

Consultancy Services  
provided by AWN Consulting  
to COMAH Establishments

AWN Consulting offers a range of consultancy services to the operators of COMAH establishments who, due to the quantity and nature of substances stored on site are subject to the provisions of the European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations, 2006 (S.I. 74 of 2006), also known as the COMAH Regulations.

Our services include modelling the consequences and risks associated with major accident scenarios, using the DNV PHAST and BREEZEHAZ Modelling Software, assisting operators with Hazard and Operability (HAZOP) assessments, Hazard Identification (HAZID), carrying out site inspections and preparing COMAH compliance documentation including Major Accident Prevention Policies (MAPP) and Safety Reports. The emphasis is placed firmly on the provision of clear and concise guidance and solutions that add value to our clients' businesses and ensure compliance with the COMAH Regulations.

We provide our services to a range of blue chip clients and have also acted as expert advisers to Local Authorities and An Bord Pleanála with regard to risk assessment and consequence modelling for COMAH sites.

The company has offices in Dublin and Cork and is able to call upon a team of highly qualified and motivated professionals who provide consultancy services over a range of disciplines. This has allowed us to provide technical support to more than 500 clients and develop an extensive track record of undertaking contract work for major infrastructure projects, blue chip industrial clients, property developers and COMAH establishments in Ireland, the UK, the Middle East, the USA and continental Europe.

Our ongoing aims are to provide our clients with leadership and advice second to none and to continue to deliver solutions that are innovative, on time and within budget.

# Introduction

AWN personnel have considerable experience in providing consultancy services to COMAH facilities, which are classified as such by the European Communities (Control of Major Accident Hazards Involving Dangerous Substances) Regulations 2006 (S.I. 74 of 2006). These regulations implement the Seveso II Directive (96/82/EC) (as amended) into Irish legislation. AWN provide a range of services to COMAH facilities including preparation of compliance documentation, hazard identification (HAZID) calculating the consequences of major accident scenarios, risk modelling and assessing the impacts of COMAH sites on land use planning.

Our specialist in house team have many years experience in providing consulting services to COMAH establishments.

**Dr. Fergal Callaghan** is Director with responsibility for Seveso Assessment within AWN Consulting. He has extensive experience in providing consultancy services to COMAH establishments. Dr. Callaghan has a B.Sc. (Industrial Chemistry) and a Ph.D. (Chemical Engineering). He is an Associate Member of The Institution of Chemical Engineers (AMIChemE), a Member of the Royal Society of Chemistry (MRSC) a Member of the Environmental Protection Subject Group, IChemE, a Member of the Safety and Loss Prevention Group of the IChemE, a Graduate Member of The Chartered Institute of Water and Environmental Management and a Member of the UK Dioxin Network. He has 18 years engineering and consultancy experience in the Irish, UK and European environmental industry.

Dr. Callaghan has extensive experience in providing consultancy services to Lower Tier and Upper Tier COMAH establishments including the preparation of Safety Reports, hazard identification and analysis, consequence and risk modelling of major accident scenarios using DNV PHAST, ERM RISKPLOT and BREEZE HAZ, provision of advice to Local Authorities regarding COMAH establishments and acting as an assistant An Bord Pleanála inspector. Dr. Callaghan also provides advice regarding land use planning near to COMAH establishments and the modelling of individual risk (IR) and societal risk (SR).

**Maeve McKenna** is a Senior Consultant with AWN. She has a BEng in Chemical Engineering from the Queens University of Belfast and a Masters of Engineering Science in Water and Environmental Engineering from NUI Dublin. Maeve is also a Chartered Engineer and a Member of Engineers Ireland. She has over 5 years experience in environmental assessment and management projects, including Seveso Assessments of IPPC licensed sites.

Maeve McKenna's experience in relation to COMAH establishments includes the assessment of the Seveso Status of a proposed pharmaceutical facility for IPPC licence and planning applications, modelling the consequences of major accident scenarios at pharmaceutical and semiconductor manufacturing facilities, assessment of an aviation fuel storage terminal, assessing the suitability of land use proposals and the individual and societal risk posed to the occupants of developments near to COMAH establishments.

