DEPARTMENT OF GENERAL SERVICES
BUREAU OF CAPITAL OUTLAY MANAGEMENT
Serving Government. Serving Virginians.

BCOM Newsletter

Issue # 22

October 2016

In this Issue:

Means of Egress – Lessons Learned from the Chicago Iroquois Theater Fire

The Virginia Construction Code, Chapter 10 addresses design requirements for the Means of Egress. The purpose is to provide safe and successful evacuation of occupants, particularly in the event of fire. Means of egress requirements have been influenced by lessons learned from actual fire catastrophes.

Theater fires are amongst the most tragic. Within the Commonwealth, the Richmond Theatre fire on December 26, 1811 killed 72 people including Virginia's sitting governor, George Smith. One of the most notable theater fires which shaped fire safety regulations was the Chicago Iroquois Theater Fire on December 30, 1903 where 602 people were killed. This fire alerted the country of the need for improved fire safety regulations, especially in theaters. Many of the deaths were due to crowd-crush. Drapery obscured exits, balcony doors were locked shut and doors opened into the theater resulting in the inability of occupants to open doors as others began to pile up against them trying to escape. The Chicago Iroquois fire prompted widespread implementation of the panic bar and requirements for doors to open in the direction of egress to ease building evacuation in an emergency.

How does this translate to the current code?

Virginia Construction Code, section 1008.1, *Doors*, requires means of egress doors to be easily recognizable as doors and distinguishable from adjacent construction. Mirrors or similar reflecting materials are not permitted on means of egress doors and doors may not be concealed by drapes, curtains, decorations or other similar materials.

Virginia Construction Code, section 1008.1.2, *Door Swing*, requires doors to swing in the direction of egress travel where serving:

1) **Occupant load of 50 or more persons**. This is level of occupant load where, in the event of an emergency, a compact line could form at a closed door that swings inward.
2) **Group H (High Hazard) occupancy**. In the event of fire in a high hazard occupancy, fire would likely spread rapidly. Occupants need immediate egress from high hazard spaces.

Virginia Construction Code, section 1008.1.9, *Door Operation,* Except where specifically permitted by this section, egress doors shall be readily openable on the egress side without special knowledge or effort. Egress doors may be locked on the outside as long as on the inside, the side from which egress is made can be unlocked. Unlocking which is integral with a single unlatching operation is acceptable. Acceptable examples include a lockset which retracts a thumbturn/deadbolt or a panic bar which unlatches a locking mechanism.

Virginia Construction Code, section 1008.1.10, *Panic and Fire Exit Hardware*, requires doors to be equipped with panic or fire exit hardware where serving:

1) **Group A (Assembly)* or E (Educational) occupancies** with an occupant load of 50 or more persons; *Note: Educational occupancies for students above the 12th grade with an occupant load of 50 or more are classified in Group A-3.
2) **Group H (High Hazard) occupancy**;
3) **Electrical rooms** with equipment rated 1,200 amperes or more and over 6 feet (1829 mm) wide that contain over-current devices, switching devices or control devices with exit or exit access doors shall be equipped with panic hardware or fire exit hardware. These doors shall also swing in the direction of egress travel. This is consistent with NFPA 70, NEC 110.26(C)-2&3.

Keep in mind, when a space requires panic or fire exit hardware, doors along the associated required means of egress from that space typically require exit hardware as well.

There is a distinct difference between panic and fire exit hardware. Panic hardware cannot be used on a fire door. Panic hardware usually has a *dogging* feature, which allows the latch to retract and create a push/pull function. This reduces wear and tear on the hardware and makes it easier for building occupants to use. Because fire doors are required to positively latch by VCC 716.5.9.1, mechanical dogging, or holding the latch retracted, is not allowed on fire exit hardware.

Both panic and fire exit hardware are required to be listed and labeled in accordance with UL 305 - Panic Hardware test standard. Fire exit hardware is required to bear an additional label, UL 10C - Positive Pressure Fire Tests of Door Assemblies. The UL label affixed to the device will clearly identify the hardware as either “Panic Hardware” or “Fire Exit Hardware”.

Lastly, the maximum unlatching force for panic and fire exit hardware shall not exceed 15 pounds.

In summary, history has taught us the importance of designing safe means to egress and escape from buildings in the event of an emergency. Means of egress doors shall be:

1) Distinguishable as means of egress doors and kept clear of obstructions.
2) Swing in the direction of egress travel where serving 50 or more persons or in a high hazard occupancy.
3) Readily openable from the egress side without use of a key or special knowledge or effort.
4) Be provided with panic or fire exit hardware where required.

