NFCC
National Fire
Chiefs Council

Fire Contaminants risk assessment –

At operational incidents

Ref no:

Issue date:		Review date:		Issue no:	

Description of activity/task/environment/role assessed

These risk assessments are provided as a suite to support services to identify hazards related to fire contaminants, assess the level of risk, and implement appropriate control measures to reduce exposure to a level that is as low as reasonably practicable (ALARP). Each fire and rescue service remains legally responsible for undertaking and maintaining its own suitable and sufficient risk assessments. When creating their own risk assessments, services should take into account local risk, operational context and incident type.

This risk assessment has been developed by the NFCC Fire Contaminants Working Group and has been subject to an independent quality assurance process undertaken by a qualified occupational hygienist from Bureau Veritas. This process has provided additional professional scrutiny of the assessment, including the identified hazards, exposure risks and proposed control measures.

NFCC recommends that this document is used as risk assessment guidance, in line with your service contaminants risks, and reviewed in accordance with your risk assessment procedures.

Fire contamination is defined as a mixture of toxic, irritant and carcinogenic chemicals, the composition of which varies depending on the specific materials burning and the fire conditions. They can be released in the form of particles which will include aerosols, dust, fibres, gases, and vapours.

Contaminants can move from the incident ground through a chain of environments, increasing the risk of secondary exposure if not controlled. This chain includes incident ground, fire appliances and equipment, premises, internal workplaces, welfare facilities (showers, kitchens, rest areas), personal vehicles, and ultimately homes. Breaking this chain relies on effective management controls.

This risk assessment provides best practice guidelines for control measures to mitigate toxic fire contaminants that all employees may encounter during fire and rescue activities. These control measures are intended to ensure that risks are kept as low as reasonably practicable (ALARP).

For the purposes of this risk assessment, PPE is defined as follows:

- **Standard full PPE:** Disposable nitrile gloves (double up), overalls, safety boots and eye protection. Disposable overalls to be considered dependant on task.
- **Structural firefighting PPE**: Firefighting tunic and leggings, firefighting boots, fire gloves, fire hood and fire helmet.
- **Lighter firefighting PPE:** Firefighting tunic and leggings, firefighting boots, fire gloves and fire helmet.
- **Respiratory protective equipment (RPE):** This is defined as self-contained breathing apparatus (SCBA), or a FFP3-rated mask. Tight-fitting RPE must be face fit tested, as per HSE INDG479 guidance.

The most effective way to manage contaminant risk is to prevent exposure in the first place.

Relevant legislation

- Health and Safety at Work etc Act
- Health and Safety at Work (Northern Ireland) Order
- The Workplace (Health, Safety and Welfare) Regulations
- Workplace (Health, Safety and Welfare) Regulations (Northern Ireland)
- Provision and Use of Work Equipment Regulations(PUWER)
- Provision and Use of Work Equipment Regulations (Northern Ireland)
- Management of Health and Safety at Work Regulations
- Management of Health and Safety at Work Regulations (Northern Ireland)
- PPE (Personal Protective Equipment) regulations
- Personal Protective Equipment at Work Regulations (Northern Ireland)

- The Personal Protective Equipment at Work (Amendment) Regulations
- Personal Protective Equipment at Work (Amendment) Regulations (Northern Ireland)
- Control of Substances Hazardous to Health Regulations (COSHH)
- Control of Substances Hazardous to Health Regulations (Northern Ireland)
- The Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (RIDDOR)
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations (Northern Ireland)

Activity / task / environment	**Hazard and outcome**	**Risk groups**	**Best-practice control measures**	**Level of risk**			**Additional control measures to consider to further reduce risk**
				L	S	R	
1. Arrival at incident	Contamination from products of combustion associated with the incident. Exposure (including secondary exposure) to fire contaminants in service vehicles by inhalation or absorption.	A, B, D, F	Keep attending vehicle windows and vents closed before arrival, including doors and lockers. Plan a safe approach route and rendezvous point: Ensure all attending personnel arrive upwind/uphill. Obtain advice from fire control on approach routes that avoid products of combustion where possible. Ensure vehicles are parked a safe distance away from the incident. Provide a safety briefing (for any pre-identified combustible / contaminants at site).				

