



Credit for Operator and Mitigation Actions, and Security Bounding Time

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NRC Public Meeting to Discuss Staffs Follow-up Actions in Response to SRM-SECY-17-0100

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Desired outcomes

- Extend RG 5.81* criteria to broader set of operator actions
 - Add more target elements to target sets
- Receive credit for law enforcement tactical support to enable additional licensee mitigation actions that would prevent radiological sabotage
 - NRC establishes a default Security Bounding Time (SBT)
 - NRC endorses NEI approach to determining a site-specific SBT
 - Allow removal of target elements that lead to a target set loss over a long duration (in excess of a SBT)
 - Address in RG 5.81 and endorsed NEI document
- Credited actions that enhance site protective strategies

* Regulatory Guide 5.81, *Target Set Identification and Development for Nuclear Power Reactors*

Definition of terms

- **Credit** – Using the term in a manner similar to RG 5.81
 - Determination that a licensee may rely on an action to be performed when developing a protective strategy
 - Conclusion of action viability should meet a “reasonable assurance” standard
- **Operator Action** - An action meeting criteria in RG 5.81
 - An operator action is a target element within a target set
 - It cannot rely on removal of adversary interference by law enforcement, but viability should consider the capabilities of the site protective strategy
 - Operator can use plant, FLEX or B.5.b equipment

Definition of terms

- **Mitigation Action** - An action that may be taken by an operator to prevent the irreversible onset of radiological sabotage but does not meet the operator action criteria in RG 5.81
 - May prevent the loss of a target set or compensate for the loss of a target set
 - May include the use of guidelines and equipment for mitigating the consequences of beyond-design-basis (BDB) external events, or events leading to a loss of large areas of the plant due to explosions or fires, as required by NRC regulations, orders and licenses (FLEX and B.5.b)
 - Requires the removal of adversary interference (i.e., a Security Bounding Time) to permit performance

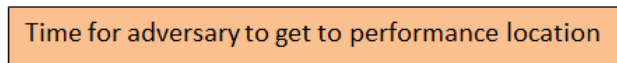
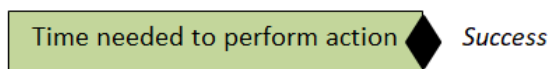
Definition of terms

- **Security Bounding Time (SBT)** - The elapsed time, measured from recognition of an attack, required for a law enforcement tactical team to eliminate adversary interference sufficiently to allow performance of a mitigation action
 - Mitigation actions are taken to protect public health and safety
 - Tactical team is augmenting the onsite security force for a specific purpose; security supervision maintains control of overall site security response
 - The NRC staff has suggested that recalled licensee security personnel may also be considered as a tactical resource for establishing a SBT; NEI supports development of this option

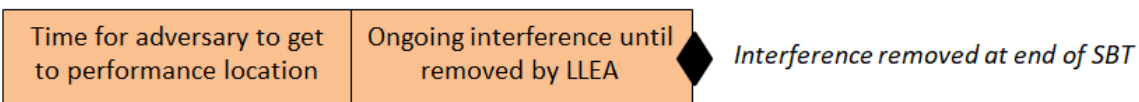
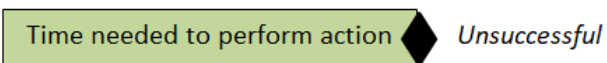
Simplified illustrative examples (*not all-inclusive*)

Operator in Control Room needs to open a valve in the Turbine Building (*timeline comparison controls*)

OPERATOR ACTION: Reasonable assurance that the site protective strategy can permit action performance before adversary interference.

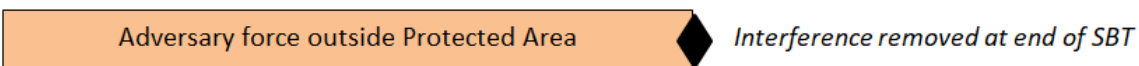


MITIGATION ACTION: The action cannot be performed before adversary interference but there is reasonable assurance that it could take place once an LLEA tactical team removes the interference.



Operator in Control Room needs to open a valve outside the Protected Area (*location controls*)

Because there may be adversary interference outside the Protected Area, LLEA must first remove the interference; therefore, this is expected to be MITIGATION ACTION, not an OPERATOR ACTION.



Operator actions

- Determination of adversary timelines should be made with consideration of the effectiveness of a licensee's protective strategy, and demonstrated capabilities to interdict adversaries
- Adding operator actions increases the complexity of the adversary's mission, which decreases the probability of success and improves margin
- Assessment of an operator action employing equipment maintained for the mitigation of BDB events (e.g., FLEX or B.5.b) should be able to credit the equipment, procedures and training described in associated program documents

Potential changes to RG 5.81 – adversary timelines

- **Performance in Force-on-Force (FOF) drills and exercises**
 - If FOF drill and exercise performance demonstrates that the protective strategy protects the operator, travel path and performance location, then the action should be credited
- **Computer modeling** - If a licensee has a site-specific computer model of their protective strategy, then the operator action may be permitted if the model shows there is reasonable assurance that an adversary cannot preclude performance

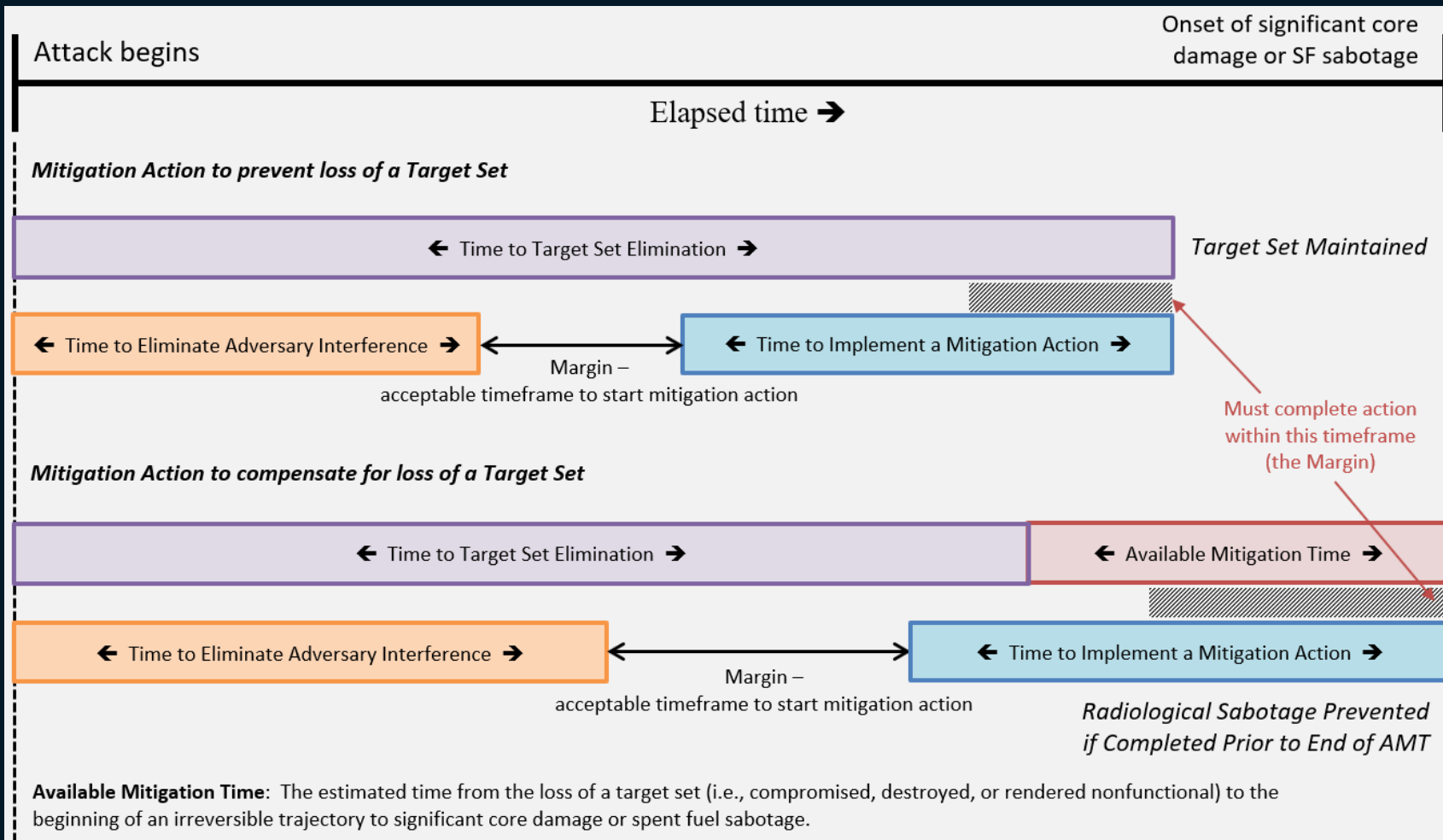
Potential changes to RG 5.81 – adversary timelines

