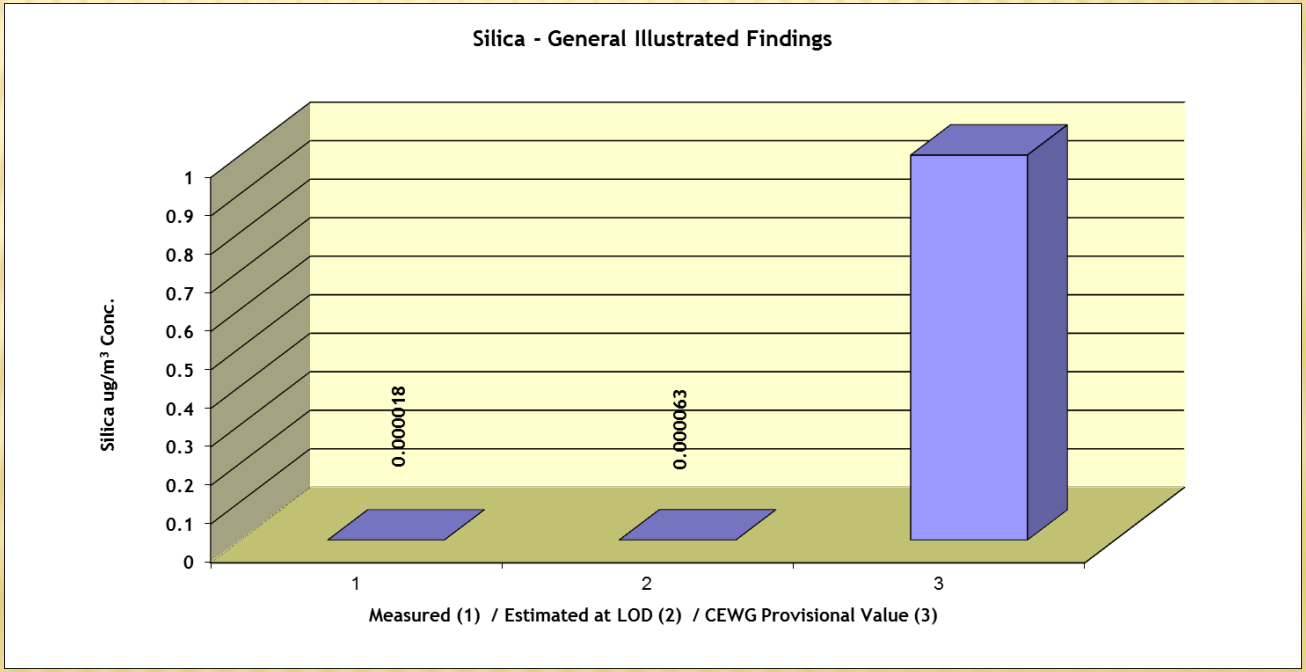
Briefing of Results April 13, 2011 to the Silica Testing Task Force (STTF)

CRYSTALLINE SILICA TEST

FINDINGS

- Crystalline Silica was found on only 1 of the 20 collected stack samples from the five (5) Intel RCTO's;
  - **(1) The detected value equates to 0.0000177 µg/m³ at fenceline**
  - **(2) Assume other non-detect samples @ LOD = 0.0000634µg/m³ at fenceline**
  - **(3) CEWG Provisions level = 1.0 µg/m³ at fenceline**



OBJECTIVE

- Determine presence of crystalline through source testing of all Intel RCTO stacks;
- Determine if crystalline silica emissions are potentially high enough to pose a known health hazard;
- If emissions are sufficiently high, measure the crystalline silica fraction of the silica emissions.

APPROACH

- Conduct EPA approved stack sampling methods to collect sufficient particulate matter (PM) from RCTO exhausts to quantify emissions;
- Use the citizen observers to ensure that the sampling is done in an unbiased, objective manner;
- Use NIOSH approved methods to analyze for crystalline silica from collected samples by X-ray diffraction (XRD) technique.

TESTING METHOD

- Execute Approved Field Measurements:
  - Develop approved methods compatible for both source and analytical lab to support collection and analyze for PM and crystalline silica;
  - Coordinate a field program to support simultaneous testing of all oxidizer stacks;
  - Send all exposed filters to NIOSH for gravimetric (PM) and XRD (silica);
  - Consolidate field and lab data to report results.

