

**R-504B**

**GE BWR/4 Advanced Technology  
Introduction**

**Chapter 1.0**

# Introductions

BWR Instructors and TTC Staff

Students

# Course Outline

## Course Schedule Provided

- Transient Analysis
- Technical Specifications
- Technical Issues
- BWR Differences
- Industry Events

# Course Outline

## Electronically Provided:

- R 504B Manual Chapters (Adobe and Word)
- Standard Technical Specifications
- Technical Specification Bases
- ADM-01, Conduct of Operations
- EPIP-01, Emergency Action Levels
- Reference Material
  - R-304B Manual
  - NUREG 1022 (Reportability)
  - IMC 0326 (Operability)

# Course Outline

## Handouts Provided:

- Student Handout
  - Objectives and Figures from each chapter
  - Blank Transient Graphs
- Sample questions
- TS Lecture Open-ended Questions
- Annotated Transient Graphs (following each lecture)
- Instructor Feedback

# What's on the exam?

## 50 Multiple Choice Questions

- Transients (36%)
- Technical Specifications (24%)
- BWR Differences (4%)
- Technical Issues (36%  $\approx$  1/hr lecture):
  - Industry Issues: Service Water, Instrument Air, Shutdown problems, Power Oscillations, IGSCC
  - Regulatory Issues: ATWS, SBO, Emergency Plan, Operability, Reportability

# What's Available for the Exam?

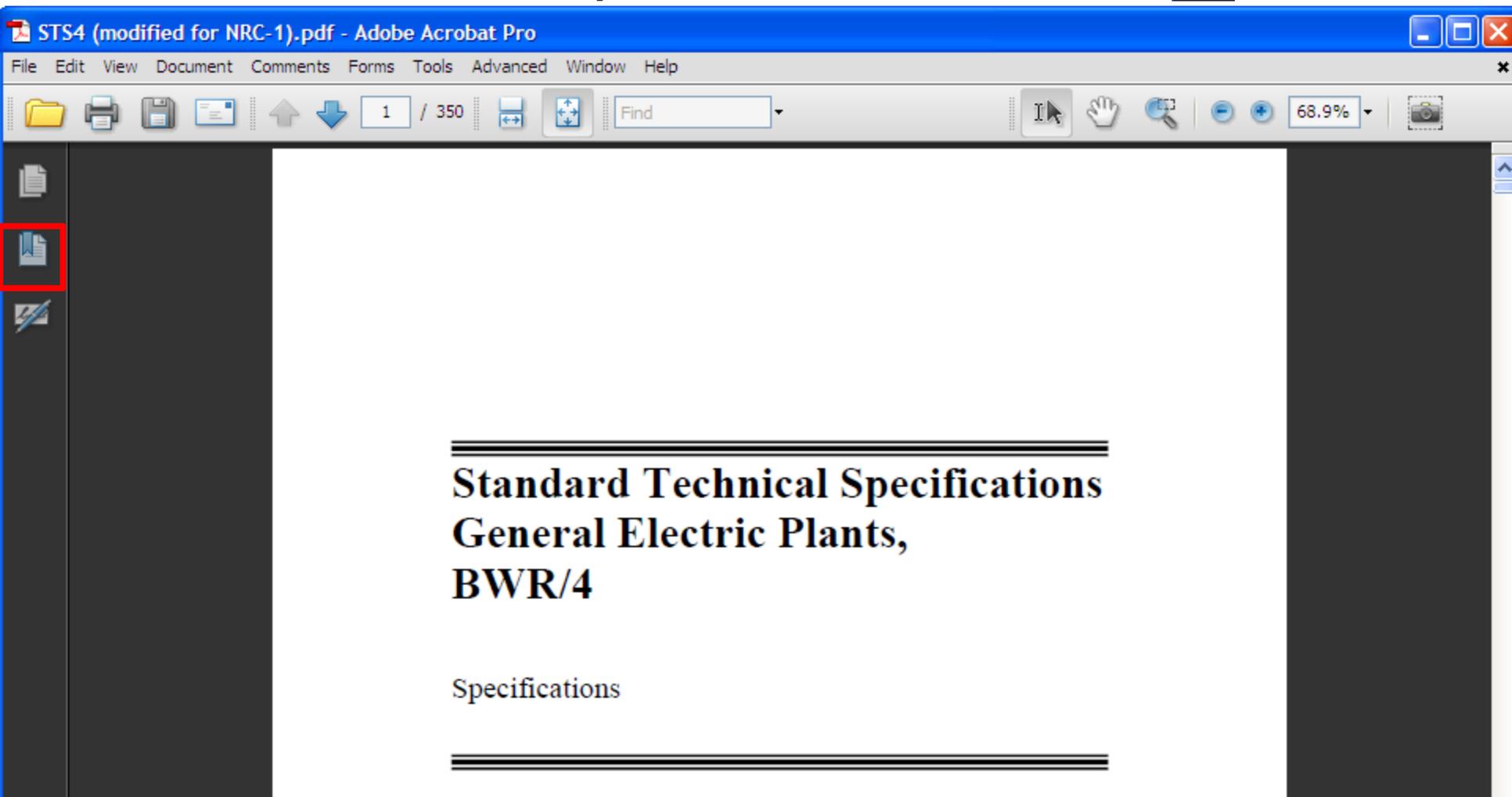
- Standard Technical Specifications/Bases
- Transient Package:
  - Setpoint table
  - Power to Flow Map
  - Balance of Plant
  - Pressure (RPV/Steam Line) versus Power
  - FWLC
  - EHC
  - RFC
- ADM-01, Conduct of Operations
- EPIP-01, Emergency Action Level Matrix

# Exam Reference Files

- These exam references are in a separate folder on the Acer desktop.
- Password protected
- Can't access student files
- Exam proctors will be monitoring for their use during the exam
- No other files will be opened during the exam

