Investigation of Secondary Off-site Radiological Effect due to Living Activities after Fukushima Accident

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Secondary Off-site Radiological Effect due to Living Activities after Fukushima Accident

Accident

Living activities
- Disaster debris, Cars, Wild fire, Transportation, Factory products, Repair of Infrastructures, etc.

Contamination

Secondary Dispersion of Contaminant

Dose reduction
- Evaluation of dose
- Implementation of counter measures for preventing or mitigating

Decontamination

Exposure of local resident
Survey of radioactive contamination of disaster debris

Disaster debris of earthquake and tsunami

(1) Correlation of ambient dose rate, soil contamination and radioactivity of debris

(2) Measurement of debris by In-situ Ge detector method and sampling
Exposure of drivers or car mechanics by cars from evacuation areas

Dose rate in engine room (μSv/h)

<table>
<thead>
<tr>
<th>Sample number</th>
<th>Drainage path</th>
<th>Radiator</th>
<th>Engine</th>
<th>Air filter</th>
<th>No.1</th>
<th>No.2</th>
<th>No.3</th>
<th>No.4</th>
<th>No.5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>42</td>
<td>13</td>
<td>8.2</td>
<td>5.2</td>
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<tr>
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<td>5.2</td>
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<td>59</td>
<td>5.2</td>
<td>4.0</td>
<td>9.2</td>
<td>5.2</td>
</tr>
</tbody>
</table>

Dose rate on the road

Exposure of drivers and car mechanics

Decontamination of cars

Before decontamination
After decontamination
In car value after decontamination

GM count rate of cars (kcpm)

Prefectural road 35, 36

R6

R288

30km

20km

0 20 40 60 80 (μSv/h)
Exposure dose due to large scale fire in evacuation areas

Investigation of contamination status in forest

Smoke rise
Dispersion of Cs with wild fire
Impact on fire fighters

Advection and diffusion of Cs

Simple and quick evaluation tool

Investigation after wild fires

Exposure dose =

Radioactive material concentration
Terrain indicator

Land use indicator
Protective mask indicator
Wind velocity indicator
Wind direction indicator

Modeling of plume
Exposure dose of workers of infrastructures

Survey of infrastructures in the evacuation area

<table>
<thead>
<tr>
<th>Infrastructure</th>
<th>Exposure dose of worker of waste incineration plant (μSv/y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Incombustible waste yard</td>
<td>1,400 Bq/kg</td>
</tr>
<tr>
<td>- Combustible waste yard</td>
<td>8,000 Bq/kg</td>
</tr>
<tr>
<td>- Control room</td>
<td>PPM</td>
</tr>
<tr>
<td>- Main ash treatment</td>
<td>PPM</td>
</tr>
<tr>
<td>- Fly ash treatment</td>
<td>PPM</td>
</tr>
<tr>
<td>- Valuable storage area</td>
<td>PPM</td>
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<tr>
<td>- Fly ash storage area</td>
<td>PPM</td>
</tr>
<tr>
<td>- Maintenance</td>
<td>PPM</td>
</tr>
</tbody>
</table>

Estimation of exposure dose of workers

Ambient dose on the pathway to the waste landfill (μSv/y)

Distance from the waste incineration plant (km)
Existing exposure dose of local residents depends on life style.
Evaluation of exposure dose for each exposure pathway is essential for dose evaluation of various life styles.
Evaluation tool is under development.
Exposure dose evaluation of local residents (2/2)

- Analyze life style of local resident
- Define exposure scenario
- Define exposure pathway of representative person

- Develop evaluation model
  - Migration of radioactive material
  - Exposure dose of each person

- Establishment of parameters
  - Field data if available
  - From existing data base if not
    (Existing data will be replaced by field data when available)

Exposure dose evaluation of local residents for future