

# **Enhancement of Nuclear Security Culture with Implementation of Nuclear Security Education at PIEAS**

**By**

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**Presented At**

**International Conference on Nuclear Security: Sustaining and  
Strengthening Efforts**

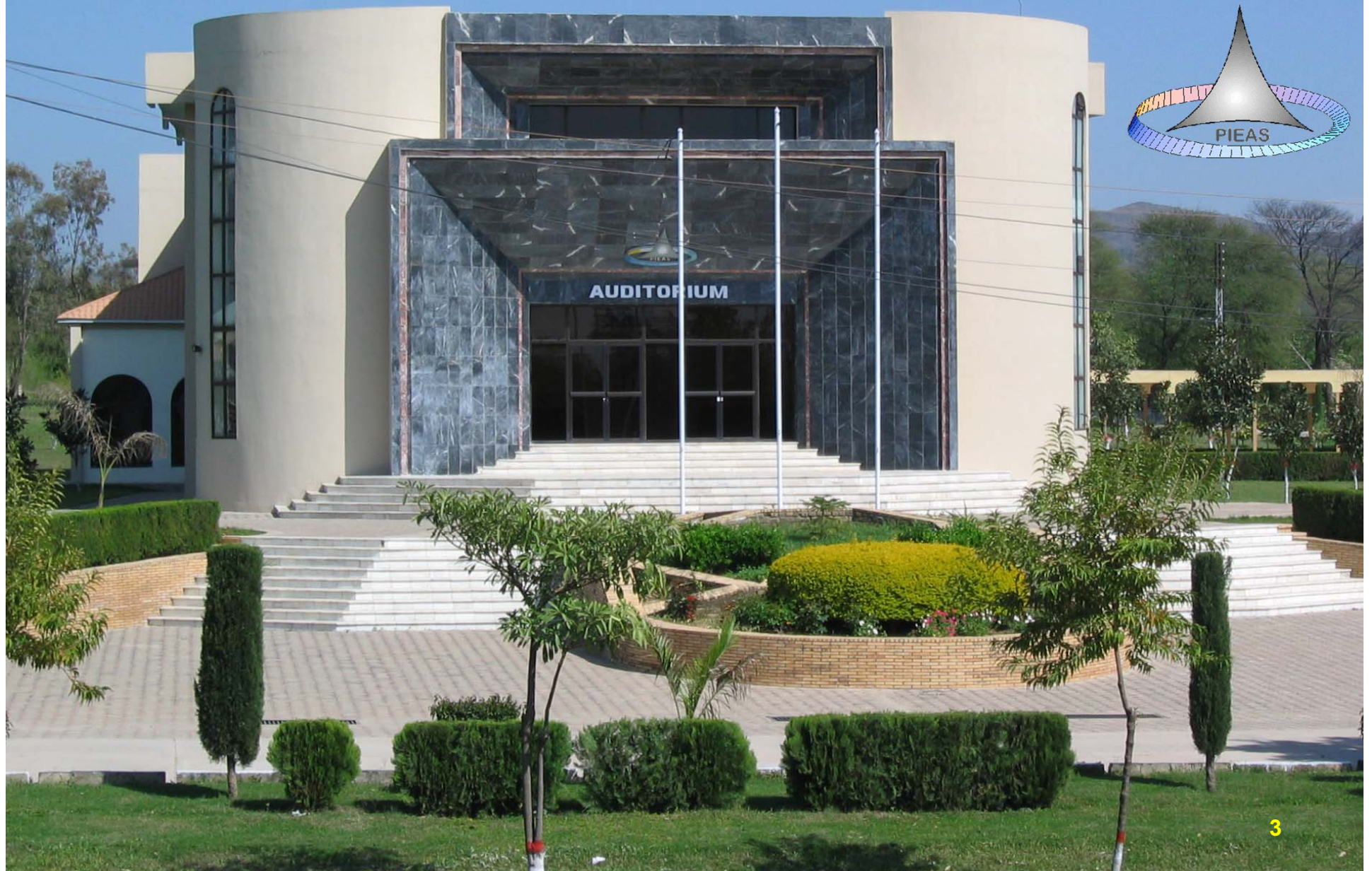
**10–14 February 2020, Vienna, Austria.**



# Presentation Layout

- **Introduction to PIEAS**
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# Pakistan Institute of Engineering & Applied Sciences





# Background Information

- **Pakistan Nuclear Regulatory Authority (PNRA) initiated nuclear security training and education program in 2007.**
- **IAEA published Nuclear Security Curriculum guidelines NSS-12 in March 2010.**
- **Curriculum guidelines prepared at PIEAS in the light of IAEA Curriculum guidelines.**
- **Nuclear security education at PIEAS was initiated as sub-specialty of MS Nuclear Engineering program in October 2009.**
- **Two elective courses have been taught since then**



# MS Nuclear Engineering at PIEAS

- **MS Nuclear Engineering programme consists of five (05) semesters:**
  - **1<sup>st</sup> and 2<sup>nd</sup> Semesters (core courses)**
  - **3<sup>rd</sup> Semester (core + elective courses)**
  - **4<sup>th</sup> Semester (core + elective courses + preliminary work on MS thesis)**
  - **5<sup>th</sup> Semester (dedicated for MS Thesis work)**
  - **Nuclear security related courses are offered in 3<sup>rd</sup> and 4<sup>th</sup> semesters**



# Main Challenges Faced by DNE

- **The introduced courses were scrutinized by the following academic bodies**
  - **Board of Studies (BoS) of Department of Nuclear Engineering**
  - **Board of Faculties (BoF) of PIEAS**
  - **Academic Committee of PIEAS (the highest academic body at PIEAS)**
  - **Starting of complete new discipline for award of MS Nuclear Security will require the approval of Board of Governors (BoG) of PIEAS.**



# Center of Excellence (CoE) in Nuclear Security

- **Pakistan announced Center of Excellence (CoE) in Nuclear Security in Nuclear Security Summit, 2014. This consists of:**
- **Pakistan Center of Excellence in Nuclear Security (PCENS), Islamabad**
- **National Institute of Safety and Security (NISAS) at PNRA HQ.**
- **Pakistan Institute of Engineering and Applied Sciences (PIEAS)**

# Center of Excellence (CoE) in Nuclear Security

**PCENS**

**NISAS**

**PIEAS**







# Collaboration with other National Institutions

- **PIEAS maintains a very close collaboration with its CoE partners:**
- **Exchange of resource persons, lecture materials, training materials, etc.**
- **Visit of PIEAS students to**
  - **PCENS**
  - **PPS exterior labs established at PCENS**
  - **PPS interior labs at NISAS**
- **Visits of NISAS training course participants to Nuclear security educational labs at PIEAS**



# Nuclear Security Culture Enhancement

- IAEA defines Nuclear security culture as “the assembly of characteristics, attitudes and behaviour of individuals, organizations and institutions which serves as a means to support and enhance nuclear security.”
- The concept of nuclear security culture
  - Covers a much wider scope of areas related to nuclear security
  - Is applicable to the entire workforce at a nuclear facility
  - Can be an effective tool to address both intentional and unintentional breaches of security.



