



Centre for Radiation, Chemical and Environmental Hazards, Games time planning and delivery London 2012 Olympic and Paralympic Games

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1. Background

The HPA commitment to the London Organising Committee of the Olympic Games and Paralympic Games (LOCOG) to deliver a daily public health Situation Report (SitRep) to the Games Chief Medical Officer (CMO) for the duration of the Games, included consideration of the potential risks for radiological, chemical and environmental hazards. The HPA's Centre for Radiation, Chemical and Environmental Hazards (CRCE) was required to provide an environmental hazards Situation Report (SitRep) on a daily basis for inclusion within the overall HPA Situation Report.

The production of an environmental hazards SitRep required the collection and analysis of incident data for both chemical and radiological incidents, along with any necessary expert public health advice. Additionally the environmental hazards SitRep also included a range of environmental quality indicators including air quality, temperature, ultraviolet radiation and pollen levels as well as information on risks from river and surface water flooding.

Air quality has improved significantly in London over the last decade; however, air quality was identified as a concern pre-Games by the IOC, campaign groups and the media. Air quality impacts on health were carefully considered as part of the overall public health risk assessment for London 2012.

2. Preparations

CRCE established a working group to prepare and plan for the Centre's Games working. The underlying planning assumption was to maintain a 'business as usual' approach with enhancements where necessary.

Incidents

A number of areas relating to the response to incidents were enhanced:

Response plan: CRCE recognised that the expectations of stakeholders were likely to be heightened in relation to any chemical or radiological incidents during the Games reporting period, regardless of whether or not the incident was actually directly linked to the Games. CRCE recognised the need to ensure that existing arrangements for the rapid provision of advice at all levels (local, regional, national), remained fit for purpose, as to put in place mechanisms to deliver an appropriate minimum level of guaranteed response capability in the short term, and then provide for a ramping up of resource with time, commensurate with need. The approach was to put in place arrangements where adequate numbers of staff were in place with the appropriate skills to deliver a response to concurrent major chemical and radiation incidents, both in and out-of-hours, while also allowing staff to take leave and deliver their other commitments.

Incident surveillance: CRCE undertook work internally within the HPA and externally to ensure that any chemical or radiological incidents were always promptly reported to CRCE. CRCE agreed with Health Protection Services that all chemical incidents, however small, would be reported to CRCE, thereby providing enhanced surveillance and situational awareness of events around the country. Similarly CRCE worked with the emergency services – principally Fire and Ambulance services – to strengthen existing early alerting mechanisms to provide prompt information and response to hazardous materials incidents.

Risk assessments: CRCE undertook risk assessments of all Olympic venues to collate information on key environmental risks including storage and transport of chemicals. Initial reference sheets (IRS) were produced for each venue highlighting the principal risks and mapping nearby “at risk” populations and critical infrastructure such as schools and hospitals. The IRSs were stored within the HPA GIS system and readily accessible 24 hours a day.

IRSs were completed for 32 Olympic venues and training camps.

Table 1: Contents of Games Initial Reference Sheets outlining the contents of each sheet developed to assist CRCE responders.

Contents	Relevance to CRCE on-call staff
Address of venue with postcode	Ability to locate venue quickly on HPA GIS or other mapping systems
Event description and dates of when venue is in use	Sporting discipline, special requirements, and when events being held at venue
Capacity of venue	Approximate number of spectators
Nominating receiving hospital and backup	In event of a mass casualty event, CRCE assist with mass decontamination advice
Nearby receptors	Quick description with links to maps (see figures 1 and 2)
Where appropriate: Chemicals stored on site and amounts	Summary chemical and toxicology information for quick reference in an incident
Local Command and Control structure on site and key contacts	Vital in an emergency to be able to establish quick, timely and robust communications

A number of key maps for each location were also generated, using the HPA GIS system. These could provide individuals with vital visual aids to assist in early emergency response. See Figures 1 and 2 in Annex 2 for examples.

Briefings: CRCE contributed to an HPA briefing pack to provide background and situational information for key stakeholders on the main chemical and radiological threats likely to result in disruption to Games activities, along with the response to any such threats.

Exercises: CRCE was very actively involved in a number of large scale chemical exercises in the eighteen months prior to the Games. The exercises provided excellent opportunities to test the Centre's preparedness to support the HPA's Games preparations and to refine and update operational procedures in light of lessons identified.

