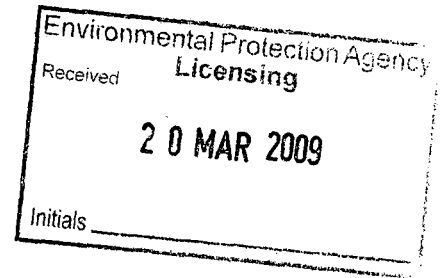


HYDRO RISK ASS REPORT
SUB. NO 8

Josephine Kennedy

From: Josephine Kennedy
Sent: 20 March 2009 15:23
To: 'Duane, Aidan'
Subject: RE: Minister of State Sargent submission



Aidan,

We have received your submission and will process in due course.

Thanks

Jo

*Josephine Kennedy
Environmental Licensing Programme
Office of Climate, Licensing and Resource Use,
Environmental Protection Agency
Headquarters
P.O. Box 3000
Johnstown Castle Estate,
Wexford
053 9160600
Email: j.kennedy@epa.ie
Web: www.epa.ie*

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From: Duane, Aidan [mailto:Aidan.Duane@agriculture.gov.ie]
Sent: 20 March 2009 14:30
To: Josephine Kennedy
Subject: Minister of State Sargent submission

Dear Josephine,

Many thanks for returning my earlier call. Minister of State Sargent has asked me to submit the attached on his behalf. Can you confirm that you have received same.

Regards

Aidan Duane
Private Secretary
Office of the Minister of State
Mr. Trevor Sargent T.D.
Department of Agriculture, Fisheries and Food
Tel: 00353 1 607 2362
Fax: 00353 1 676 3947

20/03/2009

Department of Agriculture, Fisheries and Food

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An Roinn Talmhaíochta, Iascaigh agus Bia

Tá an t-eolas san ríomhphost seo, agus in aon ceanglán leis, faoi phribhléid agus faoi rún agus le h-agaigh an seolaí amháin. D'fhéadfadh ábhar an seoladh seo bheith faoi phribhléid profisiúnta nó dlíthiúil. Mura tusa an seolaí a bhí beartaithe leis an ríomhphost seo a fháil, tá cosc air, nó aon chuid de, a úsáid, a chóipeáil, nó a scaoileadh. Má tháinig sé chugat de bharr dearmad, téigh i dteagmháil leis an seoltóir agus scríos an t-ábhar ó do ríomhaire le do thoil.

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Noeleen Keavey,
Programme Officer,
Environmental Protection Agency,
Headquarters, PO Box 3000,
Johnstown Castle Estate,
Co. Wexford.

20^ú Márta 2009

Reference – Waste Licence Reg. No. W0231-01

A Chara,

With reference to the information supplied by you, by letter dated February 20th,
entitled '*Fingal Landfill Project – Hydrogeological Risk Assessment*', I would like to
submit the attached commentary for your consideration.

Is mise le meas,

.....
Trevor Sargent T.D.,
Aire Bia is Gairneoireachta

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Hydrogeological Risk Assessment (February 2009)

Proposed Fingal Landfill Project

A Commentary

Using proprietary software (LandSim, Version 2.5, from Golder Associates, 2007) and a published document titled "Contaminant fluxes from hydraulic containment landfills spreadsheet v 1.0" (Environment Agency 2004), RPS Environmental calculated the probability of possible major (List I Contaminants) and other contaminants (List II), from leachate within the landfill, escaping into the surrounding groundwater. This study focused on the likelihood of groundwater within the underlying bedrock becoming contaminated. A hydro-geological study (Page 5 of the report) established that the proposed landfill site, if constructed, would lie above an existing locally important aquifer (letter from Dr A. Sleeman, Geological Survey of Ireland 2006). This aquifer comprises groundwater within the highly fractured limestone bedrock and groundwater above the bedrock within the clay layer. Also the proposed landfill site lies in close proximity to two major geological fault zones, the North Dublin Fault that runs east west, just north of the landfill footprint and the North-South major fault that runs adjacent to the M1 motorway, to the east of the site.

The engineered landfill would be constructed within a layer of glacial till clay, which the report identifies as being of low permeability. Given the estimated depth of this clay layer, which is populated in various locations by more permeable gravel and or sand deposits, it was stated that this layer would provide sufficient protection to the bedrock groundwater. In addition, the groundwater level within the clay layer would be higher (only during managed operation of the landfill) than the estimated leachate level within the landfill and would therefore create an inward pressure containing the leachate. This combined with the engineered linings of the landfill and the claimed low recharge of groundwater by rainfall, would prevent significant contamination occurring. The modelling undertaken confirms that cadmium (a List I contaminant) and chloride will escape from the landfill over the lifetime (estimated out to 20,000 years) of the facility. The report concludes that the low levels of these contaminants pose no significant risk to groundwater and as such does not contravene the requirements of the EU Groundwater Directive.