# Benefits of Effective Nuclear Security Culture

**An effective security culture can help in encouraging the entire workforce to**

- **Remain vigilant, and develop attitude to question irregularities,**
- **Exhibit high standards of personal and collective accountability.**
- **Improve safety arrangements,**
- **Reduce risks of vandalism and sabotage by employees and outsiders;**
- **Provide better information security and protection of trade secrets, and**
- **Develop better relationships with local authorities and surrounding communities.**



# Capacity Building for Nuclear Security Culture

- **The commitment, dedication and involvement by the top management,**
- **Involvement of the employees of the organization in nuclear security culture related IAEA training activities and workshops**
- **Continuous learning on the organizational level through systematic training and education**
- **Emphasizing the role of the human element in nuclear security at the facilities,**
- **Participation in national and international events relevant to nuclear security,**
- **Inclusion of nuclear security courses in university syllabi of higher-education institutions.**



# Nuclear Security Culture Enhancement

- A combination of the previously mentioned methodologies are used
- The main focus is on scientists and engineers working at management level as operators and regulators within the nuclear facilities of Pakistan
- Participation in short training courses conducted by IAEA at PCENS, NISAS and PIEAS further facilitate these graduates in staying abreast with
  - New techniques developed for improvement of nuclear security
  - Evolving threat scenarios,
  - New capabilities and tactics used by an intelligent adversary having malicious intentions



# Nuclear Security Culture Enhancement in Operators

The graduates who are working as operators have

- **Set a positive example for personnel, for both of their colleagues and for the staff supervised by them,**
- **Served as nuclear security culture role model for their colleagues and the staff by**
  - **Strictly following implemented nuclear security procedures,**
  - **Executing their work more diligently, and**
  - **Exhibiting high standards of personal and collective accountability.**



# **Nuclear Security Culture Enhancement in Operators-1**

- **Strived to promote an overall positive work environment by**
  - Improving productivity,
  - Reinforcing safety-security interface by strict adhering to safety precautions.
- **Made significant contribution to reduce the potential for an insider threat by**
  - promoting the culture of remaining vigilant all the time, and
  - strictly adhering to the two-person rule in vital areas to decrease the possibility of occurrence of a malicious act.



# **Nuclear Security Culture Enhancement in Regulators**

**Those who joined as regulators, have facilitated in**

- Updating the existing nuclear security regulations**
- Development of the new regulatory documents for improvement of nuclear security.**
- Serving as regulatory inspectors for inspecting the implemented security arrangements for regulatory compliance**
- Improving the performance of the security arrangements against the changing threat**
- Evaluating the existing security systems and predicting their performance.**



