# Fire Alarm Systems - UCL General Installation Design Guidance & Employers Requirements

(All Buildings - Excluding Sleeping Accommodation)

UCL Fire Alarm Standards & Specific Employers Requirements (ERs) for Projects - what you need to know:

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Standard</th>
<th>All fire alarm systems in UCL premises shall be designed, installed and maintained to comply with the latest edition of BS 5839-1 &amp; BS5839 series.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protocol</td>
<td>Protocol</td>
<td>UCL fire alarm systems and devices shall use ‘OPEN APOLLO’ protocol only, (unless the existing system is not compatible) with standard equipment to ensure communality of systems, efficiency of maintenance and control of software access. <strong>No other fire alarm panels or systems will be acceptable unless written permission.</strong></td>
</tr>
<tr>
<td>The Client</td>
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<td>UCL as the Client strives to improve its standards and requires only fire alarm system designers, installers and maintenance companies that can demonstrate BAFE SP203 or LPC1014 with ISO9001 Quality Management System compliance or equivalent to undertake works on UCL fire alarm systems.</td>
</tr>
<tr>
<td>Unwanted Fire Alarms</td>
<td>Unwanted Fire Alarms</td>
<td>Designers of fire alarm systems shall take considerable care to ensure that their fire alarm design reduces unwanted fire alarms through thoughtful understanding of room/space function, where the detection is provided, to avoid unwanted activation as far as reasonably practicable.</td>
</tr>
<tr>
<td>Prohibited</td>
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<td>The introduction by design or use of ‘closed or managed’ fire alarm systems in premises under the control of UCL.</td>
</tr>
<tr>
<td>Loop Capacity</td>
<td>Loop Capacity</td>
<td>As a general rule designers shall to ensure the numbers of devices provided on loops gives approx. 20% spare capacity (e.g. 126 devices - 20% = 105 devices) allowing for future changes or alterations to the system.</td>
</tr>
<tr>
<td>Design</td>
<td>Design</td>
<td>The raising of the alarm and warning to occupants in case of fire is a legal requirement. The addition of Automatic Fire Detection (AFD) is very often desirable to assist in early detection, property protection and in some instances an offset to extended Means of Escape (MoE) conditions;</td>
</tr>
<tr>
<td>Life Category L2 or L1 Coverage</td>
<td>Life Category L2 or L1 Coverage</td>
<td>Additional AFD to Life Category L2 or L1 standard shall be provided for specific areas such as ‘high risk’ or high value (i.e. equipment or facilities in excess £0.5 million insurance value) or, where part of a ‘fire engineered’ solution.</td>
</tr>
<tr>
<td>Contingency Funds</td>
<td>Contingency Funds</td>
<td>Project Managers / Consultants / Principal Contractors shall ensure that contingency funds from the project are available at pre-contract, to <strong>provide &amp; install addition sounders at commissioning</strong>, should the sound pressure coverage fall below acceptable levels any particular area.</td>
</tr>
<tr>
<td>UCL Fire Safety Manager</td>
<td>UCL Fire Safety Manager</td>
<td>Should be consulted with any design query in the first instance who will consult further, as required.</td>
</tr>
</tbody>
</table>
1.0. Fire Alarm Panels

1.1. UCL fire alarm panels must be capable and compatible of using and switching between all modes of Apollo Discovery detection heads, using alarm confirmation facilities.

1.2. In addition, have peer-to-peer networking and IP gateway facilities.

1.3. **UCL Fire Alarm Panel Provision** - the following manufacturers only, shall be used:

   - **Advanced Electronic Ltd** (see: [www.advancedco.com](http://www.advancedco.com));
   - **Kentec Ltd - Taktis** (see: [www.kentec.co.uk](http://www.kentec.co.uk));
   - **Morley IAS ZX series** (see: [www.morley-ias.co.uk](http://www.morley-ias.co.uk));

2.0. Smoke Detection - General Requirements

2.1. All new and refurbished fire alarm systems are to be designed and installed to meet BS 5839-1: **Life Risk 4 or 3**(L4/L3) provision AFD (see below).

