CASE STUDY ANALYSIS

EXERCISE – AI/ML AND NUCLEAR AND RADIOACTIVE MATERIAL THEFT

Case Title: Dominik – Theft of Uranium Oxide

Incident Summary: An NPP employee defeated restricted area access control measures and stole uranium oxide (UO_2); evidence of advanced planning; theft only detected because of insider actions after the theft (ransom letter); possible indication that insider stole more UO_2 than the authorities recovered.

Objective: Consider the attributes, motivations, and actions of the insider depicted in the Dominik Case Study. Identify possible AI capabilities for behavior analysis, knowledge discovery, access control, and material control and accounting. Identify considerations for AI implementation in Nuclear Material Accounting and Control (NMAC) to prevent nuclear material theft.

Question/Topic	Responses
A. Insider Position What role did Dominik have at the facility?	
B. Insider Type? • Active, Violent • Active, Non-violent • Passive • Unwitting	
C. Motivations and Indicators 1) What were the insider's motivations? (e.g. ideology, ego, revenge, financial, coercion, etc.) 2) What drove their motivation? 3) What observable behaviors related to the motivations should have been reported?	*Please complete for all motivations and indicators.*
D. AI Behavior Analysis 1) Identify at least two observable actions or behaviors of the insider 2) Consider how AI could have been used to analyze the insider's behavior to detect and prevent an insider's actions.	

Question/Topic	Responses
E. AI and Acceleration of Acquiring Technical Expertise What might the insider have been able to learn about the facility and its material, if AI were available to assist in planning and executing the UO_2 theft?	
F. AI and Access Control Identify at least two existing access control failures that contributed to the theft. For each identified failure, how might AI have been used to detect or prevent the theft?	
G. AI and Nuclear Material Accounting and Control (NMAC) The insider was successful in stealing UO_2. How might AI have been used to 1) detect material being removed or 2) bypass material control protocols?	
H. AI Implementation and Regulations 1) What are your top 3 considerations for implementing AI with NMAC? 2) What regulations may need to be in place and who would be responsible for implementation and quality control of the AI systems?	