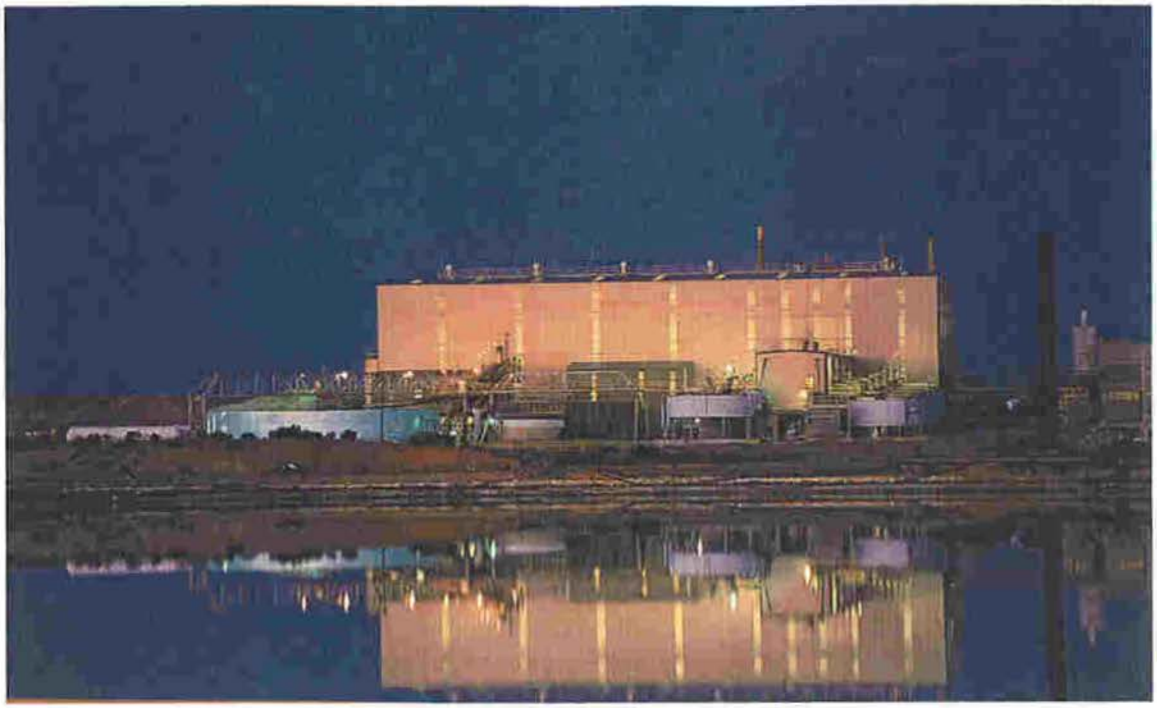

WHITE MESA URANIUM MILL

LICENSE RENEWAL APPLICATION

STATE OF UTAH RADIOACTIVE MATERIALS LICENSE No. UT1900479

February 28, 2007

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Volume 3 of 5
(License Renewal Application)
(Appendices J-O)

Training Manual

Denison Mines (USA) Corp.

White Mesa Mill

6425 South Highway 191
Blanding, Utah 84511

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Training Program

1.0 Introduction

The purpose of the Denison Mines (USA) Corp. ("DUSA") in-house safety training program is to place in the proper perspective, for the employee, the potential short and long-term hazards associated with the job; to acquaint the employee with the practices instituted by management to minimize occupational exposures and to ensure that the employee has an understanding (both initially and over the duration of his employment) of the radiation, health, safety and environmental protection procedures the employee should be following.

Additionally, DUSA management is committed to maintaining occupational radiation exposures to levels as low as reasonably achievable (ALARA).

2.0 On-Site Contractors

The employees of on-site contractors receive instructions and training prior to performing site work. New hire training, as outlined in section 1.2 is included in the training program, as applicable to the site work specifications, for on-site contractors. Contracted employees receive a review of the radiation awareness training program including definitions of types of radiation present, the monitoring program in place, levels of predicted exposures, restricted access areas, and special job hygiene and personal protection requirements involved with the site work specifications. The contractor and employees thereof are required to obey all facility safety and radiation protection requirements.

