

Talking Points for:

Health Consultation – Steel Slag on County Roads, Muscatine County, Iowa

- The location of the roads sampled for evaluation were determined by information supplied by Muscatine County Officials, including:
 - Amount of slag applied per route.
 - The date of slag application – locations where slag was recently applied.
 - Locations in close proximity to residential properties.
- The health consultation evaluated the following exposure scenarios:
 - Exposure to children living near and routinely traveling on roads where slag is applied.
 - Exposure to adults living near and routinely traveling on roads where slag is applied.
 - Incidental *ingestion* and *inhalation* exposure to the slag applied to the roads are considered in each of these exposure scenarios for children and adults.
 - Exposure to workers who apply slag and maintain the roads where slag is applied.
- The major assumptions utilized in this health consultation are:
 - Fifty percent of an adult and child's overall soil and dust exposure will come from slag deposited on roads near where they live.
 - One-hundred percent of the metals contained in the slag is bioavailable to the person exposed to the slag.
 - These assumptions are conservative and protective of human health
 - Other health evaluations that use other assumption may result in different evaluations of risk
- Potential health concerns from the slag deposited on the road locations evaluated:
 - Children living near the sample locations along Davis Avenue, 260th Street, and Holly Avenue (3 of the 5 sampling locations) may experience adverse health impacts from exposure to slag from incidental *ingestion* of slag. *Inhalation* exposure to slag is not expected to adversely impact health
 - Children who exhibit pica behavior would be at risk of adverse health impacts if they played in areas covered by slag similar to the slag that is located at the road sections sampled. Since it is unlikely that children will be playing in county roads, the county roads do not pose a significant risk of adverse health impacts through the direct ingestion route of exposure.
- The following conclusions and recommendations are made to Muscatine County:
 - A manganese concentration above 12,000 mg/kg within the steel slag-containing road surface, as determined by sampling at the road location, has the potential to produce adverse health impacts to children living near the road.
 - While the slag does not pose a significant risk of adverse health impacts, residents may seek recommendations to alleviate their concerns of exposure. Sealing or providing dust suppression on areas of the county roads where slag is applied will limit incidental *ingestion* exposure to elevated levels of manganese.

Talking Points for:

Comparison of “Health Consultation – Steel Slag on County Roads, Muscatine County, Iowa – January 2020” prepared by IDPH and “Risk Assessment for Use of Steel Slag on Muscatine County Secondary Roads – June 2019” prepared by Tox Strategies for Harsco Metals

- Tolerable levels of exposure to manganese:
 - IDPH consultation utilized a tolerable dose 0.08 mg/kg/day for children and 0.14 mg/kg/day for adults.
 - Tox Strategies risk assessment utilized a tolerable dose 0.16 mg/kg/day for adults. The tolerable dose utilized for children by Tox Strategies is not apparent from a review of the risk assessment.
- Exposure routes evaluated:
 - The exposure routes evaluated in the IDPH consultation included:
 - Incidental *ingestion* of slag on roads to adults and children living near road sampling sites and workers applying slag.
 - *Inhalation* of airborne slag from road dust to adults and children living near road sampling sites and workers applying slag.
 - Direct *ingestion* of slag to children with pica behavior.
 - The exposure routes evaluated in the Tox Strategies risk assessment include:
 - Construction workers, who use slag in road building, exposed by *inhalation* of suspended dusts and incidental ingestion
 - Adult and child residents living near slag-covered roads, exposed by *inhalation* to airborne dust from suspension of particles due to vehicle traffic. Exposure is assumed to occur solely via air.
 - Adult and children exposed to slag in a driveway via incidental *ingestion* and *inhalation* of airborne dust.
- Bioavailability of manganese:
 - The IDPH consultation assumed 100% bioavailability for manganese.
 - The Tox Strategies risk assessment assumed 33% bioavailability for manganese.
- Safe level of manganese on roads:
 - The IDPH consultation concluded that a safe level of manganese on the roads would be 12,000 mg/kg, using the following assumptions:
 - A tolerable dose of 0.08 mg/kg/day for children and 0.14 mg/kg/day for adults.
 - Fifty percent of incidental *ingestion* comes from road.
 - One-hundred percent bioavailability for manganese.
 - The Tox Strategies risk assessment established two safe levels: 108,000 mg/kg and 38,000 mg/kg
 - The 108,000 mg/kg level is for a residential roadside exposure and only considers *inhalation* exposure.
 - The 38,000 mg/kg level is for residential driveway exposure and is similar to the level of 12,000 mg/kg established by the IDPH consultation, but includes a slightly higher tolerable dose assumption and a 33% bioavailability assumption for manganese.