- **Delay factors** - Adversary timelines should reflect all factors that would hinder the movement of an adversary, not just passive features
 - Through a review of military or other literature, these factors should be identified, quantified, and made available for licensee assessments of operator actions
- **Location of the action relative to other target set equipment** – Permit operator action when performance location is in the same area as another target element and that area is included within the protective strategy
 - Consider in cases when the adversary will arrive after the operator but before the action is completed

Mitigation actions

- Increase the number of barriers to radiological sabotage
- Viable if the action can be performed after adversary interference has been eliminated, and before the onset of irreversible radiological sabotage
 - An action could involve use of plant equipment or equipment maintained for responses to BDB events (FLEX and B.5.b)
 - Eliminating adversary interference could be accomplished through containment of adversary force members within areas that do not permit interference with implementation of the action (considering both travel routes and work areas) or neutralization
 - Establish a SBT to credit law enforcement tactical response

Mitigation action types and timeframes



Mitigation actions

- As a result of NRC staff feedback on the NEI Security Event Mitigation Assessment (SEMA) white paper, submitted on May 3, 2017, the NEI SBT white paper addresses only the determination of a site-specific SBT
 - Other aspects of assessing the viability of a mitigation action need to be defined (e.g., availability and protection of FLEX equipment)
- The assessment of a mitigation action employing equipment maintained for the mitigation of BDB events should be able to credit the equipment, procedures and training described in associated program documents

NEI SBT process

- Determines credit for law enforcement tactical support received from a local, regional, State, or Federal source
 - Licensee will likely seek credit for a tactical team with the shortest response time, other factors being equal. For example, a site may achieve SBT credit based on the support from a local tactical team, even though additional tactical responders would be available from State and Federal agencies.
- Ensures tactical team has site information prior to attack
- Specifies minimum capability standards for tactical support
 - NTOA standard, or equivalent State/Federal standard
 - Capabilities may be adjusted by law enforcement agency based on site-specific mission needs

NEI SBT process

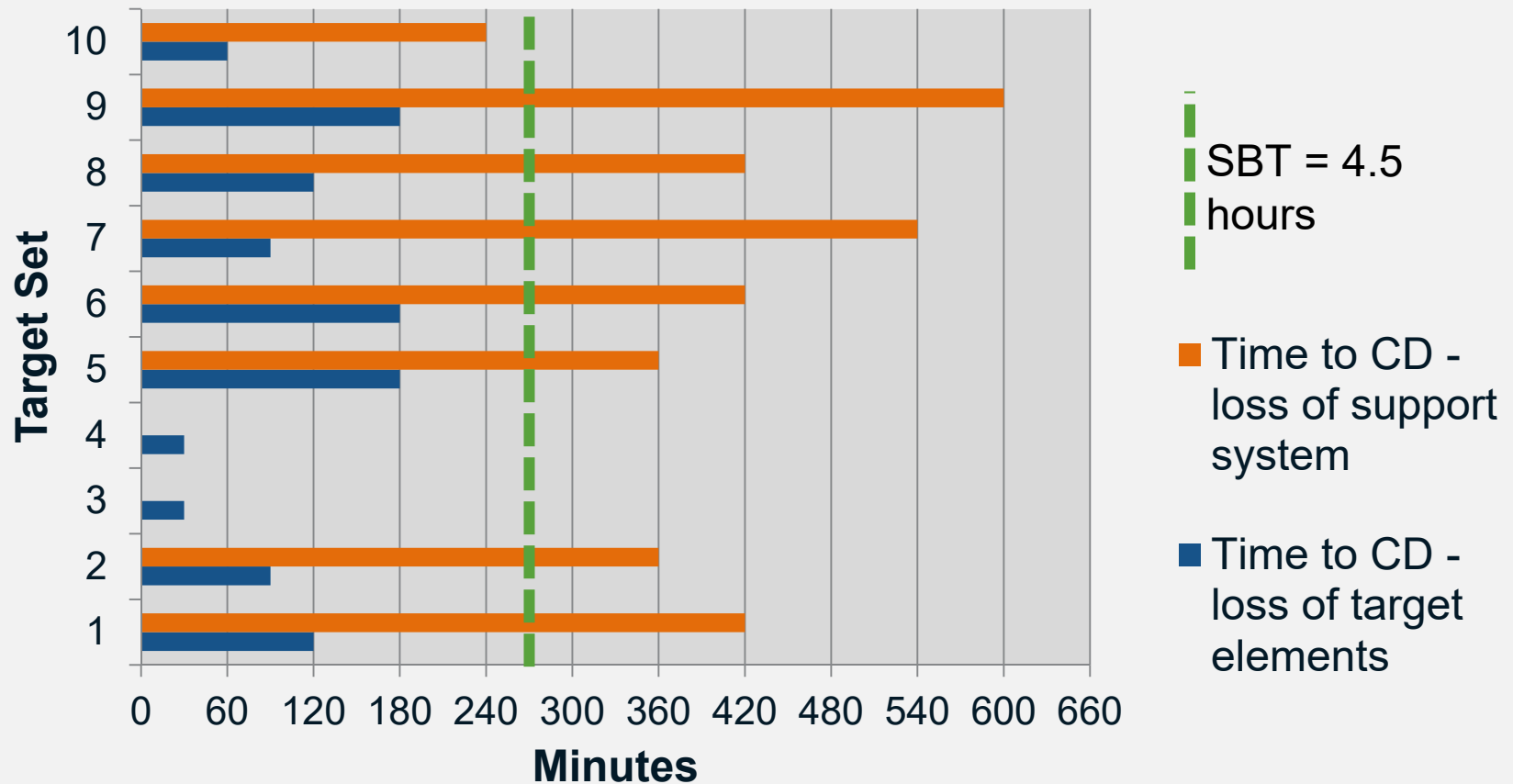
- Mission planning and execution times
 - Based on licensee experience and discussions with LLEAs
 - Reasonable and bounding for a wide range of conditions
 - Tactical team may determine times greater (but not less) than assumed times based on planning process
- Two planning categories/time formulas
 - Outside Protected Area
 - Inside Protected Area (whether inside or outside power block)
- SBT process is focused on facilitating performance of a mitigation action; it is not intended to create an integrated response plan
 - Security supervision maintains control of overall site security response