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1. **Note 1:** Category L4/3 - the minimum standard of L4 provides AFD to all escape routes; this is to be supplemented by risk assessing all rooms off escape stairs and corridors for the provision of additional AFD to bring the system up to L3 standard. For example: all corridors and rooms off a...
2.2. **Detectors** - in areas where there is an obvious risk of false alarms including persistent dusty, dirty and release of steam conditions, then the following detector heads should be considered:

(a). Rate of Rise heat detectors (kitchens - see guidance in UCL Fire Safety Technical Note TN105);

(b). Fixed heat at 55°C, 75°C or 90°C to be used where there is likely to be high ambient temperatures (boiler rooms or steam producing apparatus);

2.2. **Multi-Sensing (Apollo Discovery) Heads** - to be provided:

(a). in all laboratories;

(b). at Tea points and adjacent areas (see guidance in TN105);

(c). in other suitable locations;

(d). multi-sensing heads have five settings (guidance only check the latest specification by Apollo for accuracy before instructing):

- **Mode 1** - multi-sensing using both heat / smoke monitoring & reacting at around 1% obscuration of the optical head & any temperature changes of more than 15°C;

- **Mode 2** - optical sensing setting only (no heat sensing), reacting at around 2% obscuration of the optical head;

- **Mode 3** - multi-sensing using both heat/smoke monitoring & reacting at around 2% obscuration of the optical head & any temperature changes of more than 21°C;

- **Mode 4** - least sensitive setting using both heat & smoke monitoring and reacting at around 4% obscuration of the optical head and any temperature changes of more than 15°C - *use this setting in all laboratories (unless specific requirements identified), tea points & peripheral areas outside kitchens or tea points etc.*

- **Mode 5** - heat sensing setting only;

2.3. **Beam Detectors** - where there is a requirement for covering large open spaces then Open Area Smoke Imaging Detection (OSID) by *Xtralis Ltd* beam detectors shall be considered:

- These beam detectors use two wavelengths to distinguish between particle size and solid intruding objects, thus helping to reduce unwanted alarms. Moreover, one unit because of its design covers much more area with multipoint viewing from a single beam detector head, thus reducing the
need for point detection. Further information can be found at www.xtralis.com

- Where access to maintain point detection may be difficult;
- Where possible temperature inversions influence the effectiveness of point detection.

2.4. **Very Early Warning Smoke Detection (VESDA) / Aspirated Detection** - where there is a requirement for air sampling detection and a solution to specific problem including access, Hypoxic atmospheres (Oxyreduct) then Xtralis VESDA / Aspire systems should be considered.

- Further information can be found at www.xtralis.com

2.5 **Specialist Detection in Hard to Access Locations** - specialist detection solution such as Scorpion (www.scorpion-tester.com) should be considered to test smoke detection located for example in Containment Laboratories (CL) Containment Levels 2/3 to reduce maintenance staff exposure and lift shafts etc.

3.0. Manual Call Points

3.1. **Anti-Tamper security covers** - in student halls, circulation spaces, common rooms, bars of UCL Student’s Union occupancy and MCP located in close proximity to magnetic door release units then ‘Anti-Tamper’ security covers shall be fitted to each call point:

- I.e. Apollo - transparent hinged Cover (Apollo Ref: 26729-152);

4.0. Sound Pressure Requirements & Visual Alarms Devices

4.1. **General Note on Sound Pressure Levels** - UCL requires a higher standard of audibility than BS5839-1 for sounder coverage, therefore the average sounder level throughout the building should as far as reasonably practicable meet (or exceed) 75 dB(A) in all areas. (Commentary - experience shown during fire alarm activations that higher sounder levels are required to engage over headphones etc. and motivate some students/staff to evacuate the building).

4.2. **Sound Pressure Recording** - a sound pressure check **MUST** be carried out with sound levels being recorded on a log sheet or plan. The log is to be submitted with the ‘Commissioning Certificate’ short fall are to be increased by the addition of extra sounders to the area.

4.3. **Voice Sounders (Preferred Option where Possible)** - the following voice sounders conforming to BS5839 can be used combination voice and tone sounders shall be used in all areas where the public or large numbers of
students' use the space, where phased evacuation or the need to differentiate buildings is to be considered.