The report is compromised by the acceptance of conclusions within previous studies, commissioned by the proposers of this development. In particular, the statement in the current report that the site is predetermined a "Low Environmental Risk Setting" despite the fact that the proposed facility overlies an aquifer and is located in a rural area with residential and farming (horticultural, tillage and dairy) activities.

It is noted that this report refers to the thickness of the low permeability clay layer estimated at 30m (or more) and with a uniform minimum depth of 10m under the proposed landfill footprint. No mention is made, in the current report, of the variability in the thickness of this layer and the area under the proposed landfill site identified by RPS as being less than 10m in thickness (**Collins and Herlihy, 2008**).

The current report (2009) states that the clay zone overlying the bedrock is of low permeability and as such will protect groundwater from contamination. However, **Collins and Herlihy, (2008)** commented in their paper that, "Groundwater beneath the site is a calcium bicarbonate rich water as would be expected from a limestone aquifer and calcareous bedrock. The presence of ammoniacal nitrogen (0.2-0.9mg/l), ortho-phosphate (up to 2.91 mg/l) and sulphate (up to 533 mg/L) above the Drinking Water Standard (98/83/EC) in some wells indicate that despite the widespread low vulnerability classification in the study area, groundwater shows evidence of impacts from human activities." Without empirical evidence they conclude in their paper that this contamination "is likely to be a result of input from areas of higher vulnerability up-gradient where recharge (*from rain water*) is greater, which then flowed down-gradient within the aquifer." However they also confirm this contamination is consistent with the "ERBD classification of the aquifer being 'probably at risk from diffuse source pollution'" (**Anon, 2009**). It is evident that groundwater below this proposed landfill site can be contaminated by long-term human activities. It would appear that the 2009 report is somewhat sanitised and presents conclusions and interpretations more favourable to the proposers of this development, than the recorded data indicates.

The report (2009) confirms (Page 34) that contamination (ammonium, iron, nickel, chloride, potassium and cadmium) will eventually leak into the surrounding environment over the lifetime of the proposed landfill. Although the amounts discharged are predicted to be very low, no consideration is given to the potential interaction of these contaminants and their effects on food production. In particular it is noted that larger amounts of chloride will migrate to the surrounding environment, within

the first 30 years of the facilities operation. This discharge coupled with cadmium release from the landfill and the background cadmium levels identified in the soil, down gradient of the proposed site, may contribute a risk to food production by making cadmium more mobile in groundwater and therefore more available to plants (leafy vegetables and potatoes) which naturally accumulate (**Kim 2005**) this metal. In addition, cadmium chloride is a more readily absorbed by some animals (**Klassen, Lehman and Maitani, 1986**).

The proposed site is located in close proximity to two major geological faults. The fractured nature of the underlying limestone bedrock is indicative of past movements in the bedrock. The impact of seismic activity has not been mentioned in the report. Although, Ireland is considered a zone of low seismic activity four of the six seismic events in Ireland (1990-2006) have occurred on the east coast of Ireland (**Anon, 2009 b**). The largest event (2.0 on the Richter Scale) occurred in 1984 east of Dublin as a result of a movement in a fault line west of Hoylhead in Wales (this fault line is active every 10 years or less) and the latest event occurred on the 14th December 2005. The report is silent on this aspect.

While modelling of the impact of rainfall on the possibility of leachate escaping from the proposed landfill and its effects on aquifer recharging has been undertaken, the input data only allowed for a 10% increase over the historical recorded precipitation (Page 24). No account was taken of the impact of a severe weather event that could overwhelm the landfill. Given the predicted probability of such events due to climate change (**Anon, 2008**) should not this have been included in the assessment? The ability to modulate such events already exists (**Burton et al., 2008** and **Timbal, Fernandez and Li, 2009**). Both extremes of precipitation should be considered as severe drought could have an impact on the clay zone underlying the proposed site due to alternating periods of saturation and shrinkage.

At present a locally important aquifer is present at this location. The adoption of strategies to improve the quality of extracted water will ensure the continued availability of this vital resource for future generations. Building a municipal refuse dump on top of this natural resource is not a sustainable use of this land.

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