**Elaine Neary** is an Environmental Team Manager and Senior Consultant with AWN. She has a BA in Natural Sciences from Trinity College Dublin and a Masters in Applied Science in Environmental Science from UCD. She is an affiliate member of the Institute of Environmental Management and Assessment (IEMA), the ESAI (Environmental Sciences Association of Ireland) and the Chartered Institution of Waste Management (CIWM). Elaine has 6 years experience of preparation of compliance documentation and procedures for Seveso sites, including Safety Report Preparation, Risk Assessment and HAZID.

# Services >>



## Seveso Major Accident Consequence Modelling

AWN has significant experience of modelling the impacts of COMAH establishments, with a particular emphasis on the calculation of major accident hazard consequences. We use DNV PHAST software to calculate the consequences of major accident scenarios. This model is used by the Irish and UK Health & Safety authorities to predict the consequences of explosions, fires & toxic releases.

AWN have experience of modelling the consequences of major accident scenarios using DNV PHAST modelling software including the following:

- Thermal and overpressure impacts arising from a Boiling Liquid Expanding Vapour Explosion (BLEVE) due a ruptured storage vessel releasing a pressurised liquid at a temperature above its normal boiling point at atmospheric conditions such as LPG, hydrogen or oxygen;
- Thermal impacts arising from a pool fire following the rupture of a storage vessel or spillage or leaking of a flammable substances such as solvents or fuels, and formation of a liquid pool;
- Overpressure impacts from a vapour cloud explosion which follows the evaporation of a flammable substance from the surface of a liquid pool following an accidental release from a vessel;
- Dispersion of a toxic or an asphyxiating gas following an accidental release and determining the distance from the release to which dangerous concentrations such as the Specified Level of Toxicity Dangerous Toxic Load (SLOT DTL) will occur; and
- Thermal impacts of a chemical storage warehouse fire.

Recent projects include:

- **Large Semi-conductor Manufacturing Facility:**

Modelling of the consequences of proposed changes to the facility, determination of impacts of explosion and toxic gas release scenarios using DNV PHAST, modelling of on-site and off-site risks.

- **BMS Cruiserath:**

Modelling of Seveso impacts of pharmaceutical synthesis site, determination of impacts of toxic gas, fire & explosion scenarios using DNV PHAST.

- **Servier Industries:**

Major accident hazard identification and modelling the consequences and risk of proposed pharmaceutical manufacturing facility, determination of impacts of toxic gas, fire & explosion scenarios using DNV PHAST.

- Assessment of COMAH fuel storage site on behalf of Fire Authority including site inspection, review of safety and emergency response documentation & operating procedures, hazard identification and modelling the consequences of major accident scenarios, recommendation of measures to improve operational safety and emergency response procedures.

# Seveso Major Accident Risk Modelling & Dioxin Risk Assessment

AWN has experience of modelling the risk of major accident scenarios occurring at COMAH establishments. We also carry out dioxin risk assessments for developments such as thermal treatment facilities.

AWN undertakes modelling the risk of major accident scenarios using techniques such as fault tree analysis and software such as ERM Risk Plot. These techniques are used to calculate the probability of occurrence of major accidents at COMAH establishments and the probability of fatality.

Recent projects involving risk modelling include:

- **Servier Industries:**  
Major accident hazard identification and modelling the consequences and risk of proposed pharmaceutical manufacturing facility, determination of impacts of toxic gas, fire & explosion scenarios using DNV PHAST.
- **Large Semi-conductor Manufacturing Facility:** Completion of HAZOP and HAZID exercise including site inspection, modelling of 21 separate MAH scenarios for toxic gas, fire, explosion, & fragment rocketing, preparation of HAZID reports & risk modelling, using BREEZE HAZ & DNV PHAST.
- **Large Semi-conductor Manufacturing Facility:** Modelling of the consequences of proposed changes to the facility, determination of impacts of explosion and toxic gas release scenarios using DNV PHAST, modelling of on-site and off-site risks.