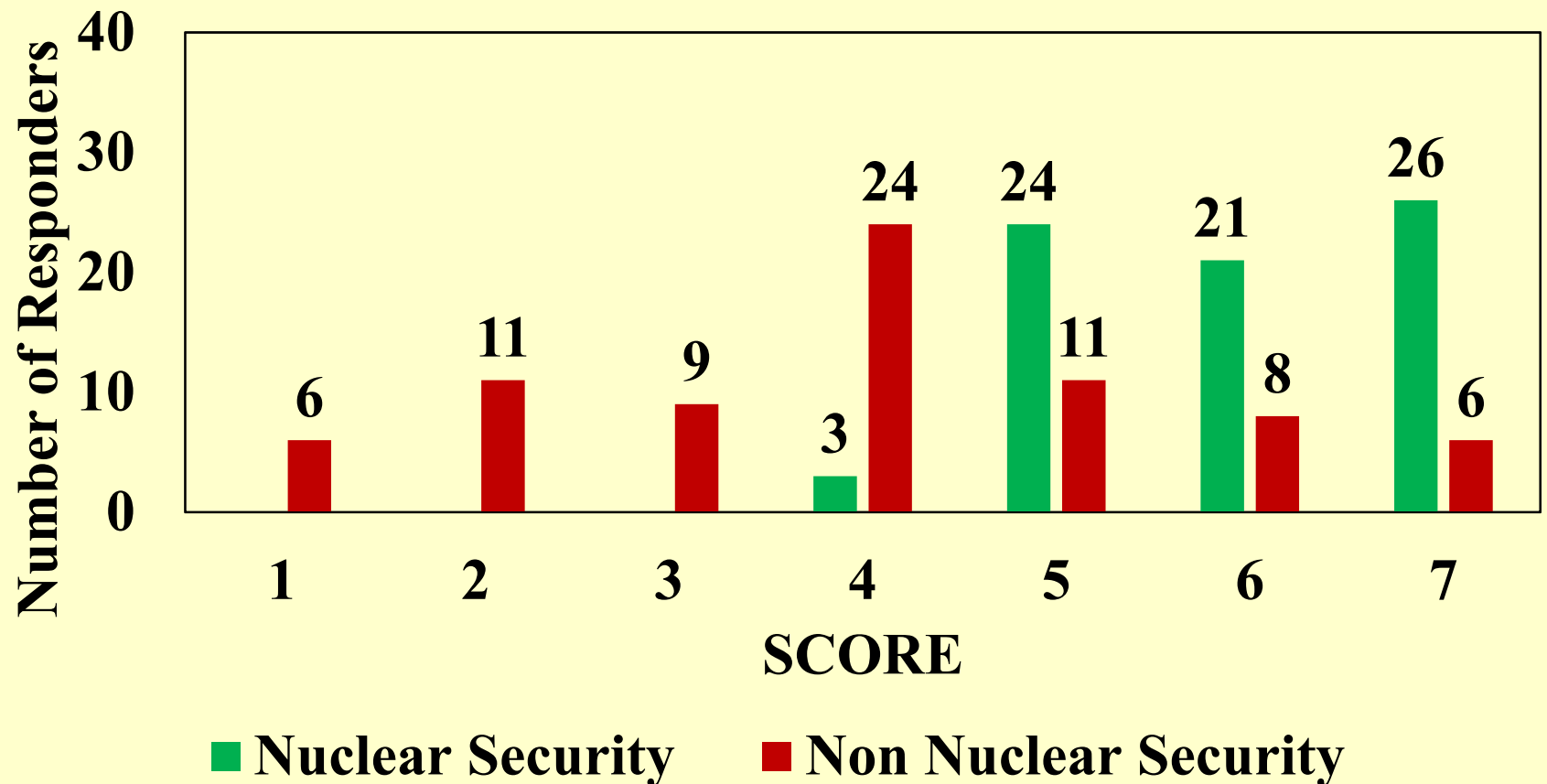


# Nuclear Security Culture Assessment Survey

- **An assessment process for nuclear security culture (in the form of a survey) among the scientists and engineers was initiated, as per guidelines of IAEA**
- **This assessment process is just a part of the large scale nuclear security culture assessment process,**
- **This current assessment has only included scientists and the engineers graduating from PIEAS, and those who have/have not gone through nuclear security course at PIEAS or elsewhere**
- **The questions have been particularly selected with reference to the workplace environment only.**
- **The questions used for the survey have been prepared in accordance with the guidelines provided by IAEA and World Institute of Nuclear Security (WINS)**

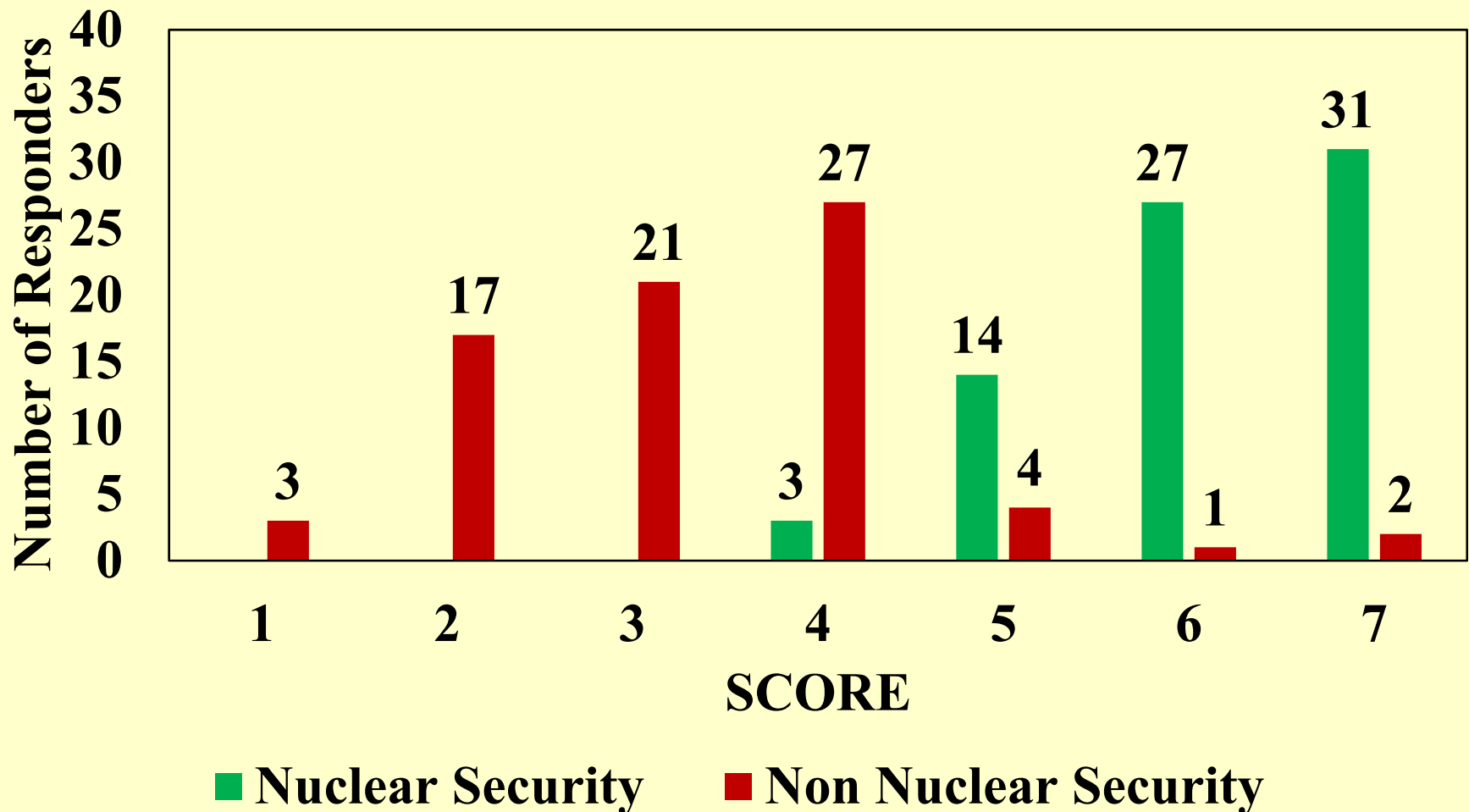
# Senior management of the facility thinks that security of the facility is very important and visibly promotes security