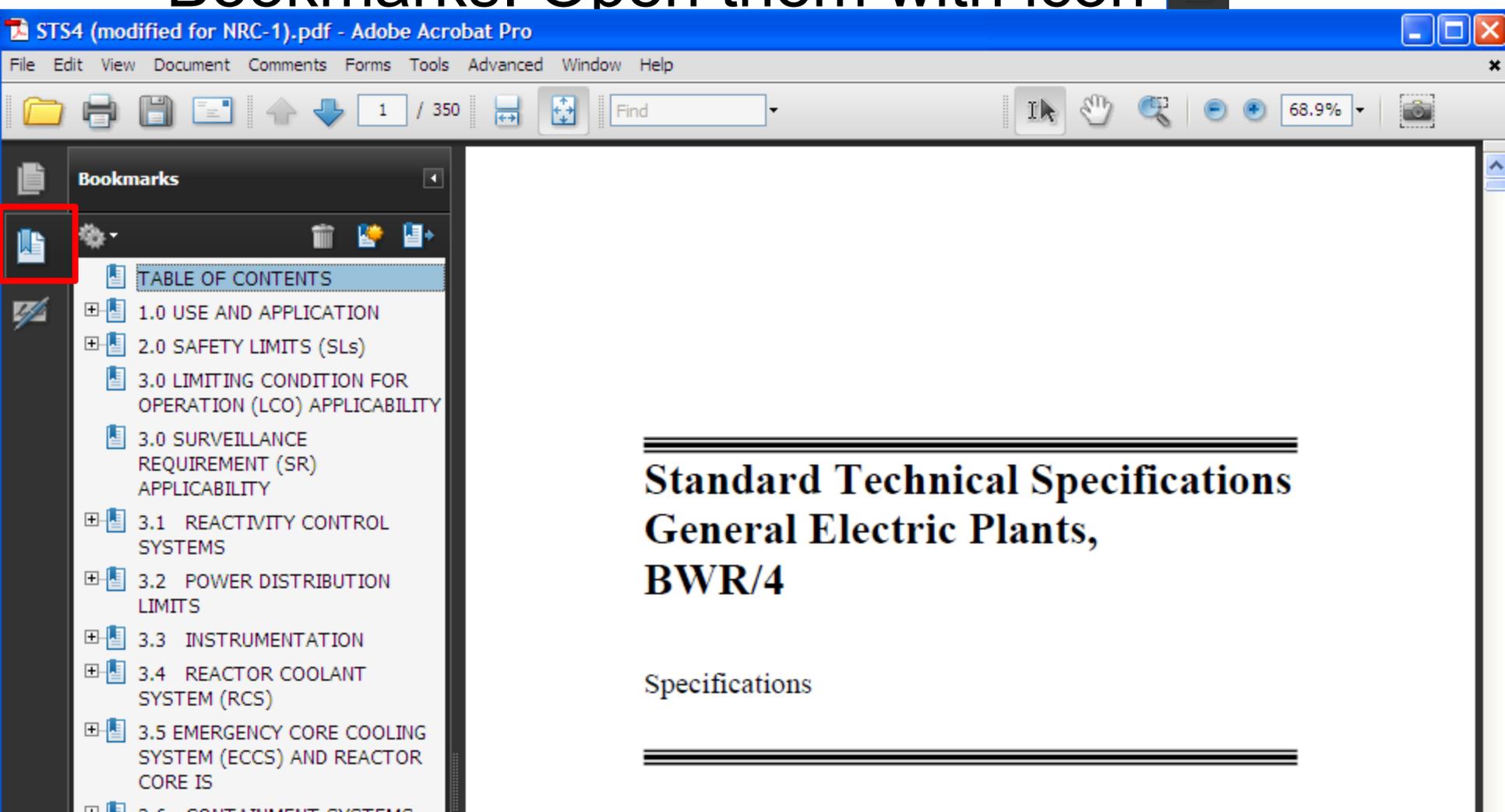
# The Beauty of Electronic References

- Bookmarks: Open them with icon 



# The Beauty of Electronic References

- Bookmarks: Open them with icon 



The screenshot displays the Adobe Acrobat Pro interface. The title bar shows the document name "STS4 (modified for NRC-1).pdf". The menu bar includes File, Edit, View, Document, Comments, Forms, Tools, Advanced, Window, and Help. The toolbar contains various icons for file operations and navigation. The left sidebar is titled "Bookmarks" and contains a list of document sections, each with a document icon. The "TABLE OF CONTENTS" bookmark is highlighted. The main content area shows the title "Standard Technical Specifications General Electric Plants, BWR/4" and the word "Specifications" below it, separated by horizontal lines.

File Edit View Document Comments Forms Tools Advanced Window Help

1 / 350 Find 68.9%

**Bookmarks**

- TABLE OF CONTENTS
- 1.0 USE AND APPLICATION
- 2.0 SAFETY LIMITS (SLs)
- 3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY
- 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY
- 3.1 REACTIVITY CONTROL SYSTEMS
- 3.2 POWER DISTRIBUTION LIMITS
- 3.3 INSTRUMENTATION
- 3.4 REACTOR COOLANT SYSTEM (RCS)
- 3.5 EMERGENCY CORE COOLING SYSTEM (ECCS) AND REACTOR CORE IS
- 3.6 CONTAINMENT SYSTEMS

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## Standard Technical Specifications General Electric Plants, BWR/4

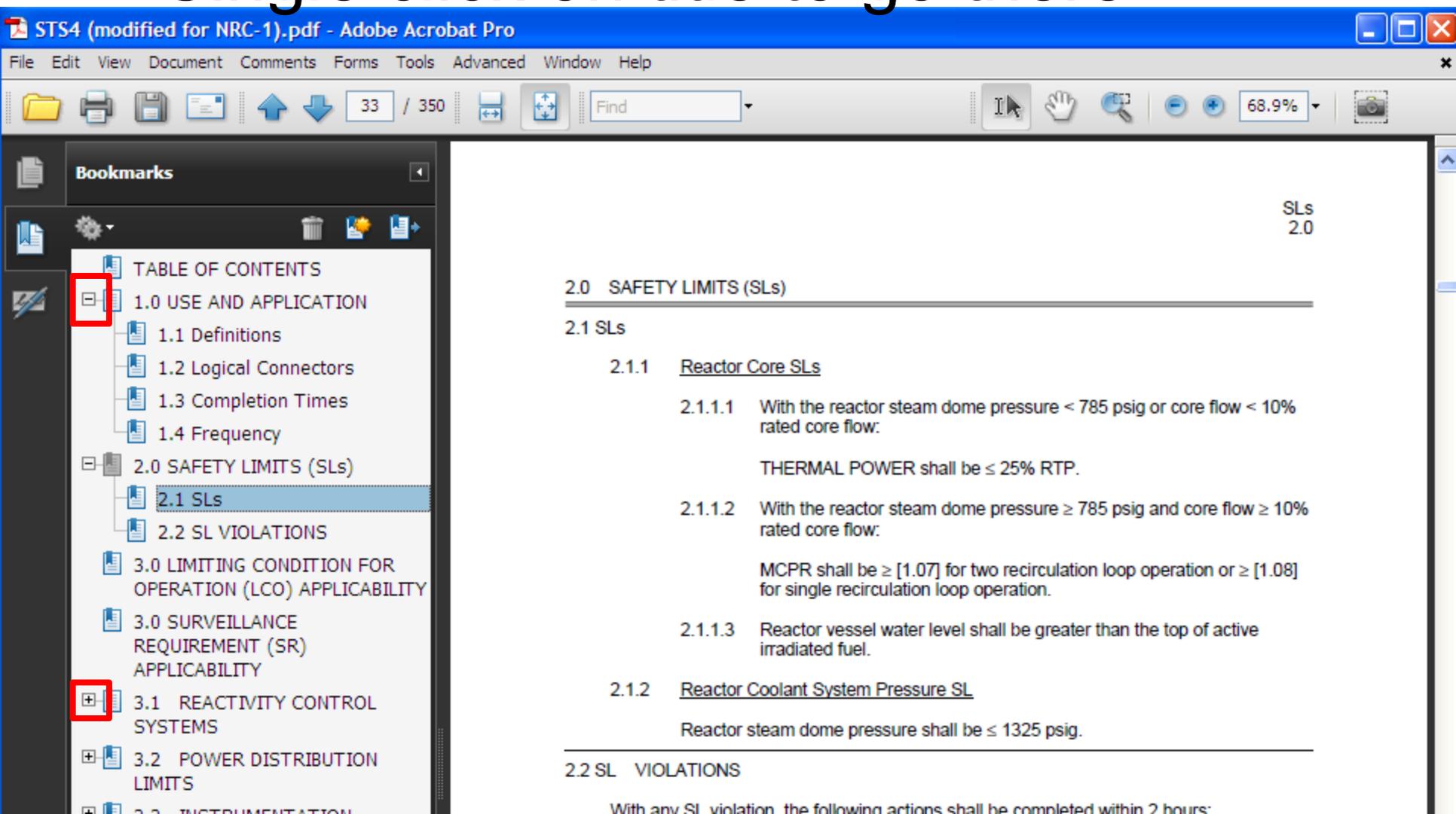
Specifications

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# Bookmarks:

Can expand  or collapse List   
Single click on title to go there



The screenshot shows the Adobe Acrobat Pro interface. The main window displays a PDF document titled "STS4 (modified for NRC-1).pdf". The left sidebar contains a "Bookmarks" panel with a tree view of the document's structure. The right pane shows the document content, which is a table of contents for "SAFETY LIMITS (SLs)".

**Bookmarks Panel (Left):**

- TABLE OF CONTENTS
- 1.0 USE AND APPLICATION
  - 1.1 Definitions
  - 1.2 Logical Connectors
  - 1.3 Completion Times
  - 1.4 Frequency
- 2.0 SAFETY LIMITS (SLs) (Expanded)
  - 2.1 SLs (Selected)
  - 2.2 SL VIOLATIONS
- 3.0 LIMITING CONDITION FOR OPERATION (LCO) APPLICABILITY
- 3.0 SURVEILLANCE REQUIREMENT (SR) APPLICABILITY
- 3.1 REACTIVITY CONTROL SYSTEMS
- 3.2 POWER DISTRIBUTION LIMITS
- 3.3 INSTRUMENTATION

**Document Content (Right):**

SLs  
2.0

## 2.0 SAFETY LIMITS (SLs)

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### 2.1 SLs

#### 2.1.1 Reactor Core SLs

2.1.1.1 With the reactor steam dome pressure < 785 psig or core flow < 10% rated core flow:  
THERMAL POWER shall be ≤ 25% RTP.

2.1.1.2 With the reactor steam dome pressure ≥ 785 psig and core flow ≥ 10% rated core flow:  
MCPR shall be ≥ [1.07] for two recirculation loop operation or ≥ [1.08] for single recirculation loop operation.

2.1.1.3 Reactor vessel water level shall be greater than the top of active irradiated fuel.

#### 2.1.2 Reactor Coolant System Pressure SL

Reactor steam dome pressure shall be ≤ 1325 psig.

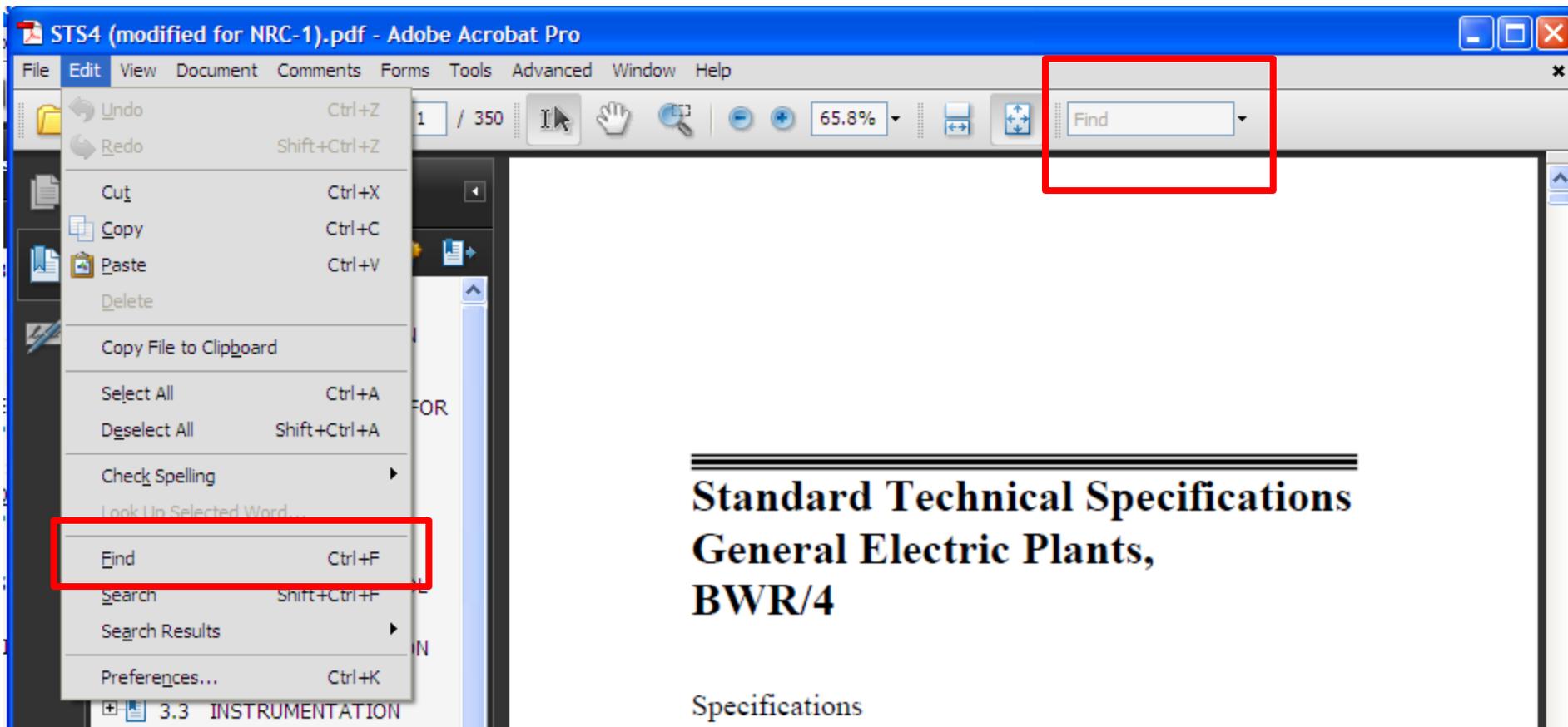
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### 2.2 SL VIOLATIONS

With any SL violation, the following actions shall be completed within 2 hours:

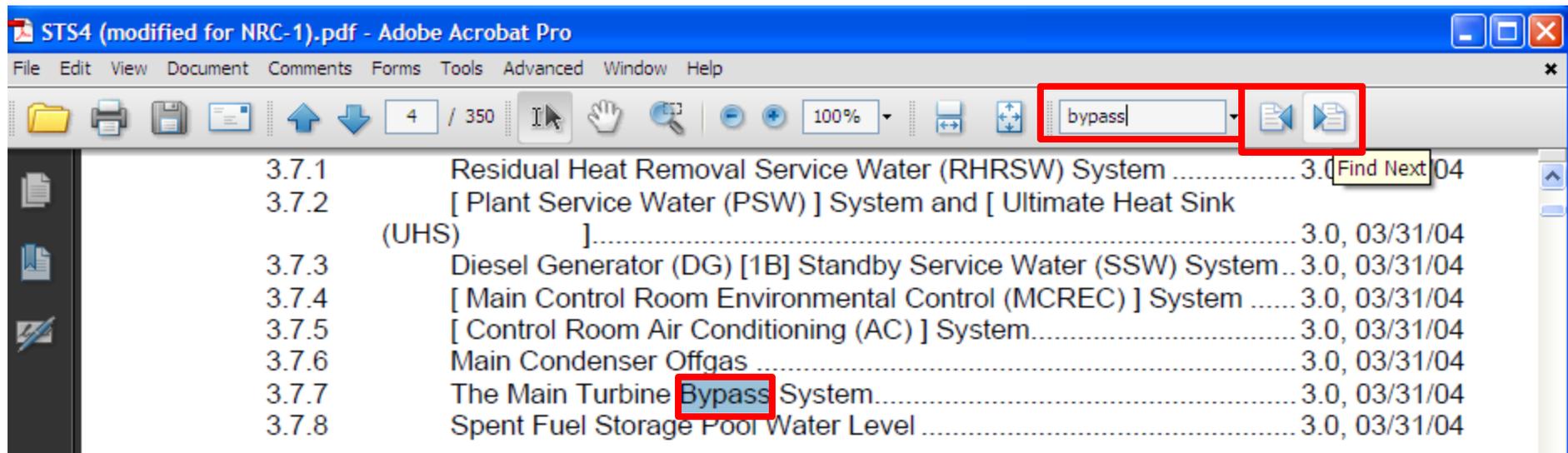
# The Beauty of Electronic References

- FIND Function: Tool Bar or under Edit



# The Beauty of Electronic References

- FIND Function: Type in word(s) to find
- Use icons  to find previous or  to find next
- Word highlighted in document



STS4 (modified for NRC-1).pdf - Adobe Acrobat Pro

File Edit View Document Comments Forms Tools Advanced Window Help

4 / 350 100%

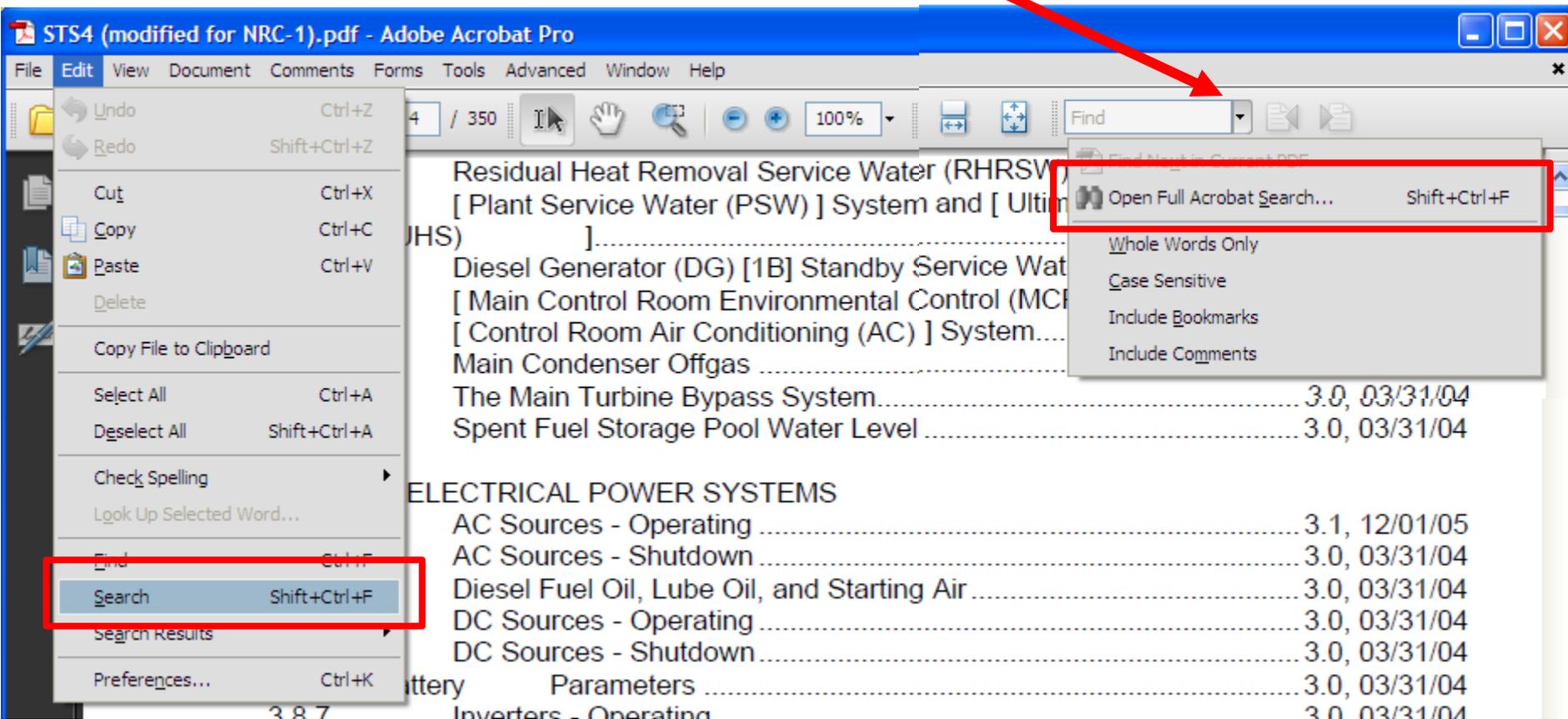
bypass

Find Next

3.7.1	Residual Heat Removal Service Water (RHRSW) System .....	3.0, 03/31/04
3.7.2	[ Plant Service Water (PSW) ] System and [ Ultimate Heat Sink (UHS) ] .....	3.0, 03/31/04
3.7.3	Diesel Generator (DG) [1B] Standby Service Water (SSW) System ..	3.0, 03/31/04
3.7.4	[ Main Control Room Environmental Control (MCREC) ] System .....	3.0, 03/31/04
3.7.5	[ Control Room Air Conditioning (AC) ] System .....	3.0, 03/31/04
3.7.6	Main Condenser Offgas .....	3.0, 03/31/04
3.7.7	The Main Turbine <b>Bypass</b> System .....	3.0, 03/31/04
3.7.8	Spent Fuel Storage Pool Water Level .....	3.0, 03/31/04

