Uranerz
ENERGY CORPORATION

February 18, 2014

Attn: Document Control Desk
Director, Office of Federal and State Materials and
Environmental Management Programs
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

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U.S. Nuclear Regulatory Commission
Deputy Director, Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Protection
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RE: Uranerz Energy Corporation, Nichols Ranch Project, Source Materials License SUA-1597, Docket No. 040-09067, License Condition 12.11 Request for Additional Information Dated February 13, 2014.

Dear Director and Deputy Director,

Uranerz Energy Corporation (Uranerz) submitted information to the Nuclear Regulatory Commission (NRC) regarding Source Material and Byproduct License SUA-1597 pre operational License Condition 12.11 on October 3, 2013. The information submitted to the NRC was reviewed in two pre operational inspection conducted November 19 through 21, 2013 and January 28 through 30, 2014 by the NRC inspection team and found to be acceptable. However, the NRC staff, in a letter dated February 13, 2014, requested additional information (RAI) regarding pre-operational License Condition 12.11.

The RAI states:

U.S. Nuclear Regulatory Commission (NRC) staff evaluated the licensee's response to LC 12.11. NRC staff is seeking clarification on two instruments identified in Table 3 (Letter from Uranerz to NRC dated October 3, 2013). The instruments are the Ludlum 43-92 and Ludlum 43-93.

1) Provide a more detail explanation for the planned use of each instrument.

2) Provide lower limits of detection (i.e., MDA or MDC) for the above instruments under anticipated or typical ambient (background) levels during operations. Demonstrate that the above instrument can continue to detect and meet the regulatory limit for its planned use. More specifically, look at the locations where these instruments will be used in the field under anticipated ambient (background) levels during operations and demonstrate by calculations that the instruments can continue to detect and meet the regulatory limit.

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Uranerz has provided responses to the two RAIs in the attached document.

Upon review of the responses provided for the RAI for License Condition 12.11, Uranerz requests to amend Uranerz Energy Corporations NRC License SUA-1597 to remove License Condition 12.11.

If you should have any questions regarding this matter, please contact me by phone at 307-265-8900 or by e-mail at mthomas@uranerz.com.

Sincerely,

Mike Thomas
Vice President Regulatory and Public Affairs
Uranerz Energy Corporation

Attachment

cc: Ron Linton, Project Manager, NRC
Linda Gersey, Lead Inspector, NRC

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Uranerz Energy Corporation Nichols Ranch ISR Project
Responses to the NRC Request for Additional Information, Pre-operational License Condition 12.11, February 13, 2014.

U.S. Nuclear Regulatory Commission (NRC) staff evaluated the licensee's response to LC 12.11. NRC staff is seeking clarification on two instruments identified in Table 3 (Letter from Uranerz to NRC dated October 3, 2013). The instruments are the Ludlum 43-92 and Ludlum 43-93.

1) Provide a more detail explanation for the planned use of each instrument.

URZ Response:

The 43-93 probe will be used for the surveying of material for release from the plant and also for personnel monitoring stations. The 43-93, coupled with the 177-84 bench top ratemeter, will be used for personnel monitoring stations while the 43-93, coupled with the 2224-1 scaler/ratemeter, will be used for survey of equipment for release. These instruments will show that release limits are met as per regulatory requirements.

Uranerz does have a 43-92 probe coupled with a Ludlum Model 3 general purpose ratemeter. This instrument will not be used to meet any regulatory requirements. The purpose of the 43-92 is solely for use as an informational tool for the radiation safety staff.

2) Provide lower limits of detection (i.e., MDA or MDC) for the above instruments under anticipated or typical ambient (background) levels during operations. Demonstrate that the above instrument can continue to detect and meet the regulatory limit for its planned use. More specifically, look at the locations where these instruments will be used in the field under anticipated ambient (background) levels during operations and demonstrate by calculations that the instruments can continue to detect and meet the regulatory limit.

URZ Response:

In NUREG-1507, a MDA calculation is given by Strom and Stansbury for cases where the background and sample count times are different:

$$MDA = \frac{3 + 3.29\sqrt{R_b t_g (1 + \frac{tg}{tb})}}{t_g E}$$

Where

- Rb is the background counting rate
- Tg is the sample counting time
- Tb is the background counting time
- E is the efficiency

To illustrate that Uranerz can meet regulatory requirements for release of personnel and equipment in areas with gamma backgrounds, the following calculation shows worst case scenarios in which Uranerz can meet those objectives. For the 43-93 instruments that are on site, the average efficiency quoted from Ludlum is slightly higher than 25%. Ludlum quotes efficiency within a 20% uncertainty. Based on this uncertainty, a conservative use of 20% efficiency (E) is used in the calculation. The background count time (Tb) is set at 5 minutes and the sample count time (Tg) is set at 0.5 minutes, or 30 seconds. With a removable contamination release limit for betas of 1,000dpm/100cm^2 and a fixed contamination limit of 5,000 dpm/ 100cm^2, Uranerz assumes a conservative value of 900 dpm/100cm^2 in the equation. This value is used to demonstrate at what levels Uranerz can meet the removable contamination limit, with the understanding that Uranerz would still use swipes to better assess the amount of removable contamination on equipment. The calculation is as follows:

$$900\ dpm/100cm^2 = \frac{3 + 3.29\sqrt{R_b 0.5(1 + \frac{0.5}{5})}}{0.5(.20)}$$

$$R_b = 1{,}271\ cpm$$

From the calculation, in order to see at least 900 dpm/100cm^2, the background must be under 1,271 cpm on the instrument with these parameters. For release of equipment using the fixed contamination limit of 5,000 dpm/100 cm^2, the MDC is well below and is of little concern. To meet the removable limit of 1,000 dpm/100 cm^2, equipment being released may have to be moved to areas of lower background within the restricted area.

For personnel monitoring stations, health physic technicians (HPT) will need to verify background levels are below the above situation in order to ensure that the MDC are being met for beta. In discussion with other facilities, dose rates at their scanning stations were between 20 and 30 μR per hour. The manufacturer specifications state the sensitivity of the 43-93 instrument to gamma radiation is 15-20 cpm per μR/hr. Thus with 30 μR per hour one would expect to see an instrument reading of 600 cpm. This is well below the 1,271 cpm calculated above. In fact, to achieve the above scenario, a 60 μR/hr field would have to be present.

The above discussion demonstrates hypothetically that Uranerz can meet the required limits. Until operations begin, Uranerz will not know the specific dose rates at various scanning stations. However, Uranerz will verify backgrounds to ensure that acceptable MDCs are met. In situations where MDC are not being met because of high dose rates, items will be moved to lower background areas to perform the surveys. Also it is worthwhile to note it may be necessary to establish alpha to beta ratios to demonstrate

compliance to limits. However, these ratios can only be established once operations begin.