EXHIBIT P

UTE MOUNTAIN UTE TRIBE
ENVIRONMENTAL PROGRAMS DEPARTMENT

Exhibit P to December 16, 2011 Comments on DUSA RML Renewal
Re: Deficiencies in DUSA's Environmental Monitoring Program

Currently, DUSA's environmental monitoring lacks the ability to intercept pollutants in air, soil and vegetation. Water monitoring also continues to have significant deficiencies in quality control and quality assurance. Past and current environmental monitoring for radioactive materials in air, soil and vegetation conducted by DUSA and its predecessors has indicated no significant levels of pollutant above what has been determined to be local background levels. This means either: (1) there is no significant amount of radioactive materials in environment; (2) the radioactive materials are not present or not concentrated enough at the sampling points; or (3) that the monitoring methods and quality assurance program supporting them are insufficient to collect representative data about environmental pollutants.

<u>Methodology for Environmental Monitoring</u>

Environmental monitoring programs require an understanding of the local geology, hydrology and meteorology supported by data; a set of hypotheses that are justified by the data and that are testable; an understanding of peer-reviewed guidance documents to explore and justify the selection of sampling locations, sampling methods and analyses; and periodic evaluation of locations and methods to determine if the sampling and assessment program is representative of the risks being evaluated.

<u>Omission of Certain Radionuclides in DUSA's Environmental Monitoring</u>

Currently, DUSA's air samples are analyzed for U-natural, Thorium-230, Radium-226 and Lead-210, its vegetation samples for Radium-226 and Lead-210, and its soil samples for U-natural and Radium-226. The omission of two important uranium decay series chemicals, Thorium-230 and Polonium-210, from these environmental monitoring must be corrected. Spikes above the standard were observed in air for Thorium-230 in the past and Polonium-210 accounts for up to 50% of internal exposure in humans (Holtzman 1966). Polonium-210 is mobile in the body and has a higher dose rate than either Radium-226 or Plutonium-239 due to its short half-life (Thomas 1994). The inclusion of these two additional analyses in the monitoring program for airborne particulates, soil and vegetation would be more protective of public health and environment.

Soil Monitoring

At the outset of radionuclide monitoring in soil, a baseline survey in basic soil quality parameters (texture, moisture content, organic/inorganic content, etc.) as well as radiochemistry speciation and concentration analyses is necessary. This requires collecting soil samples from a variety of surface geologic formations and at various distances from the sources of contaminants using a grid sampling pattern or other scientifically accepted systematic patterns to cover a large area. The final selection of sampling locations; the timing and frequency of sample collection; and sampling methodology should be based on the result of the baseline survey, so that sampling and assessment is representative and provides the information to determine the risk to public health and environment posed by the levels of pollutants in soil (see Lenth 2001 for discussion of sample size determination).

DUSA's soil samples have been collected at five high volume air monitoring stations distributed on the Mill property and one off-site towards Blanding. Selection of these locations would be justified if the data analyses from pilot studies concluded that those six locations represent the surface soil within the Mill property with the regard to radionuclide composition and concentrations. But there is no record indicating that such analyses have been applied to justify the locations. Also unclear are the basic soil parameters of the samples, the depth of where the sample is from, and what other pollutants are in the soil. As soil is dynamic and its ability to retain, remedy and/or release toxins depends on its dynamic ecology and interaction with elements (Tamponnet et al 2008), the baseline analyses of soil quality, composition, radiochemistry speciation and concentration are necessary.

Recommendations

a. Soil should be collected on the surface if there is no vegetation, and soil sampling should be repeated for sub-surface samples if the vegetation nearby is found to be accumulating radionuclides to look into the pathways of pollution. Reevaluation of sampling points, sampling depth, methods and number as the monitoring progresses is absolutely necessary.
b. Analyze the soil samples for Uranium-238, Thorium-230, Radium-226, Lead -210, and Polonium-210.
c. A baseline survey of soil for a distribution of radioisotopes covering a large area and variety of land forms and environmental aspects following an established sampling method such as grids, making sure that sampling points are placed evenly between the sources, such as the ore storage pads, stacks and transportation paths and the Mill's boundary.
d. Regularly, collect a sample for radiochemistry analysis to find *all* radioisotopes present in soil, so that radionuclides other than that of uranium series may be detected.

