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DECISION ANALYSIS

PROPOSED AMENDMENT TO RENEW LICENSE

For

Maybell Uranium Heap Leach Site
Umetco Minerals Corporation
Colorado Radioactive Materials License No. 660-01

By

Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division



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of Public Health
and Environment

January 14, 2000

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I. INTRODUCTION

A. Umetco Minerals Corporation's Colorado Radioactive Materials License (CRML) No. 660-01

Umetco Minerals Corporation's CRML No. 660-01, was renewed with Amendment No. 13, June 30, 1993, to perform decontamination, decommissioning and reclamation of the Maybell Uranium Heap Leach Site. The renewed license authorized possession, storage and permanent disposition of heap leach tailings and residues on site. This license expired June 30, 1998.

On May 29, 1998, Umetco Minerals Corporation submitted an application to the Colorado Department of Public Health and Environment (Department) to renew its license for possession, storage and permanent disposition of heap leach tailings and residues on site and to continue reclamation activities (Umetco, 1998a). This renewal request was received in a timely manner, and the current license amendment remains in effect during this license renewal. The State of Colorado *Rules and Regulations Pertaining to Radiation Control, 6 CCR 1007-1* (Regulations), require that a preliminary decision to renew a Colorado uranium milling license be accompanied by a written analysis of the basis of decision.

B. Purpose of the Decision Analysis

The decision analysis serves to:

1. summarize the Department's evaluation of the applicant's qualifications to use the radioactive material for the purpose requested in a manner that minimizes danger to public health and safety and property;
2. document that the application has been thoroughly reviewed by the Division;
3. identify requirements of regulations not covered by the present license, but addressed in the proposed license conditions;
4. identify areas of the present license for revision or deletion, and;
5. present notice to members of the public of an opportunity to comment on the amendment to renew the license.

II. SITE OVERVIEW

A. Location and Settings

Location. The Maybell Uranium Heap Leach facility is located in Moffat County, Colorado, about two miles north of U.S. Hwy 40 and four miles northeast of the town of Maybell (see Site Location Map, Appendix B). Residence in the immediate area is sparse being limited to a few isolated ranches. The nearest resident is three miles south southwest west of the site. At least a dozen open pit uranium mines dot the landscape east of the heap leach site. No perennial stream exists on the site. Lay Creek, which passes about one mile southeast of the site, has seasonal flow into the Yampa River to the south. The site is located downgradient from the Maybell Title I uranium site.

Environmental and Geologic Setting. The site is flat and arid with an elevation of about 6,200 feet above sea level. Vegetation is sparse, consisting of sagebrush, saltbrush and short grasses. The climate is described as harsh, with low precipitation and widely varying temperatures being the norm.

The site is gently sloping topography. Most of the site consists of silty and clayey sands on top of underlying sedimentary deposits of the Browns Park Formation. The formation contains pods rich in uranium that were mined in the 1950s and 1960s. In this area the Brown's Park Formation is a silty sand that exhibits a fair-to-good ability to transmit water.

B. History and Current Status

History. The Maybell Uranium Heap Leach site, covering about 60 acres, consists of 35 to 55 foot high piles of low-grade uranium ore from local open pit mines placed on a compacted clay liner (see Maybell Site Features, Appendix B). The facility, built by Union Carbide Corporation, was operated between 1975 and 1982. During operation, dilute acid was ponded in cells on top of the heaps and allowed to percolate by gravity through the low-grade ore. A pipe system constructed at the bottom of the heap collected the leach solution produced by the heap leach process and drained it to an adjacent plant for concentration. The adjacent 8-acre processing area also included several holding and evaporation ponds. The ponds are currently used for storage of winter precipitation and evaporation of liquids draining out of the heaps. After operations ceased, an estimated two million tons of ore remained on site.

Reclamation. A final reclamation plan, *Final Plans and Specifications for Closure Activities*, was submitted by Umetco, January 23, 1989 (Umetco, 1989). This plan was reviewed against the requirements of Part, Appendix A of the Regulations. A revised version of this plan, Revision 3, March 28, 1995, was found to meet the criteria in Appendix A and was approved by the Department April 7, 1995. The plan provided for major reclamation activities including heap configuration, plant decommissioning, soil cleanup, cover construction, liquid management and surface water runoff control. Siting is adequate under Criterion 1 of Appendix A. Umetco's design provides reasonable assurance of tailings isolation. The disposal site is remote from populated areas, the site is separated from the local water table by 200-250 feet of silty sandstone, there are no major water drainages adjacent to the tailings, and the radon barrier and erosion protective cover provide long-term stability.

Reclamation began with construction to consolidate the individual heap leach piles into one pile. Contaminated soils and demolition debris from the torn-down process plant were buried in the heap. The heap was covered with an engineered earthen radon barrier cap to reduce the radon flux from the contaminated materials in the pile to less than 20 pCi/m²s and to decrease the infiltration of precipitation into the interior. On top of the radon barrier a frost protection layer was added, followed by placement of a rock cap to protect against erosion. The rock cover was designed to withstand flood flows from the Probably Maximum Precipitation event. The stability of the pile was evaluated with regard to failure from earthquake. The pile was found to be able to withstand the forces of the Maximum Credible Earthquake. Placement of the rock erosion protection layer on the outslopes and leach tank top was completed during the 1998 construction season. Radon flux tests performed on the heap cover show that the radon barriers meet the Environmental Protection Agency radon release rate requirements. Other reclamation activities included the construction of a new evaporation pond and modifications to the heap drainage system. Also completed during the 1998 construction season was rock lining of the Channel, which is the main surface water diversion channel.

C. Future Plans

Umetco has notified the U.S. Department of Energy (DOE) that reclamation of the site is nearing completion. Upon completion of reclamation and termination of the license, the property will be transferred to the DOE for long-term custody.

Remaining site work includes the following:

1. Site surface recontouring and revegetation;
2. Final status survey tests to verify soils clean-up have been conducted by Umetco. The test results, however, have not been validated. Upon completion of the final status survey, the Department will conduct a confirmatory survey;
3. The heap drainage system will be plugged and sealed once minimal flow rate through the heap is achieved;
4. Liquids in the evaporation ponds will be evaporated or disposed of in some approved manner and the liners and other contaminated material will be placed in an on-site cell. The cell will then be covered with an engineered cap, and;

5. A new ground water monitoring well will be installed down gradient from the evaporation and winter water storage ponds as a new Point of Compliance well.

III. LICENSING OVERVIEW

A. Recent Licensing History

CRML No. 660-01 was last renewed in June 30, 1993, with Amendment No.13. The renewed license authorized Umetco Minerals Corporation to perform decontamination, decommissioning and reclamation of the site and facilities in order to dispose of and isolate heap leach tailings and other contaminated debris and residues. The licensee is also authorized to possess, store and permanently dispose of site-derived heap leach tailings and other contaminated debris and residues on site.

Prior to issuing Amendment No. 13, the Department evaluated the licensee's application for renewal for final decontamination, decommissioning and reclamation of the Maybell site. The evaluation was published as a Preliminary License Statement (PLS). The PLS reviewed the potential impacts to the environment and proposed specific license conditions to ensure that no significant impact would occur as a result of the licensed reclamation activities (CDPHE, 1992).

The license has been amended twice since it was renewed in 1993. Both amendments made minor administrative changes to the license. Amendment No.14 became effective December 31, 1996, and Amendment No.15 was issued September 30, 1997.

B. Results of Recent Compliance Inspections

Annual inspections are conducted by the Department to determine compliance with the Regulations, 6 CCR 1007-01. The compliance inspections are supplemented by periodic site visits to observe reclamation construction activities.

Umetco Minerals Corporation has a commendable record of compliance with conditions of its Maybell site radioactive materials license. The results from the last four annual inspections show one item of non-compliance or concern identified during this period, and this item was addressed before the inspection report was issued.

Inspection of October 28-29, 1996. One item of non-compliance was identified - failure to maintain a financial assurance instrument in force; four recommendations were made. The Department subsequently learned that the financial surety instrument was self-renewing and that a response by Umetco to the non-compliance item was unnecessary.

Inspection of October 15, 1997. No items of non-compliance or concern were identified. Nine recommendations were made, including improvements in record keeping and in reporting.

Inspection of October 16, 1998. No items of non-compliance or concern were identified.

Inspection of September 27 and October 14, 1999. No items of non-compliance or concern were identified. The inspectors conducted an interview with the licensee, toured the site and examined records pertaining to licensed activities to determine compliance with the Regulations.

C. License Renewal Request

On May 29, 1998, Umetco Minerals Corporation submitted an application to renew its license, which was set to expire on June 30, 1998 (Umetco, 1998a). The application for renewal of the license was filed in a timely fashion in accordance with Departmental regulations, therefore, the current license remains in effect during the renewal process. The renewed license is proposed to continue the reclamation activities begun in 1993. The renewal application proposes license changes that reflect the current site reduced potential for radiation exposure to workers and the public.

IV. ADEQUACY OF THE PROPOSED LICENSE IN ADDRESSING THE COLORADO REQUIREMENTS OF REGULATIONS

The following outlines the requirements of Colorado's Regulations, relevant to this Decision Analysis, which must be met for the Department to issue a specific license to authorize use of the radioactive material. According to the Regulations, a license application will be approved if the Department determines the licensee will meet the following requirements:

- A. The applicant is qualified by training and experience to use the material in question for the purpose requested in such a manner as to minimize the danger to public health and safety or property (6 CCR 1007-1-3.9.1)**

The present license condition in place that assures that the applicant is qualified by training and experience to use radioactive materials is LC 14.0. This license condition addresses authorization of each user, assignment of a Radiation Safety Office (RSO) and requires documentation of the training and experience of each user and the RSO to the Department for approval.

Shane Brightwell is the approved Radiation Safety Officer (RSO) listed on the current license, CRML No. 660-01, and is qualified to continue these responsibilities. Mr. Brightwell's radiation services are provided to Umetco Mineral Corporation through Shepherd Miller Incorporated, Fort Collins, Colorado. The Department has also approved Terry Bendetti, Ted Moralez, Ed Ley, Howard Stephens, John Hamerick, Curtis Sealy and Scott Schierman as users. The license states the requirements for the RSO and users in License Condition (LC) 14. The Department reviewed the qualifications of each user and the RSO according to the provisions of the license and determined that they meet the qualifications of an authorized user defined in Part 3.9.1 of the Regulations, i.e., "the applicant is qualified by reason of training and experience to use the material in question for the purpose requested..."

The RSO has the responsibility for the technical adequacy and correctness of the radiation protection program and an ALARA program (maintaining occupational radiation exposures as low as reasonably achievable). The RSO also has continuing responsibility for surveillance and supervisory action in the enforcement of the program.

The present license conditions are adequate to assure that the license applicant is qualified by training and experience to use the radioactive materials in question and in such a manner as to minimize the danger to public health and safety or property. No changes to these conditions are recommended in the proposed renewed license.

- B. The Applicant's Equipment, Facilities And Procedures Are Adequate To Minimize Danger To Public Health And Safety Or Property (6 CCR 1007-1-3.9.2)**

License conditions in place that assure adequacy of equipment, facilities and procedures to protect public health and safety and property include:

- LC 15, Emergency Actions
- LC 16, Facility Additions or Changes
- LC 17, Design and Engineering
- LC 18, Radiation Protection Program
- LC 19, Site Control and Personnel Safety
- LC 20, Health, Safety and Environmental Procedures Manual(s)
- LC 21, Point Source Air Emissions Controls
- LC 22, Area Source Air Emissions Controls
- LC 23, Solid Waste Management
- LC 24, Liquid Waste Management
- LC 25, Transfer of Contaminated Materials
- LC 26, General Specifications for Inspection and Monitoring
- LC 27, Personnel and Facility Monitoring

LC 28, Environmental Monitoring and Analysis Program and Off-Site Dose
LC 29, Safety Inspections and Audits
LC 32, Decommissioning, Decontamination, Reclamation and Stabilization

Licensee compliance with conditions of the license is monitored by the Department through periodic site visits, review and approval of procedures in the licensee's *Site Health and Safety Plan for Remedial Action at the Maybell Uranium Heap Leach Site, Maybell, Colorado*, as revised (Umetco, 1997), *Policy and Procedures Manual-Maybell*, as revised (Umetco, 1994), review of licensee Annual Reports and annual license compliance inspections.