Credit for mitigation actions – desired outcomes

- Permit consideration of law enforcement tactical support and mitigation actions
 - Recognize adversary interference is eliminated after the SBT is exceeded, and subsequent mitigation actions
- Consideration could inform:
 - Target set development
 - Selection of FOF exercise scenario target sets
 - ◆ Certain scenarios with durations beyond an SBT would “screen out” because a mitigation action could be taken
 - Inform SDP by allowing the outcome of an FOF exercise to be evaluated under the framework of the Baseline SDP
 - ◆ Could eliminate the FOF exercise SDP

Mitigation action example

Lost Mesa NPP – Time to Core Damage



Mitigation action example

- Lost Mesa NPP with a 4.5 hour SBT – potential support element screen-outs

	Target Element	Support Structure, System or Component for Target Element				
		Component Cooling	DC Power	Fuel	Secondary Cooling	Flooding
If this is lost:	Element A	Primary cooling of Element A	Battery / bus power for Element A	Fuel source for Element A	Water source or heat sink for Element A	Flooding of area with Element A
Time to core damage is:	3.0 hours	3.5 hours	5 hours	7.5 hours	8 hours	10 hours

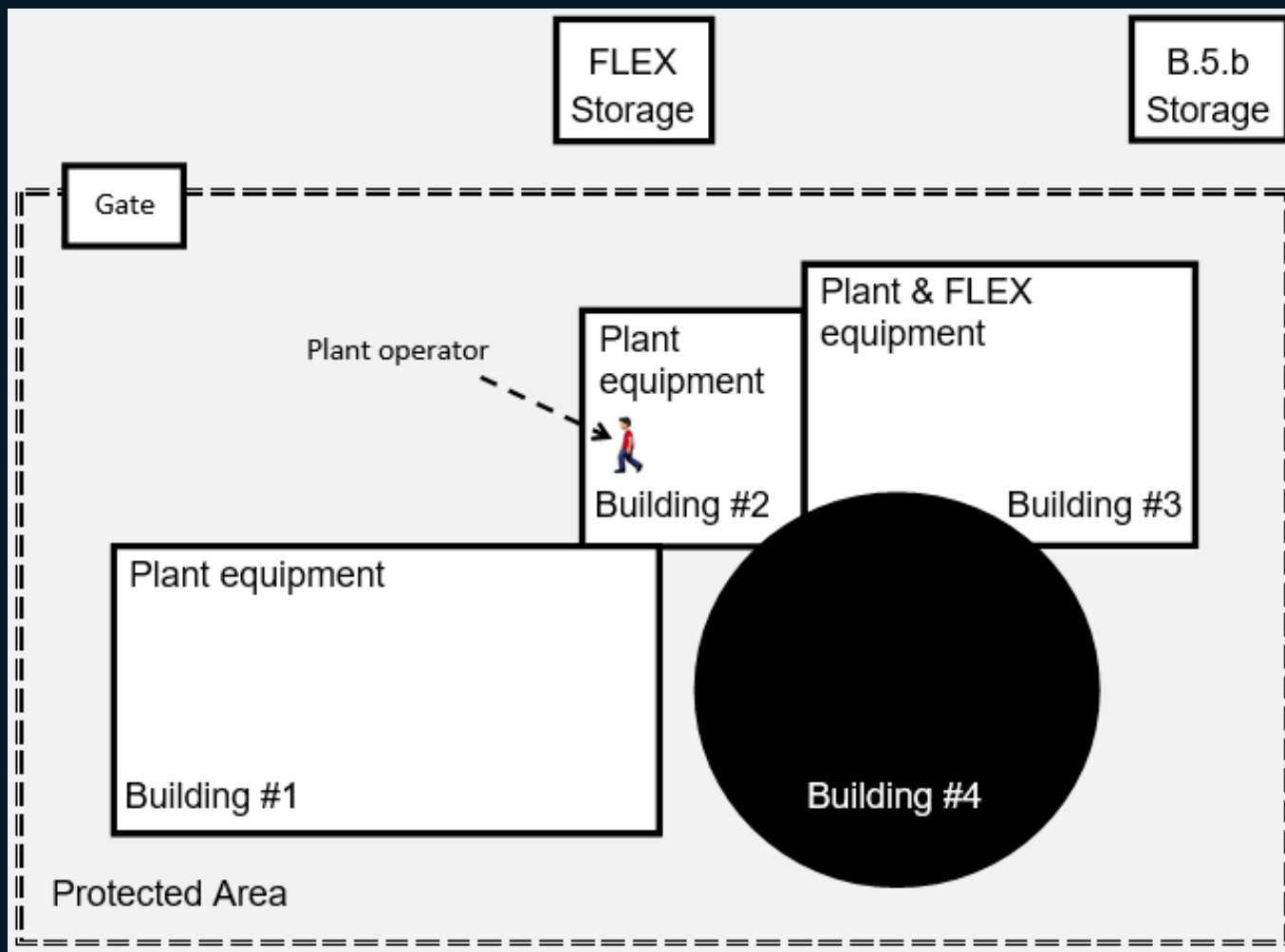
SBT



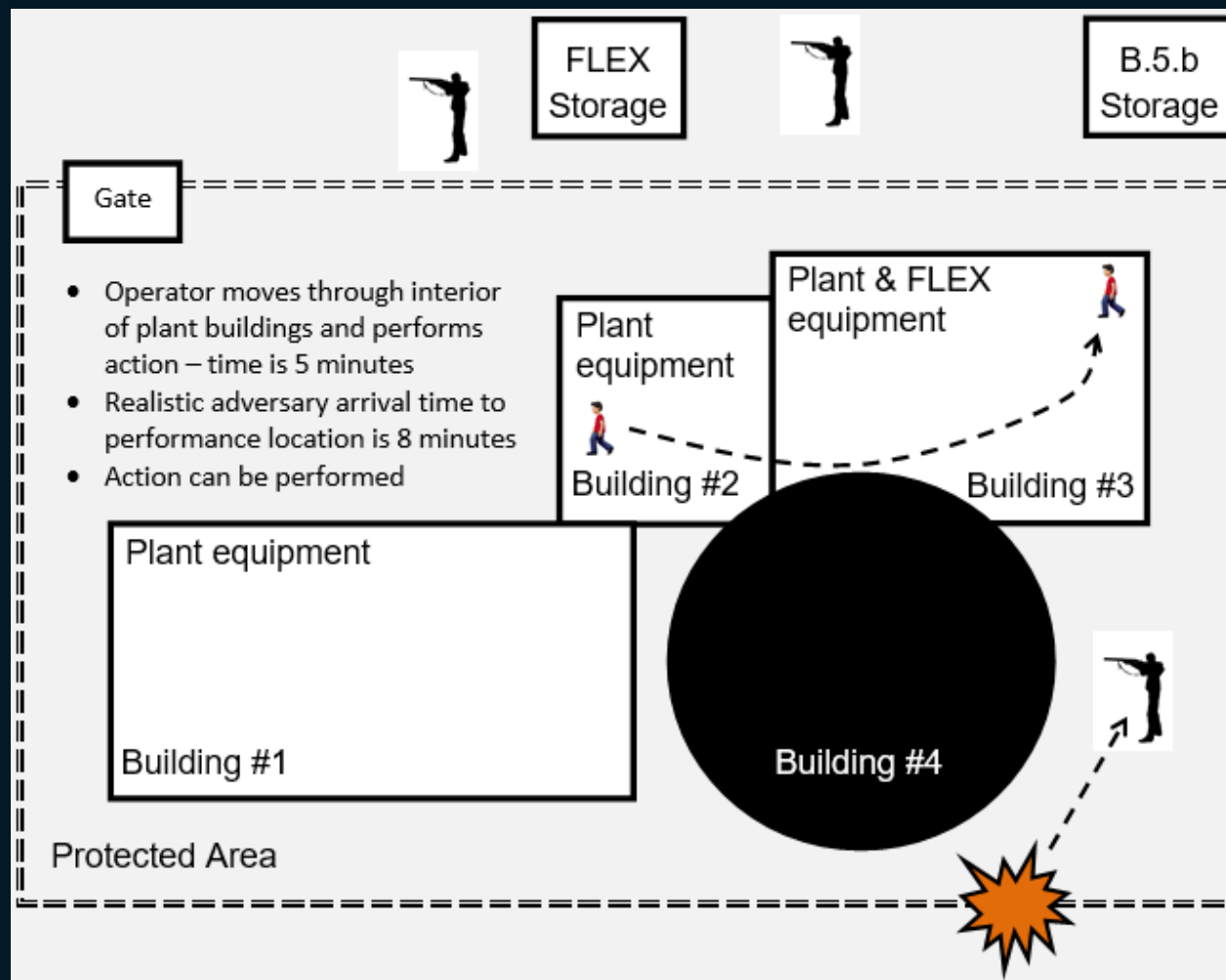
Questions / Discussion

Backup Slides

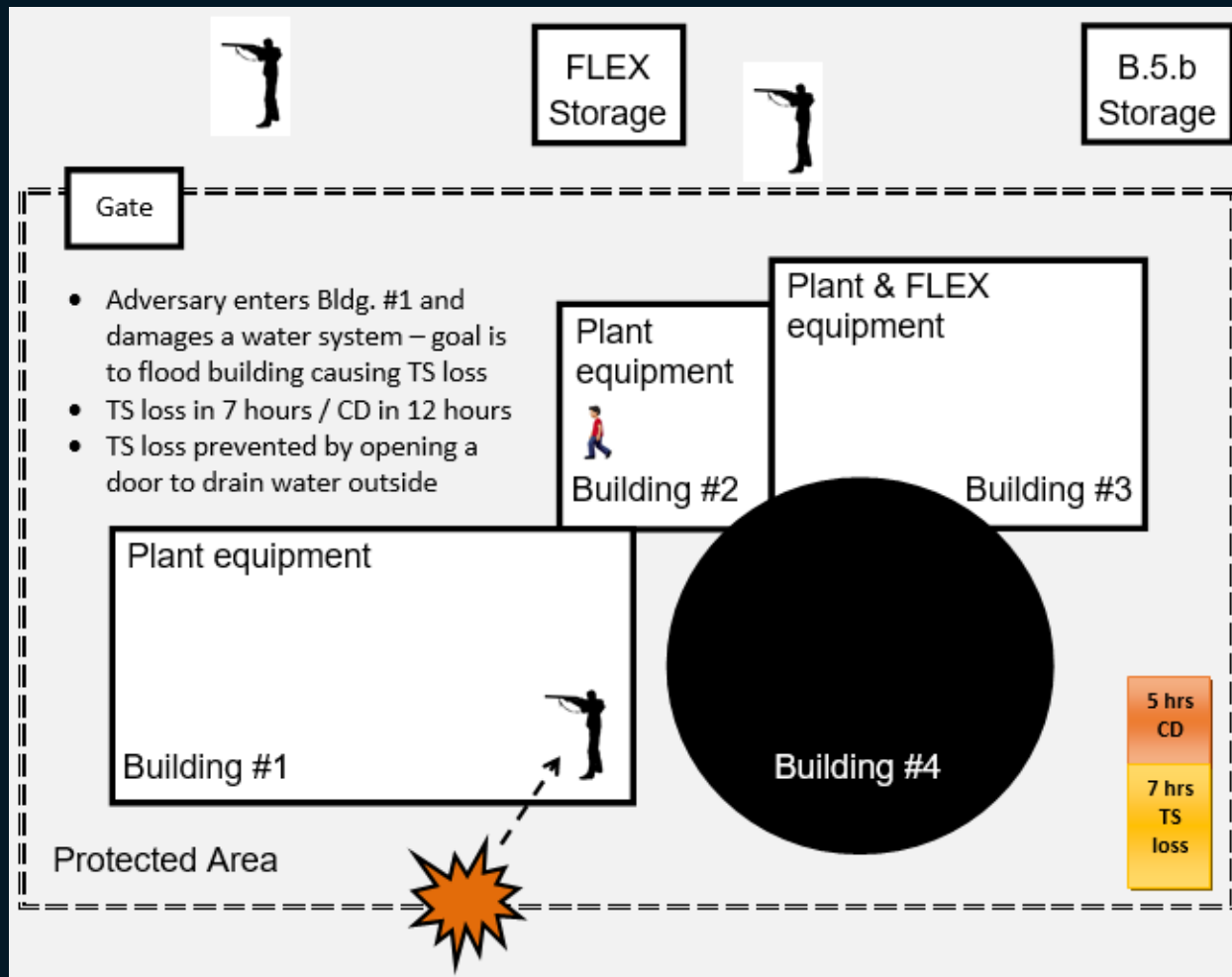
Detailed examples using the Lost Mesa Nuclear Power Plant