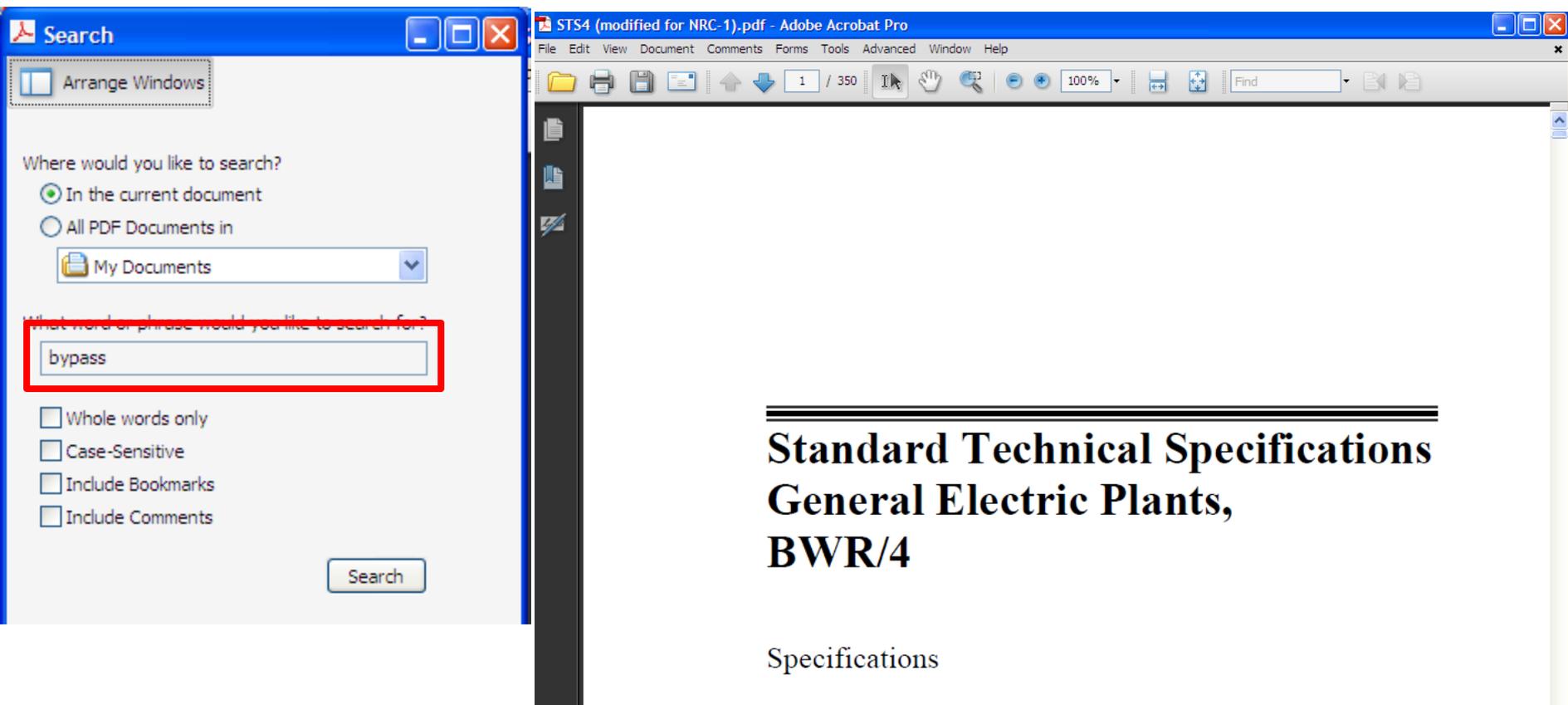
# The Beauty of Electronic References

- Search Function: Tool Bar or under Edit



# The Beauty of Electronic References

- Search Function: Opens a separate Search Window, enter word(s) to search



# The Beauty of Electronic References

- Search Function: Search Results displayed

The screenshot shows the Adobe Acrobat Pro interface with a search window open. The search window displays the following information:

- Looking For: **bypass in the current document**
- Results: **1 documents with 40 instances**
- Buttons: Arrange Windows, New Search

The search results are displayed in a list view, showing the following entries:

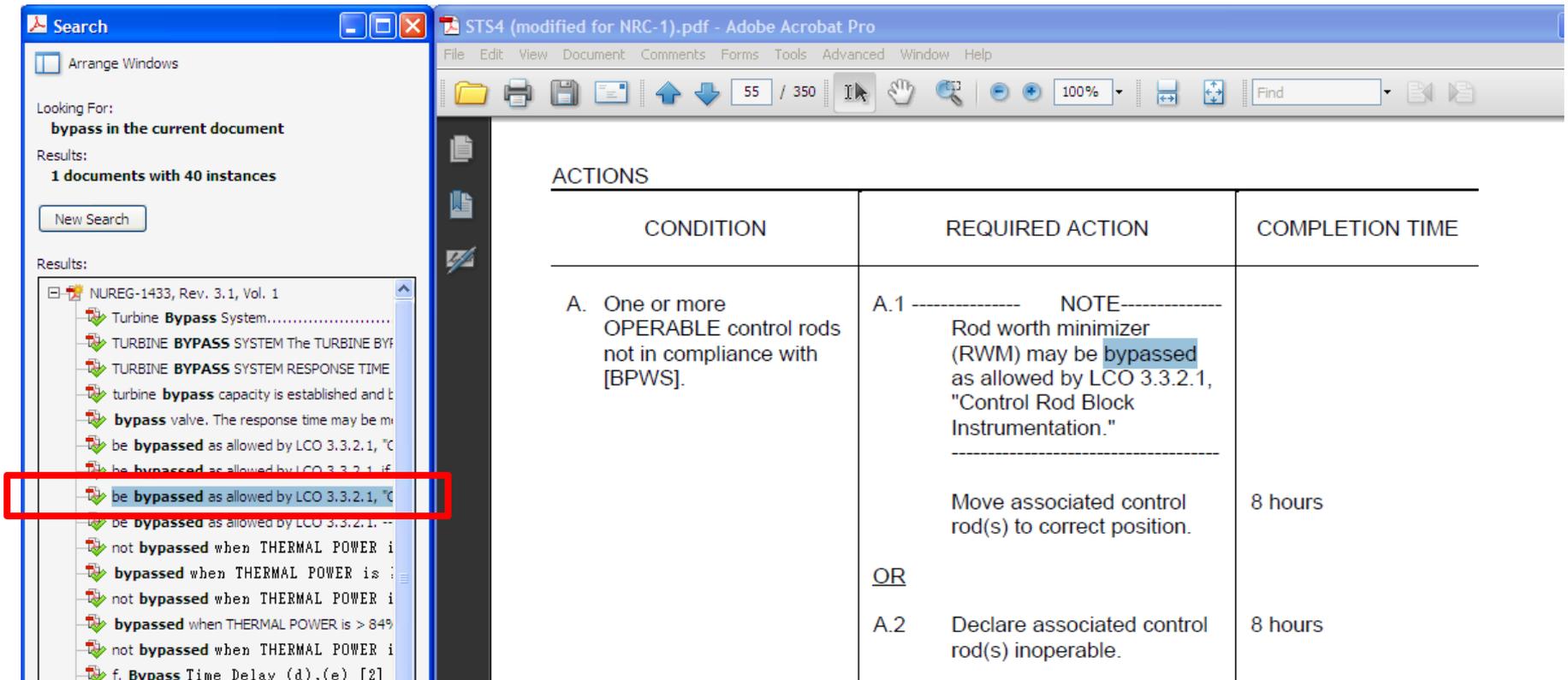
- NUREG-1433, Rev. 3.1, Vol. 1
  - Turbine **Bypass** System.....
  - TURBINE **BYPASS** SYSTEM The TURBINE BY
  - TURBINE **BYPASS** SYSTEM RESPONSE TIME
  - turbine **bypass** capacity is established and
  - bypass** valve. The response time may be n
  - be **bypassed** as allowed by LCO 3.3.2.1, "
  - be **bypassed** as allowed by LCO 3.3.2.1, it
  - be **bypassed** as allowed by LCO 3.3.2.1, "
  - be **bypassed** as allowed by LCO 3.3.2.1. -
  - not **bypassed** when THERMAL POWER
  - bypassed** when THERMAL POWER is
  - not **bypassed** when THERMAL POWER
  - bypassed** when THERMAL POWER is > 84'
  - not **bypassed** when THERMAL POWER
  - f. **Bypass** Time Delay (d),(e) [2]
  - not **bypassed** when THERMAL POWER