The present license conditions are adequate to assure that the license applicant's equipment, facilities and procedures are adequate to minimize danger to public health and safety or property.

LC 15 is revised to update the emergency incident reporting requirement created by reorganization of the Department's Laboratory and Radiation Services Division on December 1, 1999, which reassigned the Uranium and Special Projects Unit to this Division.

LC 16 requires notification of facility addition or changes with potential significant impact on public health, safety, or the environment.

LC 17 specifies that all design and engineering plans be approved by the Department (Division) prior to implementation.

LC 18 requires implementation and subsequent annual review of a radiation protection program to ensure compliance with the provisions of 6 CCR 1007-1-4. LC 18 also specifies that the licensee shall use, to the extent practicable, procedures and engineering controls based on sound radiation protection principles to achieve occupational doses and public doses that are "as low as reasonable achievable" (ALARA). Transportation of any radiation material shall be in accordance with the provisions of 6 CCR 1007-1, Part 17.

LC 19 requires licensee accountability for radiation safety and site security, fencing, posting and area control of the site. Smoking and eating are prohibited in controlled areas. Special work permits are required for any activity with safety implications for which no written procedures exist. Radiation safety training is required for all new employees and annual refresher training is provided by the licensee for each worker.

LC 20 specifies maintenance of Department-approved (Division-approved) written health, safety and environmental procedures governing license activities, including administrative and operating procedures, instruction and precautions to keep exposures and releases ALARA and details of the personnel and environmental monitoring programs requiring written procedures. These conditions are fulfilled as a commitment in LC 11.14 to conduct licensed activities according to procedures contained in Umetco's *Site Health and Safety Plan for Remedial Action at the Maybell Uranium Heap Leach Site, Maybell, Colorado*, as revised and approved by the Division. Commitments are also specified in LC 11.15 for Umetco's *Policy and Procedures Manual-Maybell*, as revised and approved by the Department (Division).

LCs 21 and 22 place conditions for control on point source and area source air emissions.

LCs 23 and 24 place requirements on solid waste and liquid waste management.

LC 25 controls the release of potentially contaminated equipment and materials from the restricted area.

LC 26 specifies maintenance of Department-approved (Division-approved) quality assurance/quality program for radiological monitoring. LC 26 also requires the availability of operable and calibrated monitoring equipment on hand or readily available at all times.

LC 27 requires the licensee to establish and maintain a personnel and facility monitoring program sufficient to enable estimation of maximum potential occupational dose commitment and compliance with Part 4 of the Regulations, Standards for Protection Against Radiation. The procedures for conducting the monitoring are incorporated in Umetco's *Policy and Procedures Manual-Maybell*, which is reviewed and approved by the Department (Division).

The Umetco *1998 Annual Report, Maybell, Colorado*, states that the total effective dose equivalent TEDE received by each occupational worker while performing license related activities at the Maybell site was measured. The TEDE is the sum of the deep-dose equivalent (DDE) and the committed effective dose equivalent (CEDE). Evaluation of results from thermoluminescent dosimeters (TLDs) monitoring of 15 site workers in 1998 showed no measurable external dose from DDE. Therefore, the only contribution to the TEDE was the CEDE. This is expected since the radon barrier over the heap was completed in 1997, and during 1998, gamma radiation levels contributing to measurable external exposure were at or near background levels.

The CEDE, or internal dose, was determined by summing ore dust derived air concentration (DAC) hours. The CEDE for the Maybell technical staff during 1998 ranged from 0.5 to 16.3 mrem with an average CEDE of 10 mrem. The highest CEDE of 16.3 mrem is 0.3 percent of the annual limit of 5 rem. The CEDE for the construction personnel during 1998 ranged from 0.5 to 7.5 mrem with an average CEDE of 3 mrem. The highest CEDE of 7.5 mrem is 0.15 percent of the annual limit.

One breathing zone sample was collected during 1998 and reported in the Umetco *1998 Annual Report, Maybell, Colorado*. The observed air concentration of airborne radionuclides was $1.1E-14$ $\mu\text{Ci/ml}$, or 0.02 percent of the ore dust DAC of $6E-11$ $\mu\text{Ci/ml}$. No bioassay samples were taken in 1998 since no personnel were deemed likely to receive a body dose of 500 mrem from external sources in one year (or a dose of 50 mrem for declared pregnant workers or minors).

LC 28 pertains to the licensee's environmental monitoring, analysis program and off-site dose commitment to the public. The environmental and analysis program is incorporated in Umetco's *Policy and Procedures Manual-Maybell*, which is reviewed and approved by the Department (Division).

Air particulate sampling is performed at two locations specified in *Maybell Policy and Procedures Manual*, with samples collected at frequencies increasing during the construction season at the site. Hi-vol sample results from monitors at background, downwind of the site and the nearest neighbor, about three miles south southwest of the site, are reported in the Umetco *1998 Annual Report, Maybell, Colorado*. Airborne particulates were analyzed for uranium-natural, thorium-230, radium-226 and lead-210. No significant changes from 1996 and 1997 data were observed. The historical trend has been that of decreasing downwind and nearest neighbor concentrations, and the current values are virtually the same as background. The nearest resident CEDE from airborne radionuclides for 1998 was essentially zero (0.03 mrem/year above background).

Environmental radon is to be measured semiannually according to methods outlined in the *Maybell Policy and Procedures Manual*. Air radon concentrations at background, downwind of the site, the nearest resident, and in the vicinity of the evaporation pond, are reported in the Umetco *1998 Annual Report, Maybell, Colorado*. Ambient air radon concentrations are monitored using track etch detectors and are analyzed semiannually. The radon concentration measured at the nearest neighbor at 0.5 pCi/l is less than the Maybell site background level of 0.7 pCi/l.

Radon flux measurements, conducted by Umetco, confirmed that radon flux through the completed heap cover has been restricted to radon release rate levels less than the 20 pCi/m²s EPA (40 CFR 192) standard (Umetco, 1998b).

LC 29 requires an annual audit of all inspection and monitoring data by the RSO and an independent audit of the site radiation protection program.

LC 32 states the decommissioning, decontamination, reclamation and stabilization requirements for restoration of the site for unrestricted use.

The present license includes requirements for air particulate sampling, ambient radon sampling, radon flux sampling, ground water monitoring, surface water monitoring and off-site dose assessment. One added license condition will be to construct a new monitoring well downgradient of the evaporation and winter storage ponds and to designate the new pond as a Point of Compliance (POC) well (LC 28.5.4). The purpose of the new well is to monitor for potential leakage from the storage ponds.

The modified license conditions are adequate to minimize danger to public health and safety or property, and no changes to these conditions are recommended in the proposed renewed license.

**C. The Proposed Licensed Activities Will Not Be Injurious Or Harmful To Public Health
(6 CCR 1007-1-3.9.3)**

The same license conditions described in the previous section also apply to the requirement that the proposed license activities will not be injurious or harmful to public health.

D. An Acceptable Financial Assurance Arrangement Is In Place (6 CCR-1007-1-3.9.5)

The requirements for financial assurance arrangements to cover the costs of decommissioning and reclaiming the millsite, plus long term monitoring and maintenance, are stated in LCs 31 and 33. The licensee is required to maintain in force a financial assurance warranty adequate to cover the cost for decommissioning, decontamination and reclamation of the licensed site. An acceptable document that fulfilled this requirement, "Union Carbide Decontamination, Decommissioning and Reclamation Financial Agreement," April 17, 1980 and including subsequent revisions approved by the Department, is included in the license as LC 11.5. The current value of this surety bond is \$5,584,303, which includes \$5,055,101 for reclamation and \$529,202 for long-term care (Umetco, 1999a). As required by LC 31.2, an annual update of the financial cost estimate is submitted to the Department for review.

The renewed license, LC 33.0 has been revised to delete the cost estimates for long-term monitoring since these costs are subject to change over time. The long-term care fund, as defined in 6 CCR 1007-1, Part 3.9.6, will be increased to the amount required by Regulation prior to termination of the license.

The modified license conditions are adequate to assure that acceptable financial assurance is in place.

**E. The Proposed License Meets The Environmental Requirements of 6 CCR-1007-1-3.8.8 And
6 CCR-1007-18.4**

In the case of license renewal application, the licensee is required by 6 CCR-1007-3.8.8 to submit information, including an environmental report, to assist the Department in evaluation of short-term and long-term impacts of the project and activities so that the Department can weigh environmental benefits against environmental costs. In the event an environmental report acceptable to the Department is on file with the Department in regard to the specific licensed activity authorized under the existing license at the time of renewal application, the Department has the authority to grant an exemption of a requirement for the licensee to submit an additional environmental report or to require an amendment of the existing environmental report. The Department conducted an extensive environmental assessment evaluation of the Maybell Uranium Heap Leach site at the time of license renewal for final decontamination, decommissioning and reclamation. The Department's PLS for evaluation of the application for renewal included an environmental assessment of long-term impacts of the reclamation project (CDPHE, 1992). The Department published a preliminary license for public review in the PLS, which contained specific conditions to ensure that no significant environmental impact would occur as a result of the licensed reclamation activities. The Department received no public comment on the proposed license, and following the required 90-day public notification period, an amendment was issued to renew the license for final reclamation of the site (CRML No. 660-01,

Amendment No. 13, June 30, 1993). The conditions of this license have been restated in all subsequent amendments to the license, are contained in the present license, Amendment 15, and are proposed for the reinstatement in the latest amendment for renewal. The documents used to prepare the environmental assessment for the 1993 license renewal are referenced in the PLS and are available in the Department's files. Since an environmental assessment of the Maybell site reclamation project has already been approved, the Department grants the licensee an exemption to the requirement to submit an additional environmental report or to require an amendment of the existing environmental report in support of the current application to renew their license.

The Department is required by 6 CCR-1007-18.4, however, to prepare a written analysis of the impact of the licensed activity on the environment for each application to amend or renew an existing license to receive, possess or use source material. The analysis is to include:

1. an assessment of the radiological and non-radiological impacts to public health;
2. an assessment of any impact on any waterway and ground water;
3. consideration of alternatives to be conducted; and
4. consideration of the long-term impacts of the licensed activities.

Assessment of the radiological and non-radiological impacts to public health. Reclamation at the Maybell heap leach site has the goal of site soils cleanup, as a minimum, to the radiological standards established by the EPA (40 CFR 192) and the requirements included in the Regulations (6 CCR 1007-1, Part 18, Appendix A). The ALARA (as low as reasonable achievable) principle as applied to soil cleanup by Umetco is to reduce radiation exposures to ALARA and to minimize the potential for release of radioactive materials at the site. The Regulations state that the concentration of radium-226 at the site averaged over any area of 100 square meters shall not exceed the background by more than 5pCi/g, averaged over the first 15 cm of soils below the surface, and 15 pCi/g, averaged over 15 cm thick layers of soil more than 15 cm below the surface. The EPA standard further requires that the designed control of residual radioactivity to be effective for up to 1000 years to the extent reasonably achievable, and in any case, for at least 200 years, and provide reasonable assurance that releases of radon-222 from the residual radioactive material to the atmosphere will not exceed an average release rate of 20 pCi/m²s.

Following issuance of Umetco's Maybell License Amendment No. 13 in 1993, authorizing reclamation, and approval of the revised reclamation plan in 1995, the licensee commenced site reclamation. The greatest potential radiological impact was from the 1,940,000 tons of mined uranium ore remaining in heaps after operations ceased in 1981. Reclamation began with placement of the process plant demolition debris and contaminated soils in the heaps and reshaping the heaps into one cell to improve long-term stability. A new heap drainage system and evaporation pond was constructed to optimize collection of waste liquids from the cell. The heap drains are to be plugged and the evaporation pond eliminated once flow from the cell has ceased. The heap has been covered with an earthen radon barrier cap to keep moisture from entering the cell and to control radon emission from the cell. A frost protection layer was placed over the barrier to guard against frost damage. Finally, a rock erosion protection layer has been placed over the entire cell to keep the cover intact. A rock-lined channel directs surface water from the top of the cell and into a diversion channel and away from the heap. Radon flux measurements conducted by Umetco confirmed that radon flux through the completed heap cover has been restricted to radon release rate levels less than the 20 pCi/m²s EPA standard (Umetco, 1998b).