The following covers the overall on-site contractor training review:

2.1 Personal Protection

A. MSHA approved hard hats, safety glasses, and steel-toed shoes will be worn by all personnel on the property.
B. MSHA approved respirators will be worn in designated areas.
C. Hearing protection will be worn in designated areas.
D. The mill uses many acids and chemicals; protective clothing will be worn in designated areas.
E. Eating and drinking is only allowed in designated areas.
F. Smoking in the restricted area is not permitted.
G. Observe all safety signs and warnings.
H. Obey the posted speed limit of 15 mph.

2.2 Radiation Protection

A. Certain areas in the mill contain radioactive materials; your access will be restricted.
B. Obey all signs posted throughout the mill.
C. Respirator protection and protective clothing are required in designated areas in the mill.
D. Respirator test fitting is required prior to uses. Fitting is by authorized personnel.
E. Respirator usage will be governed by the respiratory protection program of the facility.
F. Do not enter any yellowcake designated area unless so authorized by the Radiation Safety Officer of this facility.
G. Eat, chew and drink only in designated lunchrooms.
H. Do not track yellowcake out of the yellowcake designated areas.
I. Personnel will be surveyed for alpha contamination prior to leaving the facility.
J. Personnel working in yellowcake areas will be furnished coveralls and will be required to shower and be surveyed prior to leaving the facility.
K. Personnel will wear personal monitors as designated.

2.3 Radiation Awareness

A. The facility Radiation Safety Officer has the authority to regulate the contractor work environment and the authorization to shut down work performed by a contractor as he deems necessary.

2.4 Emergency Procedures

A. Report all injuries to the nearest supervisor. An ambulance is available for emergency transportation.
B. Report any fire to the nearest DUSA worker so fire fighting equipment can be brought to the scene.

2.5 Sign-off Procedures

A. Each contracted employee is required to sign the appropriate MSHA training documentation acknowledging that they understand, accept, and will abide by the safety and radiation protection procedures in use at the White Mesa Mill. See attachment 1.

3.0 Training and Education Program

3.1 Pre-Employment Instruction

Classroom instruction of all new employees is conducted under the supervision of the Radiation Safety Officer and Safety Coordinator, covering plant and personal safety, including radiological protection. As appropriate the operations and maintenance staff will be utilized to provide portions of the new employee training. This initial orientation involves demonstrations of proper safety precautions and measures to minimize radiation and industrial hygiene exposure. Listed below is a summary of the training program utilized at the White Mesa Mill.

A. Employee Indoctrination
B. Statutory Rights of Miners
C. NRC/State of Utah
D. Transportation and Communication
E. Emergency Procedures
F. First Aid
G. Hazard Recognition
H. HAZCOM (hazard communication)
I. Radiation Protection Program
   a. Prenatal Radiation Review
   b. Radiation Protection Review
J. Respirator Protection Program

Copies of the new employee training outlines that are utilized in the classroom portion of the training are illustrated in Addendums 1 thru 10. A quiz will be given to document the employees understanding of the safety precautions and procedures utilized at the mill for plant and personal safety, including radiological protection. The quiz is reviewed in the class following the testing procedure. Any further instruction, if needed with employees, will be done at this time to assure the employees understanding of the materials that have been presented. Examples of quizzes for the Radiation Protection and First Aid segments of the training have been included in Addendums 6 and 9. Quizzes for the remaining training segments will be on file at the mill and available for review.

All female employees are given a verbal presentation regarding prenatal radiation exposure along with a copy of the Appendix to NRC Reg. Guide 8.13 for their review. Both the female employee and the Radiation Safety Officer certify in writing as to the employee's understanding of these regulations, and the alternatives afforded the employee. A copy of this form is presented in Addendum 9, Section A.

3.2Radiation Protection Review

On an annual basis, a one hour safety meeting is scheduled specifically for radiation awareness, protection and review of policies. These meetings are used to reiterate safety precautions, and to demonstrate personal safety equipment. A copy of the safety meeting program review is included as Addendum 9, Section B. During monthly safety meetings, time is specifically allotted to discuss radiation protection practices and policies in addition to receiving measured radiological parameters.