3. Environmental considerations

Air quality

In the period preceding the Games, there were numerous media reports about the adverse health effects of air pollution in London and the failure of the capital to meet EU air quality targets. Although air quality in London has improved over the past decade, progress had not been as fast as expected and concerns were raised about the potential impacts on athletes and visitors to the Games. In light of experience from previous host cities, the International Olympic Committee was keen to receive assurances that the air quality in London would not be a cause for unnecessary concern, especially in light of the negative media reports.

Although the relevant Government bodies were confident that existing and planned measures would enable compliance with the relevant air quality standards, due to the unpredictable nature of the weather, which has a significant impact on air quality (for example through the transport of pollutants from mainland Europe), it was necessary to highlight any air quality issues that might have impacts on health as early as possible to the Department of Health, NHS London and the LOCOG medical advisory group.

Two years before the Games, CRCE established an Games Air Quality Co-ordination Group (AQCG), with the necessary stakeholders including the lead UK government department (Defra), the Greater London Authority (GLA), Local Authorities, academics and other experts to provide wherever possible a consistent line on air quality and any potential health implications.

The overall aim was to ensure that the UK was prepared to respond to any air quality issues or concerns in a timely manner through a consistent and agreed approach. A secondary aim was to ensure that the public were made aware of, and had access to, reliable air quality information.

The AQCG established a risk register for air quality issues that could potentially have an impact on the Olympic Games. The risk register considered a number of issues including the potential for elevated ozone levels associated with sustained high temperatures and sunshine levels; the potential impacts of the diversion of traffic due to the Olympic route network affecting air quality; and concerns that Local Authorities would reduce or curtail their funding for air quality monitoring, which would impact capability to provide adequate air quality briefings.

CRCE acted as a co-ordinator across a number of stakeholders to ensure that agreed lines on air quality and relevant information would be available within the public health briefings and Situation Reports used during the Games, and worked with partners on enhancements to the information available for the public.

In preparation for the Games, enhancements were made to a number of public information sources on air quality including the Defra, London Air, AirTEXT and Met Office websites. It was recognised early on that there would be a need for these websites to provide clear and consistent information.

Allied to improvements to the websites, work was undertaken between the AQCG partners to develop a media briefing pack and identify the lead organisation with responsibilities for particular air quality issues.

Londoners and visitors to the capital were able to receive better information about forecast pollution levels thanks to a new app designed by the airTEXT consortium, along with an improved Twitter service and an enhanced airTEXT website.

The new services significantly enhanced airTEXT's existing text message alerts, which are sent to registered users. Daily pollution information and forecasts for the day ahead (including UV, pollen, temperature and air quality), were available on smart phones and other mobile devices. Improvements to the London Air and AirTEXT websites also provided maps of the city's pollution levels.

The enhancements to the air quality forecasts and the development of smart phone applications will provide a long-term legacy and improve the public's access to air quality information.

Natural hazards

The HPA is a member of the Natural Hazards Partnership (NHP). The NHP brings together expertise from across the UK's leading public sector agencies with the aim of drawing upon scientific advice in the preparation for and response and review of natural hazards.

The Partnership provides a collaborative environment to enable more coordinated and coherent advice for the government and the resilience community. The NHP publishes a daily hazard summary assessment, which is issued to stakeholders which covers the following hazards:

- flooding
- geological hazards; such as landslides
- space weather
- volcanic ash
- weather
- wildfires

CRCE used the daily hazard summary assessment, along with other information sources, to collate information on environmental threats including those listed above as well as temperature, ultraviolet radiation and pollen levels. The aim was to provide a concise hazard summary and forecast within the HPA public health briefings.

4. Response

Throughout the period of reporting (2 July to 12 September), CRCE operated a combined virtual emergency operations centre (EOC) staffed by a SitRep Manager, a Task Manager and an Incident Director.

The combined virtual EOC was staffed on a rotational basis for one week by each of the chemical units in CRCE, with suitable surge capacity arrangements in place from other staff in CRCE. CRCE undertook a comprehensive review of staffing capabilities and capacity in preparation for Games time responsibilities to ensure that the Centre was able to respond, 24 hours a day, to any major chemical or radiological incidents, while also delivering routine operational work. As a result

of this review, a number of additional staff were placed on out-of-hours on-call rotas for the duration of Games time.

