

Implementation of the Expanded Declaration and the Complementary Access under the Additional Protocol in KAERI

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1. Introduction

The Additional Protocol (AP) to the Safeguards Agreement between the Korean Government (ROK) and the IAEA was signed on 21 June 1999 and entered into force on 19 February 2004. In June Korea Atomic Energy Research Institute (KAERI) provided the initial expanded declaration on KAERI site. Korean government then provided all of the information on Korea to the IAEA in August. Following the ROK's submission of the initial declaration and explanation concerning the certain experiments, the IAEA promptly dispatched a verification mission team to the ROK to verify laboratory scale experiments of uranium enrichment with the atomic vapor laser isotope separation (AVLIS) method and other related information such as conversion activities. These verification mission at the KAERI site have been carried out four times since the end of August in 2004.

This report describes the implementation of the expanded declaration and the complementary access at KAERI, and discusses the practical issues and lessons learned from operators' perspective.

2. Initial Expanded Declarations

In accordance with the regulations related to reporting the "Internationally Controlled Material", KAERI reported to the Korean government the information on the nuclear fuel-cycle research and development(R&D) activities, and each building of the KAERI Seoul and Daejeon sites for the initial declaration in June.

The information to be provided under Article 2.a.(i) of the Additional Protocol is a general description of an information specifying the location of nuclear fuel cycle-related research and development activities not involving nuclear material carried out in KAERI.

During the preparation of the initial declaration of "nuclear fuel cycle-related R&D", following issues were discussed and should be subject to further discussion:

- the definition of basic or theoretical research, which are not required to be reported;
- the research activities related to the safety
- the level of a project which is reportable, i.e., whether the reporting of large projects is suitable or whether small unit projects should be reported individually; and
- whether or not to report large R&D projects, part of which involves nuclear material

The total 26 of items are included in R&D activities of Article 2.a.(i) at KAERI-site. The 6 items are related to the large project and 20 items are related to the unit projects.

The information to be provided under Article 2.a.(iii) is a general description of each building on each site, including its use and, if not apparent from that general description, its contents. The description includes a map of the site.

For the information relevant to the buildings on the site, we met the following difficulties:

- the boundary of the KAERI-Daejeon site, where four institutes and many venture companies exist within a fences;
- the description of the building which contains a lot of R&D activities;
- checking the consistency of the information against existing safeguards information;
- the map to be checked to assure that all buildings were shown; and
- choosing the place for the managed access

The 62 items are included in Daejeon site and 15 items in Seoul site.

3. Detail of the Complementary Access Activities

Korean government had barely submitted the initial declaration to the IAEA when the IAEA inspectors had come to KAERI site to verify the information declared.

The verification mission at KAERI sites have been carried out four times since the end of August in 2004.

These verification activities of the IAEA complementary access inspection team were focused on the past experiments of conversion, AVLIS, chemical U/Pu separation experiment, and an chemical ion exchange experiment of uranium enrichment carried out at KAERI site of Daejeon or Seoul. Conversion activities included the uranium extraction from phosphates, ore processing pilot plant, and UO₂ plant and UF₄ conversion line and uranium metal reduction experiments.

Complementary access were carried out with two(2) hours notice in conjunction with inspection activities and others were carried out with twenty-four(24) hours notice. Since the Subsidiary Arrangement between the ROK and the IAEA was not concluded, the application of the measures speculated in the Additional Protocol could not be carried out smoothly. For example, administrative procedures such as delivery of inspection notices and preparation of the CA were not satisfactory. For the more efficient implementation of the CA, the

development of infrastructure, procedures and training for the implementation of the CA are needed.

3.1 Provision of the Additional Information

The IAEA verification mission team requested the facility operators the additional information on each experiment as follows:

- History of the research program (chronology);
- Reasons for conducting the research experiments and for later halting the project and current intention for each program, if any;
- Original and current intentions for the each program;
- Funding and oversight of the program and reporting chain for results;
- Nature of nuclear material used in the research experiments and current location of these materials;
- Equipment involved in the research experiments and associated activities; and
- Identify scientists and engineers involved

During the preparation of the additional information, the operator met some difficulties due to the nature of the information. Some of documents didn't exist or were not sufficient. Some times the operator didn't understand the safeguards terminology and made misleading the past experimental research works. Therefore, the information needs to be reviewed by the safeguards person before the presentation or submission of the information to the IAEA.

During the CA, the inspectors interviewed key scientists to verify declaration and record the interviews.

3.2 Verification on Experimental and Conversion Activities

For verifying the information, the inspectors carried out following activities:

- Visit the location of the each experiment;
 - To take environmental samples
 - To take inventory, characterize and photograph remaining equipment
- Verify quantities and characteristics of nuclear material involved in the experiments;
- Examine records related to the experiments;
- Verify disposition of all nuclear material and equipment from the experiments; and
- Visit other laboratories
 - To assess other technologies and equipment
 - To collect environmental samples

During the CA, operators met the following difficulties:

- Access difficulty due to the safety reasons or safety regulations; and
- Guidance of several inspectors at the same time

KAERI applied the managed access of location only for the safety consideration during these verification activities. KAERI support the verification activities in all means.

For the further verification activities, they visited the associated waste storage location and measured radiation activities and took DA or environmental samples. Sometimes they applied containment and seals on waste boxes and verified the fate of equipment. They also followed up the nuclear material involved. At the end of the verification mission, they conducted swipe sampling to re-establish baseline in the verification location. During the course of the CA to the wastes or dismantled equipment, we met the difficulties of access due to the radiological safety reasons or multi-lay-up stock piling of wastes or identification of requested wastes.

It was recognized that all safeguards matter be well documented, reported and kept in an appropriate manner.

3.3 Other Verification Activities

To confirm the associated location, the inspection team visited Youngnam chemical company in Ulsan and U-mine in Goesan. They confirmed the current status of the plant and mine, respectively, and took photographs and samples. They also performed the clarification of the functions of building formerly associated with the site but not part of current site boundary at KAERI Seoul site.

These verification activities required the accessibility of associated location in timely manner. Procedures to access the other sites should be established properly.

4. Conclusion

The Complementary access under the Additional Protocol is an impotent component in strengthened safeguards. It can provide the IAEA with a greater understanding of a State's nuclear activities, resolve questions and inconsistencies that arise through information analysis and serves as a deterrent undeclared nuclear activities. For the more efficient implementation of the CA, the development of infrastructure, procedures and training for the implementation of the CA are needed.

REFERENCES

- [1] "Protocol Additional to the Agreement between the Government of Korea and the International Atomic Energy Agency for the Application of Safeguards in Connection with the Treaty on the Non-Proliferation of Nuclear Weapons" entered into force on 19 February 2004.
- [2] "Reporting Criteria for Internationally Controlled Material", Notice of the Minister of Science and technology, No. 2004-5. (in Korean)