	Acute health effects: Immediate or short-term ill health, including irritation, breathing difficulties, toxic effects, infection, serious injury or death. **Chronic health effects:** Long-term ill health, including respiratory disease, skin disorders, organ damage, and other life-limiting or fatal health conditions.		Identify incident-specific hazards and control measures in relation to contaminants. Maintain a safe distance from incident based on the dynamic risk assessment (DRA).				

2. At incident – firefighting operations	Contamination from products of combustion associated with the incident. Exposure to contaminants by inhaling, ingestion, absorption or injection by personnel in the area. **Acute health effects:** Immediate or short-term ill health, including irritation, breathing difficulties, toxic effects, burns, infection, serious injury or death	A, B, D, F, G, H	Use visual indicators, incident knowledge and gas monitoring to determine the level of PPE and RPE required. Position appliances at a safe distance away from the hazard. Position personnel upwind of an incident wherever possible. Monitor changes in weather conditions (wind direction) and impact on the dispersal of contaminants. Account for fire contaminants in initial dynamic risk assessment (DRA) and ongoing analytical risk assessment (ARA). Use effective zoning to minimise the movement of contaminants throughout the incident ground. Ensure all attending personnel, including other partner agencies, are included in safety briefs. Establish a decontamination strategy at an early stage, including arrangements for the replacement of personnel where required. Use appropriate operational tactics to avoid contamination exposure.				

	Chronic health effects: Long-term ill health, including respiratory disease, skin disorders, organ damage, and other life-limiting or fatal health conditions.		Enforce strict access controls, minimising the number of personnel and equipment within the risk area. Define routes in and out of the incident ground to minimise spread of contaminants where possible and communicate this with Fire Control. Limit contact with contaminated surfaces where possible, avoiding areas that may contain contaminated materials. Avoid direct contact with the face and mouth. Avoid smoking, vaping, eating or drinking in the risk area.				
3. Welfare arrangements	Contamination from products of combustion associated with the incident. Exposure to contaminants by inhaling, ingestion, absorption or injection by	A, B, D, F, H	Use visual indicators, incident knowledge and gas monitoring to locate a suitable location for welfare arrangements, outside of the risk area. Do not enter the welfare area if contaminated or carrying any contaminated PPE or equipment. Use an effective cleaning method such as wipes or soap and water on hands, face, neck, wrists and any exposed areas before using any welfare facilities (including toilets),				

	personnel in the area. **Acute health effects:** Immediate or short-term ill health including irritation, breathing difficulties, toxic effects, infection, serious injury or death. **Chronic health effects:** Long-term ill health including respiratory disease, skin disorders, organ damage, and other life-limiting or fatal health conditions.		or undertaking any activities such as smoking, vaping, eating or drinking. Dispose of any disposable items used for decontamination appropriately. Provide information or a safety briefing to partner agencies (including internal partners) operating within the incident ground (affected area) for hazard awareness and controls associated with fire contaminants.				

4. Preparing to leave the incident	Contamination from products of combustion associated with the incident. Exposure to contaminants by inhaling, ingestion, absorption or injection by personnel in the area. **Acute health effects:** Immediate or short-term ill health, including irritation, breathing difficulties, toxic effects, burns, infection, serious injury or death.	A,B,D,F,G,H	**For associated control measures, please also refer to the following fire contaminant risk assessments:** • **Post-incident risk assessment** • **Operational frontline appliances and vehicles risk assessment** • **Equipment risk assessment** Wear, as a minimum, a half mask with FFP3 filters or FFP3 dust mask with standard-level PPE whenever cleaning any contaminated items, including equipment, PPE and clothing. Carry out on-scene decontamination of PPE, RPE or any other contaminated equipment to remove gross or lose contamination. If further cleaning is required, bag and seal PPE and equipment before transporting it back to workplace. Carry out a final clean at the workplace. Use an effective cleaning method such as wipes or soap and water on hands, face, neck, wrists and any exposed areas before entering vehicles. Ensure all employees that may have been exposed to contaminants go through full personal decontamination before leaving the incident ground.				