Vegetation Monitoring

The same systematic approach in baseline surveying described above applies to vegetation monitoring. Radionuclide monitoring in vegetation should include all species present at the baseline survey, and the species that contain the target pollutants should be selected for the monitoring program. Futhermore, this selection of species should take into account other factors, such as whether those species are: (1) used by local residents as food sources or for ceremonial purposes, and/or (2) foraged by small or large herbivores. If those species are foraged by herbivores, the approach should consider whether those animals are hunted and ingested by the public. Also essential to vegetation monitoring is the availability of populations. If the area to be sampled were not densely vegetated, repeat monitoring would become challenging. If the sample area is not densely vegetated, extending the sampling area outside of the Mill property may be necessary.

Three sagebrush (*Artemisia tridentata*) populations appear to have been selected to monitor radionuclides in vegetation by DUSA, though species composition of samples is not clear as DUSA's Semi-Annual Effluent Reports do not specify sampled species. It is assumed that those populations were chosen after the Environmental Assessment (EA) was completed in 1978. However, the EA did not analyze radionuclide composition and concentration in the vegetation. Thus the use of the EA's vegetation survey as a baseline in monitoring radionuclides in vegetation is not appropriate. Further, if sagebrush is the only species sampled, it would be grossly inadequate to represent the vegetative uptake of radionuclides in the Mill property, as accumulation of the metals in plants differ from one species to another, and so would the consequent predictions to assess ecotoxicins' pathways to higher trophic levels (see Saric et al 1995, Soudek et al 2004, Thomas 1997).

<u>Recommendations</u>

a. A baseline survey of soil and vegetation for a distribution of radioisotopes covering a large area with a variety of land forms and environmental aspects is recommended following an established sampling method such as grids, making sure that sampling points are placed systematically between the sources, such as the ore storage pads, stacks and transportation paths and the Mill's boundary.
b. Analyze the vegetation samples for Uranium-238, Thorium-230, Radium-226, Lead-210, and Polonium-210.
c. Regularly, collect a sample for radiochemistry analyses to find *all* radioisotopes present in vegetation, so that radionuclides other than that of uranium decay series may be detected.

<u>Air Monitoring</u>

DUSA's air monitoring program uses high volume air samplers at six locations (with five currently operating). It is questionable whether these locations are effectively sampling the representative amount of radionuclides present in ambient air. Studies reveal that body dose factors are greater closer to the ground (Arberg 1989) and that the ground resuspension of fugitive dust laden with radioactive materials influences internal exposure (Thomas 1997). Most radionuclides end up in soil and remain mobile. As wind, hooves, or shoes resuspend them in air the radioactive particulates could adhere to body, be inhaled, or be ingested by anyone in the zone. Therefore, an additional sampling strategy to assess the risk due to resuspended radionuclides closer to the ground level is needed. This sampling consideration is especially important due to children's elevated susceptibility to environmental carcinogens including radionuclides (see http://www.epa.gov/ttn/atw/childrens_supplement_final.pdf), and the younger the children, the closer their activity zone is to the ground. Furthermore, most species of small mammals, birds and insects, are active and forage at the ground level.

There is an alternative method successfully used in the baseline survey for detecting radionuclides, where one square meter vinyl adhesive papers are utilized suspended in three positions, horizontal, vertical and inverted horizontal at approximately one meter above ground (Thomas 1997). The last was shown to collect the most radionuclides. By placing these dust collectors systematically throughout the Mill's property using an established method such as a grid or transect to cover the large area, there may be a trend in the movement of the radionuclide laden fugitive dust. Sampling should be repeated in different durations and in different seasons that represent high wind (spring), hot and dry (summer), and freeze and dry (winter). If the results reveal a higher concentration in a certain area at certain time of the year, it would be necessary to relocate the high volume air samplers to these locations.

As for the monitoring data interpretation of direct gamma measurements, or the estimate of annual gamma exposure using thermolumnescent dosimeters (TLDs), DUSA's practice in subtracting "background" gamma measurement (BHV-3) from the result is not acceptable. The gamma measurement from the TLDs needs to be reported as is and the Cumulative Semi-Annual Dose must be estimated without subtracting the "background" as recommended in the Guidance on Implementing Radionuclide NESHAPs.

The explanation that DUSA provides for this practice has been published in Semi-Annual Effluent Reports, repeatedly.

> With regard to background monitoring, the Mill previously operated a continuous high volume air sampling station (BHV-3) which was located approximately 3.5 miles west of the Mill site. With the approval of NRC, this station (BHV-3) was removed from the active air monitoring program in November 1995. At that time, NRC determined that a sufficient air monitoring data base had been compiled at BHV-3 to establish a representative airborne radionuclide background for the Mill. It should be noted, however, that while air sampling was discontinued at this location, gamma measurements and soil sampling continue to be collected at BHV-3 (Denison Mines USA, 2011).