AWN Consulting also undertake dioxin risk assessments for developments such as thermal treatment facilities using the methodology developed by the US EPA for hazardous waste facilities. This involves carrying out soil sampling and air quality modelling to determine background PCDD (dioxin) and PCDF (furan) concentrations, development of a Conceptual Site Model and modelling of background dioxin and furan intake, modelling the impact of deposition rates from the proposed development on soil concentrations and increase in ambient air concentrations, and modelling the impact on dietary intake of dioxin and furans for the Most At Risk Individual.

AWN has carried out dioxin risk assessments for the following developments:

- **Indaver Carranstown Municipal Waste Incinerator:** Dioxin and furan dietary intake and inhaled risk model from incinerator emissions, major accident emission modelling of toxic release from bunker fire.
- **Indaver Ringaskiddy Municipal Waste Incinerator:** Dioxin and furan dietary intake and inhaled risk model from incinerator emissions.
- **N7 Resource Recovery Project (Municipal Waste):** Dioxin and furan dietary intake risk model from facility emissions.
- **College Proteins animal by-products processing plant:** Dioxin and furan dietary intake risk model from biomass combined heat and power plant emissions.



# HAZID, HAZOP and Site Inspections

A fundamental element of the Seveso II Directive (96/82/EC) (as amended) and the associated COMAH Regulations (S.I. 74 of 2006) is that the Operator of a COMAH facility “take all measures necessary to prevent major accident hazards and limit their consequences for man and the environment”. Current best practice in meeting this requirement is to conduct Hazard and Operability Assessments (HAZOP), and to identify major accident hazards (MAH) using the HAZID process. The completion of site inspections forms an integral part of this process.

AWN has assisted the operators of COMAH establishments in the completion of HAZOP assessments, and in the identification of major accident hazards followed by consequence modelling and risk assessment.

AWN complete HAZOP and HAZID studies in conjunction with staff members from a number of different disciplines across the COMAH site, in order to benefit from the invaluable insight provided by their work and experience into potential major accident hazards.

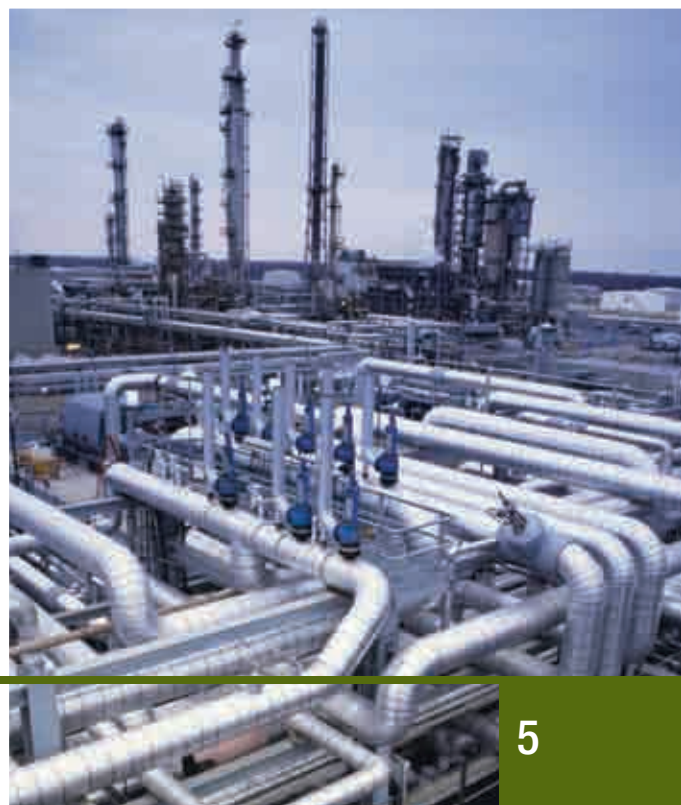
We then model the consequences and risk of major accident scenarios using PHAST DNV software and other risk assessment techniques, as described in the ‘Consequence Modelling’ and ‘Risk Modelling’ sections of this brochure.

AWN conduct site inspections of COMAH establishments as part of HAZOP and HAZID studies, and also as part of site assessments completed on behalf of regulatory authorities.

AWN has previously conducted the following HAZOP and HAZID studies and site inspections:

- **Large Semi-conductor Manufacturing Facility:** Completion of HAZOP and HAZID exercise including site inspection, modelling of 21 separate MAH scenarios for toxic gas, fire, explosion, & fragment rocketing, preparation of HAZID reports & risk modelling, using BREEZE HAZ & DNV PHAST.

