

**TOWN AND COUNTRY PLANNING ACT 1990 - SECTION 77 AND TOWN
AND COUNTRY PLANNING (INQUIRIES PROCEDURE) (ENGLAND)
RULES 2000**

**APPLICATIONS BY LONDON ASHFORD AIRPORT LTD
SITE AT LONDON ASHFORD AIRPORT LIMITED, LYDD, ROMNEY
MARSH, TN29 9QL**

SUMMARY

REVIEW OF THE RISKS AND HAZARDS PRESENTED TO THE NUCLEAR POWER PLANTS AT DUNGENESS FROM THE PROPOSED DEVELOPMENT OF LYDD AIRPORT (LONDON ASHFORD INTERNATIONAL AIRPORT)

Client: LYDD AIRPORT ACTION GROUP (LAAG)

Summary of JOHN H LARGE

PLANNING INSPECTORATE REFERENCE: APP/L2250/V/10/2131934

LPA REFERENCES: Y06/1647/SH and Y06/1648/SH

INQUIRY DOCUMENT REFERENCE: LAAG/4/A

1 ST ISSUE	REVISION N ^O	APPROVED	CURRENT ISSUE DATE
1 DECEMBER 2010	LAAG-4-B-R18		7 JANUARY 2011

This pdf version of [LAAG-4-B](#) contains hyperlinks that directly link to other documents shown thus [TABLE 3](#) will display the whole of the paper, report, etc., referred to providing the host computer is internet connected. The printed hard copy of this document does not contain these links or full citation of the source references - access to the [Large & Associates](#) web page displaying the linked documents is direct by entering the Secure Passcode [CZ3136](#) on the [Client Zones](#) tab.

RISKS, HAZARDS AND POTENTIAL OUTCOMES PRESENTED TO THE NUCLEAR POWER PLANTS AT DUNGENESS FROM THE PROPOSED DEVELOPMENT OF LONDON ASHFORD INTERNATIONAL AIRPORT

S1 I am John Large, a Chartered, Consulting Engineer with considerable experience in nuclear matters.

S2 I am instructed by the *Lydd Airport Action Group* (LAAG) to provide opinion on if and how the proposed development of the London Ashford International Airport (LAIA) at Lydd might encroach upon nuclear safety of the Dungeness [nuclear power plants](#) (NPPs).

S3 In my main [evidence](#) have considered this matter in terms of:

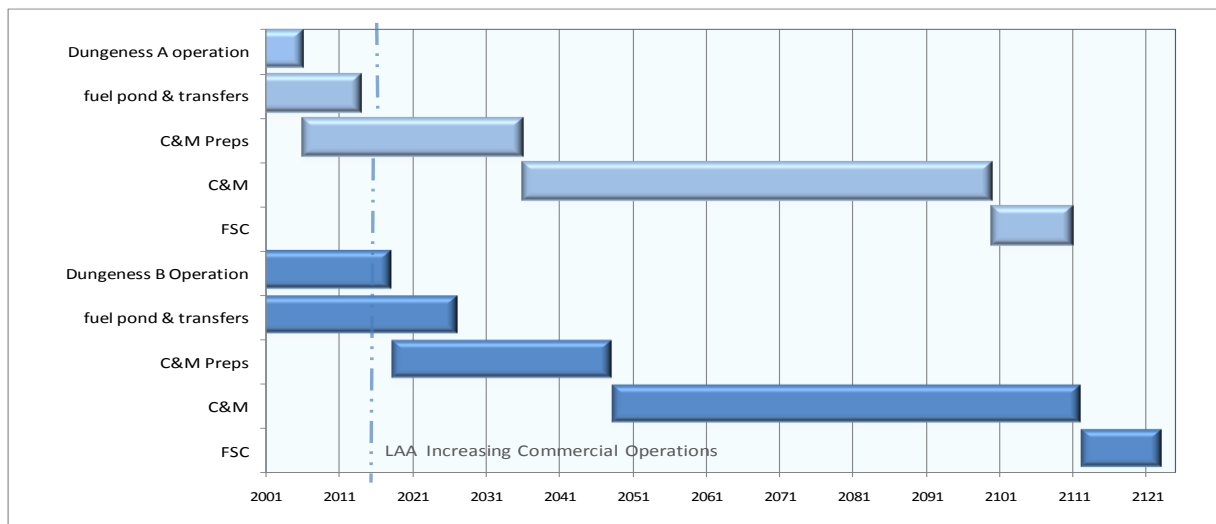
- S4 i) the continuing presence of the Dungeness NPPs, nuclear activities and radioactive materials on and about the Dungeness A and B sites for the foreseeable future;
- S5 ii) the radioactive hazards at the Dungeness NPPs, radioactive wastes (radwastes), associated activities, etc;
- S6 iii) the severity of damage arising from aircraft crash onto the Dungeness NPPs or onto the associated activities and radwaste, etc; and
- S7 iv) if and how these hazards might result in radiological consequences to the public communities in the interim and longer terms, both nearby and afar from Dungeness.

