

## **Case Study: Evaluation of a Mock-up State Evaluation Report. –**

Objective: This case study will reinforce the knowledge acquired throughout the workshop: Based on active reading (before the workshop) participants will be provided with a set of questions based on a real-life dilemma:

Is the declared information provided by a fictitious state (Bludonia) consistent with the information obtained from other sources of information?

If these two sets of information are not fully consistent, can it be concluded that the “State” is in compliance with its safeguards commitments? (Safeguards Agreement and Additional Protocol). In other words, can one conclude that the state has declared all its facilities and that they are being used exclusively for peaceful purposes?

Following a discussion in small groups, each group will be required to present their conclusions to the class. A guided debate will follow and the moderator will attempt to reach a conclusion under consensus.

### **THE CASE**

Timeline of events:

- Bludonia ratified the Nuclear Non-Proliferation Treaty (NPT) on 29 October 1969 by depositing their instrument of accession and ratification with the Government of the Kievan Republic, a nuclear weapon state. The NPT was opened for signature on 1 July 1968 and entered into force on 5 March 1970.
- Bludonia signed a comprehensive Safeguards Agreement (SA) with the Agency and it entered into force on 29 February 1972.
- Pursuant to the entry into force of the SA, a pool type 2 MW(th) Research Reactor supplied by the Kievan Republic in 1960 was put under IAEA Safeguards. Bludonia submitted the Reactor’s Design Information to the IAEA and declared an inventory of 10970 g of HEU total with 8780 g U-253 and an enrichment of 80%. The inventory consisted of 96 tubular type assemblies.
- Bludonia and Gaul (another nuclear weapon state) signed a cooperation agreement for the peaceful utilization of Nuclear Energy in 1975.

- Bludonia reported in 1978 that its 2 MW research reactor had been upgraded to 5 MW (th) and provided an updated Design Information to the Agency.
- Bludonia bought from Latina a set of well-equipped hot cells for irradiation analysis.
- Bludonia imported five tons of Natural and Depleted Uranium UF<sub>6</sub> from Pindorama and from other countries. Total imports amounted to 1.8 Tons of LEU, 6 tonnes of Depleted and 540 tonnes of natural Uranium.
- Bludonia failed to convince Gaul to sell them a gas-graphite plutonium-producing reactor and a reprocessing plant, and likewise failed to convince the Latina government to sell them a Cirene reactor.
- Bludonia procured a MTR fuel fabrication plant and constructed it in the Bludon Research Centre. The Plan was declared to the Agency and inspections were carried out in conjunction to inspections at the research reactors in the Centre.
- Bludonia purchased from Gaul two research reactors: a pool type reactor of 500 KW (th) named Tommy-1 and a 40 MW (th) tank-pool MTR reactor, Tommy-2. Both reactors were constructed at the Bludonian Research Center near the capital of Bludonia, Bludo City. Construction began in 1979. Officials of both states made several public statements at different national and international forum regarding the agreement reached for the provision of equipment and construction of both reactors at the Bludo Research Center.
- Bludonia submitted design information for both reactors six months before the arrival of fuel to Bludonia, according to the SA in place. Initial Inventory reports were submitted timely to the Agency.
- IAEA inspectors verified the Design Information at both research reactors, Tommy-1 and Tommy-2 in September 1979. The inspectors concluded that both reactors were constructed according to the Design information submitted and that the use of those reactors was as declared.
- The IAEA performed an inspection on 28 to 29 June 1980 at the time of the arrival of the fuel assemblies from Gaul. The inspectors verified the 39 MTR fuel assemblies produced in Gaul and confirmed that they contained 12300 g of Total HEU with an enrichment of 93%. The shipment was the first of a planned six

deliveries totaling 72 kilograms. It was stipulated in the purchase agreement that no more than two HEU fuel loadings (24 kilograms HEU) could be in Bludonia at any time.

- Given the fact that there were less than 25 Kg of U235, the Agency continued its inspection plan of 2 inspections per year. When the inventory of U235 would reach this 25 Kg threshold the IAEA would inspect the reactors every month.
- The Maledonia-Bludonia war erupted in September 1980 and lasted until August 1988. Half a million Maledonians and Bludonians died during this long conflict.
- On 30 September 1980, Maledonia send an air raid to Bludonia and attacked the Tommy-1 reactor, just a few days after the start of their conflict. The attack did little damage to the reactor itself. Press reports indicated that it was the first instance of a preventive attack on a nuclear reactor that aimed to forestall the development of a nuclear weapon by Bludonia.
- In January 1981, all three-research reactors were inspected and all nuclear material was satisfactorily accounted for.
- Gaul and Bludonia maintained that the reactor was intended for peaceful scientific research.
- Medinata, a neighboring country (not party to the NPT) viewed the reactor with suspicion, and concluded that it was designed to make nuclear weapons. Eight months later, on 7 June 1981, Medinata, also sent air fighters and bombed the reactor Tommy-2 damaging heavily the reactor. Fortunately, all but one fuel assembly for Tommy-2 was stored at Tommy-1 that was not attacked.
- Several spokesmen of Medinata justified their attack to the reactor by saying that Bludonia planned to use the reactor to make an arsenal of plutonium nuclear weapons. They also said that it was urgent to destroy the reactor before it went critical to avoid radioactive debris over Bludon City. They said that between the safeguards inspections, the Bludonian operators would surround the core of the reactor with a blanket of Natural Uranium. While the blanket was in place, the operators would run the reactor at full capacity, building up plutonium in the blanket. When sufficient plutonium had accumulated they would remove the blanket and reprocess it to remove the Plutonium that would be converted in a nuclear weapon device. Medinata leaders justified the attack

stating that in the interest of its national security it felt motivated to take military action.