Addendum 1

Employee Indoctrination

1. Employee Handbook

   A. Pay Practices

      1. Hours of Work
      2. Shift Differential
      3. Overtime
      4. Call out pay
      5. Holiday pay
      6. Paydays
      7. Time Cards/Exposure Sheets

   B. General Policies and Practices

      1. Probationary Period
      2. Absences
         a. Reporting
         b. Doctors Release
         c. Unexcused Absences
      3. Suggestions and Complaints
      4. Personal Conduct
      5. Disciplinary Procedure

2. General Forms

   A. INS Eligibility Certification
   B. W-4
   C. Radiation Exposure Form (Females and previous radiation workers)

3. Benefits

   A. Medical/Dental Explanation
   B. Savings program
   C. Basic Life
      i. Sickness and Accident
      ii. Temporary and Permanent (T & P)
      iii. Long Term Disability (L.T.D.)
      iv. Supplemental Life
      v. Vacations
      vi. Holidays
      vii. Jury Duty
      viii. Funeral Leave
      ix. Educational Refund Plan

Rights of Miners

In 1977, new legislation was signed into law by President Carter, which is known as the Federal Mine Safety and Health Act of 1977.

In addition to retaining Safety and Health Standards covered under the previous laws, this act stipulated mandatory safety and health training requirements for all miners.

The act defines a miner as any person working in a mine. This means any person working at the Mill is a miner by definition. Therefore, as an employee of the Mill, you are protected under the rights given to miners and representatives of miners under this act.

A representative of miners is defined by MSHA to mean any person who has been chosen by two or more miners to represent them in matters relating to safety and health at the mine.

You have the right to have a representative of miners accompany Federal Inspectors during inspections at the mine. At the present time there are no designated representatives at the White Mesa Mill. Therefore, the Federal Inspectors may contact as many employees as practical during their inspections.

You have the right to obtain an inspection of the mine where there are reasonable grounds to believe that an imminent danger, a violation of the act or the safety and health standards exist.

It is imperative, that hazardous conditions or other concerns be discussed with your supervisor in an attempt to resolve them prior to making any complaints. The Safety Department is also available to help with any problems, but you should work with your direct supervisor first.

You have the right to receive pay during certain periods of time when the Mill or part of the Mill has been closed because of a withdraw order issued by MSHA.

You have the right to be protected from discrimination based on the exercise of the rights given in the act. A miner who uses any of the rights of the act given to him or her cannot be discriminated against for doing so. It is illegal for a miner to be fired, transferred to a lower paying job, not hired, harassed, or to otherwise lose job benefits for:

Filing or making a complaint under the act for an alleged danger or safety or health violation.

For instituting, testifying, or assisting in any proceeding conducted under the act.

For being a subject of medical evaluations leading to a possible transfer to another job location.

For being withdrawn from the mine for not having the mandatory safety and health training.

You have the right to receive the appropriate safety and health training.

You also have the right to be informed of, and to participate in the enforcement and legal proceedings under the act. The bulletin board on the East End of the office building is utilized for this purpose. All citations, orders, modifications, etc. will be posted there for your information.

Any miner has thirty days to challenge any order issued, modified, or terminated by a Federal Inspector for a violation of any of the standards.

Legal Responsibility of Miners

The act specifically states that miners who violate safety standards by smoking or carrying smoking materials into areas of mines where smoking is prohibited may have to pay a fine of up to two hundred and fifty dollars ($250) for each violation.

The act also states, that any miner who knowingly makes a false statement, either orally or in a written report, plan, training certification, or any other document required to be kept or filed with MSHA, shall be subject to a fine of up to ten thousand dollars ($10,000) or imprisoned for up to five (5) years or both.

Conclusion:

The act passed by Congress provides protection of miners safety and health by giving the mine operators the main responsibility for preventing unsafe and unhealthy conditions at the mines. Also, the Act establishes certain rights given to each miner. However, the intent of Congress in passing the law and MSHA in implementing it, is to involve the miner in the health and safety aspects much more than before. If we all work together, we will have a much safer work environment.

NRC/State of Utah / MSHA Training

This section of New Hire Training will cover the United States Nuclear Regulatory Commission (NRC) and State of Utah standards

A. The State of Utah, Division of Radiation Control has primary responsibility for radiation Protection.

    1. Workers and the Public are protected from excessive exposure to radiation.

B. Employer responsibility

    1. Company must comply with the State of Utah regulations at R313-15, which incorporate the NRC Regulations at 10 CFR Part 20.
    2. Failure to comply – fined, license modified, license suspended, or revoked
    3. DRC Radiation requirements
        a. Will be covered in Radiation Health Safety section of training.

