Human Performance Improvement #191

Title	Enclosure Reset Keys Incorrectly Issued
Event Date	10/26/2017
Close Out Date	11/27/2017
Performed On	Accelerator Division, AD Deputy Org, Accelerator Systems, Operations
Led By	Accelerator Division, AD Deputy Org, Accelerator Systems, Operations
Department Manager	Daniel Johnson
Location	Main Control Room
ORPS	No
Incident Category	Unexpected Outcome
Entered By	Maddie Schoell 11/27/2017 14:23
Updated By	Maddie Schoell 06/15/2020 15:09

Incident Description On October 26, 2017 there were two separate instances of enclosure Reset keys being incorrectly issued instead of the appropriate enclosure Enter keys. In the morning, there was a large tour going into the MI-65 enclosure with multiple waves of personnel obtaining keys. An AD Operator (#1) was issuing keys by pulling a group of keys from the key cabinets, setting it on the desk in front of the keylogger, and then issuing the keys out individually. Since there was such a large group, a second AD Operator (#2) got up to help. When they got behind the desk near the key cabinets, they noticed that the MI-65 Reset key was missing from the cabinet. They (#2) checked the keylogger to see who it had been issued to, and noticed that the individual (#3) was still in the MCR so they returned the MI-65 Reset key and issued the correct MI-65 Enclosure Enter key. Later in the day, another individual (#4) was going into the Main Injector to do a routine end-of-the-day walkthrough and asked an AD Operator (#1) to issue keys for MI-10 and MI-20--MI-62 enclosures. The Operator issued an MI-10 Enclosure Enter key and an MI-20--MI-62 Enclosure Reset key. MI-10 was in Controlled Access mode, so the individual filled in the MI-10 Access key barcode number on the RWP. MI-10--MI-62 was in Supervised Access mode so they were not required to enter in any key information when signing this RWP. The individual (#4) met up with a coworker (#5) (who received his keys earlier in the day) to do their walkthrough: 1: They performed a Supervised Access from MI-60 Service Building into the MI-20--MI-62 Enclosure (Person #5 used their MI-20--MI-62 Enclosure Enter key to open the door, no keys were required in interlock boxes) 2: They performed a successful Controlled Access from the MI-20--MI-62 into the MI-10 Enclosure (Person #4 used their MI-10 Enclosure Enter key in the first interlock box, Person #5 used their MI-10 Enclosure Enter key in the gate and then their MI-20--MI-62 Enclosure Enter key in the second interlock box) 3: They went to perform a Controlled Access out of the MI-10 Enclosure through the second gate into the MI-20--MI-62 Enclosure. Person #4 put their MI-20--MI-62 key (not realizing that it was a Reset key) into the first interlock box and noticed that it wouldn't turn. The two compared their keys and didn't notice any differences, and thought it was a damaged/sticky key. They then switched places and Person #5 used their MI-20--MI-62 Enclosure Enter key in the first interlock box, Person #4 pushed open the gate (no key is needed going through either gate from MI-10 into MI-20--MI-62 for life safety purposes) and put their MI-10 Enclosure Enter key in the second interlock box. They successfully completed a Controlled Access out of the MI-10 Enclosure. 4: They were continuing their walkthrough back to MI-60 Service Building. At the same time, the MCR Duty Assistant (#6) noticed that an MI-20--MI-62 Reset key was missing from the key cabinet, looked up who it was issued to, and paged the individual in the MI-20--MI-62 enclosure. Person #4 and Person #5 exited the enclosure and reported the event to the RSO.

What Happened? AD Operator (#1) was helping issue keys for the MI-65 tour - they grabbed multiple keys from the key cabinet, placed them on the counter in front of the key logger, and issued them out individually. When issuing keys, after entering the key number and the individual's ID number they hit the "enter" key to complete the process. For the MI-65 Enclosure Enter keys, hitting "enter" successfully completed the process and logged the key out to that individual. When attempting to issue the MI-65 Reset key, hitting "enter" key prompts a window to pop up indicating that they key is to be issued for search and secures only. They noticed the pop-up, but didn't recognize the importance of it and didn't ready it, they just thought it was a random computer window pop up. They kept hitting the "enter" key to issue the MI-65 Reset key, and this cleared the pop-up window and issued the key. Later in the day, when issuing keys to Person #4, Person #1 grabbed one MI-10 Enclosure Enter key and one MI-20--MI-62 Reset key. They went through the same process to issue keys as described above, and again hit the "enter" key to clear the pop-up without reading/properly acknowledging it. Person #1 did indicate that they try to not issue keys for Main Injector from the bottom rows, because the Reset keys are usually on the bottom row on the far right - but in this case they thought they pulled keys from a "non-bottom" row, so it seemed like MI-20--MI-62 Reset keys were in upper rows as well. AD Operator (#1) indicated that he was fatigued from staying up late working on school work the night before, and was in "zombie mode" and "auto-pilot" on this day.

Immediate Actions Taken Immediately following the reporting of these events, the following actions have been taken: 1) The key fobs on the Reset keys have been more clearly marked so they are visually different than the Enclosure Enter keys. This was either done with a diagonal red marker mark across the entire key fob (for the keys that couldn't be removed from the key cabinets due to beam operation) or with printed text saying "RESTRICTED ACCESS" diagonally in red across the entire fob behind the key information text (for the keys that could be removed from the key cabinets). 2) A colored plastic cover was placed over the end of the Reset keys (for the keys that could be removed from the key cabinets) so that the Reset keys were tactilely different. The remainder of the Reset keys are being updated as machine operation allows. 3) The keylogger has been updated to prompt two different pop-up windows when attempting to issue Reset keys: one to alert the Operator that they are issuing a Reset key and the second to ensure that they mean to issue a Reset key.