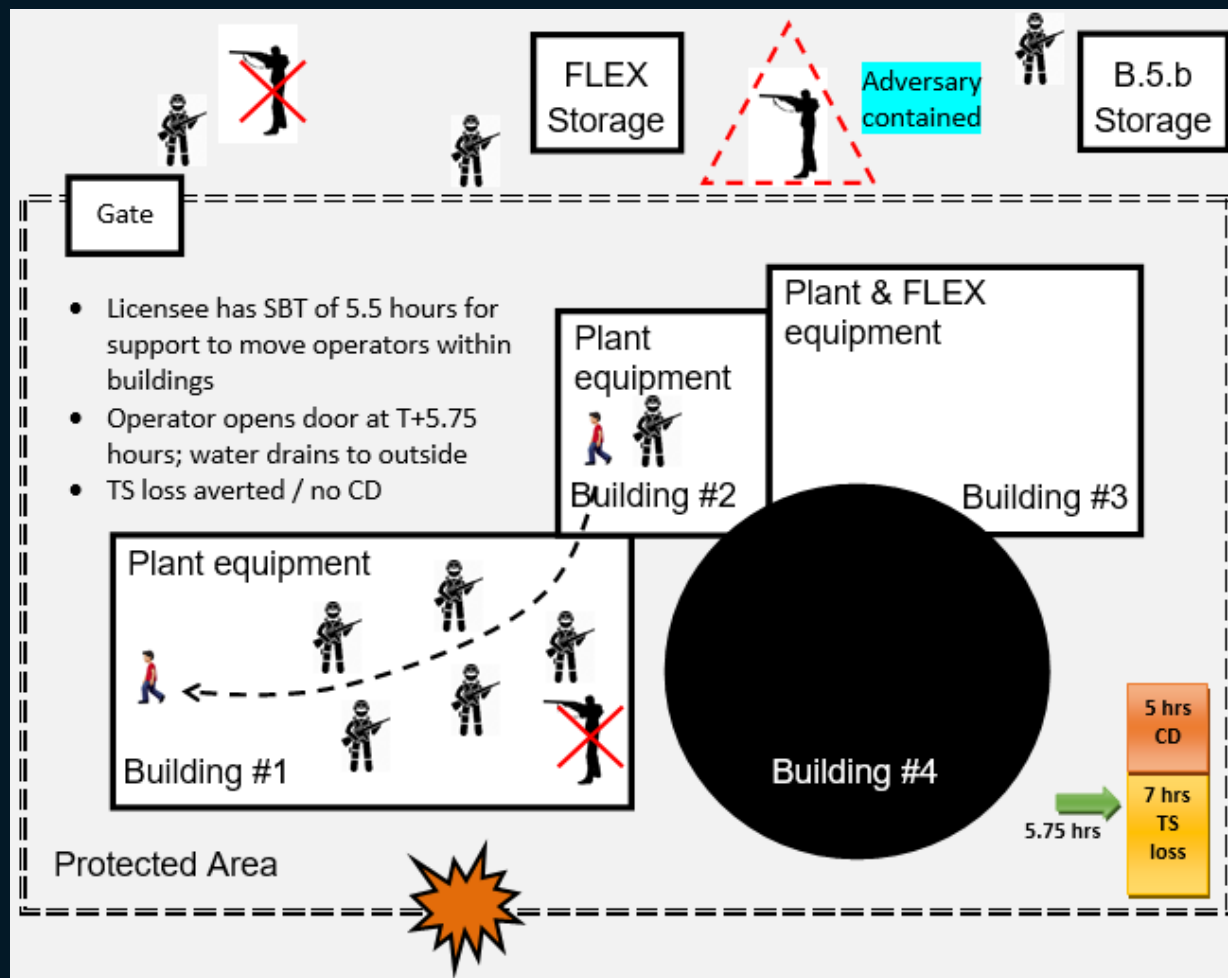
Operator action example at the Lost Mesa Nuclear Power Plant



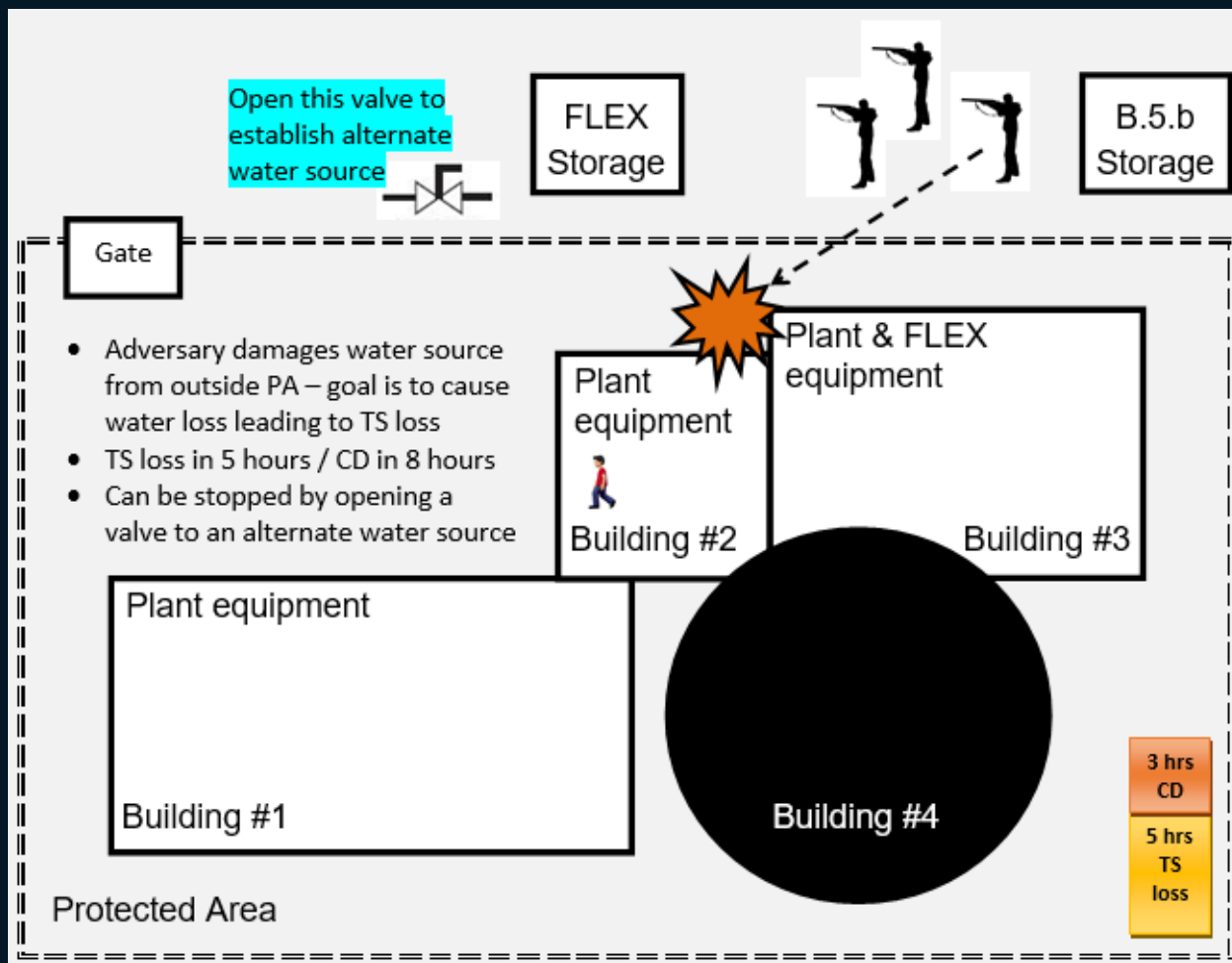
Mitigation action example #1 at the Lost Mesa Nuclear Power Plant



