(Attachment 3)

[Survey 3] Results of FY2020 Survey on Concentrations of Radioactive Cesium Contained in Male Flower of Cedar

1. Purpose of Survey

For the concern over re-spreading of fallout radioactive cesium into forests due to cedar pollen scattering, in 2011, immediately after the accident at the Fukushima Dai-ichi Nuclear Power Station, the Forestry Agency began a survey to estimate the radioactive cesium concentrations in cedar pollen from male flowers. In light of past surveys, the radioactive cesium concentrations in male cedar flowers have shown a general decreasing trend each year, but tend to be high when air dose rates are high. This year, continuing from the previous year, the Forestry Agency conducted another survey on radioactive cesium concentrations in male cedar flowers, with special attention given to sites with relatively high air dose rates.

Photo 1 Sampling

Photo 2 Measuring air dose rates

2. Survey Method

The survey was conducted at 16 sites with relatively high air dose rates in Fukushima Prefecture. Among them, 10 sites have been continuously surveyed since 2011, and five

sites were newly selected in FY2017. The remaining one site has been continuously surveyed since FY2016, which was re-selected in the previous fiscal year.

Male cedar flowers were sampled in November 2020, and at that time, air dose rates at a height of 1 m from the ground were measured near the sampled trees. In this period, male flowers (pollen) are fully mature and have fallen dormant, and the concentrations are nearly the same as those in the pollen scattered in spring the following year. The number of trees from which male flowers were collected was about three per site. Samples were collected from the same trees from which samples were collected in the previous year as much as possible. If male flowers were not available, samples were collected from nearby different trees.

The sampled male flowers were washed, dried, gathered up per site, and subjected to gamma-ray spectrometry using a germanium semiconductor detector to measure radioactive cesium (Cs-134 and Cs-137) concentrations. This year's measurements were normalized to February 1, 2021.

3. Results

The results of the survey on the concentrations of radioactive cesium (sum of Cs-134 and Cs-137) contained in male flowers of cedar collected from 16 sites are shown in Reference 1.

The trend of higher radioactive cesium concentrations in male flowers in areas with higher air dose rates was observed this year as well. This year, the highest radioactive cesium concentration in male flowers was 10,400 Bq/kg, which is approximately 4% of the highest value (253,000Bq/kg) observed immediately after the accident at the Fukushima Dai-ichi Nuclear Power Station (occurred in FY2011).

Compared with the survey conducted in the previous year (FY2019) , this year's values of radioactive cesium concentration in male flowers and air dose rates both averaged approximately 90% of the results in the previous year. Comparing the 10 sites for which the survey has continued since FY2011, immediately after the accident, the radioactive cesium concentrations in male flowers averaged about 1% of the values for this fiscal year.

The radioactive cesium concentrations in male cedar flowers and the local air dose rates in the high radiation dose areas of Fukushima have decreased significantly compared to the period immediately after the accident.

From the results above, under the conditions used in FY2011, the radiation dose a person receives when the highest concentration of radioactive cesium as measured in this

year’s survey is scattered into the air carried by cedar pollen and the person inhales the air was estimated. The maximum estimated value was 0.0000096 μSv per hour, which was about 5% of the value (0.000192 μSv) estimated in FY2011 (Reference 2). The cumulative radiation dose during the cedar pollen dispersal period (February to May) is 0.0000276 mSv, which is sufficiently small (0.001%) compared to the annual radiation dose received by humans in Japan (2.1 mSv/year on average). Therefore, the effect on the human body is considered to be negligible.