Simultaneously with the construction of the engineered cover to restrict release of radioactive materials from the heap, a *Soils Cleanup Plan* (Umetco, 1995), which outlined the steps to be taken to clean up soils from land located around the heap leach, was submitted and approved by the Department. The land included previously-mined areas which had been subjected to mining and milling activity prior to construction of the heap, and unmined areas that had not been subjected to mining

and milling activity. From soil samples and gamma surveys made during 1989 and 1991, vicinity background radium-226 levels were established. The mean background concentration of radium-226 in the unmined area was reported as 1.7 ± 0.9 pCi/g and as 22.3 ± 41.8 pCi/g in the mined area. Based on these data and application of the EPA cleanup requirement of 5 pCi/g plus background, cleanup standards for the surface soils (0-15 cm) were established as 6.7 and 27.3 pCi/g for the unmined and mined areas, respectively.

Background gamma exposure rates were determined as 9.8 microrentgen/hour μ R/hr (corrected/true) for the unmined area and 47.4 μ R/hr (corrected/true) for the mined area. Using a correlation factor of 1.8 μ R/hr for each additional pCi/g of radium-226 over background, a gamma exposure rate of 19 μ R/hr was obtained for surface soils in the unmined areas (rounded to 20 μ R/hr) and 56 μ R/hr in the mined areas (rounded to 57 μ R/hr). These gamma exposure rate limits were used as field parameters to guide cleanup efforts. Cleanup was documented by taking soil samples for radiometric analysis. At this time soils, cleanup at the Maybell site has been completed, but a final status report has not been submitted to the Department. Upon review and approval of the licensee's final status report, the Department will conduct a confirmatory cleanup survey.

Regulations also require that site soils be cleaned up to meet Department-approved non-radiological constituent standards, including arsenic, cadmium, lead, molybdenum, selenium and vanadium. The licensee conducted comprehensive testing on both on-site and off-site for these heavy metals and documented that the concentrations of these metals were generally within background ranges, posed no threat to public health, and thus needed no further evaluation during cleanup activities.

Potential impacts of radiological and non-radiological contaminants on public health continue to be assessed during reclamation. Assessment is made through reviews of cleanup activities data included in the annual reports required by LC 30, in monitoring and reclamation reports, and by annual license compliance inspections conducted by the Department. Through isolation of the contaminated materials in the heap and placement of the radon barrier over the heap, the greatest potential impacts to public health from radiological sources has been eliminated.

Assessment of any impact on any waterway and ground water. Potential impacts on waterways and ground water have been assessed in the PLS (CDPHE, 1992).

The nearest permanent surface water to the site is the Yampa River, approximately two miles away (see Site Location Map, Appendix B). There is no permanent surface water on the site. The western part of the site is drained by several small ephemeral washes, that drain into the Yampa River. The central and eastern portions of the site are drained by ephemeral streams that enter Lay Creek, an intermittent stream, then into the Yampa River. Due to the location of the heap, near the top of rolling hills, it is not within the flood plain of any perennial stream. The average precipitation rate at the site is 12 inches per year. The more significant geomorphic factors with the potential for causing long-term change are flooding of the ephemeral drainages and gully erosion. The reclamation design of the site has incorporated features to mitigate these factors (Umetco, 1995). Overall, the site is located in a geomorphically stable area.

No discharge of contamination to surface waters is anticipated during reclamation. Therefore, no monitoring requirements are stipulated in the license. LC 28 requires sampling in the unlikely event of a spill to surface water. The drain system under the heap collects liquid from the heap and discharges it into the evaporation pond. With the completion of the cover over the heap in 1998, infiltration into the heap virtually ceased. Umetco has demonstrated, through a technical evaluation (Miller 1998), that the remaining flow through the heap will not exit the sideslopes or endanger the stability of the heap if the existing drain system is sealed. Once the drain system is sealed, liquids in the evaporation pond and winter storage ponds will be evaporated or disposed of in some approved fashion, and the ponds will be reclaimed.

Potential impacts to ground water quality at the Maybell site has been reviewed in detail in the PLS

(CDPHE, 1992). The Maybell heap is situated over the Browns Park Formation, a sandstone layer about 1000 feet thick. Ground water under the site occurs in unconfined conditions within the Browns Park Formation at a depth of approximately 200 feet. Recharge to the aquifer occurs through the infiltration of precipitation. The aquifer flows in a southeasterly direction and discharges to the Yampa River about two miles from the site.

Ground water quality at the Maybell site is subject to influence from former land use upgradient of the site and from impacts by low-grade mineralization in the area. The ground water quality is highly variable and is unusable in many locations. Upgradient land use includes a former open pit uranium mine (now inactive), known as the Rob Pit, located one-half mile east of the Maybell heap leach site, and a DOE Uranium Mill Tailings Remedial Action (UMTRA) Maybell Title I mill site, one mile east of the Maybell Uranium Heap Leach site.

Ground water monitoring has been performed at the Maybell Uranium Heap Leach site since 1975 in the Millsite #1 and Rob Ramp wells. The Site Map, Appendix B, shows the Umetco monitor well locations. In 1991, two more wells, designated as Millsite #2 and NE Heap, were constructed. A fifth monitoring well will be constructed downgradient from the evaporation and water winter storage ponds (CDPHE, 1999). The installation is a requirement of the proposed license (LC 17.3.1). Amendment No. 13 to the license, required that a ground water compliance monitoring program be initiated. Umetco submitted a preliminary draft ground water report required by LC 28.5 of the license, but the report has not been finalized at this time. Millsite #1 and Millsite #2 wells have been designated as Point of Compliance (POC) wells in the license, while the Rob Ramp and NE Heap wells have been designated as background wells. The new monitor well will also be a POC well. The monitoring wells have been sampled in accordance with an approved ground water procedure (Umetco, 1994).

The DOE has demonstrated that background water in the Browns Park Formation has concentrations of radiological and non-radiological constituents that exceed the applicable ground water standards (DOE, 1996). The Department and the Nuclear Regulatory Commission (NRC) approved closeout of the ground water phase of the Maybell Title I project under the supplemental standards provision of the EPA regulations (40 CFR 192) due to the presence of wide spread ambient contamination in the aquifer that is not due to the milling operations at the Maybell Title I site. Despite the presence of contaminated ground water beneath the Title I site, the ground water plume has not migrated beyond the borders of the Title I site. Based on this observation, the DOE concluded that the Browns Park Formation has capacity to effectively attenuate the radiological and non-radiological constituents in the ground water.

The POC wells, Millsite #1 and Millsite #2, have shown that no impacts to ground water quality have occurred as a result of leakage from the heap leach pad.

Historically, the background Rob Ramp well, which is upgradient from the Maybell heap leach site, has shown elevated concentration of uranium, but since 1984 there has been a marked decrease in uranium concentration. The earlier elevated levels of uranium may have been associated with the mining disturbances, and once mining ceased, the ground water quality rapidly improved.

Ground water monitoring has not been required previously downgradient from the evaporation and winter storage ponds. Each pond was constructed with a liner and leachate sump at the time of installation. The sumps are monitored periodically, and both sumps have measurable levels of liquid. Since measurable levels of liquids have been recorded in both sumps, this may indicate that some leakage into the sumps may be occurring. Umetco has agreed to install a new monitoring well, which should be completed in the year 2000. One year of quarterly monitoring of the winter storage pond is needed to establish a baseline. Umetco's ground water procedures will be revised to incorporate the sampling and analysis plan for the new well.

Although Umetco's 1995 draft ground water report has not been finalized at this time, the analysis conducted by the Department concluded that the ground water program conducted at the Maybell

heap leach site is adequate to determine that impacts to ground water quality have not occurred as a result of leakage from the heap leach pad. However, as a result of the review, and based on observations that there is possible leakage from the evaporation and winter storage ponds, the Department requested that a new monitoring well be installed downgradient from the ponds to assure that the ground water is unaffected by liquids stored in the ponds.

The actions taken and planned by the licensee are adequate to assure minimum impact on any water way and ground water and the design of Umetco's's ground water monitoring program is adequate for analysis of Umetco's compliance with the Department's guidelines and ground water monitoring for compliance with the requirements of 6 CCR 1007-1, Part 18, Appendix A.

Alternatives to be considered. Since remediation of the site has proceeded according to the approved Reclamation Plan (Umetco, 1989), and this was the preferred remedial action, no further consideration has been given to other alternatives. Remediation at the site is nearly complete. Once completed, the license will be terminated, and custody of the site will be given to the DOE for long-term care.

Long-term impacts of the licensed activities. When remediation of the site is completed, site soils will have been cleaned up to meet the requirements of the standard of 5 pCi/g radium-226 above background established by the EPA (40 CFR 192) as incorporated in the Regulations (6 CCR 1007-1, Part 18, Appendix A). Contaminated soils, removed during remediation, have been impounded in the heap and covered with an engineered soil cover and radon barrier that restricts radon-222 release to the atmosphere to an average release rate less than 20 pCi/m²s. The controls have been designed to meet the EPA standard to be effective for up to 1000 years, to the extent reasonably achievable, and in any case for at least 200 years. These remedial actions provide reasonable assurance that potential exposure by the public to residual radioactivity from uranium and uranium decay-series radionuclides has been reduced to standards issued by the EPA and incorporated in the Regulations.

Site soils have also been decontaminated to meet Department-approved non-radiological constituents cleanup standards, including arsenic, cadmium, lead, molybdenum, selenium and vanadium. Umetco has conducted comprehensive testing on both on-site and off-site for these heavy metals and documented that the concentrations of these metals were generally within background ranges, posed no threat to public health, and thus needed no further evaluation during cleanup activities (Umetco, 1995).

License conditions in effect that contain specific provision for management and control of operations to prevent potential releases of contaminants that could adversely impact public health include:

- LC 15, Emergency Management
- LC 21, Point Source Air Emissions Controls
- LC 22, Area Source Air Emissions Controls
- LC 23, Solid Waste Management
- LC 24, Liquid Waste Management
- LC 25, Transfer of Contaminated Materials
- LC 29, Safety Inspections and Audits.

In addition to license conditions that specify management and control, there are conditions for environmental monitoring, a requirement for an annual report on monitoring and inspections and restrictions on license termination pending final reclamation. These include:

- LC 28, Environmental Monitoring, Analysis Program and Off Site Dose
- LC 30, Reports to the Division
- LC 32, Decommissioning, Decontamination, Reclamation and Stabilization.

V. PROPOSED LICENSE - AMENDMENT 16 TO CRML NO. 660-01

Radioactive Materials License Conditions

The radioactive materials license issued to Umetco Minerals Corporation contains detailed license conditions that place specific requirements on the licensee. The current and proposed renewed license requires compliance with all applicable requirements of the Regulations.

The proposed license is not extensively modified. Minor changes have been made since the license was last renewed in 1993 through the amendment process, thereby keeping the license current. Proposed changes include:

LC 11, Referenced Documents. Referenced documents that describe completed commitments are deleted. Umetco's letter with a new legal description of the Maybell Title II site has been added as a referenced document.

LC 12, General Conditions. The definition of the Division has been changed to reflect reorganization within the Department effective December 1, 1999. The uranium licensing unit has been assigned to the Laboratory and Radiation Services Division of the Department.

LC 15, Emergency Actions. The information for reporting emergencies resulting from the release or imminent threat of release of radioactive materials into unrestricted areas has been updated to reflect current notification requirements.