The main document window shows the following table of contents:

TABLE OF CONTENTS / REVISION SUMMARY		Revision - Date
3.6	CONTAINMENT SYSTEMS (continued)	
3.6.3.3	Containment Atmosphere Dilution (CAD) System .....	3.0, 03/31/04
3.6.4.1	[ Secondary ] Containment .....	3.0, 03/31/04
3.6.4.2	Secondary Containment Isolation Valves (SCIVs) .....	3.0, 03/31/04
3.6.4.3	Standby Gas Treatment (SGT) System.....	3.0, 03/31/04
3.7	PLANT SYSTEMS	
3.7.1	Residual Heat Removal Service Water (RHRSW) System .....	3.0, 03/31/04
3.7.2	[ Plant Service Water (PSW) ] System and [ Ultimate Heat Sink (UHS) ] .....	3.0, 03/31/04
3.7.3	Diesel Generator (DG) [1B] Standby Service Water (SSW) System ..	3.0, 03/31/04
3.7.4	[ Main Control Room Environmental Control (MCREC) ] System .....	3.0, 03/31/04
3.7.5	[ Control Room Air Conditioning (AC) ] System.....	3.0, 03/31/04
3.7.6	Main Condenser Offgas .....	3.0, 03/31/04
3.7.7	The Main Turbine <b>Bypass</b> System.....	3.0, 03/31/04
3.7.8	Spent Fuel Storage Pool Water Level .....	3.0, 03/31/04

# The Beauty of Electronic References

- Search Function: Can quickly go to each hit



The screenshot shows a search window on the left and a PDF document on the right. The search window displays the following results:

Looking For:  
bypass in the current document

Results:  
1 documents with 40 instances

New Search

Results:

- NUREG-1433, Rev. 3.1, Vol. 1
  - Turbine Bypass System.....
  - TURBINE BYPASS SYSTEM The TURBINE BYF
  - TURBINE BYPASS SYSTEM RESPONSE TIME
  - turbine bypass capacity is established and t
  - bypass valve. The response time may be m
  - be bypassed as allowed by LCO 3.3.2.1, "C
  - be bypassed as allowed by LCO 3.3.2.1, if
  - be bypassed as allowed by LCO 3.3.2.1, "C
  - be bypassed as allowed by LCO 3.3.2.1, --
  - not bypassed when THERMAL POWER i
  - bypassed when THERMAL POWER is :
  - not bypassed when THERMAL POWER i
  - bypassed when THERMAL POWER is > 849
  - not bypassed when THERMAL POWER i
  - f. Bypass Time Delay (d),(e) [2]

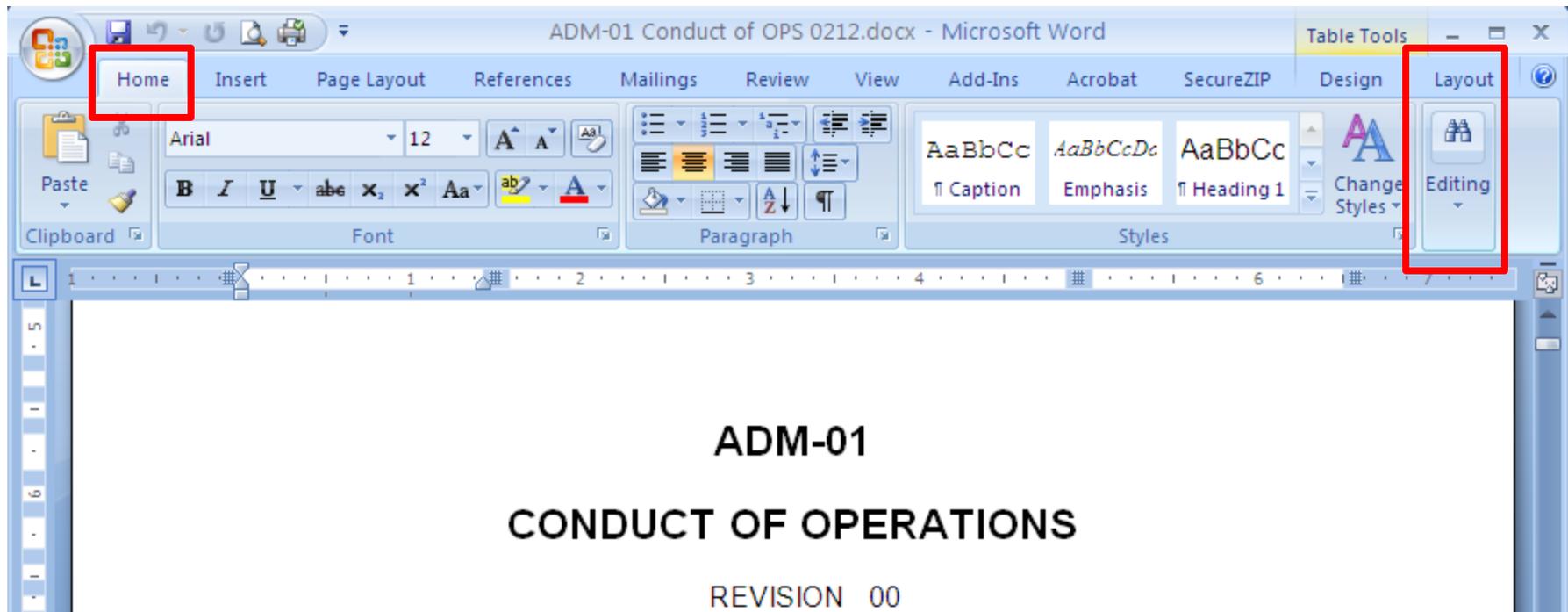
The main window shows a table titled "ACTIONS" with the following content:

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more OPERABLE control rods not in compliance with [BPWS].	<p>A.1 ----- NOTE----- Rod worth minimizer (RWM) may be bypassed as allowed by LCO 3.3.2.1, "Control Rod Block Instrumentation."</p> <p>Move associated control rod(s) to correct position.</p> <p>OR</p> <p>A.2 Declare associated control rod(s) inoperable.</p>	8 hours

# The Beauty of Electronic References

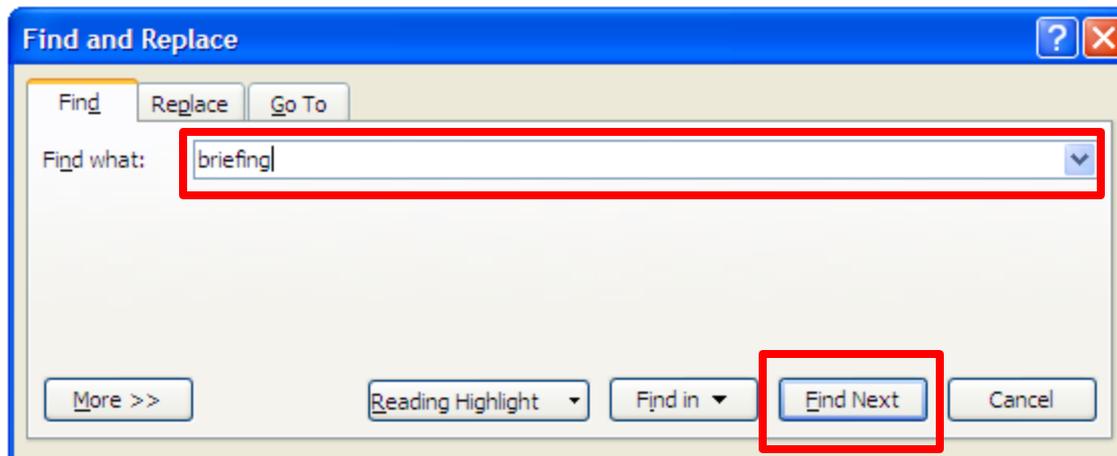
## Word Documents

- On the Home tab, Editing select the Find function. A separate window opens



# The Beauty of Electronic References

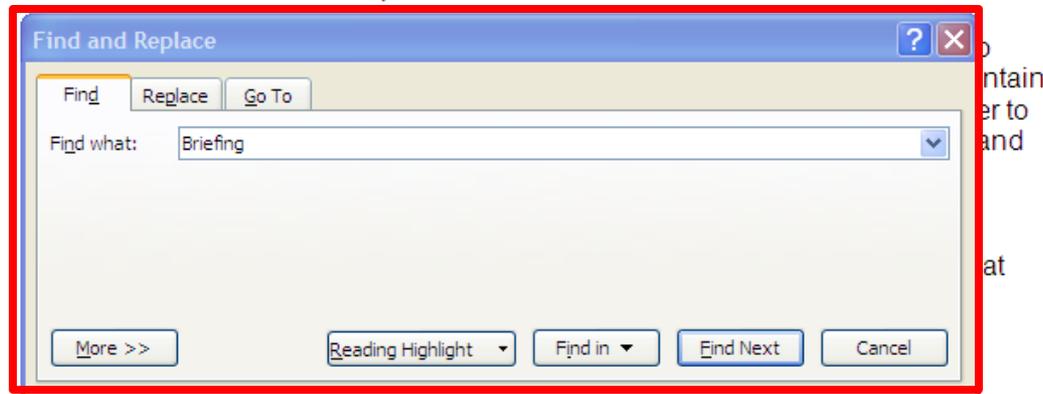
- Enter the word(s) to find
- Hit the Find Next button



# The Beauty of Electronic References

- Find window stays open and word is highlighted
- Hit Find Next to find next occurrence

## B.3 Main Control Room Atmosphere and Professionalism



- Maintain a business-like approach (i.e., “rigor and formality”) to assigned duties.
- Non-work related discussions are minimized to reduce interference with the conduct of shift activities and monitoring of station parameters.
- Only personnel on official business are allowed in the control room
- Noise level will be maintained at reasonable volume to ensure adequate communications and to avoid distractions to the operators.
- Briefings (other than reactively **briefings** or transient briefs) shall be conducted outside the control room.



# Course Administration

# Basic Rules

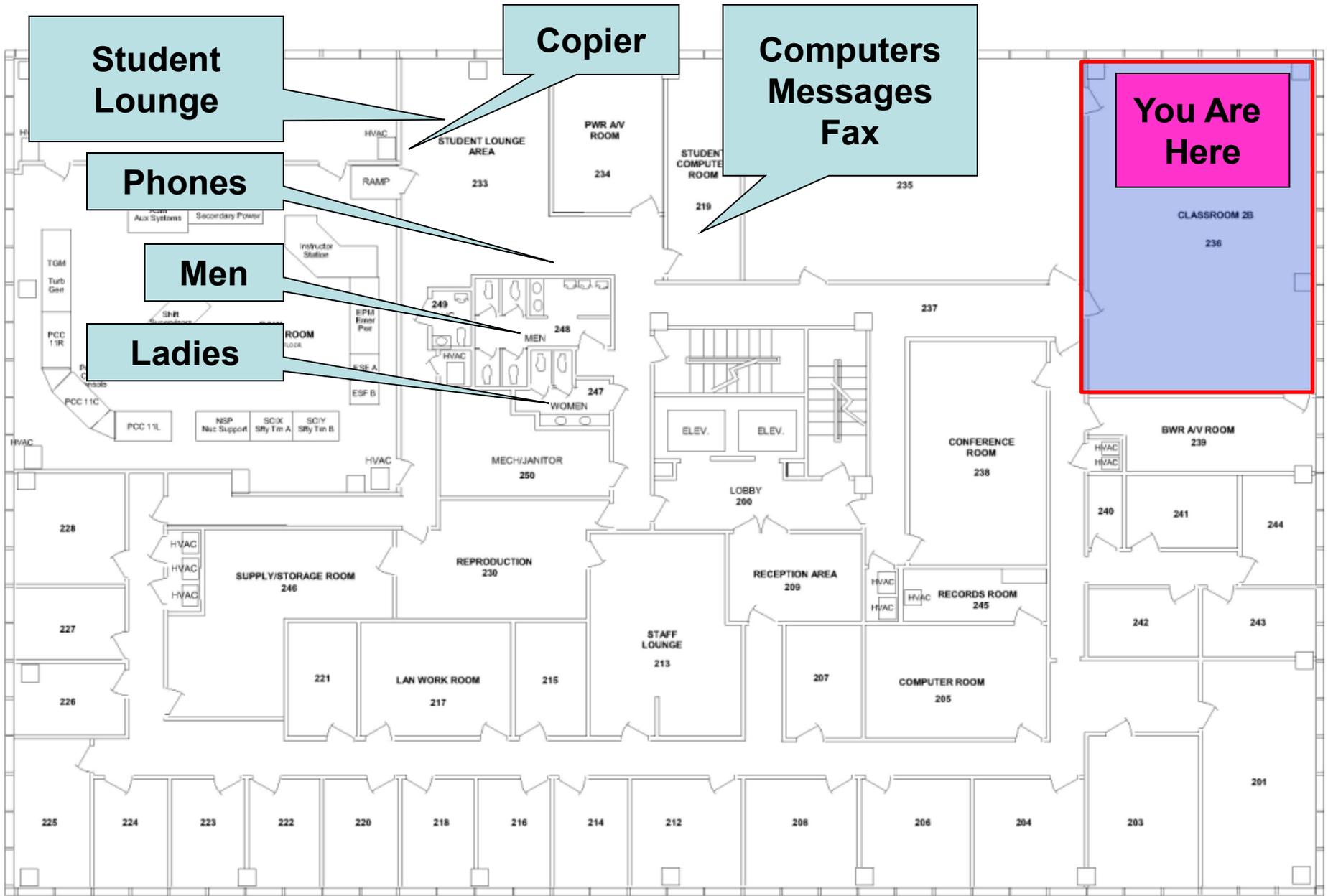
- Please remember that training is a work assignment and requires the same level of professionalism and performance as any other assignment
- Official TTC work hours are 7:30 am to 4:15 pm
- Course presentations are 8:00 am to 4:00 pm
- Instructors are available before and after class
- Some self study time has been scheduled and/or may become available. Conducting self study activities away from TTC must be authorized by your immediate supervisor.