- On 9 June 1981, the IAEA Director General (DG) addressed the Board of Governors and pointed out that Bludonia is a party of the NPT and had accepted safeguards in all its nuclear activities. He stated that at the last inspection in January 1981, all material in Bludonia had been satisfactorily accounted for.
- On 12 June 1981, the BoG passed a resolution noting the statement of the IAEA's DG and condemned strongly the attack of Medinata on the Bludon Research Center that is covered by Agency safeguards. The BoG recognized the "inalienable right of all members of the Agency to develop nuclear energy for peaceful purposes to further their scientific, technological and economic development. The board reaffirmed its confidence in the effectiveness of the Agency's safeguard system as a reliable means of verifying the peaceful use of a nuclear facility.
- On June 19, 1981, the IAEA Director General addressed the United Nations Security Council (UNSC) and reported that in this type of reactor, diversion of fuel assemblies or undeclared plutonium production would be detected with very high degree of probability. He stated that there had been nothing wrong with the safeguards applied to the Tommy reactors and that there had not been any deficiencies in the inspections, schedule or procedures.
- On the same day, the UNSC adopted a resolution that also strongly condemned Medinata as well as recognized the inalienable sovereign right of Bludonia and all other states to establish programs of technological and nuclear development consistent with international accepted objectives of preventing nuclear weapons proliferation.
- The Head of the IAEA's Department of Safeguards at the time wrote an article in the Agency's monthly Bulletin. He said that the safeguards measures implemented at the Tommy-2 Reactor were based on two diversion strategies that had to be countered: First the diversion of highly enriched uranium contained in standard fuel elements and second on the production of plutonium in fertile materials specially manufactured for that case. The first strategy was countered by inspection activities such as item counting, identification and Gross and Partial defect measurements by NDA (enrichment and active length). If the fuel were irradiated, a verification of the Cherenkov glow of the assemblies

would detect any diversion of fuel assemblies or plates. The second diversion strategy: After removing the reflector elements of the reactor, 15 to 20 fertile elements –containing natural or depleted uranium- could be dispersed among core elements. To produce one or two significant quantities of plutonium a high throughput of fuel –several cores per year- would be needed and this would be known by the Agency through its inspections and also from Gaul who is committed to inform in advance of every shipment to Bludonia. Also, any substantial change to the configuration of the reactor could be countered by visual observation of the reactor core and ponds.

### QUESTIONS FOR DISCUSSION

1.- A careful observer would question the wisdom of Gaul in providing a powerful and sophisticated research reactor (40 MW!) to a country that had virtually no civilian use for it. Do you think the IAEA had the legal authority to raise this question to Gaul and Bludonia? Consider:

Article 2 of the IAEA Statute:

“The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world. It shall ensure, so far as it is able, that assistance provided by it or at its request or under its supervision or control is not used in such a way as to further any military purpose.” <http://www.iaea.org/About/statute.html>

And Article II of NPT:

“Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination”

<http://www.iaea.org/Publications/Documents/Infocircs/Others/infocirc140.pdf>

2.- The strike on Tommy-2 reactor by Medinata meant that this country did not trust IAEA safeguards as a credible means to provide assurances about the Compliance of Bludonia to its Safeguards Agreement. The effect of the attack was in practice a measure of restriction and denial of access to nuclear technology as an effective (though wicked) approach to non-proliferation. Do you think that Medinata had a valid reason to proceed to this attack?

3. Do you also think that the real purpose of the reactor was to make nuclear weapons? Why?

4.- The DG of the Agency at the time stated that this attack was also an attack on the Agency safeguards. The BoG stated that “this military action, besides affecting the

security and peace in the region ...could do great harm to the development of nuclear energy for peaceful purposes". In fact, the Fukushima accident affected the development of Nuclear energy in Japan and in the world much more than the proliferation issues in the Middle East. What does this mean? A radiological accident affects public opinion more than a proliferation case? How come?

5.- Efforts to replace HEU from research reactors around the globe have been successful and currently the diversion scenario for >90% HEU is almost non-existent. However, enrichment and reprocessing are two areas with still great sensitivity due to the short path for potential proliferators. Do you think that NNWS should not have access to these technologies? How would you rearrange the world nuclear order to reach this goal?

6.- Those who approved of the raid argued that Medinata had engaged in an act of legitimate self-defense justifiable under international law and under Article 51 of the charter of the United Nations (UN). Critics contended that the Medinata claims about Bludonia's future capabilities were hasty and ill-considered and asserted that the idea of anticipatory self-defense was rejected by the community of states. Where do you think the truth lies?

7.- Do you think the attack on Tommy-2 increased or decreased Bludonia's intentions to prepare a nuclear weapon device?

8.- The IAEA stated that due to the transparent design of the reactor and clear visibility of all substantial changes of its configuration, diversion according to the two strategies considered could be easily detected. Do you agree with this statement? Couldn't they produce plutonium using a long experimental channel?

9.- In summary, was the declared information provided by Bludonia, i.e. their reports that all their facilities were for peaceful purposes correct or was Medinata correct in concluding that the Tommy-2 reactor was a threat to their national security and therefore it should be destroyed?