

Construction of a four-bedroom chalet bungalow on land adjacent to Croft House, Croft Road, Spencers Wood, Wokingham, RG2 9EY

Emergency Plan in respect of radiological accidents at AWE Burghfield

Site and risk assessment

1. Permission has been granted to build a four-bedroom chalet bungalow with a detached carport for two cars and a detached cycle store on land adjacent to Croft House, Croft Road, Spencers Wood, Wokingham, RG2 9EY.



Figure 1 - Google Earth plot of site

2. It can be seen from Figure 1 that the site (shown in yellow and with a pin to the right of the plot) is about 4.25 km from AWE Burghfield (shown in the top left in red (the surrounding blue lines are the two evacuation distances mentioned in the Off-site Emergency Plan). The 3160 m UPA (distance out to which shelter is beneficial) is the

yellow circle. The current DEPZ is shown in red and a legally compliant alternative shown in blue.

3. The REPP19 regulations require the local authority to make an adequate off-site plan covering the DEPZ. It does not mention land use planning nor give the Council extra powers to require emergency plans in businesses in the area.
4. Because this site is within the DEPZ of AWE Burghfield Wokingham Borough Council have imposed a planning condition:
5. No. 14. Construction Phase Emergency Plan

No development shall commence on site (including any demolition or site preparation works) until a Construction Phase Emergency Plan for the maximum number of construction staff and visitors to the site, has been submitted to and approved in writing by the Local Planning Authority. The Construction Phase Emergency Plan shall include (where applicable):

- i) Triggers for activation of the plan;*
- ii) Means and location of sheltering for a period of no less than 72 hours¹*
- iii) Means of support for staff and visitors whilst in sheltering conditions;*
- iv) Means of evacuation and recovery;*
- v) Method and frequency of review;*
- vi) Contractor names and emergency contact information for the construction period.*

Public: Information that can be seen and used by everyone inside and outside the Council.

Upon implementation of the development hereby approved, the approved Construction Phase Emergency Plan shall be implemented and maintained in accordance with the approved details throughout the entire construction period.

Reason: As insufficient information is contained within the application submission and in order to provide assurance that an effective Construction Phase Emergency Plan will be put in place to protect visitors to the site in the event of an incident at AWE Burghfield. Relevant policy: NPPF section 8 (Promoting healthy and safe communities), Core Strategy policy CP3 and Managing Development Delivery Local Plan policy TB04.

¹ There is no justification given for demanding 72 hours. The Consequence Report recommends up to 48 hours.

6. The Radiological Impact Assessment [Thorne 2023] submitted with the application showed that *“residents of the proposed dwelling would incur an effective dose of about 0.7 mSv if an accident occurred under average weather conditions and about 4.3 mSv if it occurred under weather conditions that occur for only 12% of the time and only at night. Furthermore, these effective doses are conditional on the wind blowing toward the proposed dwelling at the time of the accident and take no account of sheltering, which is an effective measure in mitigating first-pass inhalation dose.”* (Paragraph 3.2). These dose estimates are also valid for those building the house.
7. REPIR-19 describes doses in the range 1 – 10 mSv as “minor” with no potential for immediate radiation harm and minimal impacts on longer term health and safety, quality of life, property or the environment. The 0.7 mSv dose estimate is in the “limited” dose range (less than 1 mSv) which is compared to normal background and the sustaining of normal life activities.
8. Considering the long-term risks of cancer death associated with radiation doses of magnitude and the probability of the accident occurring with the wind blowing towards the site Thorne (Paragraph 3.18) estimated an annual risk of death to someone at the site as the result of the presence of AWE(B) as one in 2.7 thousand million years.
9. HSE in its report ‘Reducing Risks, Protecting People’ [HSE, 2001] (Paragraph 132) states that the boundary between “tolerable” and “unacceptable” for members of the public who have a risk imposed on them ‘in the wider interest of society’ is 1 in 10 000 per annum, very far below the annual risk of being at the development site.
10. Paragraph 138 states that *“Thus in the case of most housing developments, for example, HSE advises against granting planning permission for any significant development where individual risk of death for the hypothetical person is more than 10 in a million per year and does not advise against granting planning permission on safety grounds for developments where such individual risk is less than 1 in a million per year”*.