Why Did It Make Sense At The Time The Enclosure Enter keys and Enclosure Reset keys look nearly identical. The key fobs have the same shape, background color and "enclosure name" text on the top. They do have different text indicating "Enter" or "Reset", and different key numbers and barcode numbers on the bottom, but they are not obviously different when comparing keys since they have the same "enclosure name" and background color. The Reset keys are also stored in close proximity to the Enclosure Enter keys. When logging out Reset keys, a window pops up that the Operator must acknowledge, but this can be done by hitting "enter" - which is the same motion that they use to enter information into the keylogger and successfully issue keys.

Topic(s)	Communication	Design	Process
Lead Reviewer	Schoell, Maddie 16344N (ES)
Review Team	McHugh, Eric 13747N (ES)
Review Team	Newhart, Duane 11580N (AD)
Involved Person	Dave Capista ()
Involved Person	Denton Morris ()
Involved Person	Marcellus Parker ()
Involved Person	Mary Kohler ()
Involved Person	Mike Olander ()

Person Involved		Tony Busch ()
Person		

Organizational Weakness Design or Process Change: Enclosure Reset keys are printed on fobs that are the same color and shape as Enclosure Access keys, with slightly different wording and numbering. Issues with the reset keys looking too similar to other keys was noted in the past, changes were made but they were insufficient. (Red marks were added, but worn off.)

Error Precursor Human Nature / Complacency / Overconfidence: Individual saw the pop-up, but didn't think it was important and didn't properly acknowledge it.

Individual Capabilities / Illness / Fatigue: Individual indicated that they were fatigues from staying up late the previous night.

Task Demands / Repetitive actions, monotonous: Issuing keys is inherently a repetitive task, but requires attention. There are precautions built into the system to alert user if an error was made, which was ignored/bypassed because the way to acknowledge the pop-up (hitting "enter") is the same way that keys are issued successfully.

Work Environment / Confusing displays or controls: Enclosure reset keys look very similar to enclosure access keys and are kept in the same area.

Causal Codes

Item ID	Causal Code	Narrative
98050	A1.B5.C02 Physical environment LTA	2 factors: 1. Popup recognized, but not as an important popup. Also the normal way to move through the key logger system required using the enter key. When the warning "this is a reset key" popup appeared, the default positioning for the cursor allowed the enter key to be pressed again acknowledging the popup as okay and continuing the process. 2. The reset keys had the same look, feel, colors and were in close proximity to the regular enter keys. See HPI https://www-bd.fnal.gov/cgi-msd/admin/hpiForm.pl?hpiID=191&urlDeptID=
98050	A3.B1.C06 Wrong action selected based on similarity with other actions	The normal way to move through the key logger system required using the enter key. When the warning "this is a reset key" popup appeared, the default positioning for the cursor allowed the enter key to be pressed again acknowledging the popup as okay and continuing the process. See HPI https://www-bd.fnal.gov/cgi-msd/admin/hpiForm.pl?hpiID=191&urlDeptID=

iTrack Items

Item	Responsible Person	Categroy	Item Title	Item Description	Item Due Date	Item Status	CAP	CAP Scheduled Date	CAP Close Date	CAP Title	CAP Description	CAP Resolution	CAP Status
98050	Newhart, Duane	Non-Conformance	Individual Incorrectly Issued Reset Keys when Enter Keys Should Have Been Issued	https://www-bd.fnal.gov/cgi-msd/admin/hpiForm.pl?hpiID=191&urlDeptID= Investigate further improvements of the keylogger system to make it more difficult to accidentally acknowledge and clear pop-up windows. Investigate further capabilities of changing the appearance of the Reset keys. Investigate long-term improvements for where the Reset keys are stored in relation to the Enclosure Enter keys in the MCR key cabinets.	10-MAY-18	Closed	79290	19-DEC-17	10-MAY-18	Investigate near-term improvements to key appearance and keylogger	Investigate further improvements of the keylogger system to make it more difficult to accidentally acknowledge and clear pop-up windows. Investigate further capabilities of changing the appearance of the Reset keys.	Keylogger updated to remove ability to hit "enter" to accidentally acknowledge pop-up, and 2nd pop-up window added for additional acknowledgment. Reset key fobs updated with "Restricted Use" text across the background (when machine allowed). Rubber covers were also added to Reset keys to give tactile difference.	Closed
98050	Newhart, Duane	Non-Conformance	Individual Incorrectly Issued Reset Keys when Enter Keys Should Have Been Issued	https://www-bd.fnal.gov/cgi-msd/admin/hpiForm.pl?hpiID=191&urlDeptID= Investigate further improvements of the keylogger system to make it more difficult to accidentally acknowledge and clear pop-up windows. Investigate further capabilities of changing the appearance of the Reset keys. Investigate long-term improvements for where the Reset keys are stored in relation to the Enclosure Enter keys in the MCR key cabinets.	10-MAY-18	Closed	79291	19-DEC-17	10-MAY-18	Investigate long-term improvements to MCR key cabinets	Investigate long-term improvements for where the Reset keys are stored in relation to the Enclosure Enter keys in the MCR key cabinets.	We have investigated the long-term improvements to the MCR key cabinets, such as isolating the reset keys from the entry keys. This will depend on the key demands of LBNF and PIPII and will require a significant reconfiguration of the cabinets. The first opportunity to accomplish this will be during the	Closed

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