## Question-1



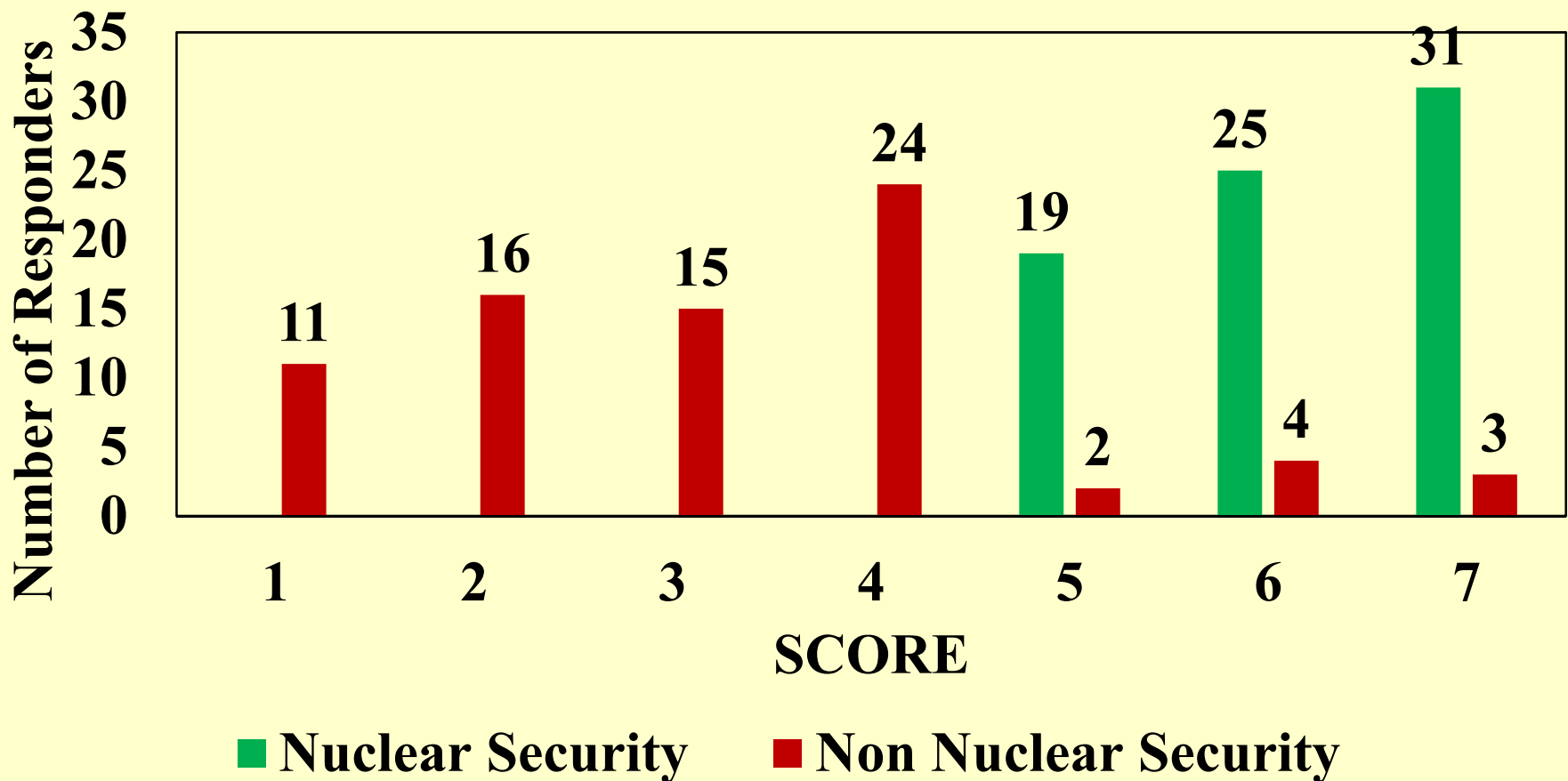
# Nuclear security and safety are considered equally important at my workplace.

## Question-2



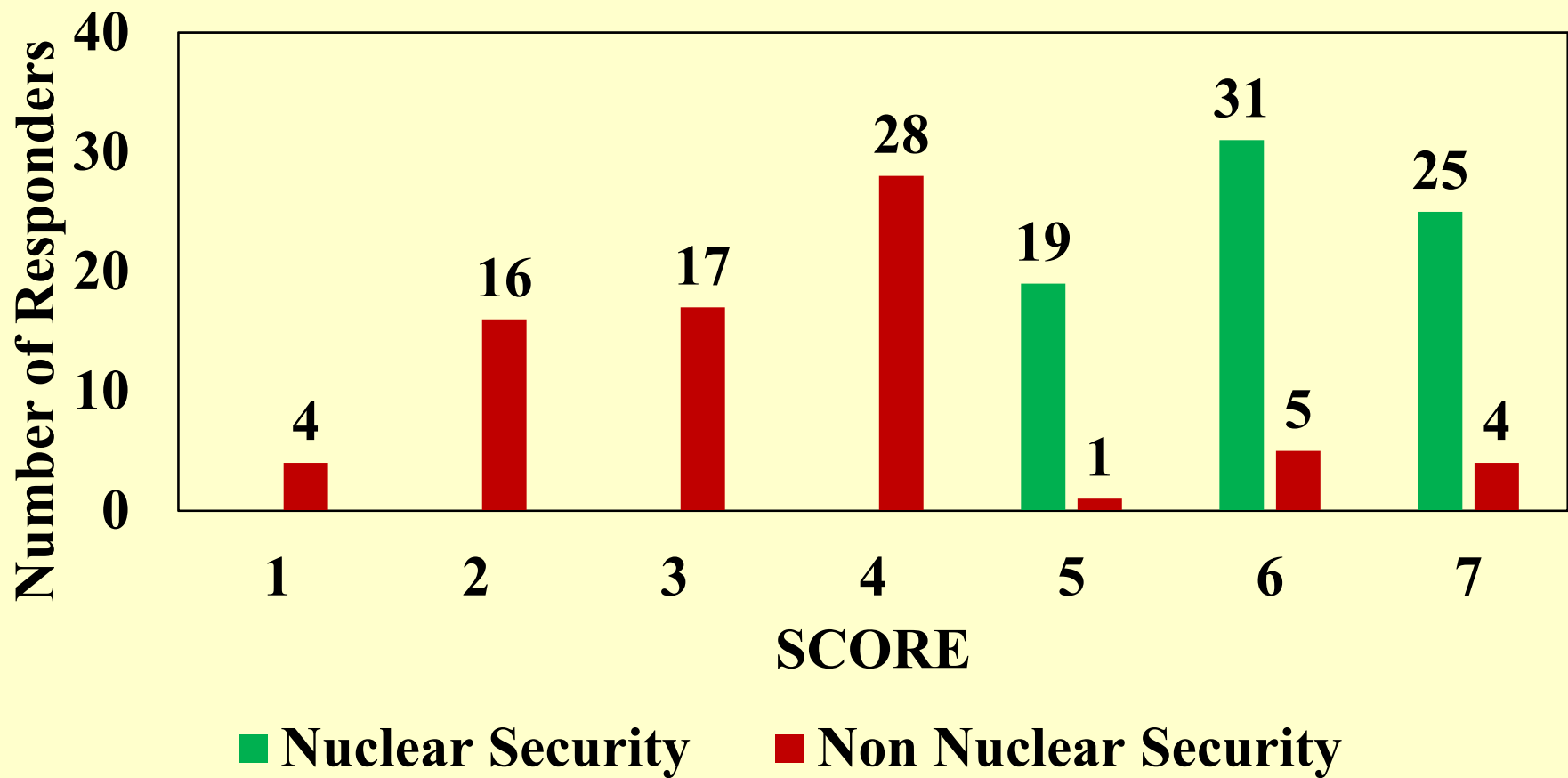
**I fully understand the main nuclear security threats that we could experience here at my workplace.**