CRCE also instituted mechanisms for the use of the HPA shared task management system (Corporate Incident Response Administration System, or CIRAS), which was designed for use by the HPA Olympics Coordination Centre (OCC) for recording tasks assigned to CRCE.

Overview of CRCE's routine commitment during the Olympic reporting period

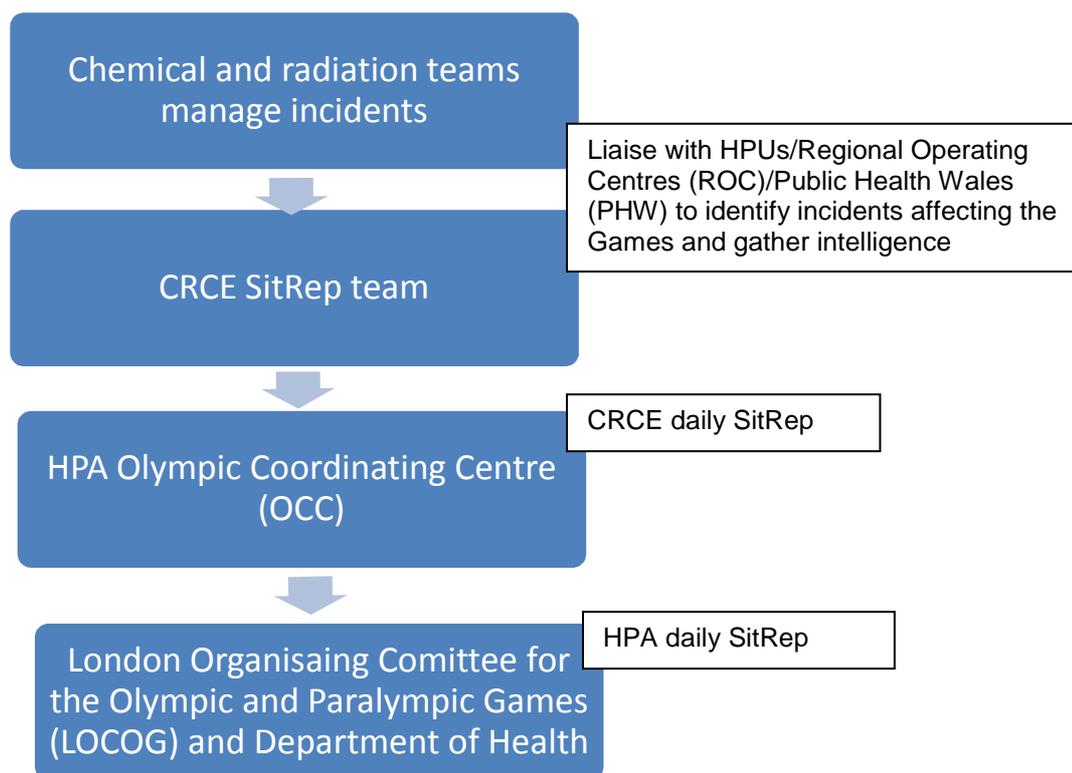
CRCE provided the environmental hazards SitRep (CRCE SitRep, see Annex 1) to the OCC each day, seven days a week, from 2nd July to 12th September 2012. From 21 May to 2 July, CRCE also reported any incidents that might have affected the Games to the HPA OCC, to enable the provision of weekly exception reports.

From 2 July to 23 September, CRCE participated in a daily national HPA business continuity teleconference at 1230hrs. The teleconference was chaired by OCC, and shared significant events/incidents that may have had any impact on the Games.

The CRCE SitRep was submitted to the HPA OCC by 1600hrs. In the case of major chemical and radiation incidents (IERP Level 3 and above) that might have affected a Games venue, CRCE was required to report these immediately to the OCC and follow processes laid out in the HPA's Incident Emergency Response Plan (IERP), after liaising with HPUs/ Regional Operating Centres (ROC) or Public Health Wales (PHW).

Further detail about the daily information flow involving CRCE is highlighted in Diagram 1.

Figure 2: Summary explanation of information flow between CRCE, OCC and LOCOG



5. Air quality

In general, during the Games, there were two episodes where air quality in the South East of England was poor, with ozone levels recorded as being moderate to high due to the warm and sunny weather. The prepared information sources and agreed lines to take enabled the HPA to inform the Olympic CMO and LOCOG in a timely and consistent manner, as well as to assist with additional questions that the episodes generated, such as those regarding the potential for moderate to high ozone levels just before the opening ceremony.

