Current Strategies against Environmental Endocrine Disrupters by the Ministry of the Environment, Government of Japan

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My name is Kazuhiko Adachi and I am the director of the Environmental Health and Safety Division, Environmental Health Department, Ministry of the Environment, Government of Japan.

On behalf of the Ministry of the Environment, I welcome all you who are participating in this symposium.

At the Ministry of the Environment I am in charge of safety measures concerning chemical substances. I would therefore like to talk briefly about what we are doing to address the problem of endocrine disrupters in the environment, also known as "environmental hormones".

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First I would like to explain just what endocrine disrupters are. Endocrine disrupters are defined as "exogenous substances that alter normal function of the endocrine system in animals." It has been pointed out that endocrine disrupters can disrupt the endocrine systems of human beings and wild animals, and have a serious deleterious effect on future generations. The Ministry of the Environment therefore recognizes endocrine disrupters as a serious problem concerning the health of the environment.

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Next is the typical mechanisms of action of endocrine disrupters. Hormones such as estrogen in the living body of an organism normally bind with the proper receptors and exhibit their effect. Scientists however say that when chemical substances that are not hormones bind with these receptors, the normal hormone effect is inhibited or amplified.

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The existence of these substances was first pointed out by the book "Our Stolen Future" published in 1996, giving rise to concern about "environmental hormones" in Japan as well as other countries. With the Interagency Liaison Committee on Endocrine Disrupters was established in 1997, the entire government became involved in a coordinated effort to address the problem of endocrine disrupters. In 1998, the former Environment Agency promulgated Strategic Programs on Environmental Endocrine Disrupters (SPEED'98) for addressing the problem of endocrine disrupters in the environment, and created a list of 67 substances suspected of being endocrine disrupters.

Subcommittee of Endocrine Disrupters was established in the Environmental Committee of Liberal Democratic Party in 1998. Under the leadership of the late Prime Minister Keizo Obuchi, the Millennium Project was initiated in the year 2000. The project calls for assessing the hazard of over 40 substances over a period of three years.

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Based on SPEED '98 promulgated in 1998, the government began to actively address the problem of endocrine disrupters in the environment primarily by: (1) conducting a study of the environment, (2) conducting experimental research and developing technologies, (3) assessing environmental risk and providing information, and (4) promoting international joint researchers.

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Next I would like to talk about the Ministry of the Environment's system of countermeasures to deal with the problem of endocrine disrupters. First is to conduct a study of the environment and assess hazard of chemicals existing in the environment using the test methods we have developed. We then assess risk of the chemicals based on the results of the study and assessment, together with the results of assessing exposure of the environment, food and indoor air to the chemicals. We then manage risk based upon these results. At the same time, we work together with the international community through international symposiums and international joint research.

In the first part of our symposium, leading researchers in the field will provide a description of their work.

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I would first like to talk about hazard assessment. Hazard of certain chemicals has been assessed as part of the Millennium Project initiated in 2000. Here you see a list of chemicals we began to assess in the year 2000 and the year 2001. Hazard of each of these chemicals concerning mammals and fishis currently being assessed.

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First is assessment of hazard in mammals. The OECD tests for verification are being conducted along with the *in vitro* test and one generation study that Dr. Aoyama of the Institute of Environmental Toxicology will talk about in his presentation.

We are also involved in development of a test method using the DNA chip that Dr. Kondo of Takara Shuzo Co., Ltd., will describe in his presentation.

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Next is assessment of hazard in the ecosystem. In addition to the experiments conducted by Dr. Yokota of the Chemical Evaluation and Research Institute using fish, particularly *medaka*, test methods using birds and amphibians are also being developed.

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Of the 20 substances mentioned previously, the results of assessing risk of nonylphenol and tributyltin toward fish were announced in August this year. The English version of the assessment has already been presented to the OECD, and we have heard the comments of other member countries, so I would like to talk briefly about that.

These are photographs of testis-ova that appeared in an experiment where *medaka* were administered doses of nonylphenol. Photograph A shows normal testes and photograph B shows normal

ovaries. Photographs C and D however show oocytes in the testes of fish living in water containing nonylphenol.

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The Ministry of the Environment considers the concentration where testis-ova do not appear, in other words, the predicted non-effective concentration, 0.608 (g/L obtained by multiplying the non-effective concentration of 6.08 (g/L by the safety coefficient of 1/10. Compared with the results of the study of the environment, predicted non-effective concentration was exceeded at 71 of 1,574 sites, or 4.5% of the sites.

It has been therefore determined that nonylphenol found in the environment of Japan could be affecting fish by its endocrine disrupting effect. This is however the effect of the substance on fish, and there is currently no evidence of such an effect on human beings. Our research has revealed that the affinity of nonylphenol to bind with the receptors of human beings is less than one of several hundredths that of fish, we believe it would have almost no effect on human beings.

I have mentioned that nonylphenol may have an effect on fish, but with the data we currently have, we don't know what is actually happening out in the natural environment. We don't know for example if egg cells in the testes leads to decline in reproductive function or how nonylphenol behaves in water. Although we have used the safety coefficient of 1/10, we have a lot of things to reveal about the effect on the species preservation at this level. Based on the preventative approach, we feel it is necessary to try to reduce risk.

In specific terms, we feel it necessary to consider what sort of testing and restrictions would be best for chemical substances from the standpoint of conservation of the ecosystem, developing and using less toxic substitutes for such chemicals, and having industry take the initiative for implementing measures to prevent the harmful effects of such chemicals.

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There is still a lot that we do not know about endocrine disrupters. We therefore feel that international cooperation is important. We feel it is important to contribute to the efforts of the OECD, conduct international cooperative research such as joint research between Japan and the U.K. and between Japan and the Republic of Korea, and hold international symposiums.

Today we heard Dr. Bo Janssen talk about the Stockholm Convention on POPs concluded in May 2001. The 12 POPs substances have been listed together with substances suspected of being endocrine disrupters in SPEED '98. Japan is also taking positive measures toward conclusion of the convention.

The Ministry of the Environment will continue to be actively involved in finding solutions for the problems posed by chemical substances, including endocrine disrupters. We appreciate your continued understanding and cooperation.

This brings my introduction to a close.
I now turn the floor over to other speakers.
Thank you for your attention.