LC 17, Design and Engineering. The requirement for the installation of a new ground water monitoring well downgradient from the evaporation and winter storage ponds is added to the license. Installation data and a sampling and analysis plan are to be submitted to the Division. Condition for completed commitments are deleted.

LC 28, Environmental Monitoring. The new ground water monitoring well to be installed downgradient from the evaporation and winter storage ponds is designated as a Point of Compliance well. A reference to compliance with the requirements of 40 CFR 190 is deleted since the provision is contained in the Regulations.

LC 31, Financial Assurance. The term "financial assurance warranty" replaces other terminology, such as financial assurance instrument and financial assurance agreement, to be consistent with the current usage in Part 3 of the Regulations.

LC 33, Long-Term Monitoring and Care. The detail of the long-term care warranty is deleted from the license since the general provision for establishment of the (LTC) warranty is in Part 3 of the Regulations, which is referenced in the license, and the monitoring and expense details will be worked out when the long-term surveillance plan is reviewed in preparation for license termination.

Annex A, Authorized Place of Use. The legal description of the Maybell Title II site has been revised in accordance with Umetco's request and legal description in a letter to the Department, December 13, 1999.

STATE OF COLORADO
DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT

RADIOACTIVE MATERIALS LICENSE

Pursuant to the Radiation Control Act, Title 25, Article 11, C.R.S. 1989 Replacement Volume, as amended, and the Colorado *Rules and Regulations Pertaining to Radiation Control* (6 CCR 1007-1), and in reliance on statements and representations heretofore made by the licensee designated below,

COLORADO RADIOACTIVE MATERIALS LICENSE #660-01 IS HEREBY AMENDED IN ITS ENTIRETY,

authorizing such licensee to possess, store, and dispose of the radioactive material(s) designated below. This license is subject to all applicable rules, regulations, and orders now or hereafter in effect of the Colorado Department of Public Health and Environment (the "Department") and to any conditions specified below.

1.0 LICENSEE NAME

Umetco Minerals Corporation ("Umetco"), a wholly-owned subsidiary of Union Carbide, a New York corporation.

2.0 LICENSEE ADDRESS AND PHONE NUMBER

Corporation Mailing Address

2754 Compass Drive, Suite 280
Grand Junction, CO 81506
Phone (970) 245-3700
FAX (970) 245-7543

Site Mailing Address

c/o Site Superintendent
P.O. Box 506
Maybell, CO 81640
Phone (970) 272-3070
FAX (970) 272-3058

3.0 LICENSE NUMBER 660-01 AMENDMENT NUMBER 16

4.0 EXPIRATION DATE June 30, 2003

5.0 REFERENCE NUMBER SUA-660, SUA-660-01, 660-01S

6.0 RADIOACTIVE MATERIALS

Natural uranium and radioactive decay products of uranium, in particular, thorium-230, radium-226, and progeny.

7.0 CHEMICAL AND/OR PHYSICAL FORM

Tailings from heap leach activities; evaporation residues; contaminated process equipment, soils, and building materials; and other contaminated debris and residues resulting from the decontamination, decommissioning and reclamation of Umetco's Maybell Uranium Heap Leach Site.

8.0 MAXIMUM QUANTITY LICENSEE MAY POSSESS AT ANY ONE TIME

- 8.1 2,000,000 dry tons of heap leach tailings derived from ore.
- 8.2 Unspecified quantities of waste and contaminated soil.

9.0 AUTHORIZED USES

The licensee is authorized to perform decontamination, decommissioning and reclamation of the site and facilities in order to dispose of and isolate heap leach tailings and other contaminated debris and residues.

The licensee is authorized to possess, store, and permanently dispose of site-derived heap leach tailings and other contaminated debris and residues on site in accordance with this license.

10.0 AUTHORIZED PLACE OF USE

The licensee's uranium heap leach facility in Moffat County, Colorado (approximately four miles northeast of Maybell), located more specifically as follows:

Those portions of Township 7 North, Range 95 West, 6th Principal Meridian, Sections 23 and 24, as delineated in Annex A.

11.0 LICENSEE PROPOSALS AND COMMITMENTS ("REFERENCED DOCUMENTS")

Except as specifically provided otherwise by this license, the licensee shall possess, store and dispose of the radioactive materials described in License Conditions (LCs) 6, 7, 8, and 9 of this license in accordance with the commitments, statements, representations, and procedures contained in the licensee's:

Reclamation Plans

- 11.1 Umetco's "Final Plans and Specifications for Closure Activities, Maybell Heap Leach Facility, dated March 28, 1995," approved by the Division on April 7, 1995; and as subsequently revised with Division approval.
- 11.2 Umetco's "Quality Plan and Construction Verification Program for Reclamation Activities, Maybell Heap Leach Reclamation, dated July 1995," interim approval by the Division on April 7, 1995, and final approval by the Division on August 1, 1995; and as subsequently revised with Division approval.
- 11.3 Umetco's "Soils Cleanup Plan, Maybell Heap Leach Facility, dated March 1995" approved by the Division on March 15, 1995; and as subsequently revised with Division approval.

- 11.4 Umetco's "Liquid Waste Management Plan, Maybell Heap Leach Facilities, dated May 1994," approved by the Division on May 18, 1994; and as subsequently revised with Division approval.

Financial Assurance

- 11.5 Union Carbide Decontamination, Decommissioning and Reclamation ("DDR") Financial Agreement dated April 17, 1980, and as subsequently revised with Division approval.
- 11.6 Union Carbide Long-Term Monitoring and Care ("LTC") Financial Agreement dated June 3, 1981, and as subsequently revised with Division approval.
- 11.7 Umetco letter dated December 20, 1992, from M. Derrick to R. Quillin regarding monetary increases to the DDR and LTC letters of credit.
- 11.8 Umetco letter dated December 3, 1992, from R. Evans to R. Quillin regarding a modification of the LTC financial arrangement of June 3, 1981.

Health, Safety and Environmental Procedures

- 11.9 Umetco's "Maybell Site Health and Safety Plan for Remedial Action" as approved by the Division; and as subsequently revised with Division approval.
- 11.10 Umetco's "Maybell Policy and Procedures Manual" as approved by the Division; and as subsequently revised with Division approval.

Other Referenced Documents

- 11.11 Umetco letter dated May 8, 1992, from M.G. Derrick to J. Hook (U.S. Dept. of Interior, Bureau of Land Management) enclosing a copy of a surface ownership status map covering Umetco's Maybell operations.
- 11.12 Umetco letter dated December 13, 1999, with new legal description enclosing all structures related to the final reclamation of the Maybell Title II site as currently described in LC 10.0 and Annex A.

12.0 GENERAL CONDITIONS

12.1 DEFINITION OF TERMS

Unless otherwise provided in this license, terms used herein are as defined in the Colorado *Rules and Regulations Pertaining to Radiation Control* (6 CCR 1007-1) hereafter the "Regulations" as amended.

"Division" means the Laboratory and Radiation Services Division of the Colorado Department of Public Health and Environment.

"LC" is an abbreviation for License Condition.

"NRC" means the United States Nuclear Regulatory Commission.

"RG" means a Regulatory Guide issued by the Division or the NRC.

12.2 OBTAIN PERMITS OF OTHER AGENCIES

Prior to beginning any new construction or new operations, or any other activities authorized by this license, the licensee shall obtain all applicable permits and other authorizations of local, state and federal agencies having authority over health, safety, and environmental protection aspects of the activities authorized by LCs 6, 7, 8, and 9 of this license. The licensee shall maintain in force such

applicable permits. The licensee shall notify the Division in writing within thirty (30) days after, or as soon thereafter as it is practicable, of any application to permitting agencies, or modification or renewal of such permits or other authorizations for activities involving the decontamination, decommissioning, and reclamation of Umetco Maybell Site.

12.3 COMPLY WITH PERMITS

Within the scope of applicable statutes and lawful regulations thereunder, the licensee shall operate in full compliance with the requirements of each other division of the Department.

Violation of such other requirements shall not by itself constitute violation of this license, unless the Division makes an independent finding of violation of the Regulations or a condition of this license other than this LC 12.3.

12.4 STATUS OF REFERENCED DOCUMENTS

Proposals and commitments in referenced documents are in effect license conditions.

The words "will" or "should" as used in the referenced documents (in LC 11.0 above), shall denote a commitment and requirement on the part of the licensee.

If statements in the referenced documents conflict, the most recent document shall prevail unless the Division determines otherwise.

A requirement of the Regulations shall govern, unless the licensee's commitments, statements, representations, and procedures contained in the application and correspondence to the Division are more restrictive than the Regulations.

12.5 SEVERABILITY

If any part of this license is held invalid, the remainder shall not be affected.

12.6 WRITTEN APPROVAL

12.6.1 Department or Division "acceptance," "approval," "authorization," or "concurrence" shall be obtained in writing from the Division unless otherwise specified.

12.6.2 When the Department or Division routinely consults with another party, including, but not limited to, the State Archaeologist, State Engineer and Colorado Geological Survey, the licensee shall:

12.6.2.1 Permit such party to inspect any facility, site, and/or Division-designated document;

12.6.2.2 Submit Division-designated documents to the party for review; and

12.6.2.3 As determined by the Division, conform applications and supporting documents to such party's written guidelines applicable to the project, for example regulatory guidance of the NRC.

12.7 SPECIFIC LICENSE CONDITIONS

The conditions of this license specify requirements that are in addition to the licensee's statements and commitments in the referenced documents. If statements in referenced documents conflict with license conditions, the license condition shall prevail.

13.0 OWNERSHIP AND CONTROL

13.1 EVIDENCE OF TITLE

The licensee shall provide the Division with written evidence of title and any change in title to the land described in Annex A.

13.2 NOTIFICATION OF INTENT

The licensee shall provide the Division with ninety (90) days written advance notification of any proposed change in ownership or control of the land described in Annex A.

13.3 AUTHORIZATION REQUIRED

13.3.1 No transfer of licensee-held title to any portion of the licensed site may be made at any time without prior written authorization from the Division. Any such transfer shall be in accordance with 6 CCR 1007-1, Part 3.15, unless otherwise authorized by the Division.

13.3.2 No portion of the licensed site may be vacated without notification in accordance with 6 CCR 1007-1, Part 4.59, and prior written authorization from the Division.

13.4 TRANSFERABILITY

Ownership or control of the tailings and/or waste confinement areas shall be such that ownership of the property may be readily transferred to the State or federal government under the provisions of the Regulations.

13.5 BANKRUPTCY

The licensee shall notify the Division (in writing, indicating date and court) immediately following the filing of a voluntary or involuntary petition for bankruptcy under any Chapter of Title 11 (Bankruptcy) of the United States Code by or against:

- a. The licensee;
- b. An entity (as that term is defined in 11 U.S.C. 101(14)) controlling the licensee or listing the license or licensee as property of the estate; or
- c. An affiliate (as that term is defined in 11 U.S.C. 101(2)) of the licensee.

14.0 USERS

14.1 AUTHORIZATION

The licensee shall submit a resume and documentation of each user's training and experience to the Division and obtain written authorization from the Division for each user.

14.2 LIST

The licensee shall maintain throughout the use of the radioactive materials authorized by this license at least two (2) trained and qualified authorized users, which shall include the Radiation Safety Officer ("RSO").

14.3 AVAILABILITY

An authorized user shall be on hand at the facility or on call at all times during any activities at the facility.

14.4 RADIATION SAFETY OFFICER ("RSO")

14.4.1 The licensee shall designate an individual to perform the duties of the RSO.

14.4.2 Prior to designating an individual as RSO, the licensee shall provide the Division with documentation of the individual's training and experience and shall obtain written authorization from the Division.

14.4.3 The designated RSO shall have refresher training in health physics (a minimum of 40 hours) at least every two years.

15.0 EMERGENCY ACTIONS

15.1 REPORT OF ACCIDENTS

Immediately upon discovery of any failure, or imminent threat of failure, in any process, diversion, or retention system that results or may result in a release of radioactive materials into unrestricted areas, the licensee shall notify by telephone the Colorado Department of Public Health and Environment at the emergency reporting number, 877 518-5608.