### Question-3



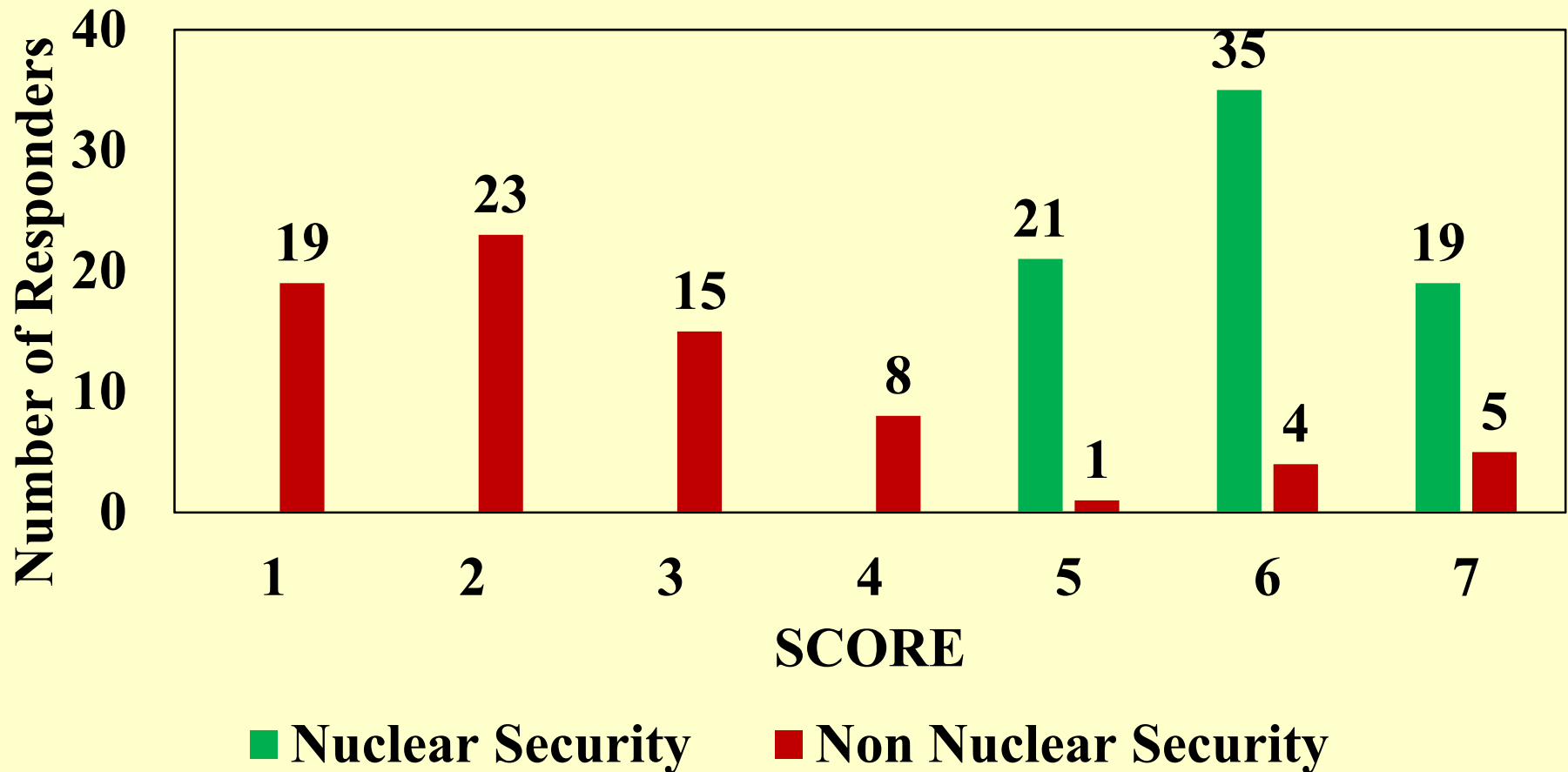
**I fully understand the security requirements with which I am expected to comply at my workplace on daily basis.**

### Question-4



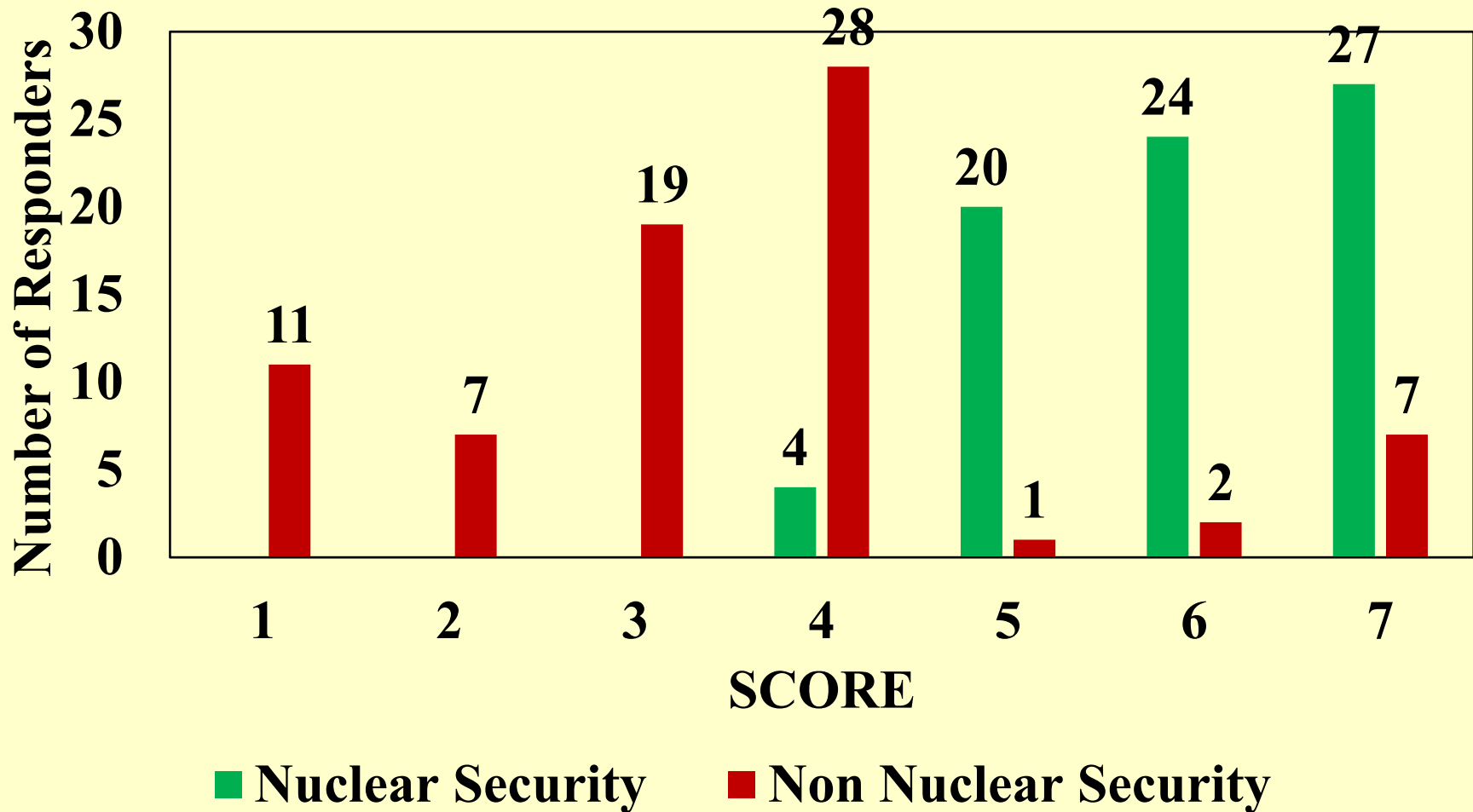
**The education and training that I have received on nuclear security is clear and comprehensive.**

