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Options for a New Integrated Natural Resource Monitoring Framework for Wales

Project Document

Briefing note: Requirements and Opportunities for Emergency Response in an Integrated National Monitoring Programme

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Centre for Ecology & Hydrology
Natural Environment Research Council

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BTO Looking out for birds

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Requirements and Opportunities for Emergency Response in an Integrated National Monitoring Programme

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Requirements and Opportunities for Emergency Response in an Integrated National Monitoring Programme

Rationale

The Civil Contingencies Act 2004 defines an emergency as a situation or series of events that threatens or causes serious damage to human welfare, the environment, or security. In most cases the response to emergencies will be conducted at a local level by local responders, usually the emergency services, local authorities, health bodies and government agencies. These are termed Category 1 responders. The Police Service usually has the lead role in managing the immediate emergency response, although other agencies can take the lead, depending on the type of emergency. In the recovery phase the lead responsibility is normally formally transferred to the agency with the most significant role.

Category One responders such as NRW have four main duties under the Act:

- risk assessment;
- emergency planning;
- business continuity management;
- maintaining public awareness and arrangements to warn, inform and advise the public.

During the recovery phase, NRW's role is to advise and support the multi-agency effort, and to perform our regulatory duties.

These arrangements operate for local incidents, but for the most severe emergencies a co-ordinated combined government response may be essential. The Pan-Wales Response Plan[1] sets out arrangements for the way that this response is implemented. The Wales Civil Contingency Group decides on whether the Plan is initiated.

The primary source of scientific and technical advice for is provided by the government agencies working within the response team. The STAC (Scientific Technical Advisory Cell) advises on the monitoring requirements - both immediate and long term. An Air Quality Cell is a pre-established STAC specifically for responding to air quality emergencies. At the UK level via COBR, the Scientific Advisory Group for Emergencies (SAGE) is responsible for coordinating scientific and technical advice.

Objectives of Environmental Monitoring

Environmental monitoring is an integral part of emergency response to incidents involving releases of materials, chemicals or radioactivity to the environment. Environmental monitoring is essential to assess the impacts of an incident and needs to cover the main media – air, water, soil, vegetation and the food chain The monitoring data aids the implementation of counter-measures, and post-incident recovery plans.

[1] *Pan-Wales Response Plan. Wales Resilience Forum, September 2014*

Monitoring has four main objectives

1. The most urgent need is for assessment of the impacts of an incident – whether man-made or natural – on public health. The public health focus is on assessing contaminant levels, and the resulting intake of these contaminants to humans. This needs to consider both short-term exposure and chronic longer-term exposure. The human population is not homogenous, so exposure must be considered for groups characterised by age, diet types, and lifestyle. For example radiological protection is based on the EU Basic Safety Standards Directive, which requires assessment of the doses to members of the most highly exposed population groups ('critical' groups) from all relevant potential sources of anthropogenic radioactivity and all relevant potential exposure pathways to such radioactivity.

2. Environmental monitoring helps to inform risk reduction plans, which may include removing target groups of people and animals to areas where they are less exposed, or introducing protection measures to reduce exposure. For example iodate tablets can be issued to people most directly exposed to radioactivity.

3. Monitoring is necessary to assess the impacts on the natural environment. For example, an oil pollution incident often has most impact on birds, fish and shellfish. Studies are important if the emergency affects a nature designated area e.g. SAC

4. Following the immediate assessment of impacts of an incident, monitoring has an essential role in tracking the recovery of systems to the baseline levels of contamination, state of health and population. This requires environmental monitoring information on baseline levels.

Key Components of National Monitoring for Emergency Response.

For a national monitoring programme to maximize its value for emergency response, the main requirements are:

1. Modelling expertise using meteorological data and dispersion models to assess direction of pollutant plume and likely pathway of dispersion/deposition. Fate of pollutants also need to be considered. This informs immediate counter-measures to protect the public, either by moving them, or installing protection measures.

2. Modelling also facilitates planning of the monitoring network to target the most exposed areas, and to provide preliminary assessment of sensitive receptors. The assessment helps to decide on immediate ways to protect sensitive receptors.

3. Based on the monitoring plan, provision of adequate trained resources to sample the environment – if possible before the incident reaches the environment, and subsequently. Sampling should be to agreed standards/protocols, with effective health and safety protection.