C. Employee responsibility

    1. Follow all rules
    2. Protective clothing

D. Report violations

E. Occupational Safety

    1. MSHA jurisdiction

Addendum 4

Communication and Transportation

This section of New Hire Training will cover Communication and Transportation segments including:

1. Organization

   A. Organization Chart
   B. Safety Rule Book handed out

2. Reporting unsafe conditions and inquiries

   A. Immediate notification of unsafe activities to supervisors
   B. Green Card – All accidents must be reported.
   C. Accident/Incident Reports
   D. Doctor's return to work slip

3. Exposure Sheets

   A. Explain weekly exposure sheets and how to fill out

4. Conduct

   A. Discussion of conduct expected of employees at the White Mesa Mill
   B. Rules

5. Safety Glasses

   A. Company policy on purchasing prescription glasses
   B. Goggles – areas where worn

6. Noise

   A. Audiograms
   B. Posting – Areas – Equipment
   C. Discussion on Noise Dosimetry
   D. Discussion on Sound Levels
   E. Allowable decibels

7. Vehicles – authorization

   A. Safety Rules
   B. Equipment check lists
   C. Valid driver's license
   D. Use of seat belts

E. Speed Limits

8. Warehouse

A. Safety shoes or boots – issue

i. Company policy on leather boots

B. Safety glasses with side shields – issue
C. Hard hats – issue

i. Discussion on painting or applying stickers

9. Mill Tour

A. Schematic of mill area
B. Tanks and contents – labels
C. Piping – labels
D. Postings
i. Radioactive Materials
ii. Hearing protection
iii. Respirator Areas
iv. Restricted Areas

Emergency Procedures – Fire and Evacuation

1. Fire

   A. Basic Elements of Fire

      i. Discussion of fire triangle
         1. Heat
         2. Fuel
         3. Oxygen

   B. Classes of Fires – Extinguishing Media

      i. Class A Fires
         1. Wood, cloth and paper
            a. Extinguishers for Class A
            b. Water, dry chemical, AFFF foam

      ii. Class B Fires
         1. Vapor – air mixture over the surface of flammable liquids.
            a. Extinguishers for Class B
            b. Dry Chemical, AFFF foam, water, fog, carbon dioxide

      iii. Class C Fires
         1. Electrical
            a. Extinguishers for Class C
            b. Dry chemical and carbon dioxide

   C. Characteristics of Flammable Liquids

      i. Flash Point
      ii. Fire Point
      iii. Ignition Temperature
      iv. Flammable or explosive range

   D. Schematic of Fire Systems

      i. Location of fire pump, plugs, valves
      ii. Location of SX foam system
      iii. Explanation of fire equipment and hose stations
      iv. Explanation of SCBA's and Turnout Gear
      v. Tour of pump house, hose stations, and SX building

Addendum 5

E. Fire extinguishers – Different types

   i. Classes – A, AB, ABC, BC
   ii. AFFF foam

F. Fire alarm – Dial 185 (intermittent siren), announce location three (3) times and return to scene

G. Actual hands on 2 ½" fire hose – basic

H. SCBA an SX escape bottles

   i. Explanation of their use and demonstration

2. Emergency Evacuation Procedures

A. Emergency Response Plan

   i. Available for review in the Central Files
   ii. Roles and responsibilities
   iii. Organizational chart

B. Evacuation Siren

   i. Dial 184 – Steady Siren – Announce location and then evacuate
   ii. Response team will respond to emergency

C. Assembly Areas

   i. Administration parking lot
   ii. Scalehouse
   iii. Determination of when to evacuate to which area

D. Emergency Response Team

   i. Operational
      1. Leach Operator
      2. Yellowcake Precipitation Operator
      3. "A" Operator
      4. Mill Trainee
      5. Shifter – will be in charge on off shift
   ii. Non-operational
      1. Scalehouse Operator

      2. Operations Personnel

3. Maintenance Personnel

E. Emergency Response Procedures

F. On Site Emergency Equipment

   i. Ambulance
   ii. Company vehicles
   iii. SCBA's

G. Off Site Emergency Equipment

   i. Local emergency medical services
   ii. Blanding Fire Department
   iii. Local law enforcement