### Question-5



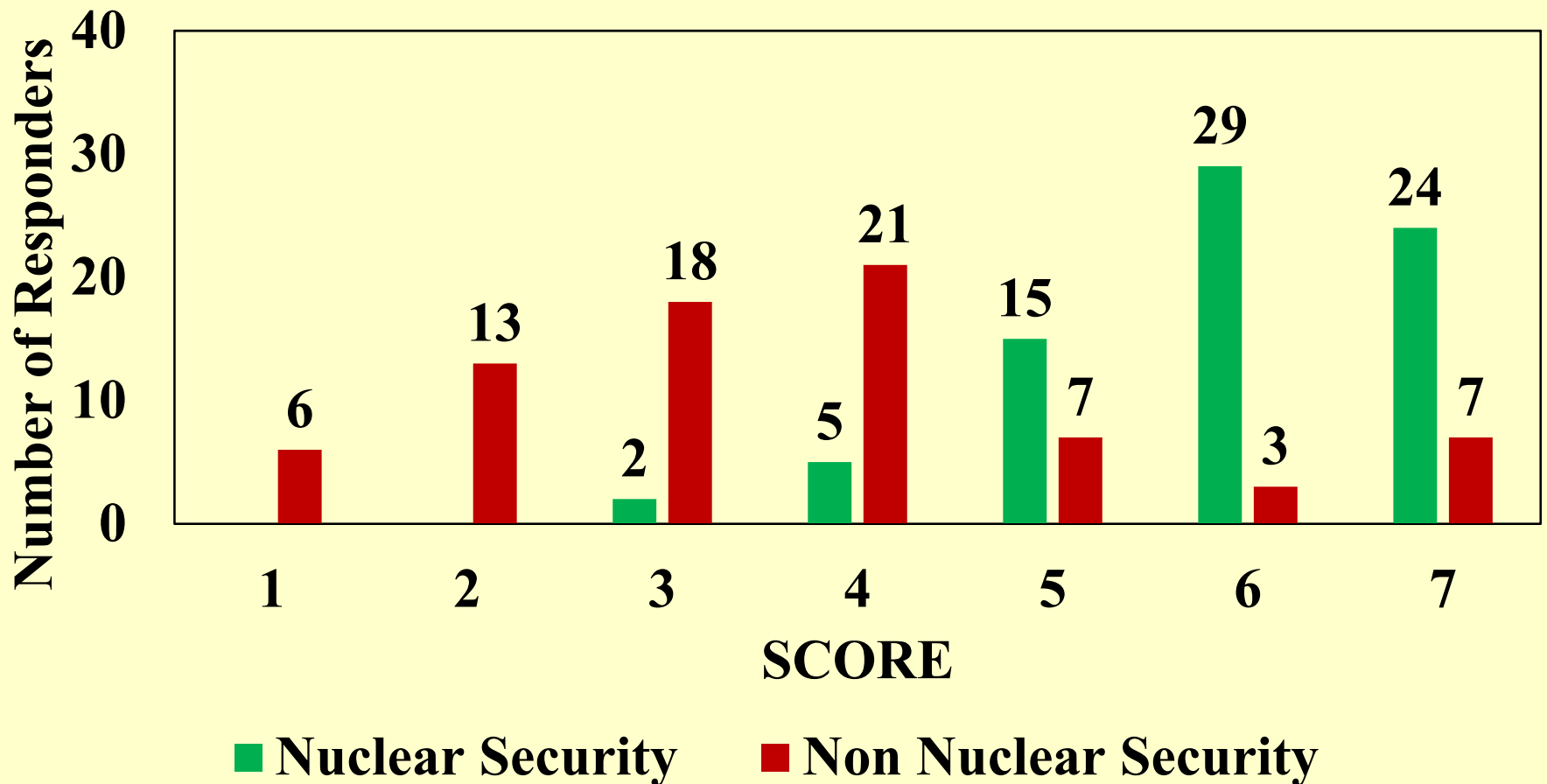
# I feel confident about the implemented security arrangements at my workplace.