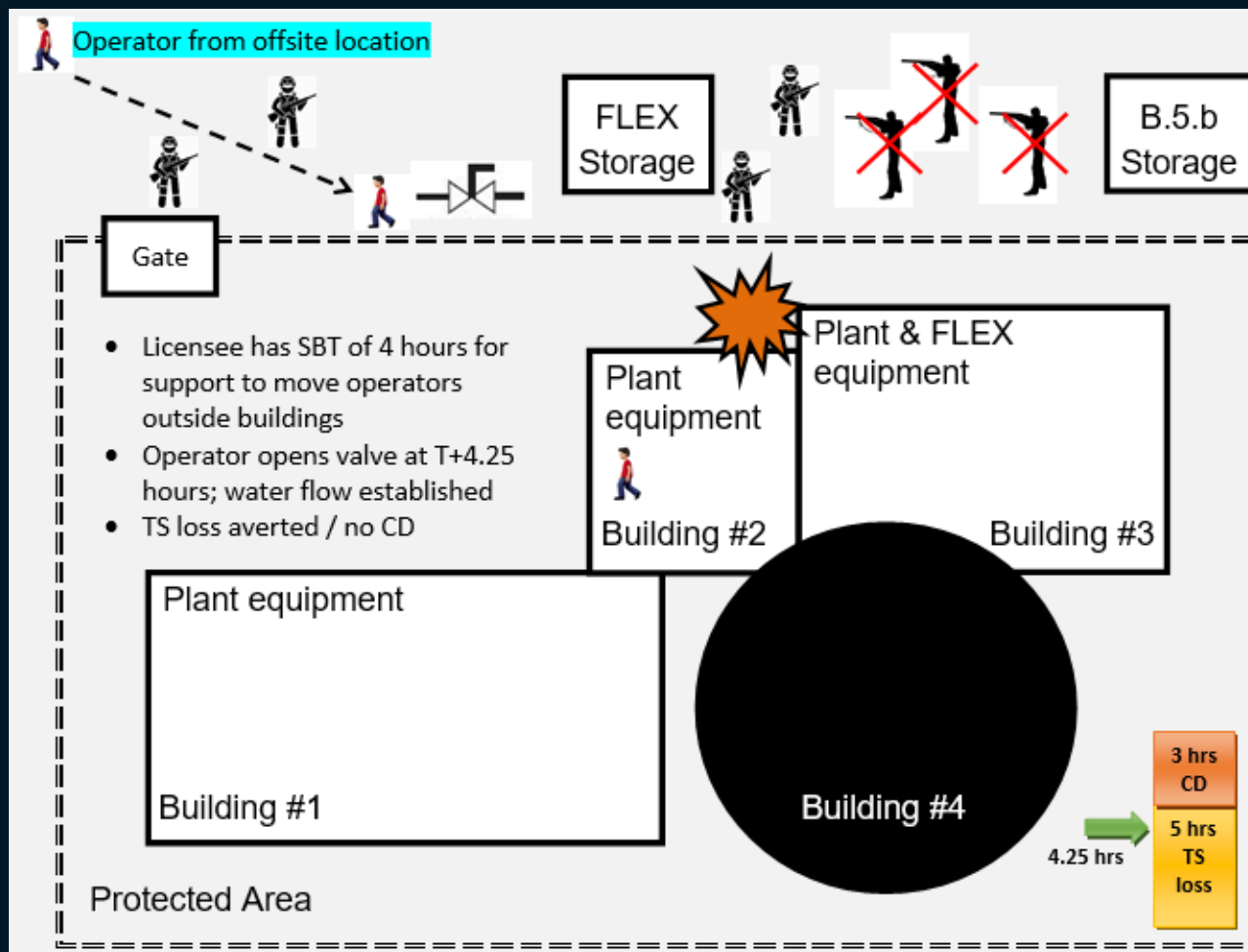
Mitigation action example #1 at the Lost Mesa Nuclear Power Plant



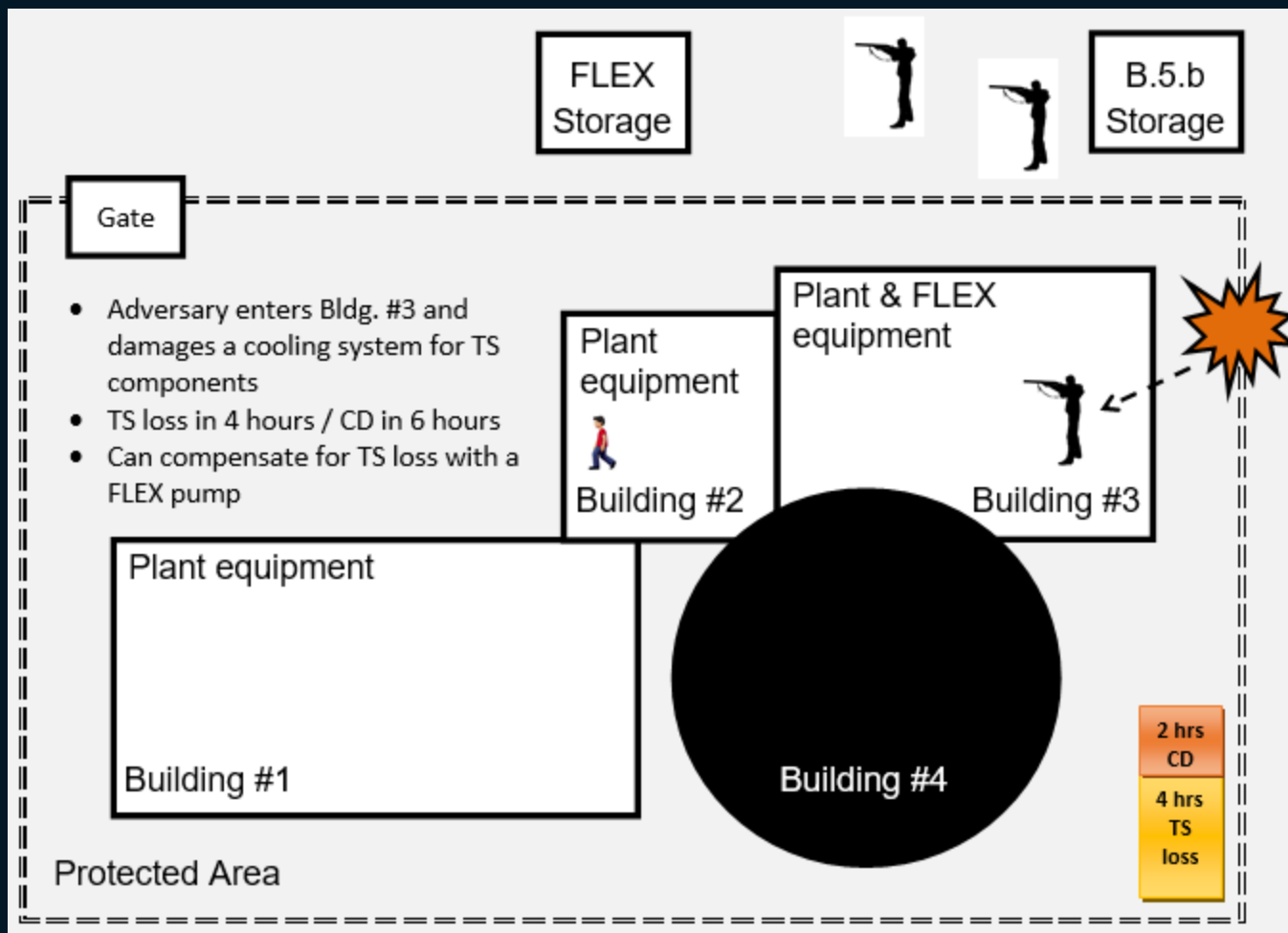
Mitigation action example #2 at the Lost Mesa Nuclear Power Plant