S8 In these respects:

S9 i) **Nuclear & Radioactive Activities:** [TABLES 1](#) and [2](#) identify the sources and volumes of radiological hazards that are expected to remain active on and about the Dungeness NPP sites until the projected brown-field clearance of all radioactive matter is completed in or about 2125.

S10 ii) **Presence of Radioactive Hazards:** [CHART 1](#) shows the times scales over which these radioactive hazards are expected to remain 'active' on and about the Dungeness NPP sites:

S11 **CHART 1 RADIOACTIVE ACTIVITIES & HAZARDS - DUNGENESS A & B SITES**



- S12 iii) **Severity of Damage of Aircraft Crash:** I describe the types of forces generated during impact of a large, commercial aircraft; the response of building structures and equipment to the impact; and the nature and severity of building and plant damage sustained, including for the effects of aviation fuel burning and the possibility of an unconfined fuel-air explosion.
- S13 As a reference to this complex subject matter, I refer to a number of learned society publications relating specifically to the resilience of the civil engineered structures of NPPs, particularly those published following the tragic events of 9/11 and, I take example of the damage severity sustained by the [Pentagon](#) as a result of the 9/11 aircraft crash.
- S14 I note that the both Dungeness NPPs were designed, built and nuclear safety licensed before the possibility of a crash of a large, commercial airliner was considered to be a credible external event (a '*design basis event*' on the basis of predicted frequency of crash alone).
- S15 In other words, at the time of the design and construction there was no compulsion for the designers of either NPP to take account of aircraft crash and build in resilience against it.
- S16 Taking Dungeness B NPP as example, I evaluate the provision of redundancy and diversity in the plant and equipment serving the reactor to determine if the NPP remains today '*fit for purpose*' and thus able to withstand aircraft crash, irrespective that aircraft crash was not a specified external '*design basis event*' at the design and licensing stages.
- S17 I conclude that although the main, reinforced concrete pressure vessel of each reactor would more likely than not withstand aircraft crash, one or more of the quadrant-based equipment and safety systems could be overwhelmed in such an event, potentially resulting in immediate depressurisation of the reactor primary circuit, then rapid overheating and failure of the irradiated fuel in the reactor core, with a resulting release of aerosolised radioactive fission product to the local environment.
- S18 The risk of a high radiological consequence event from an aircraft crash damaged operational reactor will remain a running hazard until the Dungeness B NPP shuts down – this is tentatively scheduled for 2018 but if Dungeness B is granted lifetime extensions (as have the similar NPPs at Hunterston and Hinkley Point), then it could remain operational to 2023 or, possibly, 2028.
- S19 iv) **Off-Site Radiological Consequences:** I arrive at much the same conclusion of risk of radioactive release and off-site radiological consequences relating to the Dungeness B spent fuel storage ponds, and for the other sources of radioactivity comprising operational and decommissioning radwastes that are scheduled to remain on the Dungeness NPP sites for up to 100 years or more following cessation of commercial generation of each NPP.
- S20 In [TABLE 3](#) I explore qualitatively the main and several sub-cases of radioactive releases that I consider at risk.