4. Deployment of continuous monitoring equipment for analysis of contaminant levels – particularly important for air and water. Analysis is to agreed protocols.

5. Accredited laboratory facilities for sample preparation and analysis of collected samples.

6. Data analysis including validation of predicted model behaviour of the releases based on baseline monitoring data.

7. Public health expertise to assess exposure of the population and sensitive sub-groups most likely to be exposed, in relation to standards for concentrations and exposure levels. This aids planning of counter measures.

Current Environmental Monitoring Facilities for Immediate Response

After an incident, the monitoring priorities are to assess human exposure from pollutants via the following pathways

- By inhalation from the air directly or from deposited materials which are resuspended
- By consumption of drinking water
- By consumption of freshly collected vegetables exposed to the atmosphere
- By consumption of milk from grazing animals
- By consumption of eggs from free-range poultry
- By consumption of fish and shellfish

Facilities that are available for monitoring and modelling these pathways are the following.

Air

UK RIMNET gamma monitors for radioactivity
UK Automatic Urban and Rural Monitoring Network
UK PAH and Toxic Organic Micro Pollutants Network
UK Eutrophying and Acidifying Pollutants Network (allows samples to be collected for a range of deposited materials)
UK heavy metals network
Wales local authority and NRW monitoring equipment. Continuous monitoring sites mainly in urban authorities. Results available from Wales Air Quality Forum.
EA/NRW Mobile Monitoring Facility for NO_2, SO_2, PM_{10}, $PM_{2.5}$ & CO
Mobile monitoring equipment from consultants
EA/NRW and consultants for air quality modelling

Drinking Water

Water companies are responsible for monitoring the quality of public water supplies, under the regulation of the Drinking Water Inspectorate. Private water supplies are common in rural areas and local authorities have a risk-based sample monitoring programme. In the case of an incident, the monitoring programme would need to be intensified. Provision of adequate resources for sampling and analytical facilities is a potential gap. At the time of the Foot and Mouth epidemic, a private contractor was used to monitor private water supplies around Epynt.

Vegetables, Milk, Eggs, Fish and Shellfish

Food Standards Agency (FSA) has responsibility for monitoring foods. In practice, WG field officers help in sample collection. Analysis is carried out by accredited laboratories contracted by FSA. At the time of the Foot and Mouth disease outbreak in 2011, FSA analysed dioxin and PCB contents of a range of foods because of concerns about contamination from animal pyres.

FSA carries out a routine monitoring programme around UK nuclear sites. Monitoring is done by FSA and NRW in Wales. Reports on Radioactivity in Food and the Environment are published annually by FSA and the environment agencies.

Current Environmental Monitoring Facilities for Monitoring Natural Environment and Recovery Phase

Monitoring of the recovery phase is needed mainly to assess effectiveness of recovery interventions to the baseline state. This work focuses on monitoring herbage, soils, fresh waters, marine waters, and biota most likely to be affected by dispersion and deposition. Sampling requires adequate expertise provided by NRMF partners to comply with protocols.

The UK Soil and Herbage Pollutant Survey[2] completed in 2007 by EA provides the most comprehensive baseline survey. Samples of soil and herbage taken from 122 rural, 28 urban and 50 industrial locations were analysed for metals, polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs) and dioxins. Analysis was done by FERA. The Survey published sampling and analytical protocols for reference.

Freshwaters and marine waters are monitored by NRW to assess compliance with the Water Framework Directive. In the case of an emergency, sampling and analytical facilities would need to be diverted from routine monitoring programmes.

Monitoring of impacts on biota is monitored by NRW where incidents affect sites designated under the Habitats and Birds Directives. Impacts on SSSIs also need assessment. Analysis of aquatic species helps to understand the impacts on food-webs for fish and birds. Marine areas are particularly sensitive to oil pollution.

Opportunities

The NRMF has a potential role for coordinating sampling and analysis, and data interpretation in support of the Category 1 responders to an emergency. The Framework could support the role of NRW as a Category 1 responder, and aid Welsh Government is overseeing the recovery phase of an emergency. The role of the NRMF in the Science and Technical Advice would need further consideration.

[2] *UK Soil and Herbage Pollutants Survey SC000027, Environment Agency 2007*

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