(a). **Vimpex Ltd - 'Fire Cryer'** (see: [www.vimpex.co.uk](http://www.vimpex.co.uk)) standard with the following voice messages:
   
   (1). Use Ref: (AK) "Fire emergency - please remain calm and evacuate the building immediately" (Female Voice);
   
   (2). Use Ref: (AC) "This is a fire alarm test - No action required - No action required" (Female Voice);
   
   (3). Use Ref: (AE) "Fire alarm test now complete" (Female Voice).

(b). **Apollo Discovery Voice system** - may be used but messages to be agreed with UCL Fire Safety Manager;

4.4. **Visual Alarm Devices (VAD)** - meeting BSEN54-23 shall be provided (visual flashing red lights) in the following locations:

   (a). **Noisy environments** - such as workshops / plant rooms / roof plant areas (in addition to audible sounders);

   (b). **Quite Environments** - where audible alarms are not acceptable (control rooms / sound or anechoic booths etc.);

   (c). **To find the FA Panel** - to identify and locate the main fire alarm panel particularly in property with identical frontage, or where the panel location is not obvious or in the normal location of the main entrance area;

4.5. **Specialist Alarms** - there may be projects that require more specialist equipment (e.g. external) to be specified, in which case Klaxon units should be considered. Further information can be found at [www.klaxonsignals.com](http://www.klaxonsignals.com).

4.6. **Visual Alarms Devices** - visual alarms shall be provided where disabled or hearing-impaired persons may use facilities:

   - **Disabled Refuges** - to allow clearer communications with others;
   
   - **Seminar / Lecture theatres / common rooms / WCs etc.**

**Note** - UCL will **not accept blanket coverage** of a building with supplementary VADs, provision need to be to be specific.

**Note** - Design teams and Principal Contractors to ensure that contingency funds from the project are available for **additional sounders to be installed at commissioning**, should the sound pressure coverage fall below acceptable levels any particular area. Where sound levels fall below this standard, additional sounders **MUST** be installed to raise the sound levels.
5.0. Disabled Refuges/Alarms & Hearing Impaired People Facilities

5.1. UCL has a specific policy and procedures for accommodating people with disabilities - please discuss with UCL Fire Safety Manager prior to design.

5.2. Disabled Refuge Communications - disabled refuges require a means of communicating so ensure that persons using the disabled refuge can communicate their presence and location in an emergency. Generally, there are two methods of providing this communication:

(a) Telephone (preferred option) - provide a standard UCL internal data telephone connection within the disabled refuge, and install a BT Big Button 100 or Doro Phone Easy 311c handsets which are wall mounted handsets. UCL Fire Safety provides information in a clip frame adjacent to the handset with UCL internal 24/7 full (for mobile use) & extensions contact numbers and exact location to assist user.

(b). Disabled Refuge Communication System - unless specifically agreed with UCL Fire Safety Manager do not use systems complying with BS5839-9, as UCL has found systems to problematical, because:

(1). ongoing maintenance costs and reliability;

(2). no one at the reception point to communicate with refuge occupants - causing stress to users;

(3). Often abused and interfered causing alarms and faults on system.

(c). Other Considerations - do not provide sounders close to or within refuge so that occupants can communicate without background alarm - see item 3.5 above.

5.3. Deaf Messaging Service (DMS) - UCL uses a DMS system connected to the fire alarm for hearing impaired persons through Fireco Ltd / www.alarmscom.co.uk - further details please see www.ucl.ac.uk/fire - UCL Fire Safety Technical Note TN007.

5.4. Disabled WC Alarms - disabled toilet alarms should be Timeguard Emergency Assist Alarms with a connection through the Gallagher Security system to signal back 24/7 to the UCL Security Control Room. See further detail from UCL Access Systems Manager:

- www.timeguard.com/products/safety/emergency-assist-alarms
6.0. Electrical Supplies & Batteries

6.1. **Main Electrical SUPPLY to Fire Alarm Panels** - require a dedicated 240v supply using fire resistant cable and terminated into a double pole, isolating spur with key switch as defined in BS 5839-1.

6.2. **Main Electrical ISOLATION to Fire Alarm Panels** - means should be provided for double pole isolation of the mains supply to all parts of the system.

6.3. UCL requires a ‘Fire Safety Isolator Switch’ (available from [www.firesafe.co.uk](http://www.firesafe.co.uk)) to be provided which is a secure method for safely isolating the mains voltage supply to fire systems in accordance with BS 5839-1.

