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Statement of Data Evaluation

To: Worthy Glover, San Juan Public Health;
Utah Department of Environmental Quality, Division of Water Quality

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This statement is provided by the Utah Department of Health (UDOH) Environmental Epidemiology Program (EEP). It is a written summary of an analysis of San Juan River, UT water testing carried out by the Utah Department of Environmental Quality on Monday, August 17th, 2015.

Data were compared to screening values for both human-health based effects and agricultural use (**Table 2**).

Screening values are taken from Agency for Toxic Substance and Disease Registry (ATSDR) comparison values (CVs) for drinking water when available. Those values can be found here: http://health.utah.gov/enviroepi/appletree/Drinking_Water_CV.pdf.

When ATSDR values were not available, EPA Regional Screening Levels (RSLs) for residential tap water were used. EPA RSLs can be found here:
http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/docs/restap_sl_table_run_JUNE2015_rev.pdf
Total metal data was used for assessment of human-health based effects.

Agricultural Screening Values are derived from National Academy of Science (NAS) Water Quality Criteria, 1972 (the Blue Book). Those guidelines are reprinted in EPA's Guidelines for the Reuse of Waters for Irrigation found here: http://nepis.epa.gov/Adobe/PDF/P100FS7K.pdf
Utah Standards of Quality for Waters of the State can be found here:
http://www.rules.utah.gov/publicat/code/r317/r317-002.htm#T16
Agricultural guidelines cited from University of Arkansas (UA) can be found here:
https://www.uaex.edu/publications/PDF/FSA-3021.pdf

Dissolved metal values were used for the assessment of agricultural use waters. Sulfate, nitrate/nitrite, and pH were also assessed.

Contaminants that do not exceed screening values are not considered to pose a risk of adverse health effects.

The current data set (collected 8/17/2015) can be found here:
http://www.deq.utah.gov/Topics/Water/goldkingmine/index.htm

Results

For agricultural use, no dissolved metal contaminants, sulfates, nitrates/nitrites or pH values exceeded established livestock or irrigation guideline values.

For public use, five contaminants exceeded screening values: aluminum, arsenic, iron, lead, and manganese.

Contaminants that exceed screening levels are then evaluated for recreational exposures. UDOH defines a standard recreational exposure as 60 days/year for two hours/day. It considers skin contact and accidental ingestion of river waters during recreation (50 mL/hr).

Exposure evaluation uses the 95% upper confidence limit (95% UCL) for the samples of a particular contaminant. Calculated contaminant 95% UCLs that fall below screening levels are not considered for further evaluation.

A standard ATSDR exposure calculation is used that incorporates the type of contaminant, contaminant concentration, amount of exposure (time), intake/exposure rate, and body weight. To be as protective as possible of the most sensitive populations, exposures are evaluated for children. Estimated exposure doses are then compared to ATSDR Minimal Risk Levels (MRLs) when available, or EPA reference doses (RfDs) in **Table 1**.

Estimated recreational exposure dosages fall below health-based guidelines for these contaminants. Therefore, the EEP currently finds that exposure to the contaminants of the San Juan River tested on Monday, August 17th, 2015 by UDEQ are not expected to result in adverse health effects for people recreating in the river waters.

The EEP makes the following recommendations:

- Recreational users should carry their own drinking water and not rely on filtering or purifying river waters.
- Visitors to the river, especially in the case of children, are encouraged to minimize skin contact with dirt and sand along the river.
- People who come into contact with river sediment should rinse off promptly after contact, and as always, wash hands well with soap and water before eating

Further evaluations and updated findings will be provided as new data is collected.

Table 1. Exposure evaluation for contaminants exceeding public use screening values.

Contaminant	**Concentration [95% UCL] (µg/L)**	**Estimated Child Exposure Dose (mg/kg/day)**	**Health-based Dose Guideline (mg/kg/day)**	**Source of Guideline**
Aluminum	25,876	2.75E-02[O] 2.57E-02[D] 5.32E-02[T]	1.0E+00	ATSDR Chronic MRL
Arsenic	9.61	1.02E-05[O] 9.54E-07[D] 1.12E-05[T]	5.00E-03	ATSDR Acute MRL
Iron	18,685	1.99E-02[T]	8.75E-01	Provisional based upon EPA RSL*
Lead	42.38	4.50E-05[O] 1.68E-08[D] 4.50E-05[T]	9.37E-04	Provisional based upon EPA MCL**
Manganese	1,158	1.23E-03[O] 1.15E-04[D]	1.40E-01[O] 5.00E-02[D]	EPA RfD (oral) EPA RfD (dermal)

[O]: oral exposure

[D]: dermal exposure

[T]: total combined (if applicable)

*: No established iron guideline exists. Guideline based upon EPA RSL, value indicates chronic drinking water ingestion exposure dosage at screening level.