The determination by NRC in 1995 to use the BHV-3's air monitoring database as a background value was not reviewed nor located by the Tribe. A detailed explanation, along with supporting documents, such as the database that has allowed such claim needs to be made publicly available.

<u>Recommendations</u>

a. For sampling air, vinyl adhesive paper squares are recommended by suspending them in three positions, horizontal, vertical and inverse horizontal at one meter above the ground.
b. Analyze soil and vegetation samples for Uranium-238, Thorium-230, Radium-226, Lead -210, and Polonium-210.
c. Regularly collect a sample for radiochemical analysis to find *all* radioisotopes found in air, so that radionuclides other than that of the Uranium series may be detected.
d. Report the semi-annual air monitoring results without subtracting "background gamma".

e. Justify the reason for using the past database compiled from the BHV-3's air monitoring as a background gamma values along with the database.

Water Quality Monitoring

The water quality monitoring program for the DUSA White Mesa Uranium Mill has multiple systematic deficiencies. These deficiencies have resulted in groundwater pollution and lack of corrective action by DUSA as a result of the manner in which data are collected, assessed, and provided to regulators, including the Utah Division of Radiation Control (DRC). These issues are described here in three sections, all of which have contributed to the current situation of multiple groundwater contaminant plumes and the probability of increasing trends in pollutants that have the potential to negatively impact public health and off-site environmental conditions.

Sample Collection, Analysis Protocols, and Standard Operating Procedures

DUSA has consistent difficulty with sampling and analysis protocols. In almost every aspect of the groundwater monitoring program, samples are collected in a manner that causes non-representative samples to be taken; cross-contamination due to ignorance of standard operating procedures (SOPs); and a general lack of continuity in water quality monitoring staff and their abilities. Almost every sampling event has issues with quality control. This type of problem is not unique to DUSA, but it is **very unique** that their corrective actions never seem to correct their issues.

Misunderstanding of SOPs is often cited by DUSA as an explanation of why samples are misrepresentative and cross-contaminated. SOPs are inherently meant to be simple to understand. There are some fundamental aspects of water quality monitoring that have not changed in many years—the concept of equipment decontamination; the concept of field blanks and duplicate samples; the concept of equipment calibration; the concept of consistency between sample events to produce representative and comparable data. DUSA and some of its staff have been doing this type of work at many of the same wells for decades, yet they make the same mistakes over and over. [See example, Internal DRC Memorandum from Phil Goble to Loren Morten, January 19, 2010 RE: review of 2009 Routine Groundwater Monitoring Reports GDP UG370004, Section 8.0, p. 8-9].

One main issue with this situation is that DUSA is in the business of mining and milling, not in the business of water quality monitoring. They do it, but they do it reluctantly and poorly. DUSA has not committed to paying a qualified individual to do quality monitoring work. Training is minimal, and employee retention is difficult. It may be more practical in the long term for DUSA to simply hire actual water quality (or comprehensive environmental) monitoring professionals to do the work and not task staff with other production-oriented duties.

Data Analysis and Interpretation

DUSA operates on the premise that pollution in the ground is not the result of their operations, despite the fact that it operates a large industrial facility with dozens of different chemicals that can be mishandled at any time. All data analysis and interpretation is assumes this premise, making objectivity nearly impossible. Their consultants operate under the same premise, creating similar difficulties with objectivity.

For decades, chloride was identified as the primary, conservative indicator of tailing cell impoundment leakage because of its mobility in groundwater and concentrations in tailings solutions [Letter Report Assessment of Groundwater Quality White Mesa Project Blanding , Utah, D'Appolonia Consulting Engineers, Inc., September 9, 1981, pp.2; Groundwater Study White Mesa Facility Blanding, Utah, UMETCO/PEEL Environmental Services February 1993, pp.5-22; Hydrogeological Evaluation of the White Mesa Mill, Energy Fuels Nuclear/Titan Environmental Corporation, July 1994, pp.23; Points of Compliance White Mesa Uranium Mill, Energy Fuels Nuclear/Titan Environmental Corporation, September 1994, p.6-7; Permit No. UGW3700A4, Utah DRC, February 15, 2011]. The Nuclear Regulatory Commission stated this plainly during its regulatory oversight, it was clearly identified by DRC, and was often touted by the DUSA's (IUC's) former environmental manager, Michelle Rehmann, as supporting the effectiveness of their pollution prevention measures to ensure public health and protection of the environment. No chloride, no leakage. Now there are significant increasing trends in chloride concentrations in the water, but DUSA is deflecting responsibility away from their operation and denying any leakage from the tailings impoundments. In the application for a groundwater permit modification to make Cell 4A operational, DUSA states, "The addition of monitoring wells MW-24 MW-27 MW-28 MW-29 MW-30 and MW-31 together with the existing monitoring wells at the site provides comprehensive monitoring network to determine any potential leakage from Cells 1, 2 and 3." [WHITE MESA URANIUM MILL RENEWAL APPLICATION STATE OF UTAH GROUND WATER DISCHARGE PERMIT No UGW370004 September 2009, (DUSA)]. If the intention of monitoring groundwater for increasing trends in pollutants is to determine any leakage from the cells, then why does DUSA deny responsibility of increasing trends of pollutants in their monitoring wells?