- **Chemsource Chemical Warehouse:** Major accident hazard identification and modelling the consequences and risk of upper tier chemical storage facility, determination of impacts of toxic gas, fire & explosion scenarios using DNV PHAST.
- Assessment of COMAH fuel storage site on behalf of Fire Authority including site inspection, review of safety and emergency response documentation & operating procedures, hazard identification and modelling the consequences of major accident scenarios, recommendation of measures to improve operational safety and emergency response procedures.



# HSA Notification and COMAH Compliance Documentation

The COMAH Regulations (S.I. 74 of 2006) require that Seveso sites submit a notification to the HSA and to prepare a Major Accident Prevention Policy (MAPP). 'Upper tier' Seveso sites are additionally required to prepare a Safety Report which details the Safety Management System (SMS), and the internal and external emergency plans.

AWN assist both lower and upper tier Seveso (COMAH) sites with the submission of notification information to the HSA and with the preparation of COMAH compliance documentation including MAPP, SMS, Emergency Plans & Consultation Plans.

The notification submission provides information to the HSA on the operator name and contact details, dangerous substances stored on site including their quantity, form and categorisation, a description of the activity and the surrounding environment, identification of nearby establishments that could increase the consequences of major accidents and mapping.

The Major Accident Prevention Policy (MAPP) establishes in writing the operator's overall aims and principles of action with respect to the control of major-accident hazards. The MAPP is designed to guarantee a high level of protection for people and the environment by appropriate means, structures and management systems.

The purpose of the Safety Report is to demonstrate that:

- A MAPP and a Safety Management System (SMS) for implementing the MAPP have been put into effect;
- Major accident hazards have been identified and their risk of occurring and consequences minimised,
- Adequate safety and reliability have been incorporated into construction, design and operation of the COMAH facility;
- Internal and external emergency plans have been prepared.

The Safety Report is also used to provide information to competent and planning authorities to assist with land use planning decisions in relation to COMAH establishments and contains an updated inventory of dangerous substances stored on site.

The Safety Report contains information on the management system and organisation of a COMAH establishment with a view to major accident prevention, a description of the environment of the facility and the installation. It identifies major accident hazards, and provides information on the consequences and risk of major accident scenarios. The Safety Report also describes measures for protection and intervention to limit the consequences of an accident including internal and external emergency plans.





# Land Use Planning and COMAH Establishments

Potential impacts from major accident scenarios associated with COMAH establishments can extend beyond the boundary of the site. Three land use planning zones exist in relation to COMAH establishments, namely the inner zone, middle zone and outer zone. The Health and Safety Authority (HSA) provides land use planning guidelines to planning authorities that restrict the nature and size of developments that can occur within these land use planning zones. The HSA also provides advice to planning authorities regarding the siting of new COMAH establishments and modifications to existing establishments on the basis of the consequences and risk of major accident scenarios.

AWN provides the following services in relation to land use planning and COMAH establishments:

- Assessment of the suitability of development proposals near COMAH establishments taking into account their location in relation to land use planning zones, and individual and societal risk posed to the proposed development;
- Modelling the consequences and risk of major accident scenarios for new COMAH establishments, determination of land use planning zones for the facility and assessment of the impacts on land use planning outside the facility boundary. We have also carried out this work in respect of proposed modifications to existing COMAH establishments; and
- Provision of advice to Planning Authorities in respect of proposed COMAH establishments.

Recent projects include:

- **Greenhills Development/Drogheda LPG facility:** Calculation of land use planning zones using PADHI risk assessment tool for development site vicinity of LPG storage facility in Drogheda and modelling to determine societal risk integral (SRI) for proposed development site.
- **Cork (Blackrock):** Assessment of land use planning impacts from Seveso sites (LPG and Hydrocarbons) at Tivoli, Cork.

- **Westpark, Shannon:**

Modelling of Seveso impacts of pharmaceutical plant on adjacent proposed business park and presentation to An Bord Pleanála.

