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RECENT DEVELOPMENTS OF NUCLEAR NON-PROLIFERATION IN PNC

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It is important to explain the direction and rationale of the civil nuclear program to its citizens and to citizens of other countries to avoid any possible misunderstanding. In light of these considerations, both the Government and the nuclear industry of Japan have been pursuing a multi-pronged effort to strengthen the global nonproliferation regime and enhance international understanding that the use of plutonium will occur under the most secure and rigorous conditions in order to discourage and prevent any misuse.

To this end, PNC has been a strong supporter of the technical improvement and advancement of the IAEA safeguards system, including the ability of the IAEA to apply the most up-to-date safeguards to plutonium bulk handling facilities. PNC has also been active in encouraging the examination of more "proliferation resistant" fuel cycle concepts that serve to reduce the accessibility of special nuclear materials.
So-called Pu/U co-processing is employed in the PNC fuel cycle system so that the plutonium is always recovered as a mixture with the uranium in the same or larger amount. Moreover, the concept of advanced fuel recycle system shown in Fig.1 where plutonium is never available in a form separated from other heavy elements and fission products is very appealing from a nonproliferation perspective and continues to be a subject of interest and discussion.

It is also an essential factor for PNC to gain public trust and understanding of its activities in order to continue the research and development of civilian plutonium utilization technology. PNC has begun to actively take initiatives on an international scale to improve both transparency and openness, and to contribute to nonproliferation.
A few examples of PNC's new initiatives include :

- With the motto "Nuclear Nonproliferation and Safety Are Like Two Inseparable Wheels of a Vehicle" as PNC's basic philosophy, PNC adopts appropriate measures for better transparency and reliability of its activities and promotes nonproliferation objectives.
- PNC established the Office of Nuclear Nonproliferation in 1993 to fill an important role for managing issues relating to nuclear nonproliferation, and to reinforce appropriate countermeasures against nuclear proliferation.