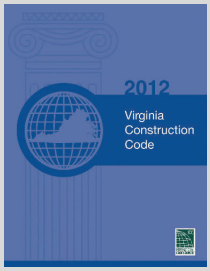
View a Chicago Fire Department Documentary of the Iroquois Theater Fire

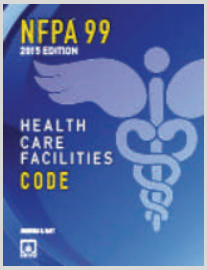
(This Youtube video is approximately 10 minutes in length.) ❑

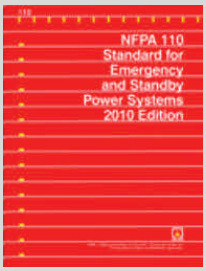
Backup Power – Emergency and Standby Electrical Loads

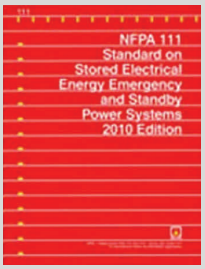
Relevant Codes:

- Virginia Uniform Statewide Building Code (2012)
- NFPA 70 – The National Electrical Code (2011)
- NFPA 99 – Standard for Health Care Facilities
- NFPA 110 – Standard for Emergency and Standby Power Systems
- NFPA 111 – Standard for Stored Electrical Energy Emergency and Standby Power Systems









There are requirements in the building codes (VUSBC Ch. 27) for emergency and standby backup power for various buildings based on Group and/or building features (such as high rise buildings). There are also some program requirements that require backup power. The National Electrical Code (NEC) has provisions that apply to the electrical safety of these installations, and the operation and maintenance of electrical systems intended to supply, distribute and control electricity for illumination, power, or both, to required facilities when the normal electrical supply or system is impaired.

NEC Article 700 *EMERGENCY SYSTEMS* contains the provisions for systems that are legally required and classed as emergency. The most common emergency systems are egress illumination, exit signs and fire alarms which are all related to life safety. Other emergency systems, typically found in larger buildings, serve horizontal sliding egress doors, Group I-3 power operated doors, certain other powered doors and locks, elevators (typically to serve accessible egress in multi-story buildings), fire pumps, public safety communication ("blue phones" for example) and some industrial processes.

Article 701 has provisions for *LEGALLY REQUIRED STANDBY SYSTEMS* which include some heating and refrigeration systems, communication systems, ventilation and smoke removal systems, sewage disposal systems, lighting systems and some industrial processes that if left without power could result in hazards or hamper the efforts of emergency first responders.

Article 702 covers *OPTIONAL STANDBY SYSTEMS* that generally are not necessary for life safety but may be important to support the program such as HVAC, data processing, non-critical communications and industrial processes that may not threaten life safety but are important to the facility's purpose.

Lastly, Article 708 *CRITICAL OPERATIONS POWER SYSTEMS* (COPS) is applicable to backup power support for designated critical operations areas (DCOA). Critical operation power systems serve vital infrastructure facilities that are necessary to national security, the economy, public health and safety; and where continuity of operations is deemed necessary by governmental authority (early disaster warnings, evacuation control).

Fuel sources for backup power are typically simple rechargeable storage batteries such as can be found in exit signs, emergency ballasts, inverter systems and uninterruptable power supplies (data centers, coupled with generators for large applications or extended duration outage protection). Liquid petroleum and natural gas fueled generators and configurations will be the subject of a future article.

Backup power systems that have battery fuel sources generally "float on line" in parallel with the electrical distribution system via an assembly that typically includes the battery or batteries, charger and controls with or without status indicators. In order to be code compliant, there are required NRTL (Nationally Recognized Testing Laboratories) listings for the assembly, with UL 924-06 *STANDARD FOR SAFETY EMERGENCY LIGHTING AND POWER EQUIPMENT* (with Revisions through January 2009) the primary requirement. Prime-mover driven electrical backup equipment (generators) must carry a UL 2200 listing, including the enclosure when provided, and typically interface the electrical distribution system through transfer switches, either manual or automatic in operation.

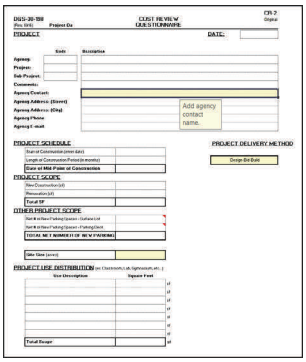
NEC 700, 701, and 708 loads require automatic transfer switches in order to ensure code specified minimum times required for transfer the power are met (10 seconds for emergency loads, 60 seconds for legally required loads). NEC 702 loads can be transferred by manual or automatic switches, with UL 1008 *TRANSFER SWITCH EQUIPMENT* the primary standard to be met along with the proper NFPA 110 defined Level (1 or 2).