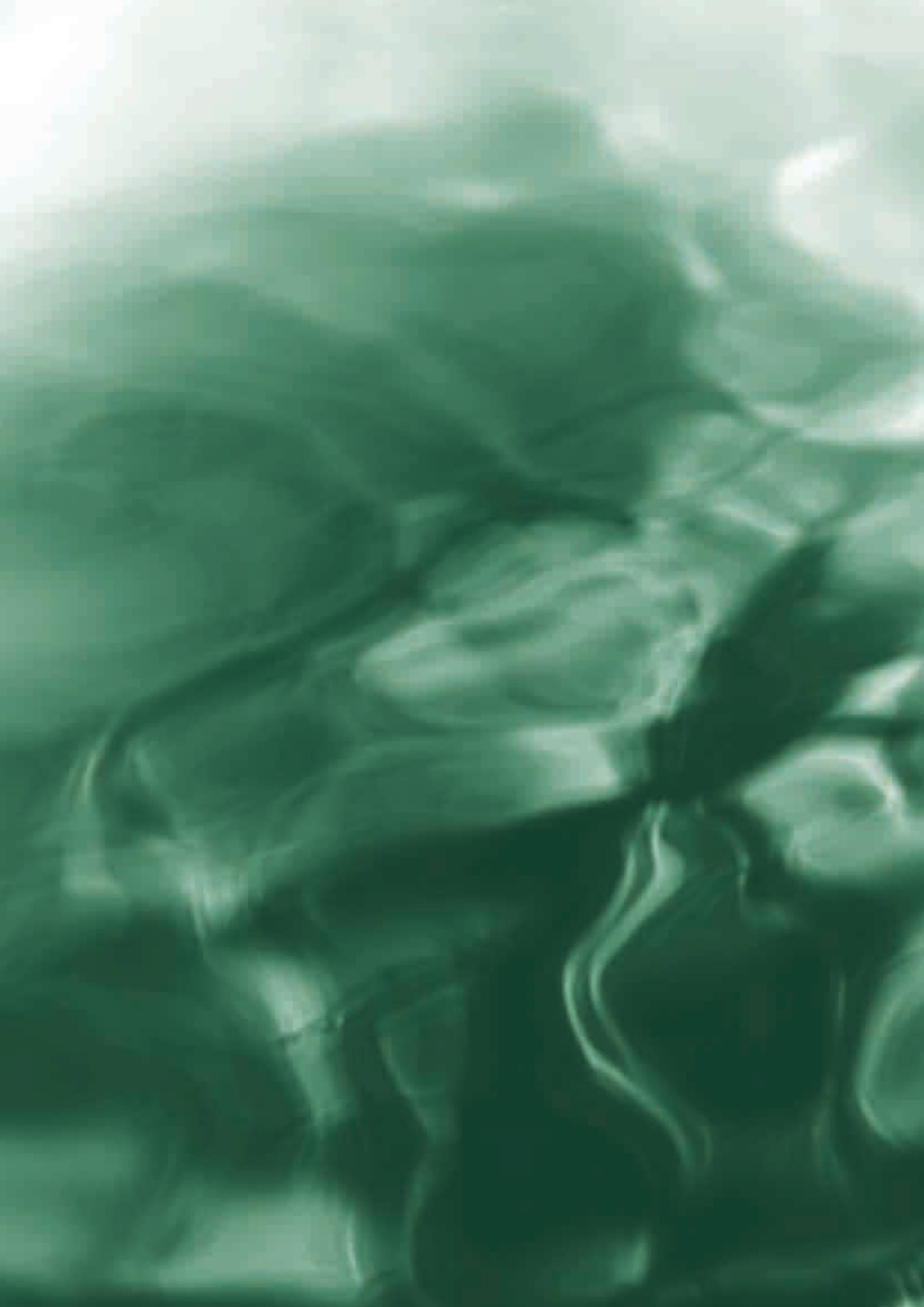
- **Shannon Explosives Factory:**

Assistant An Bord Pleanála Inspector for planning public enquiry, preparation of risk assessment, land use planning & consequence modelling report.

- **Little Island, Cork:**

Modelling of existing Seveso sites, prediction of land use planning impacts for Little Island.





## Leaders in specialist environmental disciplines

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