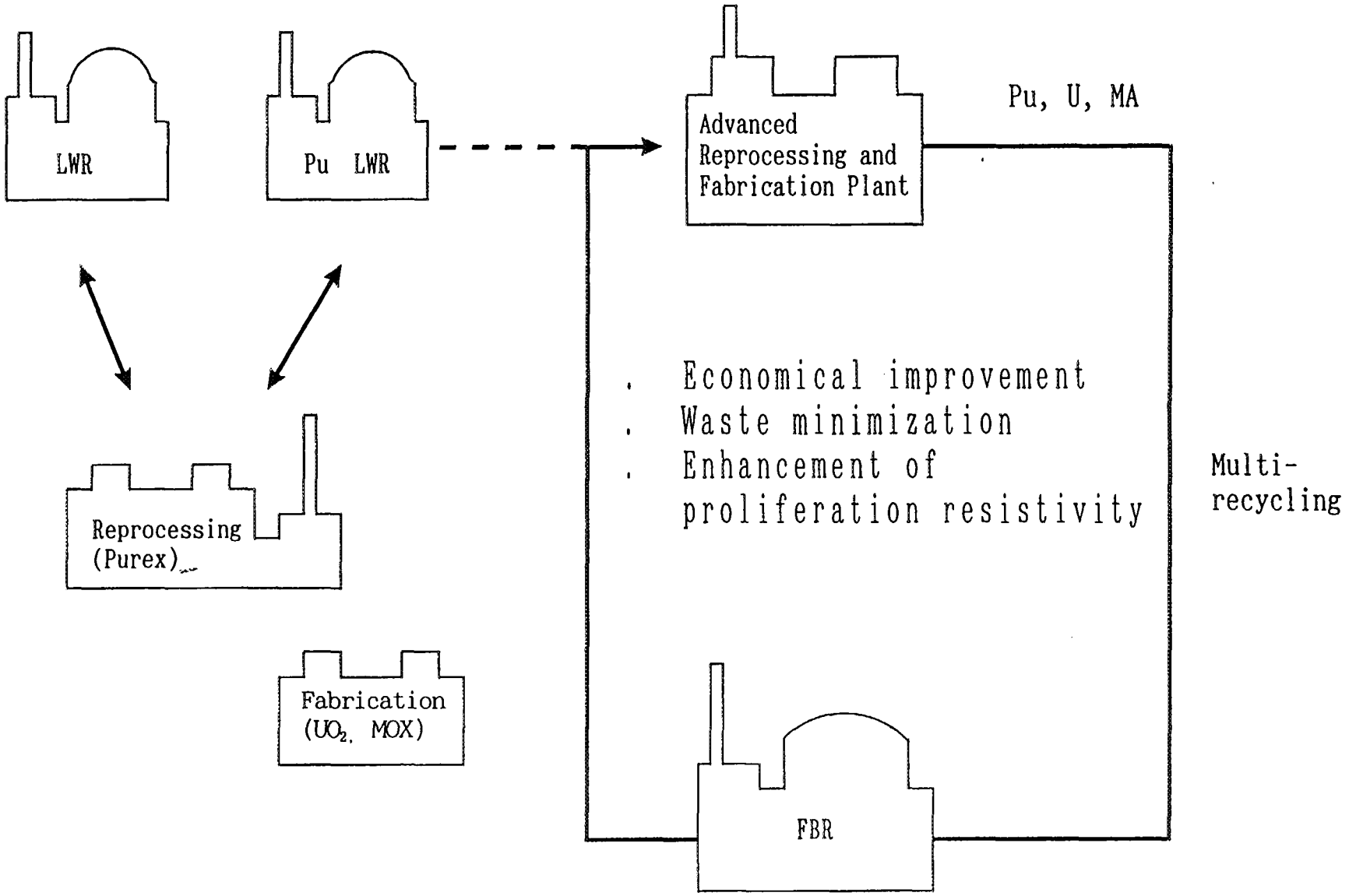

Figure 1. Concept of advanced fuel recycle system

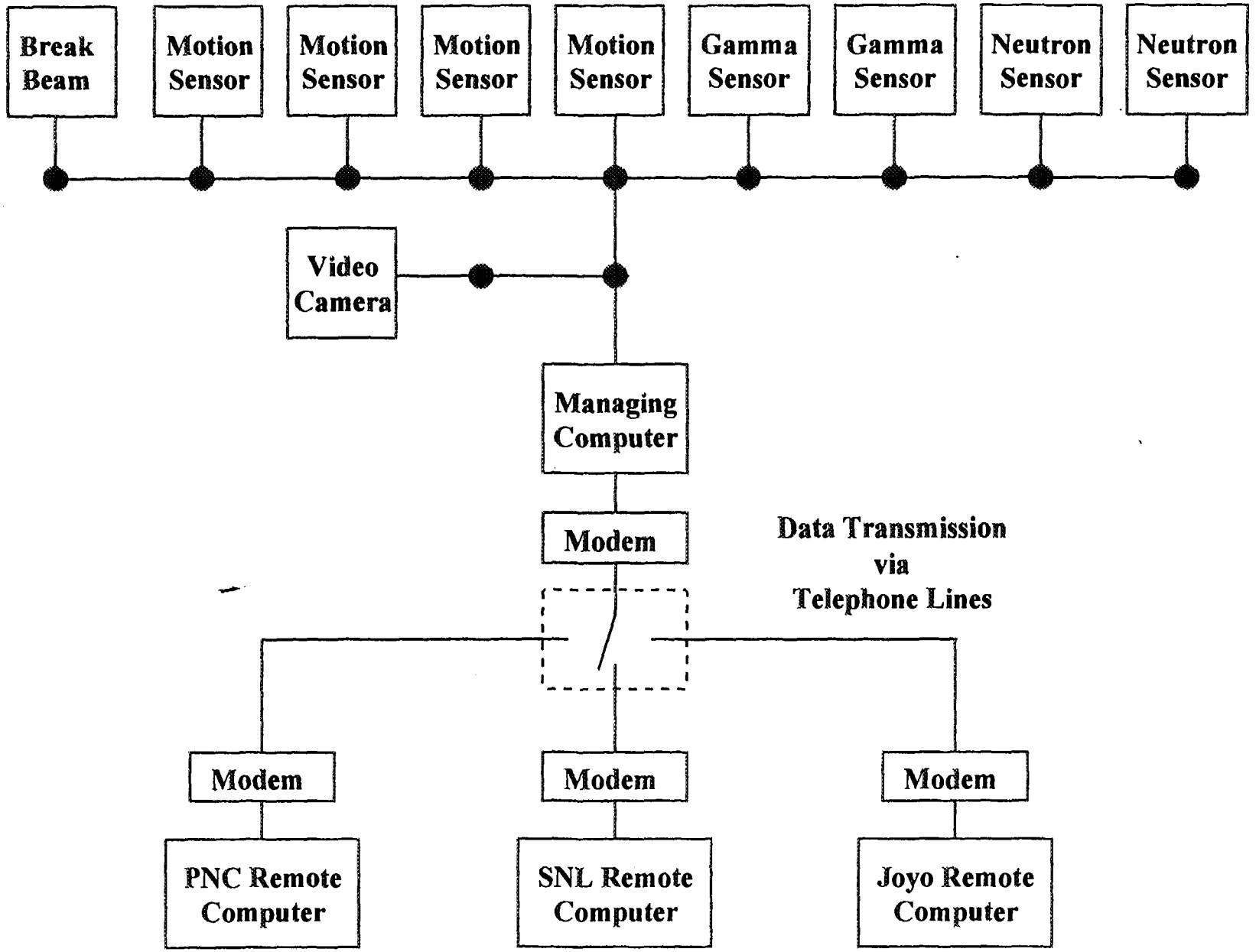

Figure 2. Joyo Remote Monitoring System Block Diagram

- In the interest of studying nuclear proliferation issues from a broader perspective, namely, fully aware of various relevant trends including those in international politics, science, culture and sociology, PNC established a "Study Group on Nuclear Nonproliferation" in 1995 primarily comprised of industry professional from other company and university professors.
- In November 1996, PNC held "the 2nd PNC International Forum on Nuclear Nonproliferation", with approximately 30 experts invited as panelists from Japan and abroad. At this Forum, which was attended by about 650 people, the discussion addressed two central themes: "The International Environment for the Peaceful Use of Nuclear Energy" and "Nuclear Energy Development and Nonproliferation Issues in Asian Region.

Furthermore, PNC and DOE are collaborating on both the development of a Remote Monitoring System and in Research on "Transparency" for nuclear nonproliferation. The collaboration is part of PNC/DOE Agreement for Cooperation in Safeguards and Nonproliferation.

A remote monitoring system is being installed in a spent fuel storage area at PNC's experimental FBR "Joyo" in Oarai Engineering Center. The system shown in Fig.2 has been designed by Sandia National Laboratories and is closely related to those used in other Sandia remote monitoring projects. In particular, the Joyo project will study the unique aspects of remote monitoring in contributing to nuclear nonproliferation. The project will also test and evaluate the fundamental design and implementation of the remote monitoring system in its application to regional and international safeguards efficiency.

The purpose of the joint Research on "Transparency" is to clarify the means to improve world wide acceptability for the nuclear energy from the nuclear nonproliferation point of view. PNC and DOE carry out the study of the related subject independently, then hold meetings to exchange information and views on "transparency", namely the policy environment of transparency, the development of transparency options, and technical options for transparency.

As a result of program of contributions to nuclear nonproliferation created by the Japanese Government, PNC, which has already obtained an extensive nuclear control-related expertise from FBRs such as "Joyo" and "Monju", was requested to provide technology assistance for the system of the nuclear material accountancy at the BN-350 FBR in Kazakhstan.