As a closing thought, not all NEC designated emergency and standby loads can be combined in a single system. Legally Required and Optional Standby (NEC 701 and 702) loads can be on the same system and share components, or can be independent from other systems. Emergency (NEC 700) and Legally Required Standby (NEC 708) loads must be powered and switched independently from any other loads, including each other, and must have their own dedicated transfer switches. ❑

CPSM Forms Update

The following CPSM forms were recently revised and are available for download:

- **DGS-30-198 CR-2, Cost Review Questionnaire** (Revised 10-16)

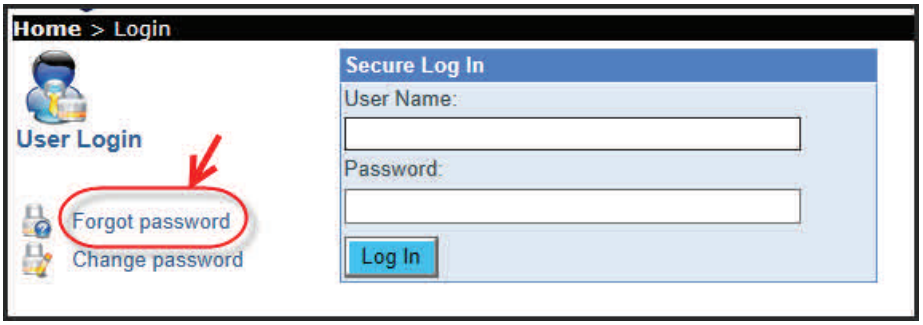


Please download Form **DGS-30-000, Capital Outlay Forms Master List** for a complete listing of the latest version of each CPSM form. All current forms may be downloaded from the DGS Forms Center. If a prior version of a form is required, please contact capout@dgs.virginia.gov. ❑

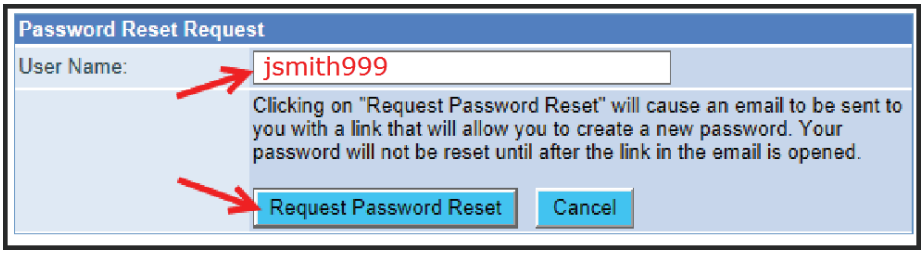
How to Self-Reset Your BITS Password

A frequent BITS support request is for assistance in resetting a forgotten or expired password. Any BITS user with an active BITS account can easily self-reset a BITS password. (*Please save these instructions for future reference.*)

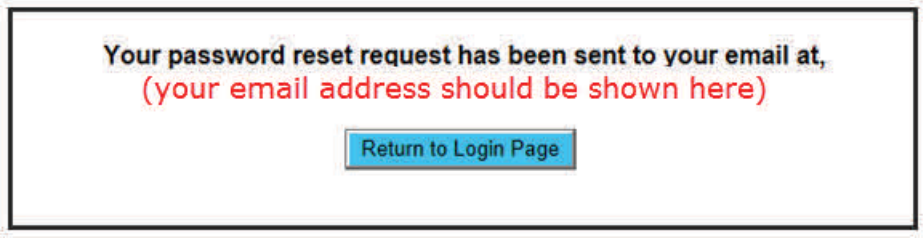
First, go to the BITS login screen (https://bits.dgs.virginia.gov). Don't enter anything. Just click the "Forgot password" link:



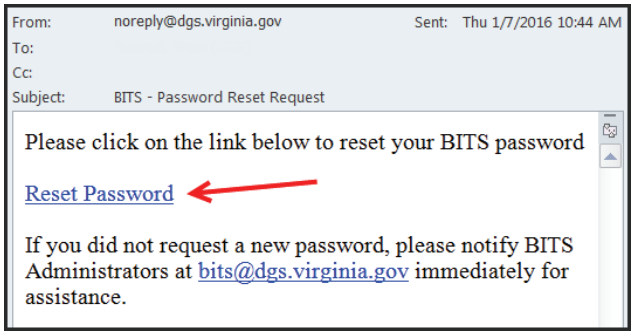
This will send you to the following page. Type in your BITS username (e.g., "jsmith999) and click the "Request Password Reset" button:



You will get the following message. Don't click the "Return to Login Page" link. Just go to your email inbox.