## Question-6



# Good security arrangements at my workplace help protect my job and are important for my safety.

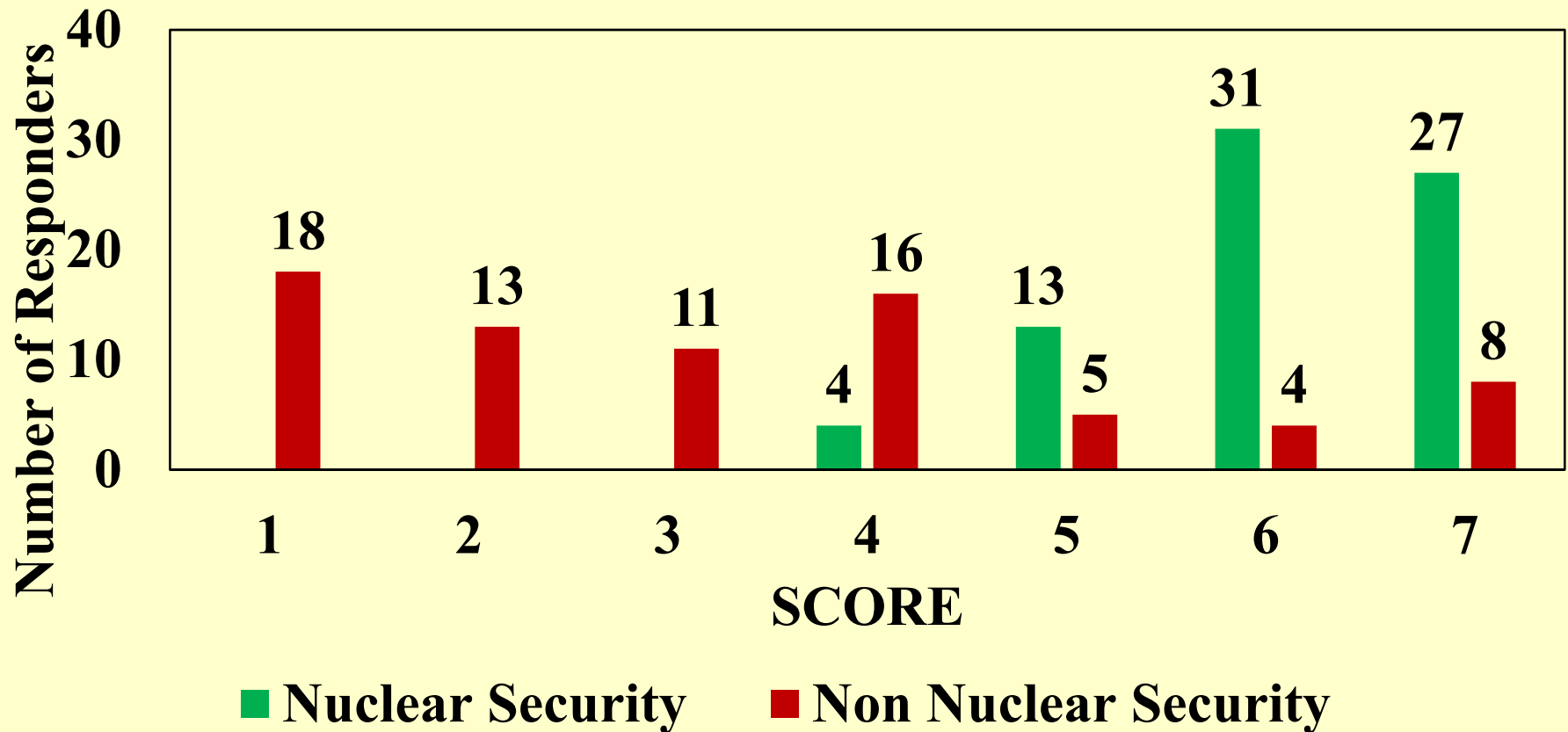
## Question-7





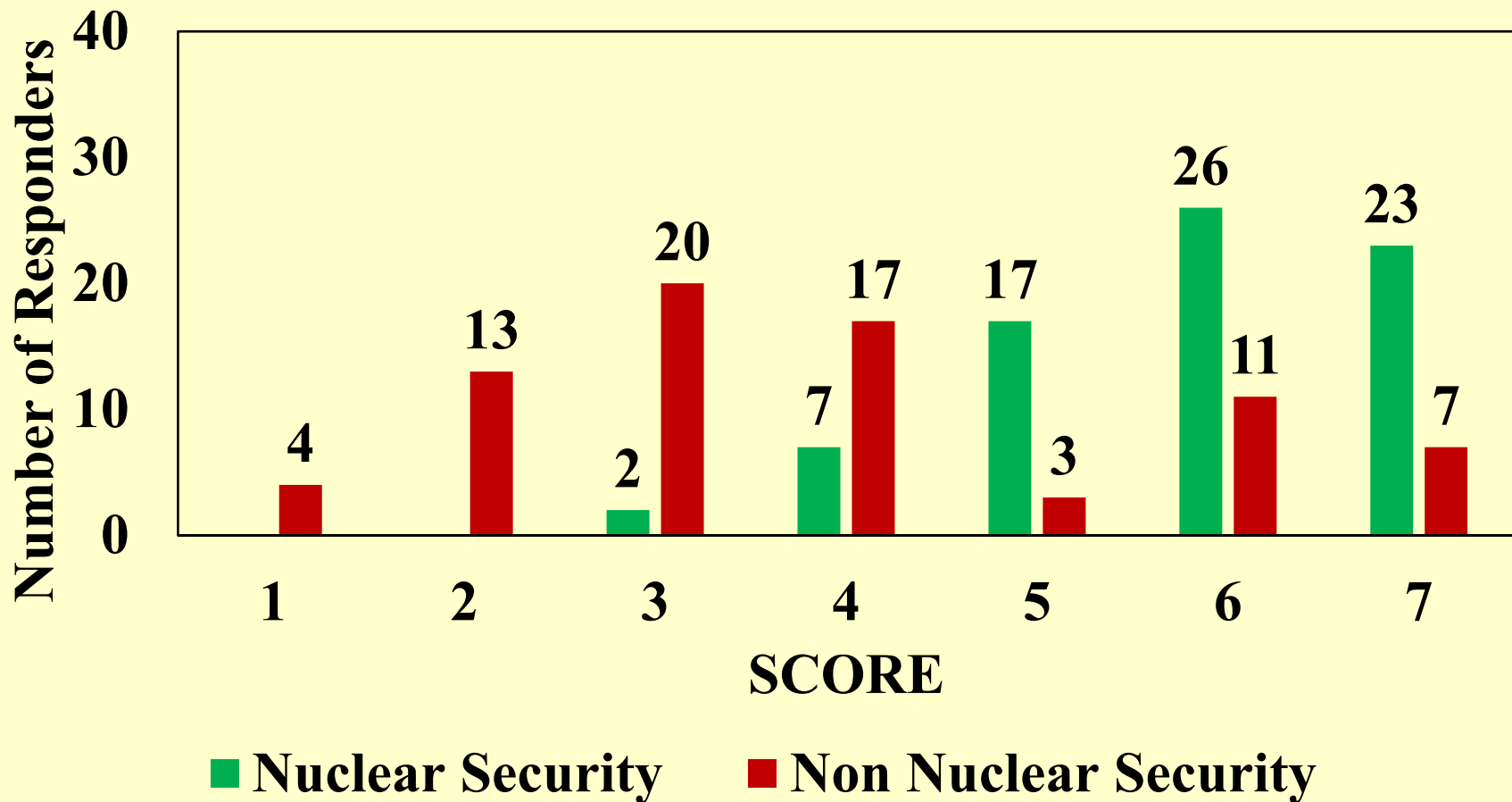
**If I were to become aware of security issues that concern me or my workplace, I would report them even if they involved a work colleague.**

