

opportunities to reduce pollution, but also to reduce disposal costs.

VII. Risk Screening Analysis

A. Introduction

The discussion below summarizes the Agency's risk screening analysis for disposable and reusable industrial wipes. For specifics regarding the risk analysis or details on how it was conducted, please see the background documents in the docket for today's proposed rulemaking, particularly the risk screening assessment document, "Estimating Risk from Disposal of Solvent Contaminated Shop Towels and Wipes in Municipal Landfills," March 1999.

As previously stated, several stakeholders have argued that disposing of industrial wipes containing small amounts of solvent in municipal or other non-hazardous waste landfills would not pose a substantial hazard to human health and the environment and have submitted rulemaking petitions to the Agency on this matter. Similarly, they argued that disposal of treatment residues, such as ash from incineration of disposable wipes and sludges from wastewater treatment at laundries washing industrial wipes, would not pose a substantial hazard. In response to these arguments, EPA conducted risk screening analyses for the following scenarios to evaluate the potential risks to human health and the environment:

- Direct landfilling of disposable industrial wipes,
- Landfilling of combustor ash generated from burning disposable industrial wipes in a municipal waste combustion facility, and
- Landfilling of industrial laundry wastewater treatment sludges generated from washing reusable industrial wipes.

B. What Analyses Did EPA Do?

EPA first estimated risks from exposure to the 30 F-listed solvents commonly used on industrial wipes assuming they were directly disposed of in an unlined municipal landfill. We looked at potential risks from inhalation of the solvents volatilizing from the landfill, from ingestion of groundwater contaminated by solvents leaching from the landfill, and from inhalation of solvent vapors released from contaminated groundwater during showering and other uses. We evaluated exposure to solvents volatilizing from landfills using a partitioning model to determine solvent releases and an air dispersion model to determine the air concentration at a point of exposure 75 meters from the landfill. The partitioning model estimates what

fraction of the total mass of solvent degrades, volatilizes, leaches, and adheres to the material in the landfill.

The evaluation of risks from groundwater incorporated previous probabilistic analyses of groundwater fate and transport to determine the relative concentrations of contaminants in the landfill leachate and at a nearby well. The 5th percentile value from the distribution of results, which is a conservatively low ratio of leachate concentration to well concentration (*i.e.*, indicates a high well concentration relative to a given leachate concentration), was used for the analysis. The results of the probabilistic groundwater analyses were combined with partitioning model results, which determined the initial leachate concentrations, and with standard default exposure assumptions, which determined the exposure to individuals from the calculated well concentrations.

The exposure evaluation examined the sensitivity of the results to different parameters such as the size of the landfill and climatic conditions. EPA determined that the most sensitive set of conditions was exposure to children due to releases to groundwater from a small landfill in a wet climate. This worst-case scenario was used to estimate maximum allowable daily loadings for each solvent, based on not exceeding specified risk levels.

In particular, to evaluate risks, EPA used health benchmarks from its Integrated Risk Information System (IRIS), supplemented with other sources as necessary. Benchmarks for noncarcinogenic solvents are presented as reference doses (RfD) for exposures through ingestion and as reference air concentrations (RfC) for exposures through inhalation. These are concentrations which are considered to be protective of human health; therefore, the calculated exposures were compared directly to these values to determine whether there was a potential human health risk for the noncarcinogenic solvents. For carcinogens, IRIS presents cancer slope factors, which are used to calculate risk as a function of exposure dose. For this analysis, EPA used the exposure dose corresponding to a cancer risk of 1 in 100,000 (10⁻⁵) as the health benchmark for an acceptable cancer risk level.

We initially evaluated disposal of industrial wipes from one generating facility sent to one landfill. EPA then evaluated various factors, such as the number of facilities likely to use one landfill for disposal, percentage of facilities using F-listed solvents, and the percentage of facilities sending their disposable industrial wipes to landfills

rather than combustors in order to extrapolate the results from the initial analysis into results which would be representative of potential actual exposures.

EPA's second analysis estimated risks from disposal of ash from incinerators burning disposable industrial wipes. EPA assumed that 99.99% of the solvent was destroyed in the incinerator (with the remainder going into the ash) to derive a solvent loading in ash for each of the 30 F-listed solvents. We then used the same landfill analysis described above to determine how much solvent would be partitioned to leachate, transported to the receiving well, and exposed to the receptor. As in the above landfill analysis, EPA then calculated what the allowable solvent loadings to an incinerator could be to determine which listed solvent ash residues could safely be disposed of in a municipal or other non-hazardous waste landfill.

EPA's third analysis was of potential risks from disposal of sludge from wastewater treatment at laundries which clean solvent-contaminated industrial wipes. For this analysis, we used the maximum of a very limited number of wastewater concentrations collected from industrial laundries by the Office of Water as part of their effluent guidelines development process. We estimated the sludge concentrations of different solvents using a partitioning model to estimate the mass of solvent in the wastewater that partitions to air, water, and sludge. Since we had wastewater data for only a limited number of solvents, we extrapolated that data to the other solvents. Once we had a solvent loading in the sludge going to a landfill, we used the same analysis described above to estimate risks.

Finally, EPA examined potential ecological risks by estimating solvent concentrations in surface water streams which are affected by groundwater contamination from landfills with solvent wastes. These estimated concentrations were then compared to available water quality criteria. The analysis was very conservative in that 100% of the solvent in groundwater was assumed to be discharged into a small stream; however, water quality criteria were available for only ten of the solvents, so the other 20 were not evaluated for ecological risks. More information on the analysis can be found in Section V of the Technical Background Document for this proposal, available in the Docket.