- To be suitably sited, near the equipment served without the need for access to remote parts of the building;
- The 'Fire Safety Isolation' switch can only be isolated by an authorised person, by means of a key lock switch - the key is removable in both ON / OFF positions;
- The fuse cannot be removed without taking the cover off & when in the off position the FUSE is disconnected from the supply;
- A neon indicator is provided to indicate mains present at the switched output;

### Technical Specification:

- **Working Voltage**: 250AV
- **Switch Contact Rating**: Double Pole - 250V AC 4Amp
- **FUSE Rating**: Max - 6A Fast (20mm) supplied
- **Switch Surge Rating**: 80Amp
- **Key Number**: 901

6.4. **24 Volt Equipment** - UCL requires all auxiliary equipment interfaced with the fire alarm system such as door hold open magnets, Fire Alarm Do Not Enter (FADE) Signs etc. to be 24v volt.

7.0. Fire Resistant Cabling

7.1. All cables shall be coloured **Red**, unless there is overriding aesthetic reasons for White to be used.

7.2. Special attention is to be paid to the terminating of cables to ensure that earth faults are eliminated.
7.3. The following cables should be used in all instances:
   (a) FP 200 Gold, equal or approved;
   (b) MICC cabling is required where routes provide mission critical signals or pass through a high risk or vulnerable areas (as per BS 5839-1);

7.4. **Fixing** - all fire alarm cabling is to be fixed to the structure, cable trays or cable management system using metal ties. *No other fixing is acceptable.*

8.0. **Marking and Indicating of Fire Alarm Devices**

8.1. **Labelling** - all fire alarm devices are to be permanently marked or by using suitable adhesive labels, to indicate the device Zone and Address number.

8.2. **Identification** - where remote or hidden detectors / devices are placed in voids, ducts or above ceilings then a suitable LED repeater indicator is to be provided in a logical and adjacent location.
   - All LED indicators are to be clearly marked specifying type of device, address number and remote device location.

9.0. **Ceilings, Ducts & Voids**

9.1. **Ceiling Voids** - generally, where a void of 800 mm or greater than 10% of the room height:
   (a) **Variations** - considered as 'low risk' (e.g. simple light units only within it, or if fire spread beyond the void / room of origin etc is unlikely) - then it is reasonable not to provide AFD in these spaces. This should be recorded as a variation on the relevant system certificate.
   (b) **Higher Risk** - where there is an obvious risk such as significant electrical equipment (other than light units) or air handling units / chillers / void passes over other rooms or compartments, then the void should be provided with appropriate automatic fire detection as any electrical / equipment fire may not be detected at its initial stages. Clarification may be sought for the UCL Fire Safety Manager.

9.2. **Detectors in Voids & Ducts** - any void where detection is provided **MUST** be fully accessible and not obstructed for maintenance purposes. This means that ceiling tiles or access panels must be available directly below the detector to allow maintenance and a ‘testing pole’ to be used, which requires a **clear vertical path from below** to be maintained.

9.3. **Identification of Hidden Devices** - see **Para 8** above.
10.0. Door Hold Open, Fire Dampers & Other Automatically Released Equipment

10.1. These items should adhere to the terms of latest edition of BS 5839-3. It should be noted that 'door holders' are generally not acceptable on any fire door that leads directly onto a ‘protected stair’ (to be discussed with the UCL Fire Safety Manager).

10.2. **Door Release Switches** - electromagnetic door release switches are to be positioned in a clear and accessible location, to prevent damage to fixings by doors being pulled close against the magnetic holders.

10.3. **Auxiliary Equipment** - interfaced with UCL fire alarm systems shall be **24 Volt** equipment.

11.0. Access Control Devices Connected To Fire Alarm Systems

11.1. Where security Access Control Systems are to be installed in a building, it will be necessary to interface with the fire alarm system to meet UCL, local fire and District surveyor requirements. See UCL Fire Safety Technical Note **TN001** & **TN005** for specific requirements.

12.0. Provision of Audible & Visual Warning at Internal Building Boundaries Connected to the Fire Alarm System

12.1. Where the Means of Escape (MoE) routes access and egress passes through a building boundary, it is necessary to provide Visual and Audible Warning signs connected to the fire alarm systems and it will be necessary to interface with the fire alarm system to meet UCL, local fire, and District Surveyor Authority requirements. See UCL Fire Safety Technical Note **TN058**.