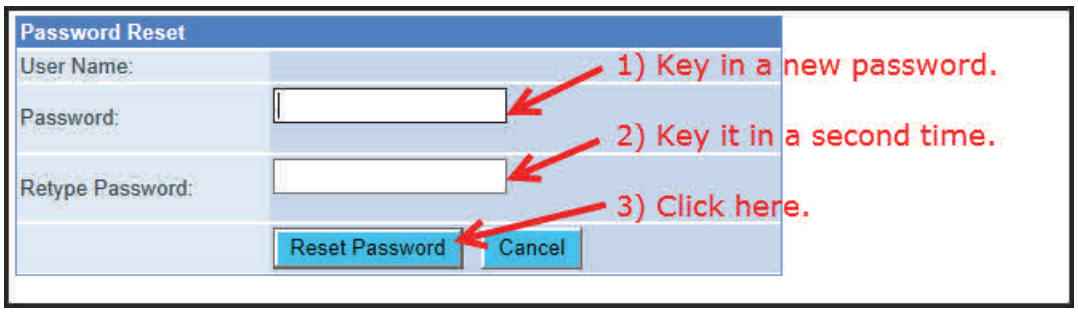


It may take a minute or two for you to receive this message in you email inbox. Once you receive this message, click on the "Reset Password" link:

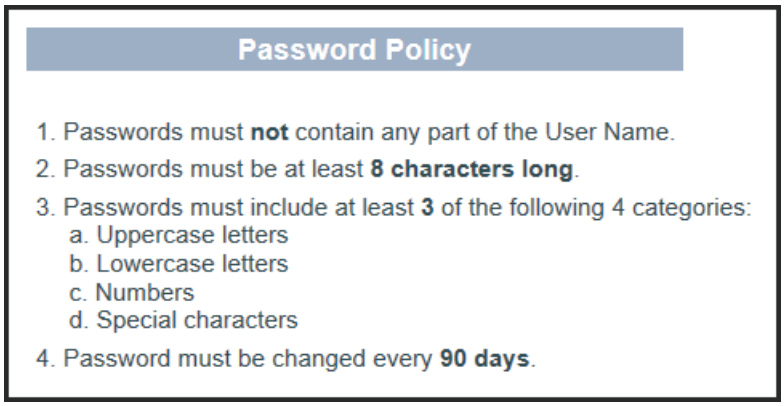


(The reason BITS sends this to your email inbox is to authenticate that it is you, and not someone else, who is requesting the password reset.)

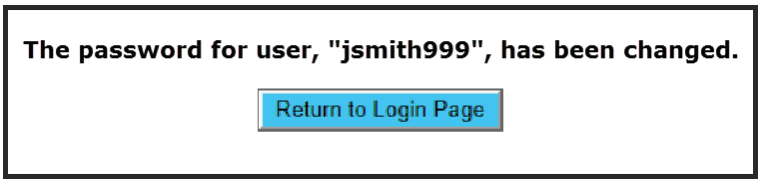
You will then be directed to this page. Follow the 3 steps shown below.



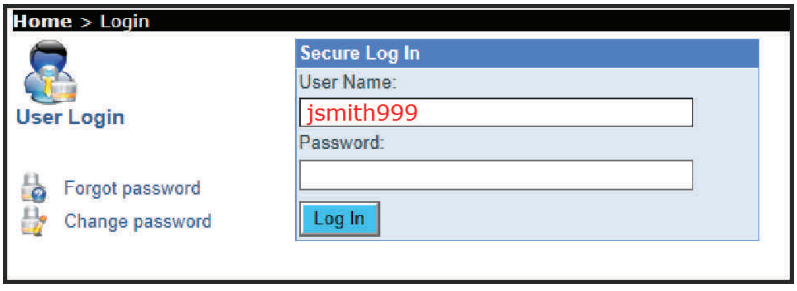
When entering your new password in Boxes 1 and 2 above, the new password you self-create must comply with the following BITS Password Policy:



After you successfully create/reset your password, you will be directed to this page:



Now click the "Return to Login Page" button which will direct you to the BITS login screen. Key in your BITS User Name (e.g., jsmith999) and the new password that you just created, then click "Log In" to access BITS:



- For additional assistance with passwords, BITS user accounts, or technical (system) issues, email bits@dgs.virginia.gov.
- For procedural assistance in creating/processing "CO" forms (CO-2, 4, 5, 6, 8, and 14 forms), email coforms@dgs.virginia.gov or call Ralph Smith at (804)225-3769.
- For procedural assistance in creating/processing "BO" forms (i.e., Building Permits or Certificates of Use and Occupancy), email boforms@dgs.virginia.gov, contact the BCOM Lead Reviewer assigned to your agency, or call Heather West at (804)786-3581.