- S21 The modelling and presentation of the radiological consequences for each of the [TABLE 3](#) scenarios would have been beyond the funding resources of LAAG so, instead, [TABLES 4, 5, 6](#) and [7](#) give summaries of the results of analysis completed by Large & Associates and, separately, the Government's National Radiological Protection Board (now the Health Protection Agency) for similar situations involving radioactive release from operational NPPs and, separately, a train hauling spent fuel flasks.
- S22 I note, however, that these summaries should be considered with caution because each applies to a different initiating event (not aircraft crash) and, particularly, with the radioactive release plume being centred over and affecting a different geodemographic sample (ie for the operating NPPs Fessenhiem in France and Sizewell in Suffolk, and for the spent fuel transport a densely populated urban/suburban location).
- S23 Even so, the summaries provide a good indication of the order of magnitude of radiological consequences that could arise so long as the Dungeness B NPP remains in operation and thereafter until all of the spent fuel is transported from the site – as I have previously noted the period of high radiological consequence risk from aircraft crash will persist until at least 2018, plus about five to six years to unload and dispatch the last of the spent fuel, or if the NPP is granted a lifetime extension of, say 10 years, the hazard will persist until about 2032 or thereabouts.
- S24 I have not considered in any great detail the radiological consequences arising from release of the accumulating stockpiles of low- and intermediate-level radwastes that are expected to remain on the Dungeness NPP sites until 2120 or thereabouts. Although I would not expect a radwaste incident to be as severe as that of a spent fuel release, the interim and longer term morbidity and mortality could be significant, and ground and surface contamination levels high and very persistent.
- S25 **Concluding Opinion:** I consider the combined expert opinion ([Spaven](#) and [Pitfield](#)) to cast considerable doubt about the applicability and reliability of the aircraft crash risk methodology (and accompanying outdated data base) adopted by the HSE Nuclear Installations Inspectorate (NII).
- S26 This is particularly concerning since it relates to the direct and indirect inputs to this Planning Inquiry by the HSE NII who specifically [advised](#) Shepway District Council that it was *'satisfied that the risk to the Nuclear Installations at Dungeness in their current plant states [that it] is sufficiently remote that we have no grounds for objection to the proposed development on the grounds of Nuclear Safety'*.
- S27 I am not at all satisfied that the NII's rationale of relying on its own risk assessments alone, as doubtful as this has been shown to be, is a correct and failsafe approach.
- S28 I consider that the underlying basis of any judgment on risk, particularly relating to nuclear safety, is that if certain externally driven events, over which the NPP operator has no control

(such as severely damaging air crash), are to be discounted on probability alone, then the basis of the judgment must be absolutely indisputable.

- S29 I am also uncomfortable with the NII's dismissal that LAIA air traffic movements might provide the opportunity for airborne terrorist attack against the Dungeness NPPs. Moreover, the NII offers no substantiation of this other than that it considers such malevolent acts not '*reasonably foreseeable*' and, on this basis alone, it effectively directs that no further consideration by this Inquiry is necessary.
- S30 I would have expected the HSE (NII), as a Statutory Consulate, to have advised the planning authority on this issue but, to my knowledge it has not done so – there is no other government agency that is sufficiently knowledgeable to provide advice on this important public safety issue.
- S31 I do not believe it possible to prove the existing Dungeness A and B NPPs, or a future Generation III NPP that might be built on the Dungeness site, against aircraft crash, particularly that of a fully fuelled, commercial airliner of the types proposed for the LAIA development. This being so, the reasonable possibility of aircraft crash and severe damage to the NPP must be ruled out by other means by, first, limiting the gross size (weight and fuel capacity) of the aircraft and, second, by setting an acceptable upper limit to the predicted frequency of crash by curbing LAIA air traffic activities.
- S32 However, to set an upper limit to the aircraft crash frequency, the adopted methodology of determining the crash rate has to be proven and reliable – the adopted Bryne methodology has been shown not to be so in both of these respects.
- S33 Without such air traffic restraint, the proposed development at LAIA neither limits aircraft size or air traffic density. Indeed, it raises the size of the aircraft using the airport and it increases the number of air traffic movements.
- S34 Because of the doubts and uncertainties over the air crash frequency, the questionable resilience of the Dungeness A and B building structures, and the potential enormity of the radiological consequences should a severely damaging aircraft crash occur – either as chance would have it or by malevolent intent - I consider it to be in the public interest that the NII fully disclose its assessment of all relevant nuclear safety case reviews and the like which, to date, it has not done so.
- S35 The potential radiological consequences resulting from an aircraft crash on the Dungeness NPPs are of great public concern and thus, I suggest, continuing nuclear safety of the Dungeness NPP sites is the paramount material consideration for this Inquiry. So, it follows, all of these aspects of the relationship between the Dungeness nuclear sites, etc., as they each relate to the proposed development of the London Ashford International Airport and public

health and safety, are material considerations and should, therefore, be fully disclosed to and considered by this Inquiry.

S36 Given the facts and opinion that I and the other experts acting for LAAG have presented, taken together with the commonsense notion that it would be folly indeed for such a development to proceed so near to the highly hazardous NPPs, radwastes and continuing radiological activities of Dungeness, the Inquiry should wholly reject this Planning Application.



JOHN H LARGE
LARGE & ASSOCIATES
CONSULTING ENGINEERS, LONDON