13.0. Mechanical & Electrical, Air Handling & Smoke Control Equipment Interfaces

13.1. Where mechanical & electrical systems and smoke control measures are provided and connected to the fire alarm system, please see **UCL Fire Safety Technical Notes TN 038 & TN039** for general requirements.

14.0. Specialist Biological Service Units

14.1. Designers working on fire alarm within BSUs are to reference **UCL Fire Safety Technical Note TN059**, available from the UCL Fire Safety Manager.
15.0. Cause & Effect Matrix Fire Alarm System

15.1. Designers are to provide a cause and effect chart for all new systems - see UCL Fire Safety Technical Note TN063.

16.0. Fire Brigade Communications

16.1. UCL fire alarm panels shall alert the fire brigade via the UCL Security Control Room (24/7) using the Gallagher Security System via UCL Data system network wherever possible, by providing:

(a). a ‘Fire Signal’ generated at the fire panel;
(b). a Fault signal generated at the fire panel;

16.2. Monitoring Centre - the signals are to terminate at the UCL Security Control Room on the Gower Street Campus, which acts as a 24-hour monitoring service for the UCL estate.

(a). The UCL Security Control Room Manager can be contacted on 020 7679 3333 and should be consulted on all signals required to be monitored by the Security Control Room, including security / lift / plant as well as fire alarm signals.

(b). Data connections can be arranged through the UCL ISD Network Group.

16.3. Alarm Receiving Company (ARC) - in some locations, a specialist ARC may be required, which should be arranged through our fire alarm maintenance provider and Southern Monitoring Services Ltd.

- A BT Redcare line and Digital Communications (Digicom) device will also be required. Requirements and procedures will need to be discussed with the UCL Fire Safety Manager at the outset of the project.

17.0. System Commissioning Requirements

17.1. Fire Alarm System Commissioning Engineers - in all cases the UCL Fire Alarm Maintenance provider (Fisk Fire Protection Ltd) shall be employed to commission / test all UCL fire alarm system changes whether new, alterations or modification projects.

Design, Installation Commissioning and UCL Acceptance Certificates:

17.2. The provision of the appropriate design, installation and commissioning certificates containing information based on the ‘Model Certificates’ provided in BS 5839-1: Annex H, is to be provided by the appropriate parties. Copies of the certificates are to be issued as following:
(a). All original certificate(s) to be placed in the Operational & Maintenance (O&M) Manuals;
(b). a copy of each certificate to be issued to the Fire Alarm Maintenance Contract Manager (UCLEM&i);
(c). a copy of each certificate to be issued the UCL Fire Safety Manager for building’s fire certificate and fire strategy documents;
(d). any additional copies required by an authorised person;

17.3. **Design Certificate** - is to be provided in all cases by the **Design Consultant** on completion of the design stage of the fire alarm.

17.4. **Installation Certificate** - is to be provided in all cases by the **Contractor** installing the fire alarm system, on completion of the installation stage.

17.5. **Commissioning Certificate** - is to be provided in all cases by **Commissioning Engineers** (generally UCL Fire Alarm Maintenance provider) on completion of the testing & commissioning stage of the fire alarm.

17.6. **Acceptance Certificate (UCL)** - this is to be completed and issued the by Project / Design Consultant; and witnessed by a **Nominated UCL Person** on behalf of the Director of UCL Estates.

17.7. Only on completion of the ‘Acceptance Certificate’ witnessed by a UCL Nominated Person may:

(a). a new system, become the primary ‘Warning in Case of Fire’ for the building.

(b). where the fire alarm system has been replaced / upgraded etc may the old system be switched off and decommissioned. The new system may then become the primary ‘Warning in Case of Fire’ for the building.

17.8. **Addressing of Fire Device Locations** - the programming of the device address must be carefully considered to ensure that its location matches the local, generic or room numbers to prevent confusion by staff, contractors or the Fire Brigade in locating the device.

17.9. **Drawing and Zone Chart** - zone chart information is to be supplied as part of the commissioning of the fire alarm system as follows:

(a). Clear fire alarm zone information in ‘A4 Word’ format, is to be provided in a suitable ‘clip frame’ position adjacent to the fire alarm panel. This is to provide quick reference to incident location.

