



DEPARTMENT OF ENVIRONMENTAL PROTECTION

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Memorandum

To: Commissioner Mark Mauriello

Through: Jeanne Herb, Director, OPPS

From: Eileen Murphy, Director, DSRT

Subject: Risk Assessment for Hexavalent Chromium Based on NTP Ingestion Study

Date: April 8, 2009

As per your request, attached is the finalized risk assessment for oral exposure to hexavalent chromium ( $\text{Cr}^{+6}$ ) based on the recently published National Toxicology Program (NTP) study of carcinogenicity via ingestion.

The risk assessment was developed by Alan Stern of DSRT. It was peer reviewed by a panel of external experts from across the country, including USEPA and state risk assessors, and the NTP researchers who conducted the original study. Following incorporation of the peer reviewers' comments, the final document was reviewed and approved by the interagency Risk Assessment Subgroup of the NJDEP Chromium Workgroup.

The NTP chronic bioassay of rats and mice exposed to sodium dichromate dihydrate in drinking water is the first study that provides data on the carcinogenicity of  $\text{Cr}^{+6}$  by ingestion that is appropriate for quantitative risk assessment. NTP concluded that the study provides "clear evidence of carcinogenicity" in male and female mice and rats, based on benign and malignant tumors in rat oral mucosa and mouse small intestine. Consistent with the criteria for carcinogen characterization in the USEPA Guidelines for Carcinogen Risk Assessment,  $\text{Cr}^{+6}$  by ingestion is determined to be "likely to be carcinogenic to humans." The mouse was selected as the most sensitive species and the human cancer slope factor was developed based on assumptions and approaches that are consistent with the 2005 USEPA Guidelines for Carcinogen Risk Assessment. The human cancer slope factor was estimated to be  $0.5 \text{ (mg/kg/day)}^{-1}$  based on the tumor incidence in male mice. Based on exposure assumptions for the oral exposure pathway in the NJDEP Soil Remediation Standards, this potency factor corresponds to a soil remediation criterion for  $\text{Cr}^{+6}$  of 1 ppm.