In addition, the licensee shall notify the Division in writing at the following address: Emergency Management Program, Laboratory and Radiation Services Division, Colorado Department of Public Health and Environment, 8100 Lowry Blvd., Denver, Colorado 80230-6928. This notification is in addition to the requirements of 6 CCR 1007-1, Parts 4.52 and 4.53.

15.2 EMERGENCY RESPONSE CAPABILITY

The following shall be specified in the licensee's Site Health and Safety Plan specified in LC 11.14.

15.2.1 Response Plans

The licensee shall use plans approved by the Division to respond to accidents and releases of radioactive material from within the project bounds specified in Annex A, and in the transportation of radioactive material. These plans shall include provisions for prompt retrieval of any radioactive material released to unrestricted areas.

15.2.2 Training

The licensee shall maintain a documented emergency response training program to insure that sufficient trained persons are always on hand at the facility or on call at all times during any activities at the facility.

16.0 FACILITY ADDITIONS OR CHANGES

The licensee shall provide the Division with thirty (30) days advance written notification of any proposed additions or changes to the site, facilities, and/or processes that could have a significant impact on public health, safety or the environment. The licensee shall obtain written authorization from the Division prior to making such modifications to the facility or processes.

17.0 DESIGN AND ENGINEERING

17.1 GENERAL CONSTRUCTION REQUIREMENTS

All construction related to the containment or disposal of the radioactive materials identified in LC 6, in the chemical and/or physical form identified in LC 7, and the quantities identified in LC 8 of this license shall be in accordance with detailed plans approved by the Division. All such plans must be approved by the Division prior to commencement of construction.

17.2 SUPERVISION

The licensee shall supervise all licensed construction activities in accordance with applicable regulations of the State Engineer and such additional requirements as are determined to be necessary pursuant the Colorado Code of Regulations.

17.3 ADDITIONAL SPECIFICATIONS AND SUBMITTALS

17.3.1 The licensee shall install a new ground water monitoring well down gradient of the evaporation and winter storage ponds, and provide well installation, completion and development data to the Division.

The licensee shall prepare and submit the following documents for Division review and approval:

17.3.2 Any licensee-proposed and Division-approved engineering design modification.

17.3.3 A cell design for final disposition of any waste from collection, evaporation, and other cleanup activities that take place after placement of the heap cover.

17.3.4 A sampling and analysis plan for the monitor well specified in LC 17.3.1.

17.4 RECLAMATION SCHEDULE

17.4.1 On or before January 15th of each year, the licensee shall submit to the Division an anticipated construction schedule for that year. This schedule shall include the specific activities expected to occur during each calendar month for that year.

17.4.2 The licensee shall submit to the Division a revision and/or update to the schedule required in LC 17.4.1 on or about May 1st of each year.

18.0 GENERAL REQUIREMENTS FOR ACTIVITIES

18.1 GENERAL MAINTENANCE

All radiation safety-related equipment and facilities used by the licensee to fulfill the requirements of this license shall be maintained in good working order. The licensee shall establish a schedule for routine inspections of radiation safety-related equipment. The licensee shall document these routine inspections and all preventive maintenance of radiation safety-related equipment performed in accordance with 6 CCR 1007-1, Part 4.

18.2 RADIATION PROTECTION PROGRAM

18.2.1 The licensee shall develop, document and implement a radiation protection program sufficient to ensure compliance with the provisions of 6 CCR 1007-1, Part 4.

The licensee shall maintain records of the radiation protection program in compliance with the provisions of 6 CCR 1007-1, Part 4.41.

18.2.2 The licensee shall use, to the extent practicable, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses and public doses that are "as low as is reasonably achievable" ("ALARA").

18.2.3 The licensee shall, at intervals not to exceed twelve (12) months, review the radiation protection program content and implementation.

18.2.4 When implementing the radiation protection program, the licensee should consider the intent of the following documents:

NRC RG 8.10, "Operating Philosophy for Maintaining Occupational Radiation Exposures As Low As Is Reasonably Achievable."

NRC RG 8.37, "ALARA Levels for Effluents from Materials Facilities."

18.3 MANAGEMENT

The licensee shall provide, by March 31st of each calendar year, updated details of the authority and responsibility of each level of management, noting any change.

18.4 TRANSPORTATION OF MATERIALS

The licensee may transport radioactive material or deliver radioactive material to a carrier for transport, in accordance with the provisions of 6 CCR 1007-1, Part 17 "Transportation of Radioactive Material."

The transportation of radioactive material in Colorado shall be subject to all applicable regulations of the Colorado Public Utilities Commission, Colorado Department of Transportation, Colorado Department of Public Safety, Colorado Department of Revenue (Port of Entry), U.S. Department of Transportation (DOT), and other agencies of the United States having jurisdiction. When DOT Regulations (Title 49, Chapter I, Code of Federal Regulations) are not applicable to shipments by land of radioactive material in Colorado by reason of the fact that the transportation does not occur in interstate or foreign commerce, the licensee shall comply with the requirements relating to packaging of the radioactive material, marking and labeling of the package, placarding of the transport vehicle, and accident reporting in DOT regulations.

19.0 SITE CONTROL AND PERSONNEL SAFETY

19.1 RESPONSIBILITY

- 19.1.1 Site management shall be accountable for safety, security, fencing, posting, and area control.
- 19.1.2 The RSO shall have authority to remove employees from a work environment or to suspend licensed activities in a particular area if health or safety conditions pose excessive hazard to the employees.
- 19.1.3 Site management shall act promptly on the recommendations of the RSO or RSO's designee pertaining to radiation safety and security.

19.2 TRAINING

- 19.2.1 New employees shall not commence work assignments in restricted areas until they have been adequately trained in the procedures and equipment associated with the assignment, radiation safety, and the provisions of 6 CCR 1007-1, Part 10 in accordance with a training program included in the Maybell Site Health and Safety Plan for Remedial Action (LC 11.9).
- 19.2.2 The RSO shall document employee training by dates, nature of training, tests and scores, and written acknowledgment of the training by the employee.
- 19.2.3 The licensee shall provide and document the radiation safety refresher training each year for each radiation worker.

19.3 PROTECTIVE CLOTHING

The RSO shall designate areas and/or activities that require the use of personal protective equipment.

19.4 RADIATION WORK PERMITS

The licensee's RSO shall prepare a Radiation Work Permit, prior to start of any work, including maintenance, at any location of the licensed facility or site, which has radiation safety implications and for which written procedures do not exist. The Radiation Work Permit shall specify appropriate radiological controls. A copy of all work permits shall be maintained for no less than five (5) years for inspection by the Division.

19.5 EATING AND SMOKING RESTRICTIONS

Within the restricted area, the licensee shall permit eating and smoking only in areas specifically designated by the RSO.

19.6 SECURITY

The licensee shall fence and post the restricted area boundary in accordance with 6 CCR 1007-1, Part 4.

19.7 POSTING EXEMPTION

The licensee is hereby exempted from the requirements of 6 CCR 1007-1, Part 4.28 for areas within the restricted area boundary, provided all entrances to the property are conspicuously posted with the sign:

"ANY AREA OR CONTAINER ON THIS PROPERTY
MAY CONTAIN RADIOACTIVE MATERIALS."

20.0 HEALTH, SAFETY AND ENVIRONMENTAL PROCEDURES MANUAL(S)

20.1 PROVISIONS

The licensee shall conduct construction and cleanup activities according to comprehensive written radiological health, safety and environmental procedures manual(s), approved by the Division, governing licensed activities. The procedures manual(s) shall contain safety, monitoring, decontamination, and emergency procedures, including:

20.1.1 Administrative and operating procedures relating to radiological health and safety.

20.1.2 Instructions and precautions to keep exposure ALARA.

20.2 REVISIONS

20.2.1 No reduction in a monitoring provision shall be made without Division approval.

20.2.2 Any procedures manual revision shall be submitted to the Division for approval prior to implementation. If the Division has not formally commented on, approved, or denied the revision within 60 days of receipt of said revision, the licensee may implement the revised procedure upon written notification to the Division.

20.2.3 The licensee shall consider proposed procedures manual revisions whenever new or revised regulatory guidance requiring such revisions is provided to the licensee by the Division.

21.0 POINT SOURCE AIR EMISSIONS CONTROLS

The licensee shall conduct activities within the specifications of any permit of the Air Pollution Control Division of the Department.

22.0 AREA SOURCE AIR EMISSIONS CONTROLS

The licensee shall institute means of control to limit fugitive dust emissions during reclamation as approved by the Division.

23.0 SOLID WASTE MANAGEMENT

23.1 SUPERVISION

The tailings confinement area shall be managed and monitored by persons trained as, or under the supervision of a professional engineer, or other qualified engineer, scientist, or person qualified by virtue of training and experience.

23.2 INSPECTIONS

The licensee shall have trained personnel perform and document inspections of the Heap Leach site, the Heap drainage collection system, the evaporation ponds, other associated facilities and equipment, and licensed activities in accordance with written procedures specified in the Maybell Policy and Procedures Manual (LC 11.10).

23.3 MAINTENANCE

The licensee shall perform required maintenance, repair and erosion control as expeditiously as possible.

24.0 LIQUID WASTE MANAGEMENT

24.1 SURFACE WATER

The licensee shall not discharge radioactive materials, hazardous constituents, and/or pollutants to SURFACE WATERS except as authorized by Department permit.

24.2 GROUND WATER

The licensee shall not allow radioactive materials, hazardous constituents and/or pollutants to migrate and impact GROUND WATER in excess of Department standards beyond the downgradient boundary of the Umetco-Maybell site specified in LC 10.0.

24.3 HEAP DRAINAGE

The heap drainage/collection system shall be monitored and maintained functional at all times until a plan for the plugging of the drainage/collection system is submitted and approved by the Division. Any required maintenance and repair shall be undertaken within time frames in accordance with written procedures specified in the Maybell Policy and Procedures Manual (LC 11.10).

- 24.4 All waste collected and evaporated from heap drainage shall be disposed of within the heaps (or in an alternative manner such as preprocessing or disposal elsewhere, as approved by the Division by explicit amendment to this LC 24).
- 24.5 The plugging of the drainage/collection system will be allowed if monitoring indicates zero (0) flow for a period of two (2) years, or if the licensee can demonstrate that the remaining flow will not exit the sideslopes or endanger the stability of the heap leach piles.

- 24.6 The licensee shall monitor and record the heap drainage flow in accordance with written procedures specified in the Maybell Policy and Procedures Manual (LC 11.10). The licensee shall continue the heap drainage flow monitoring until the Division approves otherwise.

25.0 TRANSFER OF CONTAMINATED MATERIALS

- 25.1 Tailings or other waste radioactive materials, other than samples for laboratory analysis or research, shall not be transferred to or from the site without specific prior approval of the Division obtained through amendment of this license.
- 25.2 Release of potentially-contaminated equipment or materials from the restricted area shall occur only after documented survey and decontamination, which meets the requirements of Annex B and 6 CCR 1007-1, Part 3.22.
- 25.3 The licensee shall maintain a permanent record of each radioactive material transfer.

26.0 GENERAL SPECIFICATIONS FOR INSPECTION AND MONITORING

26.1 RECORDS

The results of sampling, analyses, surveys, instrument calibrations, inspections and audits, transfers of radioactive material, and employee training (and any reviews, investigations, and corrective actions related to these results) shall be documented. All such documentation shall be retained and kept available to the Division until other disposition is authorized by the Division. Personnel exposure records shall be preserved indefinitely.

26.2 LOWER LIMITS OF DETECTION ("LLDs")

- 26.2.1 The licensee shall follow the lower limits of detection ("LLDs") contained in Annex C for the analysis of environmental monitoring samples collected pursuant to LC 28. If the licensee intends to use other LLDs, such LLDs shall be submitted to the Division for review and approval.

For personnel and facility monitoring (LC 27), the licensee shall use the LLDs resulting from the procedures contained in the Maybell Policy and Procedures Manual (LC 11.10). The LLDs for each sample will vary from one sample to the next depending on the sample volume, the sample period duration, and the time from sample collection to measurement. Other factors that are specific to laboratory operating procedures might also affect the calculated LLDs for each sample.