11. Comparing the fatal accident risk of construction (2.43 per 100,000 in the construction industry in 2023/24 [HSE 2024] fatality risk resulting from a radiation accident (one in 2.7 thousand million years) suggests that the worker is 9,000 times more likely to die in a construction accident. Another difference being that the worker is likely to die a short while after the work-related accident, or live with a life changing injury, but may look forward to many years of healthy life following a radiation exposure.
12. The risks posed by AWE Burghfield are vanishing small compared to everyday risks and would not feature on the standard construction site risk assessment as both the likelihood and consequences are below the thresholds of concern.
13. It is important to note that the estimated doses at the development site in the worst combination of accident at AWE Burghfield and weather conditions gives a maximum (unprotected) dose of 4.3 mSv. This is below the dose level at which national advice (repeated in the REPPIR guidance) is to take shelter.
14. By advising sheltering for up to two days the Council clearly envisage that work on the site will stop (unless the fitting out stage in a weather tight shell has been reached). This clearly has an economic cost to the developer and a knock-on effect on the site completion plan which will see trades needing to be reorganised. Post event compensation is likely to be sought.
15. It is likely that if many people are forced to shelter for up to 48 hours in an area where emergency services are prevented from operating or reluctant to operate then adverse health effects would occur; heart attacks responded to more slowly than useful, women unable to get to hospital or not being attended by a midwife when giving birth, to give two examples.
16. The proposed “protective actions” are likely to do more harm than good. Visitors to the site do not need protection from AWE Burghfield, they need protection from a badly drawn DEPZ and overzealous local emergency planners.
17. A better solution to the perceived problem of an off-site plan that is failing because of the population pressures within the DEPZ would be to redraw the DEPZ boundary to be the B3349 Basingstoke Road. This would remove hundreds of homes from the

DEPZ, freeing up resources for the off-site plan and removing the need for inconvenient and potentially harming (financially and health-wise) protective actions over a wide area.

18. Nonetheless the Council have required the development of an emergency plan able to respond to the AWE alarm in the event of a radiation emergency at AWE Burghfield and take shelter for up to three days.
19. It is also important to note that the Consequence Report [AWE 2019] upon which the off-site plan is based states that *“This ‘sheltering’ action may be necessary for a period of up to two days, or at least until the initial contaminated plume has passed and monitoring of the ground contamination has been undertaken to determine the level of groundshine; and subsequent potential for further dose uptake, (e.g. from contaminated locally produced foodstuffs)”*.
20. Asking for three days duration is unreasonable.
21. Since the event is an “explosive distribution” the duration of the release is likely to be a matter of minutes. There is no ground shine from this fault and shelter does not protect from ingestion dose. There seems no reason why the shelter advice could not be withdrawn within hours (particularly as the development is beyond the 3160 m range that AWE estimate shelter might be of benefit.
22. At daytime average wind speeds of 4 m.s⁻¹ the plume will cross the site 13 minutes after the explosion. The Consequence Report estimates that it will take 15 to promulgate the alarm. There will be no time for *“for the public to find suitable shelter, in order to realise any substantive benefit from the sheltering action”* (Paragraph Part 2, 2e).
23. Limiting the alarm to landlines is problematic. The people the alarm needs to reach are those outside when raised. Relaying the message to those outside, including those working on building sites, will at best cause a delay and at worse prevent the alarm being heard until it is too late (if it isn’t already by the time it is promulgated).
24. It is reported [Short-Fact 2021] that *“Despite a slight rise from 81 percent in 2014 to 83 percent in 2016, the share of households in the United Kingdom (UK) with a landline that can be used to make and receive calls fell to 73 percent in 2020. 22*

percent of households report not having a landline at all". The current AWE alert system is liable to fail to get its message to the one third of households that do not have a landline and to everybody outside at the time of the alarm. This includes the builders of the new house on Croft Road, Spencers Wood.

25. Nevertheless, the public information leaflet tells businesses that *"It is critical to any plan to ensure all staff and visitors to your business take shelter in a suitable building immediately when notified of a radiation emergency and that systems are in place to look after everyone"*.

26. However, before the building is weather tight there will be no "suitable building" on site.

27. Generally for shelter in the event of a radiation emergency solidly built houses are preferred to light constructions such as sheds, caravans and cars since solid building provide shielding against cloud gamma radiation and a reduction in inhalation dose by limiting air exchange.

28. In the case of the plutonium release from AWE Burghfield there is no gamma radiation so the shielding is irrelevant. The value of a shelter is determined by how little air exchange there is with the outside. In this respect [Ott et al 2008] state that *"With the vehicle stationary and the fan off, the ventilation rate in air changes per hour (ACH) was less than 1 hr⁻¹"*. This is not as good as a modern well-sealed home but comparable with a naturally ventilated home and shows that a car or a van can provide some protection against inhalation of plutonium. This is suggested as a pragmatic alternative.

Functional Specification

29. The Emergency Plan must allow the workers on the site to be made aware of the alarm from AWE Burghfield as quickly as possible and then take shelter and await further instructions from the authorities.

30. Shelter ideally be in a building that is well draught proofed to slow down mixing of the clean internal air with the potentially contaminated external air.

31. If shelter cannot be achieved quickly those present on site will don covid style face masks (or better RPE if they have it available) and sit in their cars or vans with engine and ventilation off, doors and windows shut, pending achieving shelter or leaving the area.