In the week leading up to the Olympic Games, a high pressure system moved over the UK bringing calm settled conditions and increasing temperatures. Ground-level ozone slowly built up due to the action of sunlight and high temperatures on pollution emitted from vehicles and industry. A few days before the opening ceremony, air quality forecasts indicated a potential increase in ozone levels.

On 25 July ozone levels were moderate across widespread parts of central and southern England, and peaked in London, reaching a 'High' rating according to the UK air quality index. Fortunately, fresh westerly winds began to clear London's air just before the opening ceremony.

Similarly ozone levels were moderate a few days before the end of the Olympic Games. On the 10th August moderate ozone was measured across London, Sussex and Kent at a total of 18

monitoring sites. Peak ozone concentrations on Saturday 11th August were similar to those on Friday 10 and 21 sites across London and the southeast measured 'moderate' ozone. 'Moderate' ozone was measured at nine sites across London and the southeast on Sunday 12 August, but pollution concentrations at the time of the Olympic marathon were 'low', as the race took place in the morning, avoiding the afternoon peak in ozone, which did not occur due to a change in wind direction.

Due to the extensive preparatory work and partnership working before the Games, the HPA had early access to comprehensive forecasts and intelligence on air quality and was able to provide detailed briefings at an early stage with suitable reassurance where necessary.

CRCE briefing for 'High' episodes of air quality: During the summer months, and under certain specific weather conditions levels of the air pollutants ozone, nitrogen dioxide and particles may be raised.

Most people will experience no ill effects. Those suffering from heart and lung conditions (including asthma), particularly the elderly, should be aware that their symptoms might worsen. They may need to consider modifying their treatment as they usually do when symptoms increase, consulting their doctor if this is not effective.

Adults and children with lung problems, and older people or people who have noticed in the past that their breathing is affected on hot, sunny days should avoid strenuous outdoor activity, particularly in the afternoon. Adults with heart conditions should also reduce strenuous activity outdoors.

6. Incidents

During the reporting period CRCE responded to a total of 168 incidents across the UK. A critical aspect of the CRCE operations was to identify any incidents that could have implications on the Games. All incidents were triaged against a range of criteria to assess the necessity for reporting. The main criteria were any incidents that directly affected an Games venue; however, incidents that might affect transport infrastructure, require large evacuations, cause suspicion, create undue alarm or generate significant media attention were also highlighted.

15 incidents, representing 9% of the total number of incidents reported to CRCE, were risk assessed as having the potential to impact the Games. Table 2 highlights the incidents that were risk assessed by CRCE as being of potential interest. The vast majority of these incidents were not included within the final HPA SitRep, as the events were generally short-lived and no significant public health threats were identified.

Table 2: Selection of events reported by CRCE by date, region and whether they were included in the OCC SitRep

Report Date	Region	Summary	Inclusion in HPA OCC SitRep
03/07/12	EM	CRCE were made aware of the loss of a small radioactive source from a coal plant, which may have been inadvertently shipped with a coal consignment to a coal-fired power station in the East Midlands.	No

		Multi-agency efforts are underway to locate the source. However, both CRCE and the Environment Agency have confirmed that there is no significant public health risk.	
05/07/12	WM	M6 Motorway toll road closed after a coach bound for London from Preston with 48 passengers reported a suspicious liquid in a passenger's bag. The police, fire service and ambulance attended the scene, which resulted in considerable media attention. The incident resolved relatively rapidly following identification of the cause as a health improvement aid for smokers. No public health issues identified.	No
06/07/12	London	A small infestation of Oak Processionary Moth caterpillars, which can cause rashes and respiratory irritation, was detected in proximity to the Wimbledon Olympic venue. The nests were removed, minimising the risk to public health. A second infestation was also found in Bromley, although the location was not in proximity to a venue or training camp.	Yes
18/07/12-02/09/12	SW	Explosion on a container ship carrying hazardous chemicals off the south west coast of the UK. Risk assessments undertaken to seek a safe berth as part of rescue and salvage efforts.	No
24/07/12	WM	Fire in a derelict leather factory in Walsall town centre about 1.6km from the University campus that was being used as a training base for an Olympic team. Fire resulted in evacuation of a few residential properties and temporary disruption to local traffic and rail services.	No
24/07/12	Y&H	Serious fire at a plastics factory that generated a large smoke plume over a densely populated area with a number of schools. HPA provided advice for residents to shelter indoors and minimise their exposure to any smoke. The fire was extinguished relatively rapidly and no impacts on Games venues were identified.	No
24/07/12	London	Fire in vicinity of the White Hart Lane railway station in north London. Rail traffic not significantly disrupted by the fire.	No
27/07/12	London	Quantities of petrol found in basement of a residential property, 1.6km north of the Olympic Park and 1.5km east of the Lea Valley Training Centre, leading to evacuation of neighbouring properties. No public health impact and no fire or spillage. Emergency services attended and secured the property.	No
27/07/12	SE	Rocket motor found within a building at a lower tier COMAH (Control of Major Accident Hazards) site that was believed possibly to contain explosive materials. Site initiated emergency procedures; however no explosive materials were found and the incident was rapidly stood down.	No