- 26.2.2 If actual concentrations being measured are significantly higher than the lower limits of detection specified in LC 26.2.1, the sampling and analysis procedures need only be adequate to measure the actual concentrations. In such cases, the standard deviation estimated for variability due to random error of the analysis shall be no greater than ten percent (10%) of the measured value.

26.3 QUALITY ASSURANCE/QUALITY CONTROL

- 26.3.1 The licensee shall maintain a quality assurance/quality control program for radiological monitoring.

26.3.2 NRC RG 4.15, "Quality Assurance for Radiological Monitoring Programs (Normal Operations) - Effluent Streams and the Environment," as revised, shall be followed by the licensee; or the licensee's specifications may provide for an equivalent quality assurance program.

26.4 EQUIPMENT AVAILABLE

The inventory of monitoring equipment shall be such that operable and calibrated units are always at the facility and/or readily available for use when needed.

26.5 CALIBRATION OF EQUIPMENT

The licensee shall calibrate all radiation monitoring and sampling equipment after repair and as authorized in the Maybell Policy and Procedures Manual (LC 11.10). Calibration shall be at least as frequently as the manufacturer's suggested interval, or annually if no interval is specified. Also, a check source shall be used to assure that each radiation detection instrument is operating properly before each use.

27.0 PERSONNEL AND FACILITY MONITORING

- 27.1 The licensee's personnel and facility monitoring program shall be sufficient to enable the Division to estimate maximum potential occupational dose commitment and to demonstrate compliance with 6 CCR 1007-1, Part 4, and shall be as in the Maybell Policy and Procedures Manual required by LC 20 (LC 11.10), revised as necessary in accordance with LC 20.2, with results included in the report required in LC 30.
- 27.2 Sampling for occupational exposure to airborne particulates shall be as specified in the Maybell Policy and Procedures Manual (LC 11.10).
- 27.3 Surveys for personnel contamination shall be quarterly on 10 percent of workers leaving the site as specified in the Maybell Policy and Procedures Manual (LC 11.10).
- 27.4 Bioassays, as required to demonstrate compliance with 6 CCR 1007-1, Part 4, shall be performed according to procedures specified in the Maybell Policy and Procedures Manual (LC 11.10).

28.0 ENVIRONMENTAL MONITORING, ANALYSIS PROGRAM AND OFF SITE DOSE

- 28.1 The licensee's environmental monitoring and analysis program shall be as in the Maybell Policy and Procedures Manual required by LC 20 (LC 11.10), as modified by this LC 28, revised as necessary in accordance with LC 20.2, with results included in the report required by LC 30.
- 28.2 AIR PARTICULATE SAMPLING shall be performed at two locations as specified in the Maybell Policy and Procedures Manual (LC 11.10) to include a control location and a downwind location; collected continuously during reclamation construction activities; collected during at least one month of each of the spring, summer and fall quarters during periods of non-construction activities; collected with weekly filter changes, or more frequently as required by dust loading; and analyzed for natural uranium, thorium-230 and radium-226.
- 28.3 AMBIENT RADON SAMPLING shall be performed as specified in the Maybell Policy and Procedures Manual (LC 11.10).

- 28.4 RADON FLUX SAMPLING shall be such to demonstrate compliance with the requirements of Title 40, Code of Federal Regulations, Part 192, as revised.
- 28.5 GROUND WATER
- 28.5.1 The licensee shall maintain a ground water monitoring program, specific to the Umetco-Maybell Uranium Heap Leach facility, in accordance with 6 CCR 1007-1, Part 18, Appendix A.
- 28.5.2 The licensee shall not modify its ground water monitoring program without prior Division review and written approval.
- 28.5.3 Ground water monitoring wells; N.E. Heap, and Rob Pit Ramp, are designated as up gradient "background wells."
- 28.5.4 Ground water monitoring wells; Mill Site #1 and Mill Site #2, and the new ground water monitoring well downgradient of the evaporation and winter storage ponds required by LC 17.3.1, are designated as downgradient "point of compliance wells."
- 28.6 SURFACE WATER shall be sampled immediately upstream and downstream from the point of release to any water of the state in the event of a spill of radioactive materials to surface water; and
- 28.6.1 Analyzed for natural uranium, thorium-230, radium-226, and gross alpha and gross beta;
- 28.6.2 Analyzed for a selected group of trace heavy metals and priority pollutants, to include, but not be limited to, arsenic, lead, molybdenum, selenium, and vanadium;
- 28.6.3 Analyzed for chloride, pH, specific conductance, sulfate, temperature, and total dissolved solids.
- 28.7 SOIL shall be sampled and surveyed in accordance with the Soils Cleanup Plan (LC 11.3) and the Quality Plan and Construction Verification Program (LC 11.2). Soil sampling and surveys shall be used in-part to demonstrate decontamination and reclamation in off-site areas.
- 28.8 OFF SITE DOSE
- 28.8.1 The licensee shall conduct operations in such a manner as to provide reasonable assurance that the annual dose equivalent does not exceed 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public as the result of exposures to planned discharges of radioactive materials, radon and its progeny excepted, to the general environment.
- 28.8.2 The licensee's environmental monitoring and assessment program shall be sufficient to enable the Division to estimate, with reasonable assurance, maximum potential radiation dose commitments to members of the public and to demonstrate compliance with LC 28.8.1.

29.0 SAFETY INSPECTIONS AND AUDITS

- 29.1 The RSO shall audit at least annually all inspection and all monitoring data. The RSO shall summarize this information and submit to the site management a written report, which recommends any necessary corrective actions and includes an evaluation of the adequacy of the implementation of license requirements in accordance with written procedures specified in the Reclamation Plans (LC 11.1 through 11.4); and the Health, Safety and Environmental Procedures (LC 11.14 and 11.15).
- 29.2 The licensee shall include in the Maybell Policy and Procedures Manual (LC 11.10) a schedule for visual and other inspections to document the status of radiation safety on the site.
- 29.3 For any calendar year during which reclamation activities are conducted, the licensee shall perform, or cause to be performed, an annual independent audit of the site radiation protection program.

30.0 REPORTS TO THE DIVISION

The licensee shall, for the previous calendar year ending December 31st, provide to the Division by March 31st of each year:

- 30.1 A RECLAMATION REPORT describing reclamation activities that have occurred and a summary of all construction QC/QA documentation.
- 30.2 An OFF-SITE RADIATION DOSE REPORT that evaluates doses to members of the public, using site specific input parameters and methods approved by the Division pursuant to LC 28.8.
- 30.3 PERSONNEL, FACILITY, EFFLUENT AND ENVIRONMENTAL MONITORING DATA, in particular all data obtained pursuant to LC 27 and LC 28, presented in such tabular and graphical form (in accord with Annex D) such that trends may be readily identified, including:
- 30.3.1 Date, type, and location for each analytical result, including for radionuclides the magnitude of the random error to the ninety-five percent (95%) confidence level.
- 30.3.2 Graphs or charts that identify trends for each data set.
- 30.4 A GROUND WATER REPORT including all data, calculations and analysis, with conclusions, pursuant to LC 28.5.

31.0 FINANCIAL ASSURANCE

31.1 MAINTENANCE OF FINANCIAL ASSURANCE AGREEMENT

The licensee shall maintain in force a financial assurance warranty pursuant to 6 CCR 1007-1, Part 3.9.5, adequate to cover the estimated cost for decommissioning, decontamination and reclamation (DDR) of the licensed site. The cost estimate shall be determined assuming performance by an independent contractor. The financial assurance warranty shall be maintained until a decision on release is made by the Division as provided by law and the financial assurance agreement between the licensee and the Division.

31.2 ANNUAL UPDATE

An annual update to the financial assurance cost estimate shall be submitted to the Division by March 31st of each year. Included with the annual update, the licensee shall submit supporting documentation showing a breakdown of the costs, the basis for each cost estimate with any adjustment for inflation or deflation, that a minimum 15 percent contingency is maintained, and any change in engineering plan, activity to be performed, or any other condition affecting the cost of site closure.

31.3 RENEWAL

If the Division has not approved a proposed revision to the financial assurance arrangement thirty (30) days prior to the expiration date of the existing arrangement, the licensee shall extend the existing arrangement for one (1) year.

31.4 COST BASIS

Each cost estimate shall be based on a Division-approved DDR plan, an element thereof, or on a Division-approved revision thereto.

31.5 REVISION

If the estimated cost of a revised DDR plan exceeds the amount covered in the existing financial assurance warranty, the licensee shall, within three (3) months of Division approval of the DDR revision, submit a proposed revision to the financial assurance warranty for Division review and approval. The proposed revision (or any licensee-initiated revision) shall be accompanied by the supporting documentation required in LC 31.2. A revised financial assurance warranty shall be in effect within three (3) months of written Division approval of a revised cost estimate.

31.6 CURRENT AGREEMENT

The licensee's currently-approved financial assurance warranty, a letter of credit issued in favor of the people of the State of Colorado, shall be continuously maintained in an amount not less than \$5,055,101 for the purpose of complying with 6 CCR 1007-1, Part 3.9.5 until a replacement financial assurance warranty is authorized by the Division.

32.0 DECOMMISSIONING, DECONTAMINATION, RECLAMATION AND STABILIZATION

- 32.1 Each decommissioned area of the facility, which is intended to be returned to unrestricted use, shall be decontaminated to background radiation ranges and hazardous constituent ranges acceptable to the Division based on statistically-defensible tests of soil contamination with depth, in accordance with regulatory controls approved by the Division.
- 32.2 The licensee shall clean up off-site contamination due to releases from the heap leach area in accordance with all applicable state and federal regulations.
- 32.3 The licensee shall minimize wind and water erosion of contaminated materials during reclamation using written procedures approved by the Division.
- 32.4 The surface of the heap leach piles shall be recontoured and covered in accordance with 6 CCR 1007-1, Part 18, Appendix A, and/or in accordance with Division-approved final plans and specifications.

32.5 OWNERSHIP OPTION

If the licensee requests to have post-reclamation ownership of the heap leach area, and if authorized by law, and the licensee obtains the approval of such from the Division and the federal government, the restrictions of 6 CCR 1007-1, Part 18, Appendix A, and the following shall be in force:

- 32.5.1 The licensee shall carry out a Division-approved long-term monitoring and maintenance program;
- 32.5.2 The licensee shall not permit tailings material to be exposed or released to the surrounding area after reclamation;
- 32.5.3 The licensee shall prohibit the erection of any structures for occupancy by humans or animals;
- 32.5.4 The licensee shall prohibit establishment of private roads, trails, or rights-of-way across the site;
- 32.5.5 The licensee shall maintain any necessary fencing to preclude entry of people, or grazing or browsing animals; and
- 32.5.6 The licensee shall maintain appropriate posting in accordance with 6 CCR 1007-1, Part 4.

33.0 LONG-TERM MONITORING AND CARE

- 33.1 The licensee shall provide a long-term care (LTC) warranty for monitoring and care of the licensed site subsequent to termination of the license as required in 6 CCR 1007-1, Part 3.