	Chronic health effects: Long-term ill health, including respiratory disease, skin disorders, organ damage, and other life-limiting or fatal health conditions.		Follow local reporting procedures if personnel fire contaminants exposure occurs. Appropriately clean, dispose of or launder any items that become contaminated during their use.				

12.Who could be exposed to the hazards? State identified persons at risk in column 3							
A: Firefighters	B: Officers	C: Instructors	D: Trainees	E: Control personnel	F: Non-operational personnel	G: Public	H:Other agencies

To be complete by fire and rescue services

Risk assessment sign-off	Name	Signature	Date	Review date
Risk assessment lead author				
Health and Safety Advisor				
Trade union health and safety reps				
Accountable manager				

Risk calculator

Risk is the chance that harm will be caused by a hazard. It is measured in terms of severity, likelihood & population affected.

A simple approach to quantifying risk is to define measures of likelihood and severity such as the descriptors given below. This allows the construction of a risk matrix which can be used as the basis of identifying acceptable and unacceptable risk.

Likelihood x Severity = Risk

Risk matrix

	Likelihood				
Severity	**Rare (1)**	**Unlikely (2)**	**Possible (3)**	**Likely (4)**	**Almost certain (5)**
Catastrophic (5)	**5**	**10**	**15**	**20**	**25**
Major (4)	**4**	**8**	**12**	**16**	**20**
Serious (3)	**3**	**6**	**9**	**12**	**15**
Minor (2)	**2**	**4**	**6**	**8**	**10**
Negligible (1)	**1**	**2**	**3**	**4**	**5**

Risk bands and suggested response

Risk band	Score	Required response
Low	**1–2**	Manage through routine controls. Maintain controls and review if circumstances change.
Moderate	**3–4**	Proceed where existing controls are effective. Consider further reasonably practicable controls; record, monitor and review where appropriate.
High	**5–12**	Further risk reduction is required. Review controls and reduce risk so far as is reasonably practicable. Where a residual High risk remains, apply explicit management or command oversight and continue to review the risk.
Very high	**15–25**	Intolerable for planned or non-emergency activity: do not commence or continue until risk is reduced. At emergency incidents, only proceed in exceptional circumstances where there is a compelling operational benefit, no safer reasonable alternative, and the decision is appropriately authorised, recorded and continually reviewed.

Likelihood descriptors

Level	Category	Descriptor
5	**Almost certain**	Expected to occur repeatedly or in most comparable circumstances unless further controls are applied.
4	**Likely**	Expected to occur at some point in the activity or relevant exposure period; has occurred repeatedly in comparable circumstances.
3	**Possible**	Could occur; credible and reasonably foreseeable, including events known to have occurred in comparable fire and rescue operations.
2	**Unlikely**	Could occur, but is not expected where controls are effective; uncommon and normally dependent on a less common combination of circumstances or control failure.
1	**Rare**	Exceptionally uncommon but still reasonably foreseeable; would normally require unusual circumstances or multiple independent control failures.

Severity descriptors

Level	Category	Descriptor
5	**Catastrophic**	One or more fatalities; a health effect reasonably capable of causing death or materially shortening life; or multiple permanent, life-changing injuries or cases of ill health.
4	**Major**	Permanent or irreversible injury or ill health; significant long-term impairment or disability; or a serious non-fatal health effect requiring substantial treatment or prolonged recovery.
3	**Serious**	Significant but reversible injury or ill health requiring medical treatment beyond first aid, temporary absence or restricted duties, or a short- to medium-term health effect requiring clinical assessment or treatment.
2	**Minor**	Minor injury or ill health requiring first aid or limited treatment; short-lived symptoms; little or no time away from normal duties; full recovery expected.
1	**Negligible**	No injury or ill health, or transient discomfort requiring no treatment and causing no lost time or lasting health effect.