09/08/12	WM	Large fire at a furniture warehouse near Coventry Airport approximately 7 miles south of the City of Coventry Stadium, which was hosting the Olympic Women's Bronze medal football match. Local air quality was unaffected including in the area around the stadium, and there were no health concerns with respect to the smoke plume. as this was moving away from populated areas and Olympic venue.	No
12/08/12	London	Very large fire at a recycling centre in northeast London. Air quality monitoring and assessment through indicated minimal impacts on air quality and no significant public health risk. The fire was brought under control within 12 hours. Significant interest as it was the largest fire in London for many years.	No
16/08/12	SE	Minor explosion caused by heating a mixture of hydrochloric acid, sulphuric acid and nitric acid in a microwave at the lower tier COMAH site. There were no casualties and all personnel were accounted for. No wider public health implications.	No
21/08/12	London	Fire in a pile of tyres close to Heathrow airport, large dense plume of smoke but no detrimental impacts on local air quality or transport infrastructure.	No
25/08/12	London	Large fire at an industrial estate in east London about 7 km from the Olympic park. Warehouses contained a mixture of cookware and toys and released a dense plume of thick smoke. As a precaution local residents were advised to shelter indoors and keep doors and windows closed, and the HPA contributed to multi-agency media messages. No public health or Olympic related impacts were identified.	No
26/08/2012	NW	Flooding resulted in the early closure of a large musical festival in Cheshire. The police declared a major incident due to concerns over the safe evacuation of the site. No public health or Games impacts identified.	No

There were two serious fires during the Games that had the potential to impact the Games directly, as well as to impact the health of the local community. Fortunately the incidents did not escalate as first anticipated; but CRCE was required to deliver the HPA response. During the Games, public health threats had to be risk assessed with greater certainty and urgency, due to the demands of stakeholders and the heightened media attention. The preparation undertaken by CRCE – through pre-prepared information resources such as the IRS sheets, the regular incident response exercises and the reinforcement of partnership working arrangements with the emergency services – ensured that CRCE staff were able rapidly to risk assess the situations, and this greatly assisted the response.

Potential impact scenario

The Olympic Games Closing Ceremony was due to take place at 9pm on 12th August 2012, at the Olympic Stadium in Stratford. That afternoon at around 1420hrs a very large fire broke out at a waste recycling plant in Dagenham, northeast London, around 7km from the Olympic Park. Over 200 firefighters and 40 fire engines fought the blaze, London's biggest for several years. Initial reports from the scene suggested that the fire was generating a significant smoke plume that was

being carried by a southeasterly wind across central London. Due to the size and nature of the fire, it clearly had the potential to impact on public health: exposure to the smoke from the plume could potentially have led to acute health effects in the local population, and the location of the fire led to initial concerns about potential impacts on the closing ceremony of the Olympic Games.

CRCE worked with partners by obtaining modelling from the Met Office to confirm that the smoke plume would be carried to the north of the Olympic site; geographic information systems were used to characterise the locality of the fire and to identify local sensitive receptors that could be adversely affected by the smoke plume. The London air quality network website was reviewed for any measured air quality impacts from the smoke plume. The data available did not indicate that air quality across east London was being adversely affected by smoke from the plume.

The use of these multiple data sources ensured that a rapid public health risk assessment could be undertaken. This risk assessment indicated that the risk to the local population was unlikely to be significant as the smoke plume was buoyant and being carried away from London. No impacts on the Olympics closing ceremony were identified.