FOR THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT:

By: _____ Date: _____

W. (Jake) Jacobi
Radiation Services
Laboratory and Radiation Services Division

Annex A

Authorized Place of Use

Township 7 North, Range 95 West, 6th P.M.: the west half (W ½) of Section 24; and the east 250 feet of Section 23:

LEGAL DESCRIPTION FOR
AREA SUBJECT TO MAYBELL TITLE II
RADIOACTIVE MATERIALS LICENSE

Fence Perimeter Description

A fence line lying in the East One-half of Section 23 and in the West One-half of Section 24 in Township 7 North, Range 95 West of the 6th Principle Meridian, Moffat County, Colorado, more particularly described as follows:

Commencing at an alloy cap and pipe established by the U.S. Bureau of Reclamation for the southeast corner of said Section 24, from whence a one-half-inch diameter rebar adjacent to the original General Land Office stone monument for the southwest corner of said Section 24 bears N 89°52'15" W a distance of 5269.56 feet, thence N 58°05'03" W 3670.34 feet to a said fence line at the point of beginning; thence on said fence line the following twenty-one courses and distances:

1. N 37°34'48" E 25.77 feet;
2. N 00°19'21" E 591.31 feet;
3. N 01°04'11" E 643.41 feet;
4. N 43°28'42" W 456.27 feet;
5. N 44°10'06" W 288.75 feet;
6. N 42°28'01" W 262.67 feet;
7. N 76°22'58" W 738.48 feet;
8. S 22°53'14" W 34.20 feet;
9. N 85°39'26" W 217.76 feet;
10. S 52°25'37" W 293.86 feet;
11. S 79°08'01" W 525.87 feet;
12. S 02°11'39" W 969.25 feet;
13. S 07°30'07" E 515.42 feet;
14. S 08°22'28" E 375.07 feet;
15. S 06°16'26" E 468.38 feet;
16. N 65°40'01" E 412.87 feet;
17. N 85°41'34" E 235.43 feet;
18. S 42°03'20" E 213.57 feet;
19. N 86°46'25" E 429.37 feet;
20. S 86°47'22" E 1033.24 feet;
21. N 01°05'22" E 453.24 feet to the beginning;

Enclosing an area of 124.65 acres.

Annex B

GUIDELINES FOR DECONTAMINATION OF FACILITIES AND EQUIPMENT PRIOR TO RELEASE FOR UNRESTRICTED USE OR TERMINATION OF LICENSES FOR RADIOACTIVE MATERIAL

These instructions in conjunction with Table I specify the radioactivity and radiation exposure rate limits that are to be used in accomplishing the decontamination and survey of surfaces or premises and equipment prior to abandonment or release for unrestricted use. The limits in Table I do not apply to premises, equipment, or scrap containing induced radioactivity for which the radiological considerations pertinent to their use may be different. The release of such facilities or items from regulatory control will be considered on a case-by-case basis.

1. The licensee shall make a reasonable effort to eliminate residual contamination.
2. Radioactivity on equipment or surfaces shall not be covered by paint, plating, or other covering material unless contamination levels, as determined by a survey and documented, are below the limits specified in Table I prior to applying the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.
3. The radioactivity on the interior surfaces of pipes, drain lines, or ductwork shall be determined by making measurements at all traps, and other appropriate access points, provided that contamination at these locations is likely to be representative of contamination on the interior of the pipes, drain lines, or ductwork. Surfaces of premises, equipment, or scrap which are likely to be contaminated but are of such size, construction, or location as to make the surface inaccessible for purposes of measurement, shall be presumed to be contaminated in excess of the limits.
4. Upon request, the Division may authorize a licensee to relinquish possession or control of premises, equipment, or scrap having surfaces contaminated with materials in excess of the limits specified. This may include, but would not be limited to, special circumstances such as razing of buildings, transfer of premises to another organization continuing work with radioactive materials, or conversion of facilities to a long-term storage or standby status. Such requests must:
 - a. Provide detailed, specific information describing the premises, equipment or scrap, radioactive contaminants, and the nature, extent, and degree of residual surface contamination.
 - b. Provide a detailed health and safety analysis which reflects that the residual amounts of materials on surface areas, together with other considerations such as prospective use of the premises, equipment or scrap, are unlikely to result in an unreasonable risk to the health and safety of the public.
5. Prior to release of premises for unrestricted use, the licensee shall make a comprehensive radiation survey which establishes that contamination is within the limits specified in Table I. A copy of the survey report shall be filed with the Radiation Control Division, Colorado Department of Public Health and Environment. The survey report shall:
 - a. Identify the premises.
 - b. Show that reasonable effort has been made to eliminate residual contamination.
 - c. Describe the scope of the survey and general procedures followed.
 - d. State the finding of the survey in units specified in the instruction.

Following the review of this report, the Division will consider visiting the facilities to confirm the survey.

TABLE I: ACCEPTABLE SURFACE CONTAMINATION LEVELS

NUCLIDES ^a	AVERAGE ^{b c f}	MAXIMUM ^{b d f}	REMOVABLE ^{b e f}
Alpha emissions from U-nat, U-235, U-238, and associated decay products	5,000 dpm per 100 cm ²	15,000 dpm per 100 cm ²	1,000 dpm per 100 cm ²
Alpha emissions from Ra-226, Ra-228, Th-230, Th-228, Ac-227	100 dpm per 100 cm ²	300 dpm per 100 cm ²	20 dpm per 100 cm ²
Alpha emissions from Th-nat, Th-232, Ra-223, Ra-224, U-232	1,000 dpm per 100 cm ²	3,000 dpm per 100 cm ²	200 dpm per 100 cm ²
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except others noted above.	5,000 dpm per 100 cm ²	15,000 dpm per 100 cm ²	1,000 dpm per 100 cm ²

- a Where surface contamination by both alpha and beta/gamma-emitting nuclides exists, the limits established for alpha and beta/gamma-emitting nuclides should apply independently.
- b As used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute observed by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- c Measurements of average contaminant should not be averaged over more than one square meter. For objects of less surface area, the average should be derived for each such object.
- d The maximum contamination level applies to an area of not more than 100 cm².
- e The amount of removable radioactive material per 100 cm² of surface area should be determined by wiping that area with dry filter or soft absorbent paper, applying moderate pressure, and assessing the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of less surface area is determined, the pertinent levels should be reduced proportionally, and the entire surface should be wiped.
- f The average and maximum radiation levels associated with surface contamination resulting from beta/gamma emitters should not exceed 0.2 mrad/hr at 1 cm and 1.0 mrad/hr at 1 cm, respectively, measured through not more than 7 milligrams per square centimeter of total absorber.

Annex C

Lower Limits of Detection (LLD) for Sample Analysis

U-natural, Th-230, Ra-226 in air	$1 \times 10^{-16} \mu\text{Ci/ml}$
Pb-210 in air	$2 \times 10^{-15} \mu\text{Ci/ml}$
Rn-222	$2 \times 10^{-10} \mu\text{Ci/ml}$
U-natural, Th-230, Ra-226 in water	$2 \times 10^{-10} \mu\text{Ci/ml}$
Po-210 in water	$1 \times 10^{-9} \mu\text{Ci/ml}$
Pb-210 in water	$1 \times 10^{-9} \mu\text{Ci/ml}$
U-natural, Th-230, Ra-226, Pb-210 in soil and sediment (dry)	$2 \times 10^{-7} \mu\text{Ci/g}$
U-natural, Th-230 in vegetation, food, and fish (wet)	$2 \times 10^{-10} \mu\text{Ci/g}$
Ra-226 in vegetation, food, and fish (wet)	$5 \times 10^{-11} \mu\text{Ci/g}$
Po-210, Pb-210 in vegetation, food, and fish (wet)	$1 \times 10^{-9} \mu\text{Ci/g}$
Total alpha in air	$1 \times 10^{-16} \mu\text{Ci/ml}$
Total beta in air	$2 \times 10^{-15} \mu\text{Ci/ml}$
Exposure rate in air	$2 \mu\text{R/hr}$

Annex D

FORMAT FOR REPORTING MONITORING DATA

HEADNOTES

- a. This table is not a complete list of data to be reported.
- b. Error estimate should be calculated at 95% confidence level, based on counting error and other sources of random error. Significant systematic error should be reported separately.
- c. All calculations of lower limits of detection (LLD) and percentages of derived air concentrations (DAC) should be included as supplemental information.

1. AIR SAMPLES

For each sample analyzed, report the following information:

- a. Date sample was collected
- b. Location of sample collection

<u>Radionuclide</u>	<u>Concen- tration (μCi/ml)</u>	<u>Error Estimate (μCi/ml)</u>	<u>LLD (μCi/ml)</u>	<u>Concen- tration % DAC</u>
U-nat				
Th-230				
Ra-226				
Pb-210				
Rn-222				

2. LIQUID SAMPLES

For each sample analyzed, report the following information:

- a. Date sample was collected
- b. Location of sample collection
- c. Type of sample (for example: surface, ground, drinking, stock, or irrigation water)

<u>Radionuclide</u>	<u>Concen- tration (μCi/ml)</u>	<u>Error Estimate (μCi/ml)</u>	<u>LLD (μCi/ml)</u>
U-nat (dissolved) (suspended)*			
Th-230 (dissolved) (suspended)*			
Ra-226 (dissolved) (suspended)*			
Pb-210 (dissolved) (suspended)*			
Po-210 (dissolved) (suspended)*			

* Not all samples must be analyzed for suspended radionuclides.

3. VEGETATION AND FOOD SAMPLES

For each sample analyzed, report the following information:

- a. Date sample was collected
- b. Location of sample collection
- c. Type of sample and portion analyzed

<u>Radionuclide</u>	<u>Concen- tration (μCi/kg wet)</u>	<u>Error Estimate (μCi/kg)</u>	<u>LLD (μCi/kg)</u>
U-nat			
Th-230			
Ra-226			
Pb-210			
Po-210			

4. SOIL AND SEDIMENT SAMPLES

For each sample analyzed, report the following information:

- a. Date sample was collected
- b. Location of sample collection
- c. Type of sample and portion analyzed

<u>Radionuclide</u>	<u>Concentration</u> <u>(μCi/g)</u>	<u>Error Estimate</u> <u>(μCi/g)</u>	<u>LLD</u> <u>(μCi/g)</u>
U-nat			
Th-230			
Ra-226			
Pb-210			
Po-210			

5. DIRECT RADIATION MEASUREMENTS

For each measurement, report the dates covered by the measurement and the following information:

<u>Location</u>	<u>Exposure Rate</u> <u>(mR/qtr)</u>	<u>Error Estimate</u> <u>(mR/qtr)</u>
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6. RADON MEASUREMENTS

Without in any way modifying or altering the monitoring requirements under the license, the following format is provided for use in reporting any information required by the license. For each measurement, report the dates covered by the measurement and the following information:

<u>Location</u>	<u>Flux Rate</u> <u>(pCi/m²-sec)</u>	<u>Error</u>	<u>Progeny</u> <u>DAC</u>	<u>Error</u>	<u>Gas</u> <u>pCi/L</u>	<u>Error</u>
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7. NON-RADIOLOGICAL MEASUREMENT

All routine and/or required non-radiological measurements (e.g., for liquid samples: pH, total dissolved solids (TDS), total suspended solids (TSS), Cl⁻, SO₄⁼, etc.) are also to be reported in an appropriate format.

VI. NOTICE OF OPPORTUNITY FOR PUBLIC COMMENT

NOTICE OF OPPORTUNITY FOR PUBLIC COMMENT IN THE MATTER OF THE APPLICATION BY UMETCO MINERALS CORPORATION TO THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT FOR AN AMENDMENT TO RENEW THE RADIOACTIVE MATERIALS LICENSE TO RECLAIM THE MAYBELL URANIUM HEAP LEACH SITE, MOFFAT COUNTY, COLORADO.

Notice is hereby given pursuant to 6 CCR 1007-1, Section 18.6, 24-4-104 and 105 C.R.S. (1988), and 25-11-103 and 104, C.R.S. (1989), that the Colorado Department of Public Health and Environment ("Department"), Laboratory and Radiation Services Division ("LARS"), is providing the opportunity for public comment and a hearing concerning the application of Umetco Minerals Corporation for an amendment to renew Umetco's existing specific Colorado Radioactive Materials License No. 660-01 for the Maybell Uranium Heap Leach site and the Department's Decision Analysis and Proposed Amendment to Renew License.

The Maybell Uranium Heap Leach site is located approximately four miles northeast of the town of Maybell in Moffat County, Colorado. The reclaimed heap, consisting of two million tons of low-grade ore on a compacted clay liner, occupies approximately 60 acres. The heap has been covered with an engineered earthen radon barrier and is capped with a frost protection layer and rock to protect against erosion.