SAMPLE COLLECTION & HANDLING

- EPA sampling techniques were used by Intel Contractor ERM to collect PM from all Durr & Munters stacks simultaneously under observation by citizens;
- A Collaborative approach to designing the field and analytical methods was supported by NIOSH (Key-Schwartz), ATSDR (Kowalski), and ERM (Parker).
- ERM conducted the field sampling;
- NIOSH contractors measured particulate mass and crystalline silica on the filters.

HOW ARE THE RESULTS TO BE USED ?

- To determine if crystalline silica is emitted from the Intel RCTO stacks;
- If crystalline silica is detected, determine if the levels are significant;
- If levels are significant: further investigation;
- If the levels are insignificant, the CEWG will change focus from the crystalline silica concerns.

ARE CRYSTALLINE SILICA EMISSIONS SIGNIFICANT?

- **FIRST**: Test for crystalline silica emissions from all oxidizer stacks;
- **SECOND**: Estimate the highest crystalline silica concentrations to be expected outside the Intel fence line;
- **THIRD**: Compare the calculated crystalline silica concentrations to that of the CEWG provisional silica level of 1µg /m^3.

SAMPLE CONSIDERATIONS FOR SIGNIFICANCE?

- Model estimates show that stack concentrations are diluted by 178,000 times before reaching the fence line;

1 microgram per cubic meter at breathing level requires 178,000 micrograms per cubic meter in the stack

HOW MUCH DID WE NEED TO COLLECT (CONT)

- We estimated that a minimum of 50µg's of sample was needed for proper detection;
- ERM sampled, on average, 289 actual ft^3 of stack gas for a 4-continuous hour periods from each RCTO (sample volume corresponds to 8.19 m^3);
- The 50 µg's per 8.19 m^3 divided by the estimated 178,000:1 dilution ratio means that we can potentially measure crystalline silica concentrations that correspond to only 0.000034 µg/m^3 in the community.

WHAT DID WE SAMPLE?

- Target – 5 RCTO Stacks;
- Concurrent sampling of all 5 stacks for 4 continuous hours for 4 separate test runs supporting a total of 20 stack samples;
- Testing supported 2 daytime (~8:00-Noon) and 2 nighttime (Midnight – 4:00AM) events at different days of the week;

WHAT DID WE FIND?

- 19 of 20 samples were non-detects for crystalline silica;
- 1 sample had a positive detect of 310 micrograms of crystalline silica;
- 1 sample had loose particles on the filter that affected the analytical limit of quantification to 300 µg/m^3 and was reported as non-detect (ND) for silica.

WHAT IS THE MOST CONSERVATIVE RESULT WE COULD EXPECT?

- If we assumed that all the non-detect samples were just below (or at) the limit of detection (LOD); the samples would support an average of 92.5 µgs of crystalline silica.

- This corresponds to 92.5 micrograms divided by 8.19 cubic meters sample size divided by 178,000=0.000063 µg/m^3 in the community.

HOW DOES THIS LEVEL COMPARE TO THE CEWG PROVISIONAL LEVEL?

- The CEWG provisional level is 1.0 µg/m^3
- The highest level possible from the measurements is ~ 0.000063 µg/m^3 of crystalline silica in the community.
- With the most conservative approach, the measured results are orders of magnitude below the CEWG provisional level.

WHY PROVISIONAL LEVEL OF 1 µg/m^3

- California uses a safe level of 3 µg/m^3 for a larger cutoff size and a safety factor of 3.
- We estimated 1 $\mu g / m^3$ and used a safety factor of 10.

WHY "PROVISIONAL"

- The provisional level methodology is subject to review by independent toxicologist(s)

BASIS OF THE PROVISIONAL LEVEL?

- Based on studies of Miners; Crystalline Silica exposures of about 1 mg/m^3 mining-year would be about the level at which some silicosis might be expected.

- Adjusting for 7 days a week for 24 hours for a lifetime of 70 years, we get about 10 µg/m^3 to produce the same damaging potential exposure to the general population.

ADJUSTMENTS FOR NON-WORKERS

- California found a similar number and divided by three to adjust for a non-worker population and found 3 µg/m^3 as a screening level;
- Our value was adjusted by 10 to account for lack of women and children in the original data and resulted in a value of 1 µg/m^3.