**: No established lead guideline exists for short-term exposures. Guideline based on EPA MCL action level, value indicates chronic drinking water ingestion exposure dosage at MCL action level.

Table 2. Health-based and agricultural comparison values for San Juan River contaminants.

			Drinking Water CV (ppb)			Irrigation Waters (ug/L) [NAS, 1972] [Dissolved Metals]		Utah WQ Standards for San Juan River [Dissolved metals]				
Analyte	**CAS #**	**Units**	**Health-Based Comparison Value for Water Ingestion (CV) [Total Metals]**	**CV Type and Source**	**Livestock Water (ug/L) [Dissolved Metal]**	**Long-Term**	**Short-Term**	**1C (Domestic)**	**3B (warm water fish) [1-hour]**	**3B (warm water fish) [4-day]**	**4 (agriculture)**	
Hardness	-	mg/L			180 mg/L (UA)							Hardness
Aluminum	7429-90-5	µg/L	10,000	Child Intermediate EMEG	5,000 (NAS)	5,000	20,000		750	87		Aluminum
Antimony	7440-36-0	µg/L	4	Child RMEG	No Data Available	No Data Available	No Data Available					Antimony
Arsenic	7440-38-2	µg/L	3	Child RMEG & Chronic EMEG	200 (NAS)	100	2,000	10	340	150	100	Arsenic
Barium	7440-39-3	µg/L	2,000	Child Intermediate EMEG	No Data Available	No Data Available	No Data Available	1000				Barium
Beryllium	7440-41-7	µg/L	20	Child RMEG & Chronic EMEG	100 (EPA)	100 (EPA)	No Data Available	<4				Beryllium
Cadmium	7440-43-9	µg/L	5	Child Intermediate EMEG	50 (NAS)	10	50	10	2	0.25	10	Cadmium
Calcium	7440-70-2	µg/L	-	No CVs available	500,000 (UA)	No Data Available	No Data Available					Calcium
Chromium	7440-47-3	µg/L	60	Child RSL, non-cancer, Cr(VI)	1,000 (NAS)	100	1,000	50	16 (VI);	11 (VI);	100	Chromium
Cobalt	7440-48-4	µg/L	100	Child Intermediate EMEG	1,000 (NAS)	50	5,000					Cobalt
Copper	7440-50-8	µg/L	100	Child Intermediate EMEG	500 (NAS)	200	5,000		13	9	200	Copper
Iron	7439-89-6	µg/L	14,000	Child RSL, non-cancer	Limit Not Considered Necessary (NAS & EPA)	5,000	20,000		1000	1000		Iron
Lead	7439-92-1	µg/L	15	Child non-carcinogenic RSL	100 (NAS)	5,000	10,000	15	65	2.5	100	Lead
Magnesium	7439-95-4	µg/L	-	No CVs available	250,000 (UA)	No Data Available	No Data Available					Magnesium
Manganese	7439-96-5	µg/L	500	Child RMEG	50 (EPA)	200	10,000					Manganese
Molyebdenum	7439-98-7	µg/L	50	Child RMEG	300 (EPA)	10	50					Molyebdenum
Nickel	7440-02-0	µg/L	200	Child RMEG	No Data Available	200	2,000		468	52		Nickel
Nitrate+Nitrite					100,000 (EPA)							
Nitrite					10,000 (EPA)			10,000				
Potassium	7440-22-4	µg/L	-	No CVs available	No Data Available	No Data Available	No Data Available					Potassium
Selenium	7782-49-2	µg/L	50	Child RMEG	50 (NAS)	20	20	50	18.4	4.6	50	Selenium
Silver	7440-22-4	µg/L	50	Child RMEG	No Data Available	No Data Available	No Data Available	50	1.6	-		Silver
Sodium	7440-23-5	µg/L	-	No CVs available	1,000,000 (UA)	No Data Available	No Data Available					Sodium
Sulfate					1,000,000 (EPA)							
Thallium	7440-28-0	µg/L	0.2	Child non-carcinogenic RSL	No Data Available	No Data Available	No Data Available					Thallium
Vanadium	7440-62-2	µg/L	100	Child Intermediate EMEG	100 (NAS)	100	1,000					Vanadium
Zinc	7440-66-6	µg/L	3,000	Child Intermediate EMEG	25,000 (NAS)	2,000	10,000		120	120		Zinc
Mercury	7439-97-6	µg/L	0.63	Child non-carcinogenic RSL, elemental Hg, µg/L	10 (NAS)	No Data Available	No Data Available	2	-	0.012		Mercury
TDS		mg/L			1200 (Utah)	500,000-1,000,000 (NAS)						
pH					6.5-9 (Utah)	4.5-9 (NAS)						

RMEG: ATSDR Reference Dose Media Evaluation Guide

EMEG: ATSDR Environmental Media Evaluation Guide

RSL: EPA Regional Screening Level