The State of Colorado *Rules and Regulations Pertaining to Radiation Control*, 6 CCR 1007-1, requires that the licensee protect public health and the environment. The requirements of regulation are implemented by agreements and commitments codified in the Colorado Radioactive Materials License No. 660-01.

Colorado's radiation regulations require that a preliminary decision to amend a Colorado uranium mill license be accompanied by a written analysis of the basis for decision. Umetco's application seeks to continue the license for reclamation of the site. Amendment is necessary in order to renew the license. The Decision Analysis, prepared by the Department, describes the proposed licensing action and reviews environmental considerations, safety considerations and radiation protection at the site. The proposed amendment to renew license is to continue site reclamation begun in 1993.

The central topic of the Decision Analysis is authorization to continue reclamation of the site to achieve long-term stability of impounded tailings, contaminated soil and mill debris granted in the renewed license of 1993 (Amendment 13). The applicant's license renewal application of May 29, 1998, has been reviewed, and the Department's preliminary finding is to authorize renewal of the license.

Copies of the Decision Analysis are available now. A full set of review documents is available at the Colorado Department of Public Health and Environment, Laboratory and Radiation Services Division, Denver, 8100 Lowry Blvd., Denver, Colorado. The Decision Analysis is also available at: Maybell Public Library, 190 Collom St., Maybell, Colorado; Craig-Moffat County Library, 570 Green St., Craig, Colorado, and; Mesa County Public Library, 530 Grand Ave., Grand Junction, Colorado.

Interested parties are invited to submit written comments on the license renewal application and the Decision Analysis no later than April 13, 2000, to: Don Simpson, Colorado Department of Public Health and Environment, 220 S. 6th St., Room 232, Grand Junction, Colorado 81501-2768.

Persons who may be adversely affected or aggrieved by the Department's action on the license application may request a hearing no later than February 14, 2000. A request for hearing is to be submitted to: Don Simpson, Colorado Department of Public Health and Environment, 220 S. 6th St., Room 232, Grand Junction, Colorado 81501-2768.

A request for hearing should state the individual's or group's interest in a hearing and the specific grounds on which they are adversely affected or aggrieved and the address and telephone number of the individual or group.

If required, a formal hearing will be held in the locale of the Maybell Uranium Heap Leach site in the town of Maybell, at a time and location set in a later notification of public hearing.

The purpose of a hearing would be to receive evidence on the license renewal application of Umetco Minerals Corporation for the issuance of a license amendment to continue reclamation of the Maybell Uranium Heap Leach site, pursuant to Colorado's *Rules and Regulations Pertaining to Radiation Control*, 6 CCR 1007-1, Parts 3 and 18, and to Sections 25-11-103 and 104, C.R.S. (1989). The hearing would be conducted in accordance with the procedures contained in Sections 24-4-104 and 105, C.R.S. (1988) and 6 CCR 1007-1, Parts 3 and 18.

After notice of a Department decision that a hearing is to be held, persons desiring to participate formally in any such hearing, and to have the right to initiate discovery, present evidence, cross examine witnesses and appeal the issuance or denial of the license amendment, must request party status, in accord with the requirements of 24-4-105 C.R.S. (1988) and 6 CCR 1007-1, Section 18.6.3.

The application for party status must identify the individual or group applying for party status, with the address and phone number where they can be contacted. The application must also state the nature of the individual's or group's interest in the hearing, the specific grounds on which they are adversely affected or aggrieved, and the specific aspects of the hearing the application wishes to address.

Two copies of the application should be submitted to: Don Simpson, Colorado Department of Public Health and Environment, 220 S. 6th St., Room 232, Grand Junction, Colorado 81501-2768.

A decision granting or denying party status will be made by the Department within five (5) days after receipt of the request for party status, based on the nature and extent of the applicant's property, financial or other interest in the hearing, and the possible effect on the applicant's interest of any order which may be entered. The Department will notify an applicant by mail of the decision on party status (notifying other party status applicants and parties at the same time).

Those granted or applying for party status are required to attend a pre-hearing conference. The purpose of the pre-hearing conference is to aid in the orderly disposition of the hearing, including consideration of: simplification of the issues; stipulations regarding facts and the admissibility of documents; limitations of expert witnesses; and requests for party status.

Parties will be required to provide all other parties, the applicant, the Department and the hearing officer with pre-hearing statements containing a brief summary of factual and legal claims of the party and the basis therefore, copies of exhibits that may be submitted at the hearing, and a list of witnesses, together with a brief statement of the testimony they will present. Except for good cause shown or for evidence or testimony accepted as rebuttal, no witness may testify nor may any exhibits be introduced on behalf of a party or applicant to be a party who has notice of the pre-hearing conference unless such witness has been previously listed and/or written testimony and related exhibits have been presented to opposing parties at the pre-hearing conference.

A specific time will also be set aside at the hearing for receipt of oral or written comments from any interested person without party status. A form will be available prior to and during the hearing to indicate a desire to present oral comments. Hearing proceedings will be recorded.

A more complete description of the statutory and regulatory requirements for the hearing procedures is found at 6 CCR 1007-1, Section 18.6 and 24-4-105 C.R.S. (1988).

Questions concerning this notice should be directed to: Don Simpson, Colorado Department of Public Health and Environment, phone (970) 248-7033.

Written comments on the license application and Decision Analysis are to be sent by April 13, 2000, to: Don Simpson, Colorado Department of Public Health and Environment, 220 S. 6th St., Room 232, Grand Junction, Colorado 81501-2768.

W. (Jake) Jacobi, Radiation Services
Laboratory and Radiation Services Division
Colorado Department of Public Health and Environment

II. APPENDICES

A. Selected References

B. Figures

Figure 1 - Site Location Map

Figure 2 - Maybell Site Features

APPENDIX A

Selected References

Colorado, *Rules and Regulation Pertaining to Radiation Control, 6 Colorado Code of Regulations 1007-1* (Regulations).

Colorado Department of Public Health and Environment, *Preliminary License Statement*, February 5, 1992. (CDPHE, 1992)

Colorado Department of Public Health and Environment, letter to Curtis O. Sealy, Umetco, from D. Arthur Burnham, stating approval for installation of a new monitoring well, November 19, 1999. (CDPHE, 1999)

Colorado Department of Public Health and Environment, CRML Compliance Inspections
Inspection - September 27, Oct 14, 1999; Letter and Report - November 4, 1999
Inspection - October 16, 1998; Letter and Report - December 10, 1998
Inspection - October 15-16, 1997; Letter and Report - October 29, 1997
Inspection - October 28-29, 1996; Letter and Report - November 26, 1996.

Shepherd Miller, Inc., *Geotechnical Considerations for Abandonment of the Drainage Collection System at Umetco's Reclaimed Maybell Heap Leach*, March 18, 1998. (Miller 1998)

Umetco Minerals Corporation, Annual Reports to the CDPHE
1998 - March 31, 1999
1997 - March 31, 1998
1996 - March 31, 1997
1995 - February 28, 1996.

Umetco Minerals Corporation, *Reclamation Plan, Final Design, Plans and Specifications for the Maybell Heap Leach Facility*, as revised, 1989. (Umetco, 1989)

Umetco *Policy and Procedures Manual-Maybell*, as revised, 1994. (Umetco, 1994)

Umetco Minerals Corporation, *Soils Cleanup Plan*, March 1995. (Umetco, 1995)

Umetco *Site Health and Safety Plan for Remedial Action at the Maybell Uranium Heap Leach Site, Maybell, Colorado*, as revised, 1997. (Umetco, 1997)

Umetco Minerals Corporation, application for radioactive materials license to CDPHE, May 29, 1998. (Umetco, 1998a)

Umetco Minerals Corporation, *Final Radon Flux Measurements, Heap Leach Area*, January 1998. (Umetco, 1998b)

Umetco Minerals Corporation letter to Donald H. Simpson, CDPHE, with an annual update of surety instruments in place, March 17, 1999. (Umetco, 1999a)

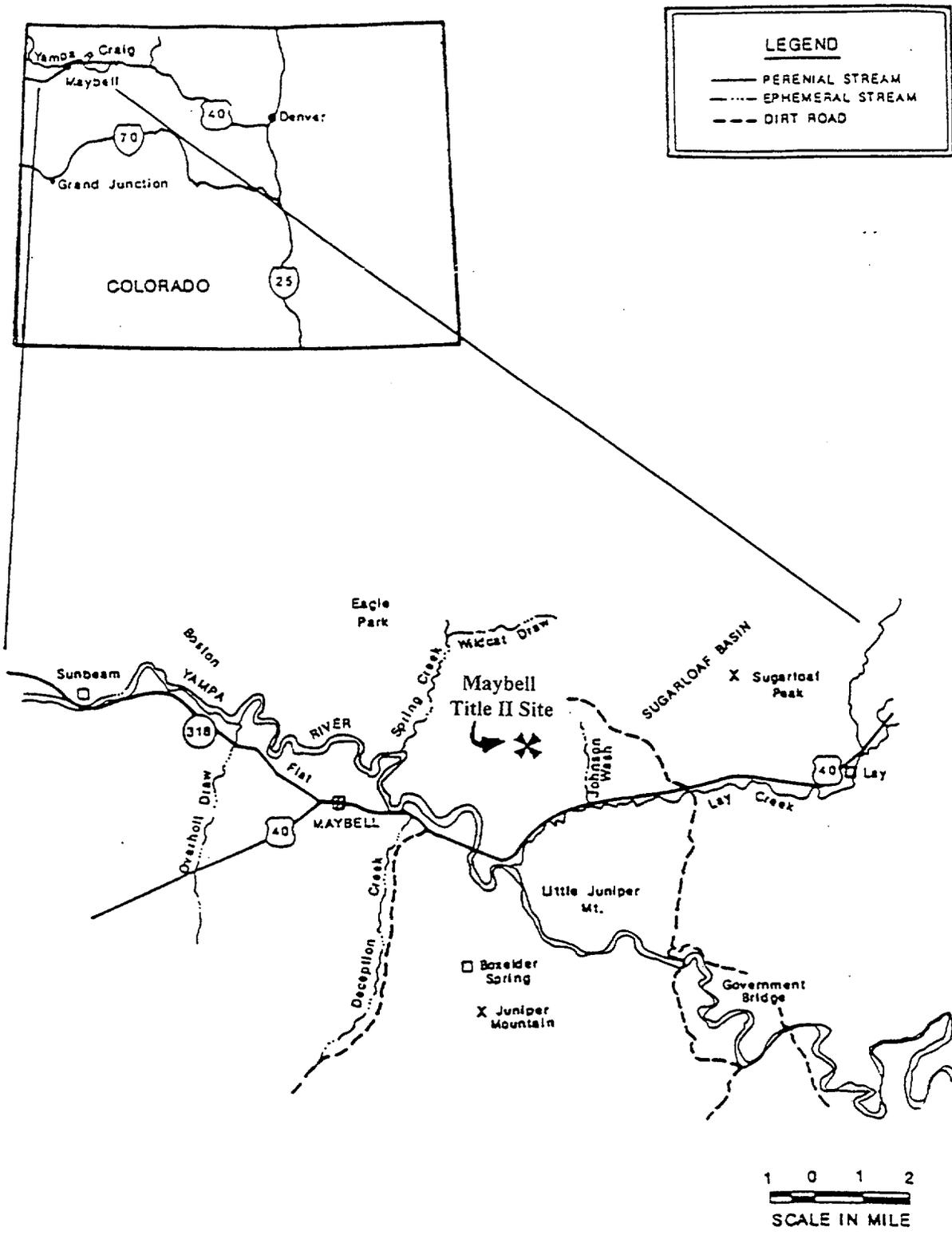
Umetco Minerals Corporation letter to Art Burnham, CDPHE, with a request to replace Annex A of the license with a new legal description, December 13, 1999. (Umetco, 1999b)

U.S. Department of Energy, *Remedial Action Plan and Site Design for Stabilization of the Inactive Uranium Mill Tailings Site, Maybell, Colorado*, December 1996. (DOE, 1996)

APPENDIX B

Figures

Figure 1 Site Location Map



UMETCO MINERALS CORPORATION
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