### Question-8



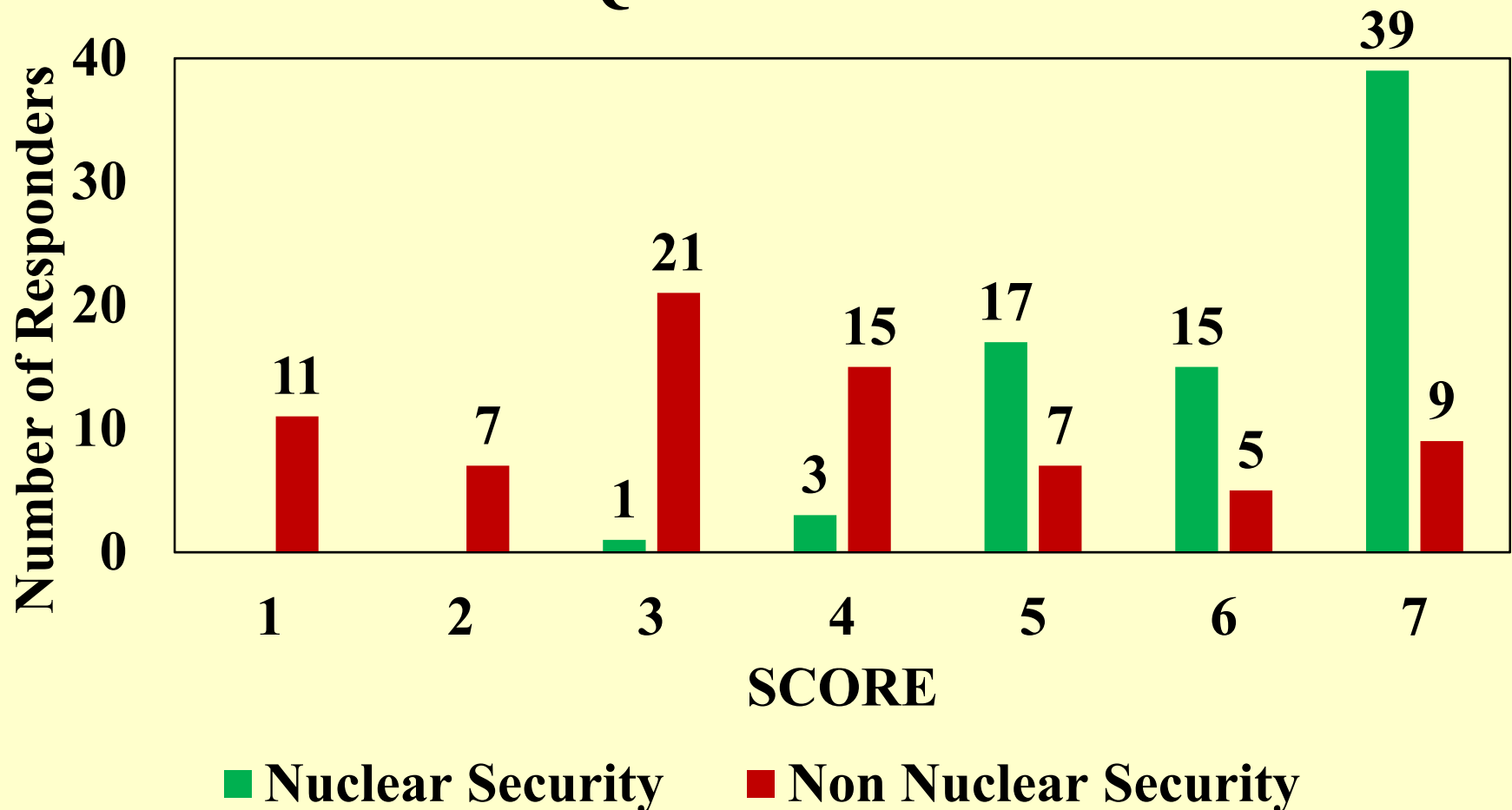
**I feel comfortable with following daily routine security checks implemented at my workplace.**

### Question-9



**I feel that my understanding of the importance of the routine security procedures implemented at my workplace has increased over the years.**

### Question-10





# Enhancement of Nuclear Security Culture: Lessons Learnt

The graduates who have taken nuclear security courses, working as operators have

- Exhibited the added advantage of developing a sense of responsibility for security of the facility
- Facilitated the security personnel in carrying out their responsibilities from the probable threat of
  - an outsider adversary,
  - an insider adversary.
- Shown an overall improvement in nuclear security culture at national nuclear facilities,
  - Being aware of the security issues and challenges during their routine technical job,
  - Preferring security concerns over friendship or relationship.



# **Enhancement of Nuclear Security Culture: Lessons Learnt-1**

- **Exhibited a broader vision of the technical aspects of nuclear safety combined with technical aspects of nuclear security requirements inside the vital assets of the nuclear facilities.**
- **Developed better understanding of the possible threat scenarios to the nuclear facilities**
- **Extended helping hand to security professionals in implementing nuclear security measures.**



# **Enhancement of Nuclear Security Culture: Lessons Learnt-2**

**The graduates who have taken nuclear security courses, working as regulators have**

- Played an important role in updating the required regulatory requirements for the national nuclear facilities and other related infrastructure as per latest IAEA requirements.**
- Helped in effective upgradation of existing overall physical protection regime at national nuclear facilities level to keep abreast with latest threat scenarios.**



# Enhancement of Nuclear Security Culture: Lessons Learnt-3

- **Nuclear security education has**
  - **Facilitated in the development of a platform among the future nuclear engineering professionals by**
  - **Developing better synergy among the scientists and engineers working in the areas of nuclear safety and nuclear security.**
  - **Reducing the inherent conflict among safety and security professionals with better understanding of nuclear security and nuclear safety requirements.**



# Enhancement of Nuclear Security Culture: Lessons Learnt-4

- The survey also indicates a critical need for creating nuclear security awareness by systematic implementation of nuclear security training/awareness program at the respective establishments.
- Interaction of these nuclear security graduates with professionals working at NISAS and PCENS further grooms them about practical aspects of nuclear security culture implementation within their workplaces.





# **Enhancement of Nuclear Security Culture: Lessons Learnt-5**

- **Launching of the nuclear security education program by PIEAS has proved it as a strong pillar of Pakistan's Nuclear Security CoE in development, promotion and implementation of an effective nuclear security culture at nuclear facilities of Pakistan.**



# Summary and Conclusions

- Nuclear security education has become a regular part of MS Nuclear Engineering program of PIEAS.
- Graduating nuclear engineering professionals with this specialty have developed a sense of responsibility towards the security of nuclear facilities.
- This will play a vital role in implementing a comprehensive nuclear security regime at national level in Pakistan.

*Thank you for your  
kind attention!*