Concept of operations

32. The AWE alarm is promulgated to all land lines in the area and repeated on broadcast and social media.

33. There is an agreement with a neighbour that if they hear the alarm, they will let those on the development site know by sounding an airhorn.

34. Failing that, those on site may pick up the alarm on radio or social media.

35. Those on site will immediately don face masks to reduce their inhalation of the particulate plutonium.

36. If the house is weather tight at this stage those on site will shelter in it with doors and windows shut. If not, they will either go into a neighbouring house or leave the area (moving away from rather than towards AWE Burghfield).

Management

37. This plan will be reviewed annually.

38. All new workers on site will be made aware of the presence of AWE Burghfield, the remote possibility of an alarm and the correct procedures to follow if the alarm is received.

39. A poster will be displayed on all Health and Safety notice boards and the public information leaflet will be available for reference.

References

- AWE, 2019, AWE Burghfield: Consequences Report, Issue 1, November 2019.
- HSE, 2001, Reducing Risks, Protecting People: HSE's Decision Making Process, HSE Books, HMSO, Norwich, ISBN 0 7176 2151 0.

- HSE, 2024, Work-related fatal injuries in Great Britain, 2024, <https://www.hse.gov.uk/statistics/assets/docs/fatalinjuries.pdf>
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- Wayne Ott, Neil Klepeis, Paul Switzer, Air change rates of motor vehicles and in-vehicle pollutant concentrations from second hand smoke, J Expo Sci Environ Epidemiol 2008 May;18(3):312-25.
- REPPiR, 2019, The Radiation (Emergency Preparedness and Public Information) Regulations 2019, Statutory Instruments 2019 No. 703.
- Thorne 2023, Radiological Impact Assessment of the Construction of a Four Bedroom Chalet Bungalow on Land adjacent to Croft House, Croft Road, Spencers Wood, Wokingham, RG2 9EY, MTA/P2072/2023-1: Issue 2.0

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Emergency Plan

Triggers for activation of the plan

The AWE Alerting system uses land line telephones to promulgate the alert followed by messages on Local Radio and TV channels, news websites and social media.

It is not practical to have a land line telephone installed in a one house development as the house is being built. An attempt was made to enlist the help of a neighbour but it turns out that they do not have a land line so would not receive the alarm themselves.

The site will have a radio tuned to the local radio stations that will relay the alert.

Means and location of sheltering

AWE's recommendation was that people be advised to shelter as soon as possible and that they may need to remain in shelter for up to 48 hours.

If the house is weather tight then the workforce and visitors will shelter in the house.

If the house is not weather tight the workforce will either shelter in a neighbouring house, shelter in their own cars/vans while wearing face masks or evacuate.

Means of support for staff and visitors whilst in sheltering conditions

Provision for supporting staff and visitors will be limited to having a minimal supply of food and water adequate, if not comfortable, for two days and having the local authority prior information available for reference.

People sheltering in vehicles will be able to tune into the local radio stations for news and updated advice.

Means of evacuation and recovery

If the local authority changes the advice to evacuation their advice will be followed so far as is practical.

It will be a condition of working on the site that the contractor has a vehicle that they can use to evacuate in should the need arise.

Method and frequency of review

The plan will be reviewed annually by Calcot Developments Limited by discussing it in a toolbox safety briefing with the workforce and making any changes that are agreed.

Contractor names and emergency contact information for the construction period.

These are listed in an attachment to this document.

EMERGENCY ACTION PLAN	
In a Radiation Emergency	
Go In	Go indoors as soon as you can and follow the instructions below. Don a face mask and leave it on until you achieve shelter (you may leave it on in shelter if you wish) If the building is airtight then go into it. If not either go into a neighbouring building or get into your car/van and sit with the engine and ventilation off and the doors and windows shut.
Stay In	Stay indoors, • Close all windows and doors. • Turn off any fans or heating systems that could draw in the air from the outside. • Remain calm and wait for further advice.
Tune in	Tune in to a local radio station, which will give you further information or instructions, including updates on schools. It may also be worthwhile checking relevant websites such as local news, schools or councils, to see whether any more information is helpful.
Don't use the phone	Don't use the phone unless you have to. This is important because the phone system could be overloaded, preventing the emergency services and other responders from receiving or making calls, or from contacting you. Dial 999 in the event of a real emergency or 111 if you think you need medical help right now.
Don't leave the area	Never be tempted to leave the area unless told to do so by the emergency services. There will normally be no need for urgent evacuation. If you try to leave, you may block the roads for the emergency services. In the highly unlikely event that you are told to leave the area follow the advice given by the authorities.

This poster to be displayed on all Health and Safety notice boards along with the local authority prior information leaflet.