7. Lessons Identified

Overall, the CRCE contribution to the Olympics and Paralympics Games was deemed to be extremely successful. CRCE was in an advantageous position, having thoroughly exercised its arrangements on a number of occasions prior to the Games.

A few lessons were identified in the initial weeks of SitRep production prior to the actual start of the Games: the requirement for exception reporting of incidents was not immediately clear to all staff, and the requirement to provide briefings for incidents which were considered to be of relatively minor public health importance was unexpected – although it was recognised that there was a need to share this information with the OCC and to provide assurances that the incident had been risk assessed and did not represent a threat to public health.

The generation of the CRCE SitRep was occasionally challenging, especially as it was necessary to provide a concise summary of the environmental conditions across geographically distributed areas. This occasionally created difficulties as the language and terminology included within the CRCE SitRep was not always clear to the staff within the HPA Coordination Centre. The CRCE SitRep template was subject to continuous review following dialogue with the HPA Olympics Coordination Centre to ensure that minimal editing of the submissions was required prior to inclusion within the HPA SitRep.

In terms of the air quality reporting, a decision was taken to provide more detailed additional background briefing material to relevant stakeholders.

**Annex 1
London 2012 Olympic and Paralympic Games**

**Daily Situation Report from the
Centre for Radiation, Chemical and Environmental Hazards**

XX August 2012, correct for 16:00

To be sent from crce2012@hpa.org.uk to hpa2012@hpa.org.uk cc. Tim.Gant@hpa.org.uk, crce2012@hpa.org.uk, generaltox@hpa.org.uk, Naima.Bradley@hpa.org.uk and CRCE Director on-call by 16.00 daily. New information is highlighted in yellow.

XX August Overview

Incidents: CRCE is aware of **ONE** acute incident involving a coach on the M6 (details below). No hazardous materials involved and **no public health impact**; emergency services on scene and considerable media attention.

Air Quality

Pollution levels are xxxxx across the UK, In cases with wide variability across the country specify which areas are most affected e.g. LOW to HIGH pollution levels are predicted, with HIGH levels forecast for London and the South East only.

Flooding forecast

The UK flood risk is **LOW**.

Temperature forecast

No extreme temperatures. The Heat Health Warning is expected to remain at level 1 – GREEN.

UV forecast

UV levels are **LOW** to **HIGH** at all sites in the UK, with HIGH levels in the South of England.

Pollen forecast

Pollen levels are **LOW** to **VERY HIGH**. **VERY HIGH** levels are forecast in London and South of England

XX (+1 day) August Summary Forecast

(This section is the forecast for the next day)

Air Quality

xxxx pollution levels are forecast across the UK, in cases with wide variability across the country specify which areas are most affected e.g. LOW to HIGH pollution levels are predicted, with HIGH levels forecast for London and the South East only.

Flooding forecast

The flood risk is forecast as **LOW**.

Temperature forecast

No extreme temperatures expected. The Heat Health Warning is expected to remain at level 1 – GREEN.

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UV forecast

UV levels are forecast to be **LOW** to **HIGH** at all sites in the UK, with HIGH levels in the South of England.

Pollen forecast

Pollen levels are forecast to be **LOW** to **VERY HIGH**. **VERY HIGH** levels are forecast in London and South of England

Incident of significance to the Games - Details

Time (or ongoing)	Location	Details	Olympics public health impact	HPA impact
CRCE alerted at 10:15.	M6 Junction 3 Toll Plaza Staffordshire West Midlands North HPU	M6 Motorway toll road closed at 08:20 after a Megabus bound for London from Preston with 48 passengers, pulled in near the toll plaza between junction 3 and 4. Report of a suspicious liquid in a passenger's bag. No public health issues. Incident involved a health improvement aid for smokers.	No Olympic venues- Significant media interest- No public health impact	HPS (HPU West Midlands North, Regional Director), CRCE Director (acting), Emergency Planning and ERD all alerted.

Forward Look

Air quality forecast to XX August

The weather over the next few days is forecast to remain unsettled and showery with wind speeds being moderate to breezy. Air masses arriving in the UK are not expected to carry significant amounts of pollutants. As a result, pollutants are forecast to remain in the **LOW** band.