In general, DUSA collects samples marginally and eliminates half of the sample for quality control reasons. Then they postulate "New Theories" and plead with DRC to change compliance standards and to exercise "enforcement discretion." The data assessment and interpretation process is clearly flawed and must be corrected to prevent further degradation of groundwater on White Mesa and to protect public health and environment.

Quality Assurance and Decision-making Processes

The concept of a *Quality Assurance Plan* is to ensure that data are collected in a manner that answers the questions for which a monitoring program is designed and that those data are of sufficient quality to make decisions based on them. The U.S. EPA describes this very clearly in their guidance for the preparation and use of *Quality Assurance Plans*: "The QA Project Plan integrates all technical and quality aspects of a project, including planning, implementation, and assessment. The purpose of the QA Project Plan is to document planning results for environmental data operations and to provide a project-specific "blueprint" for obtaining the type and quality of environmental data needed for a specific decision or use. [**EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, p. 1]**. Thus a *Quality Assurance Plan* is supposed to be a system for sound decision-making. That is part of the reason why quality assurance plans in general are stand-alone documents, separate from actual field manuals and standard operating procedures. Corrective actions are derived from the *Quality Assurance Plan*, and changes are then made in the field manuals or standard operating procedures to fix them, perhaps even in the personnel themselves. Two documents are managed by at least two separate individuals to reach one goal: quality data to make sound decisions. The combination or inclusion of quality assurance provisions within standard operating procedures is not unreasonable, in fact it is good to have overlapping concepts, but it does not take the place of a separate *Quality Assurance Plan*. There is just too much ambiguity if the two are combined.

Bias is hard to overcome in any decision-making process, but that is why, for example, a *Quality Assurance Plan* is required of all federally-funded data quality programs. The ability to assess a potential problem with all of the tools available objectively is very important. Accountability is required for important decision-making, especially when public health and environment are at risk from flawed decisions. A *Quality Assurance Plan* identifies who makes decisions and the minimum amount of and quality of data to make those decisions. Currently, the approved *Quality Assurance Plan* for groundwater quality monitoring does not accomplish these objectives. Data is collected, but incorrect decisions are made.

<u>Responsibility of DRC in the Monitoring Program at the White Mesa Mill</u>

Ultimately, DUSA will not perform monitoring at their own expense in a quality manner until DRC requires them to do so. This is a fundamental flaw in the regulatory mechanisms of DRC overseeing this facility. DRC must take action to correct problems with all aspects of the DUSA White Mesa Mill monitoring program because despite the kind assurances to the Blanding and White Mesa Communities about how well they monitor their pollution, DUSA is not collecting data in a manner that identifies the pollution identified by other studies. Just as important, DUSA does not make sound decisions because of their flawed data and biases.

An example: In an effort to duplicate the renowned air monitoring program at the White Mesa Mill at the recommendation of the U.S. EPA, the Ute Mountain Ute Tribe's Environmental Programs Director requested standard operating procedures and quality assurance plan for radionuclide air quality monitoring from DUSA; no response was made by DUSA. When this same request was made of DRC and DAQ, it was stated that the standard operating procedures were retained at the facility and that there were quality assurance provisions in those standard operating procedures. Two questions stand out in this situation: (1) How can DRC have any assurance that corrective actions take place in the radionuclide air monitoring program if they don't have a current copy of the standard operating procedures and quality assurance plan in hand for comparison to inspector observations?; and (2) how can DRC determine that the sampling results and statistical analyses provided in semi-annual effluent reports are protective of public health if they do not have the documents that define the quality of the program that is being regulated. Considering the well-documented failures of the groundwater quality monitoring program, that is a false and dangerous assumption.

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