(b). ‘As Installed’ Drawings are to be provided on hard copy A1 sheets and in electronic AutoCAD 2007+ Version format scale of 1:50, 1:100 or 1:200 as appropriate.
## 18.0. Quick Overview

### 18.1. General equipment overview required by UCL for new and existing fire alarm systems on upgrading refurbishment etc (where practical):

<table>
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<tr>
<th>Items / Devices</th>
<th>Details</th>
<th>Protocols &amp; Remarks</th>
</tr>
</thead>
<tbody>
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<td><strong>Fire Panels</strong></td>
<td>Advance / Morley IAS ZX / Kentec</td>
<td>Open Protocol / Apollo / Addressable</td>
</tr>
<tr>
<td><strong>Manual Call Points</strong></td>
<td>Apollo</td>
<td>Open Protocol / Apollo / Addressable</td>
</tr>
<tr>
<td><strong>Smoke Detectors</strong></td>
<td>Apollo Range - Type to Suite</td>
<td>Open Protocol / Apollo / Addressable</td>
</tr>
<tr>
<td><strong>Heat Detectors</strong></td>
<td>Apollo Range - Type to Suite</td>
<td>Open Protocol / Apollo / Addressable</td>
</tr>
<tr>
<td><strong>Multi-Sensing Detectors</strong></td>
<td>Apollo Discovery Range</td>
<td>Open Protocol / Apollo / Addressable</td>
</tr>
<tr>
<td><strong>Bells 8” / 10”</strong></td>
<td>To Suite</td>
<td>Open Protocol / Addressable</td>
</tr>
<tr>
<td><strong>Sounders</strong></td>
<td>Apollo - Type to Suite</td>
<td>Open Protocol / Addressable</td>
</tr>
<tr>
<td><strong>Voice Sounders</strong></td>
<td>Vimpex ‘Firecryer’</td>
<td>Open Protocol / Addressable</td>
</tr>
<tr>
<td><strong>Beam Detectors</strong></td>
<td>Open Area Smoke Imaging Detection (OSID) by xtralis</td>
<td>Open Protocol / Addressable (<a href="http://www.xtralis.com">www.xtralis.com</a>)</td>
</tr>
<tr>
<td><strong>Building Interface</strong></td>
<td>Philip Payne 2784 Range</td>
<td>‘Fire Alarm Activated Do not Enter’ illuminated signs</td>
</tr>
<tr>
<td><strong>Cables</strong></td>
<td>FP 200 Gold (or equivalent) MIC (where required by BS5839-1)</td>
<td>Red unless aesthetic consideration required</td>
</tr>
<tr>
<td><strong>Special / Bespoke</strong></td>
<td>Klaaxon Ltd</td>
<td>One off external fittings etc</td>
</tr>
<tr>
<td><em><em>Flame Proof / Explosive Proof (E</em>)</em>*</td>
<td>Apollo &amp; CooperMEDC Ltd (<a href="http://www.cooper-safety.com/brands/medc">www.cooper-safety.com/brands/medc</a>)</td>
<td>BS EN 60079-10 - Explosion Proof (E*) &amp; External Fittings</td>
</tr>
<tr>
<td><strong>Visual Alarm Devices (VAD)</strong></td>
<td>Do not blanket cover for DDA - separate arrangements at UCL</td>
<td>Red LED indicators fitted to sounder units</td>
</tr>
<tr>
<td><strong>Deaf &amp; Hearing Impaired Warning Systems</strong></td>
<td>Deaf Message Service (DMS) or Hearing Fire Alert System (HFAS) (See UCL Fire Safety Tech Note TN007)</td>
<td>Alarmscom Ltd (<a href="http://www.alarmcom.com.co.uk">www.alarmcom.com.co.uk</a>) Discuss with UCL Fire Safety Manager</td>
</tr>
<tr>
<td><strong>Disabled WC Alarms</strong></td>
<td>Timeguard Emergency Assist Alarms</td>
<td><a href="http://www.timeguard.com/products/safety/emergency-asset-alarms">www.timeguard.com/products/safety/emergency-asset-alarms</a> Discuss with UCL Access Systems Manager</td>
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End