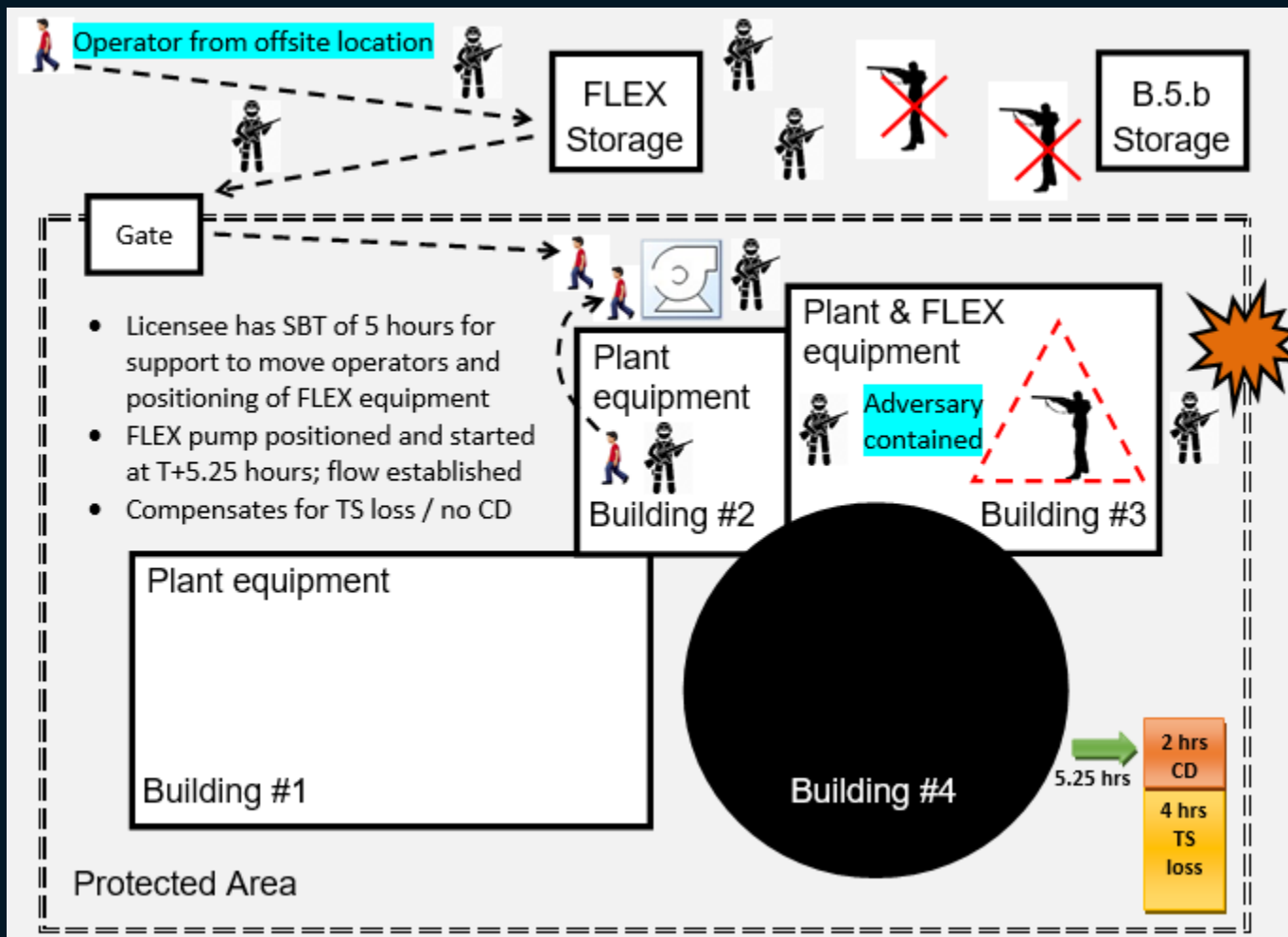
Mitigation action example #2 at the Lost Mesa Nuclear Power Plant



Mitigation action example #3 at the Lost Mesa Nuclear Power Plant



Mitigation action example #3 at the Lost Mesa Nuclear Power Plant



Change summary



Operator Action		Security Bounding Time and Mitigation Actions
Change	Revise RG 5.81 Criterion 3 to include suggested assessment criteria (FOF exercise performance, computer modeling, delay factors or location of the action relative to other target set equipment); make conforming changes to IP 71130.14	Revise RG 5.81 to identify Elements beyond the SBT as unattractive; make conforming changes to IP 71130.14
Impact	RG 5.81, Appendix A, Attribute 9	RG 5.81, Appendix A, Attributes 6 and 11; elements beyond SBT in TS's will become unattractive - move from Attribute 6 to 11 (or a new Attribute)
Benefits	Increase elements in TS's and reduce the number of standalone targets	Unattractive Elements will not require protection due to the capability to mitigate after SBT

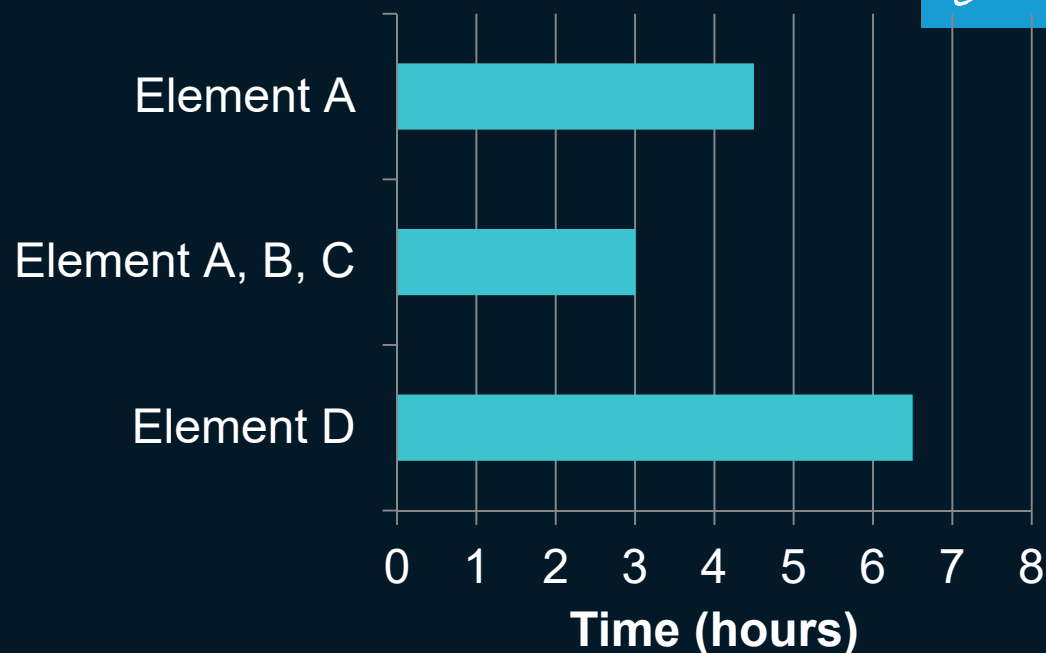
6. Target Set Equipment:

Element A **or** Element D
And
 Element B
And
 Element C

9. Credited Operator Actions and Damage Control Measures:

11. Additional Considerations:

Example 1 (current)



Primary TS Equipment	Alternate	Secondary Fuel
Elements A, B and C	Elements A	Fuel source for Element A (Component D)
$T_{CD} = 3$ hrs.	$T_{CD} = 4.5$ hrs.	$T_{CD} = 6.5$