Flooding forecast

On Day and Day, persistent and heavy rain is likely to affect parts of eastern, central and northern England, leading to a **MEDIUM** risk of river and surface water flooding for eastern, central and northern England and northeast Wales. The focus of the area at the highest risk may change closer to the event, and there remains a LOW risk of river and surface water flooding in other areas. Forecast rainfall totals, responses and likely impacts will be closely monitored with the potential to increase the flood risk for Day (xx) and Day (xx) which introduces the possibility of severe disruption.

Temperature forecast

No extreme temperatures expected. The Heat Health Warning is expected to remain at level 1 – GREEN.

UV forecast

UV levels are expected to be generally **LOW** to **MODERATE** for the next 5 days.

Pollen forecast

The pollen forecast is **LOW** to **MODERATE** for England and Wales over forthcoming days.

Global health

No chemical or radiological events to report.

Incidents risk assessed and found NOT to have an impact on the Games

For OCC: Please contact SitRep Manager if you feel any of the below incidents should be reported on the national SitRep to discuss their inclusion prior to reporting to LOCOG

Time (or ongoing)	Location	Details	Olympics public health impact	HPA impact
CRCE alerted at 10:20	Fire in factory next to M25	Smoke from fire in factory next to M25 disrupting traffic. Significant traffic delays	No Olympic venues- Minor media interest- No public health impact	HPS (HPU CCDC), CRCE

END

Annex 2: Example of map in an Initial Reference Sheet (IRS) for CRCE staff:

Figure 1: Storage area for chemicals at Weymouth and Portland Harbour (note more detailed maps of the storage area were also available but are not shown here)

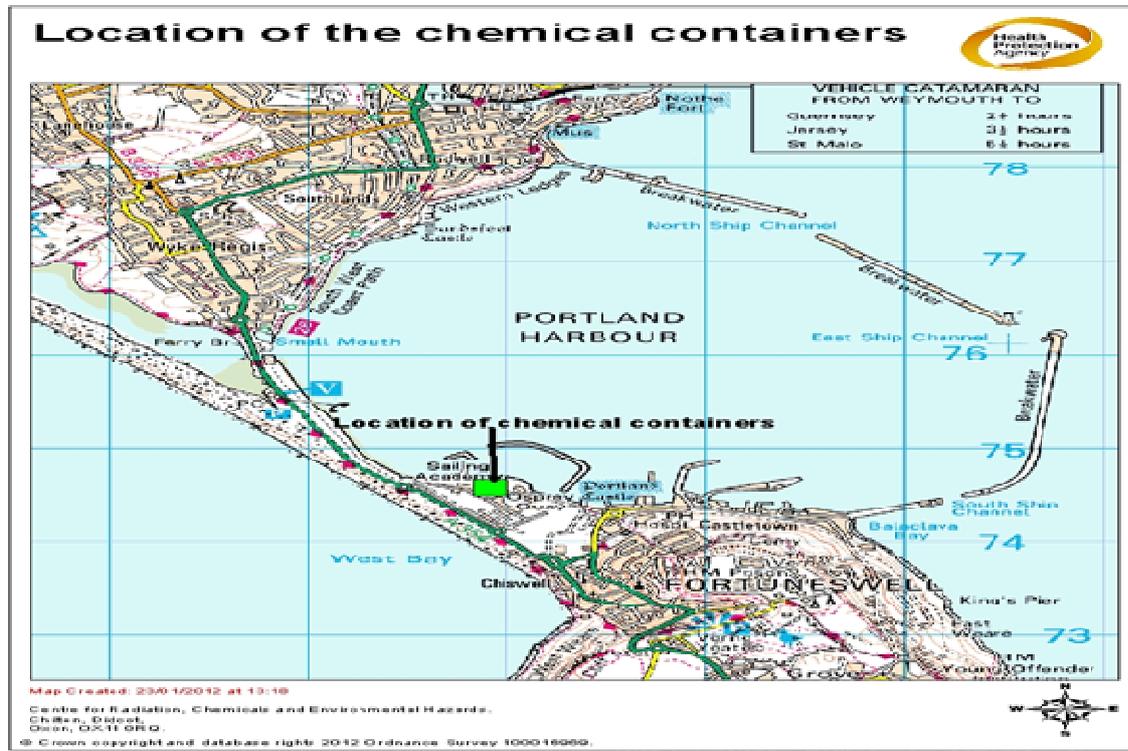


Figure 2: Location of sensitive public health receptors close to the Excel Centre