# Basic Rules

- Breaks will be provided at approximately one hour intervals
- A one hour lunch break will be provided at a convenient stopping point between 11:00 and 12:00
- Please return from breaks and lunch at the designated times to minimize impact on the learning environment for others
- Please turn off or place in silent mode your cellular phones, pagers and other electronic devices during class
- Please minimize side conversations during presentations as they are distracting and negatively affect the learning environment for others

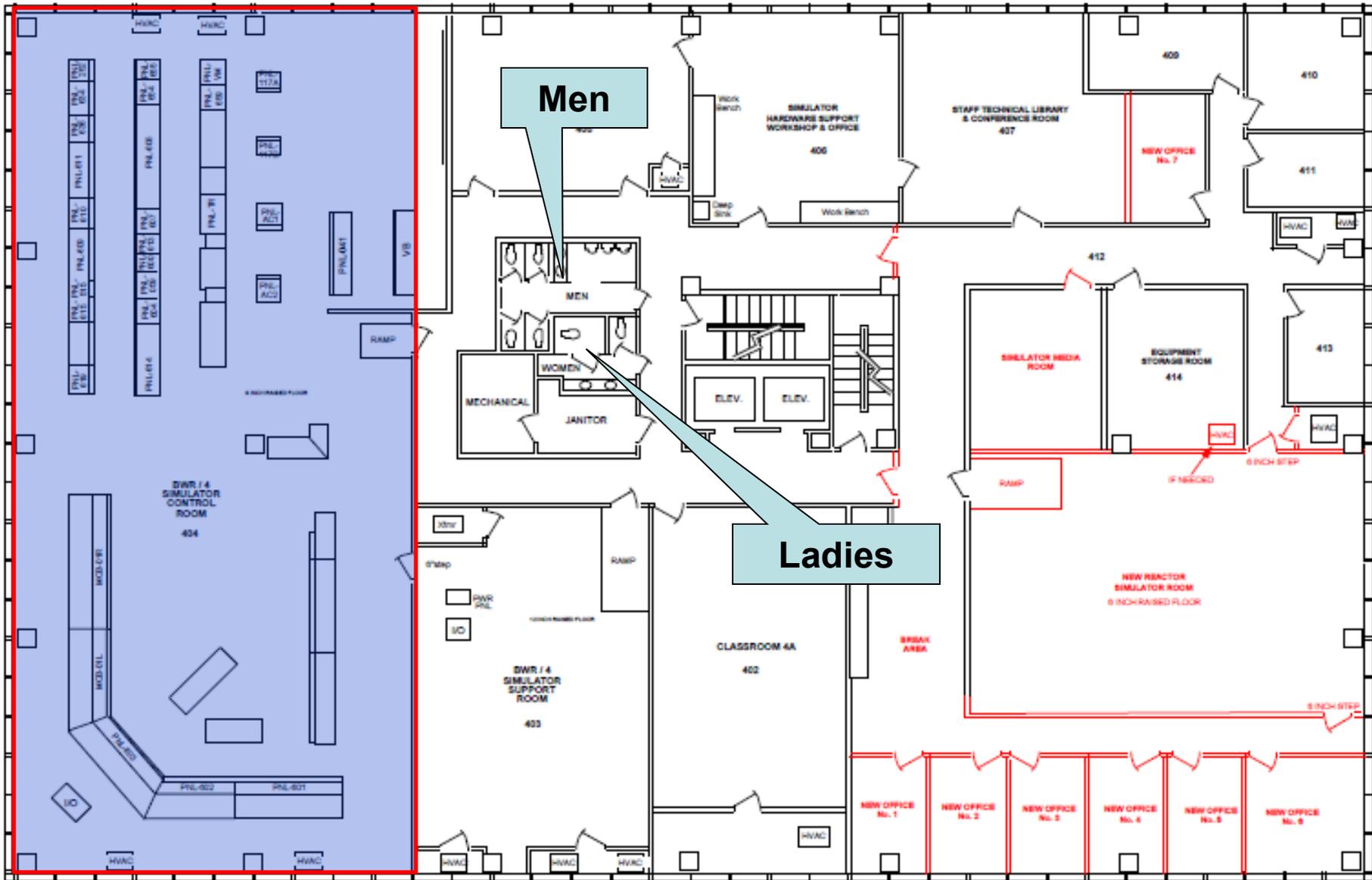
# Basic Rules

- A tablet has been provided for your use during the class
- Standard NRC rules of usage apply
- You will sign a property receipt for the device and are responsible for returning it in the same condition that it is in now
- Do not install any apps or software on the device
- Do not play games or otherwise get distracted during the lectures
- You may leave the device in the classroom overnight or over the weekend if you lock it up in the “cage”.



Second Floor





**GE Simulator**

Fourth Floor

# COMMUNICATIONS

- Phones
- local calls  
dial 9 + #
  - long distance calls  
dial 9 + 1 + AC + #

Messages (423) 855-6500

Fax (423) 855-6613 (2nd floor)  
(423) 855-6546 (3rd floor)

Computers available for NRC business

# Proximity Cards

HPSD-12 ID cards should work

- If needed: proximity cards will be issued for use during this course
- They **MUST**, be **RETURNED** on Exam **FRIDAY**
- Building doors open no later than 7:00 am
  - If you want a key to the building, let me know
  - NRC doors are alarmed between 1 am and 5 am



TTC  
OCCUPANT  
EMERGENCY  
PLAN

TTC OEP student brief

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# This is YOUR Training

- Course Feedback on-line following completion
- We need your input to make the course better:
  - Course Feedback in iLearn following completion of course
  - Instructor feedback forms in handout notebook
  - Negative feedback preferred early so that problems can be corrected
  - **Write it down as we go (hard to remember on last day)**