radiation creates other elements including plutonium but, even by the time the fuel contains so many pollutants that it has to be routinely replaced, 96% is still uranium. It also fails to mention particles, although in consultation responses we have referred to UN data ¹ on licensed releases of particles from every operating nuclear power station in the world. The UN data are quantified in Becquerels (a unit of radioactivity) so there is no doubt that the particles are radioactive.

NRW refers to the independent Hinkley Point C Stakeholder Reference Group (chaired by Dr. Jane Davidson). The Group relied heavily on submissions from CEFAS whose methodology we are questioning here, and it failed to report on submissions that discussed uranium contamination. The report ² contains only a single reference to CR-39:

'Hot particles' containing alpha emitters can be detected by using CR-39 track detectors, but these will be detected by gamma spectroscopy through the additional presence of gamma emitting radionuclides.

This dismissive observation should be considered in light of the following comments provided to me yesterday by Prof. Denis Henshaw:

... gamma counting gives no idea of whether the activity is associated with hot particles. CR-39 is a non-destructive technique (which) allows activity to be detected from small point sources, notably individual hot particles or, for example, activity ... coated on fuel rod fragments. Furthermore, since the time exposure of the sample against the CR-39 is

¹ http://www.unscear.org/docs/publications/2000/UNSCEAR_2000_Annex-C-CORR.pdf - Table 34

² <https://gov.wales/implications-hinkley-point-c-independent-report>

known, the radioactivity can be determined as well as the microscopic size of a hot particle and its structure. It is also possible to identify individual inhalable hot particles against a background of natural alpha-emitters. CR-39 is selective in detecting alpha-particles and not beta or gamma. (The alternative) radiochemical analysis is destructive of the sample and gives no idea of where particular activity comes from.

In the second paragraph of the 10th May letter NRW refers to the need for *best available techniques and expect-recognised standards* (probable reading *expert-recognised standards*) and states that *radiological analysis should be accredited* etc. I agree with this, but NRW's tone is unhelpful. Prof. Henshaw pioneered the establishment of accredited laboratories to use CR-39 for radon measurement, which is an established and well-justified technique providing unique information. (If members have ever tested their homes for radon gas they will have used CR-39, and Prof. Henshaw worked on its use in monitoring contamination inside the Chernobyl sarcophagus.)³ The only problem in setting up an accredited laboratory to test for alpha-emitting particles in the UK is that there are no obvious commercial applications.

CEFAS say

" the suggestion that large numbers of 'hot particles', containing significant levels of plutonium, would be present in sediments around Hinkley Point is contrary to that observed from environmental measurements over several decades from annual routine monitoring. Unlike at Sellafield, 'hot particles' have not been identified around the Hinkley Point coastline."

This cannot be relied on; it fails to mention uranium and, in any case, uranium is routinely not monitored. In 2018 the Low Level Radiation Campaign (which I represent) asked all four environment agencies in the UK what data they held on radioactive particles in marine and littoral sediments. All answered that they had none and they referred us to annual RIFE reports, which likewise have no data on particles. Despite the inevitability of the discharges catalogued by UNSCEAR (above) particles have not been identified because no one is looking for them. The Hinkley Point mud must be assumed to contain many particles, yet CEFAS's tests failed to use any technique capable of detecting them. In view of the potential impact on Wales' healthcare budget it would be wise to consider a programme of direct monitoring and measurement of particles.

It may be thought that EDF's decision to shift the dumping of sediment to Portishead cancels or diminishes any need for Wales to test it. This would be a mistake; the Davidson report identified that the currents on the south side of the estuary flow eastward, swing round at the second M4 bridge and flow westward on the Welsh side.

Finally I wonder whether the Committee could consider convening an evidence session to gather information on:

- the prevalence of alpha emitting particulates in the environment in Wales;
- the practicality of detecting wind-borne particulates using High Volume Air Samplers and CR-39 or any valid alternative techniques;
- the availability of laboratories to conduct appropriate monitoring and analysis;
- how such laboratories might be funded given that this is a matter of public interest with no apparent commercial applications.

Sincerely

Richard Bramhall

³ Application of SSNTD for maintenance of radiation and nuclear safety of the Sarcophagus: "Radiation Measurements" 30 (1999) 709 - 714: O.A. Bondarenko, A.A. Korneev, Yu.N. Onishchuk, A.V. Berezhnoy, P.B. Aryasov, D. Antonyuk, A.V. Dmitrienko.