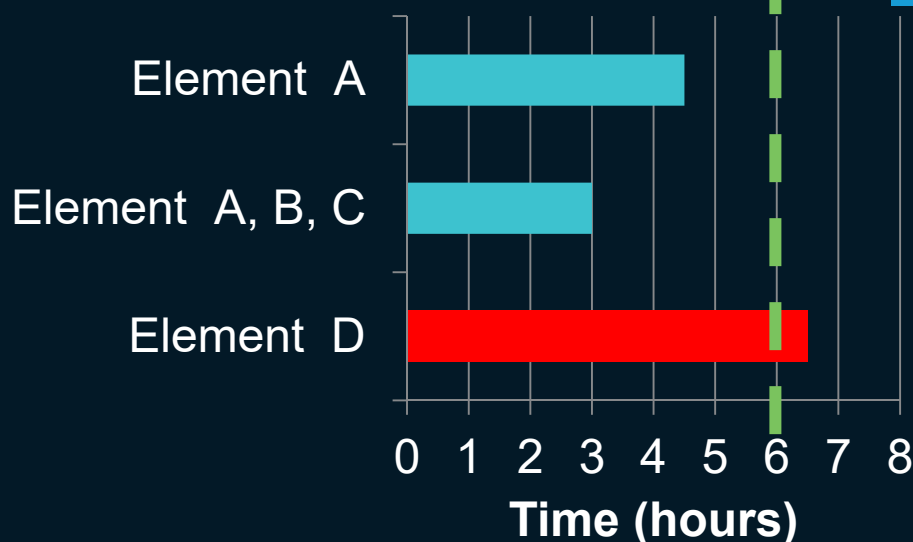
6. Target Set Equipment:

Element A ~~or Element D~~
And
 Element B
And
 Element C

9. Credited Operator Actions and Damage Control Measures:

11. Additional Considerations:
 Element D is mitigated by operator providing BDB pump. Damage control measure is credited because time to core damage is beyond SBT and operator has sufficient time to preform actions of placing BDB equipment in place.

Example 1 Mitigation Action (proposed)



Primary TS Equipment	Alternate	Secondary Fuel
Elements A, B and C	Element A	Fuel source for Element A (Element D)
$T_{CD} = 3$ hrs.	$T_{CD} = 4.5$ hrs.	$T_{CD} = 6.5$

RESULT: Protection for Element D no longer needed due to ability for operator to perform actions after SBT. Evaluate strategy for impacts.

6. Target Set Equipment:

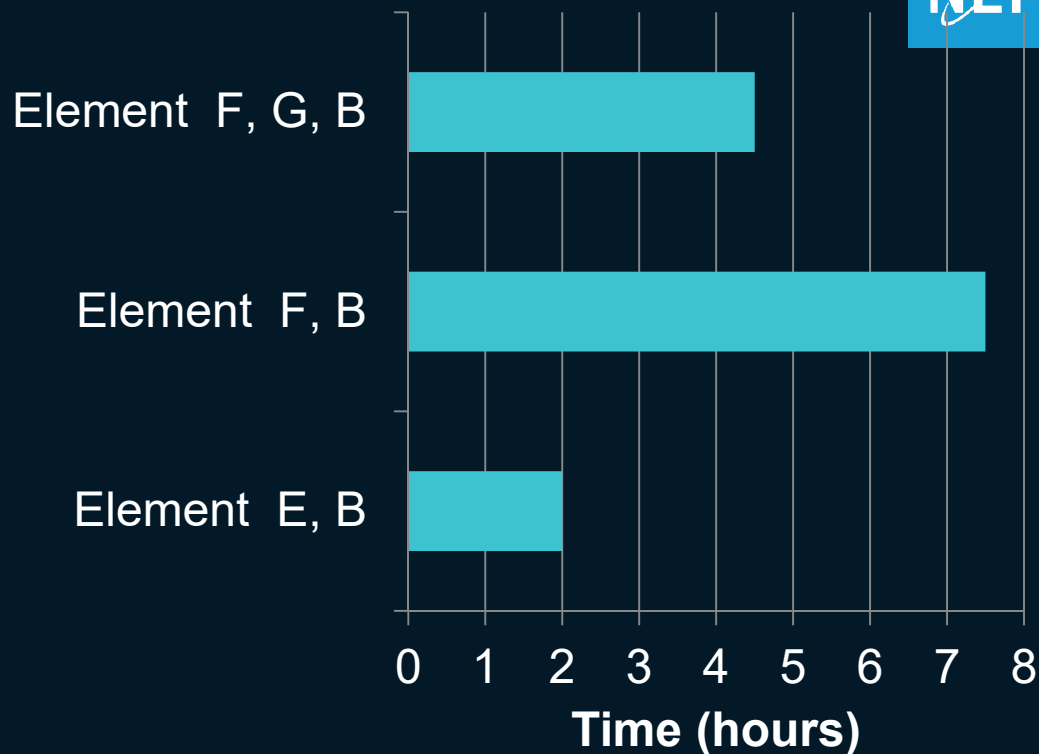
Element E or Element F
And
 Element B

9. Credited Operator Actions and
 Damage Control Measures:

11. Additional Considerations:

Time to core damage can be
 decreased by eliminating
 Element F and Element G

Example 2 (current)



Primary TS Equipment	Alternate	Secondary Flooding Effects
Elements E and B	Elements F, G and B	Flooding Element E
$T_{CD} = 2$ hrs.	$T_{CD} = 4.5$ hrs.	$T_{CD} = 7.5$

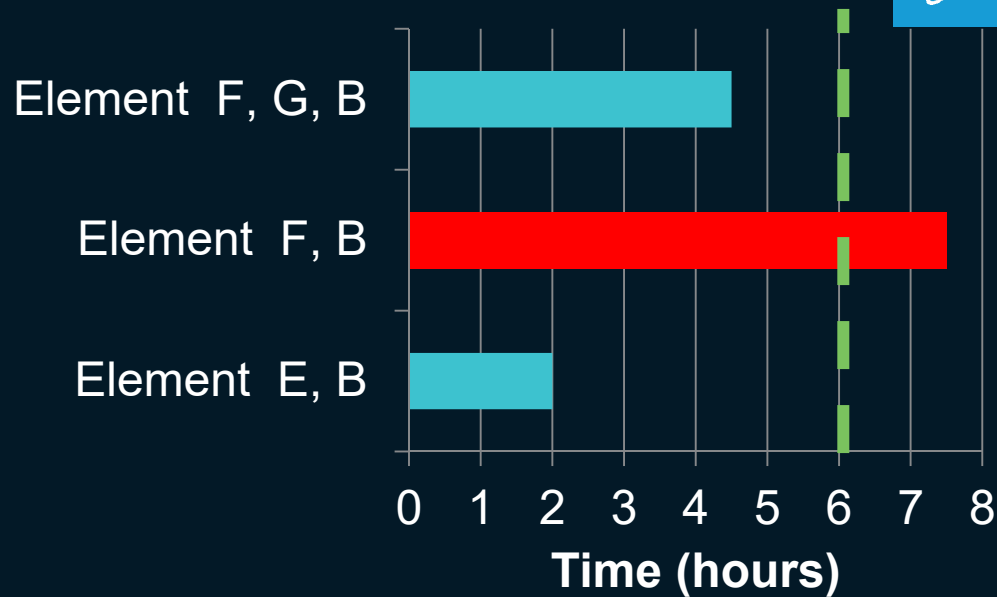
6. Target Set Equipment:

Element E
 Or
 Element F and Element G
 And
 Element B

9. Credited Operator Actions and Damage Control Measures:

11. Additional Considerations:
 Element F is mitigated by operator closing valve in PA yard. Damage control measure is credited because time to core damage is beyond SBT and operator has sufficient time to preform actions of closing valve in PA yard.

Example 2 Mitigation Action (proposed)



Primary TS Equipment	Alternate	Secondary Flooding Effects
Elements E and B	Elements F, G and B	Flooding Element E
$T_{CD} = 2$ hrs.	$T_{CD} = 4.5$ hrs.	$T_{CD} = 7.5$

RESULT: Protection for Ele. F not needed due to operator actions after SBT; however Ele. G will need protection if Ele. F protection is removed. Evaluate strategy for impacts.