Addendum 6

First Aid Outline

I. Triage

A. Feel, Talk, and Observe

i. Life saving first aid

B. Brain and Spinal Cord – Fractures and Wounds

i. Secondary first aid

II. Basic Life Support

A. Causes

i. Clinical death – heart attacks, etc…
ii. Choking – Foreign object

B. Procedure – Pulseless victim

i. Establish unresponsiveness
ii. Open the airway
iii. Look-listen-feel for breath
iv. No breath – artificial ventilation – 2 slow full breaths
v. Check pulse
vi. No pulse – start CPR

C. Procedures – choking

i. 1 thru 4 above
ii. Re-establish open airway and try again
iii. Administer Heimlich Maneuver
iv. Check and clean mouth

D. Other special cases

i. Infants, small children, etc…

E. Practice

Addendum 6

III. Control of Bleeding

A. Circulatory System – Heart, blood vessels, lungs

i. Blood – 1/12 – 1/15 of total body weight
ii. 10-12 pints in 150 pound adult
iii. Loss of 2 pints – serious shock, loss of 3 pints may be fatal (2 hours or less)
iv. Rupture of main artery in neck, arm or thigh may be fatal in 1-3 minutes; rupture of main artery in trunk may be fatal in 30 seconds.

B. Loss of blood almost always causes physical shock

i. Insufficient blood flow
ii. Death could occur if not treated

C. Review of blood vessels

i. Arteries – Immediate action is needed
ii. Veins – Immediate action if possible
iii. Capillaries – Usually not serious

D. Methods of controlling bleeding

i. Direct pressure and elevation
ii. Digital pressure – direct pressure
iii. Tourniquet – LAST RESORT

E. Internal bleeding

i. Blood from mouth – dark red, bright red, foamy
ii. Shock, guarding
iii. Medical emergency – need doctor's care as soon as possible
iv. Treat for shock
v. Apply cold packs
vi. Transport injured in the recovery position
vii. Keep airway open – victim could vomit
viii. Victim is in need of IV

Addendum 6

IV. Shock

A. Collapse or a depression of the cardiovascular system due to an accident or sudden illness. Shock interferes with the normal action of the heart, respiration, and circulation system. Shock may result from a variety of causes.

a. Cerebrospinal System – Brain and spinal cord (voluntary)
b. Sensory nerves leaving cord (heat, cold, pain, touch, etc.)
c. Sympathetic – vital organs – heart, lungs, digestive, trunk, etc..., all involuntary

B. Causes of Shock

a. Injuries
b. Pain
c. Blood loss
d. Burns
e. Electrical shock
f. Gas poisoning
g. Sudden illness
h. Allergic reactions (bites, stings, etc...)
i. Fear, apprehension, emotional stress
j. Poisons internally

C. Signs and symptoms of shock

a. Skin – pale, cool and clammy
b. Eyes – dull, lackluster, dilated
c. Respiration – shallow, irregular, labored
d. Pulse – rapid, weak
e. Blood pressure – low – below 90

D. Treatment of shock

a. Assure open airway and adequate breathing
b. Treat and control cause – example bleeding, fracture, etc...
c. Keep person laying down
d. Head level or slightly lower than body – about 1 foot
e. Remove foreign objects from mouth (false teeth, gum, etc...)
f. Access fresh air or give oxygen if available
g. Loosen tight clothing around neck, check, waist
h. Keep person warm and dry
i. Never give water, food or medication by mouth

Addendum 6

j. Reassure!

E. Anaphylactic shock

a. True emergency – get to clinic as soon as possible, take cause with you if possible.

V. Head, Neck, Spine Injuries

A. Head Injury

1. Fracture dangerous – possible brain damage
2. Pupils dilated or unequal in size
3. Depression of skull
4. Always consider an unconscious victim as having a head or spine injury

B. Treatment for Head injury

1. Lay person down – elevate head and shoulders
2. Maintain airway
3. Control bleeding from scalp with minimal pressure
4. Do NOT control bleeding in ears or nose.
5. Never give a stimulant
6. Follow other shock treatment
7. Keep victim from resting head on suspected fracture area - might have to place on side or recovery position to help with breathing.

C. Suspected Neck and Spine

1. Spinal Column

a. 24 bones called vertebra
b. Protects spinal cord and specific nerve roots

2. Fracture

a. May occur at any point – cord may be cut or broken bone or dislocated bone may be resting against cord

3. Symptoms

a. Pain and tenderness at site
b. Deformity

c. Cuts and bruises
d. Paralysis
e. Loss of sensation
f. Unconscious – Always suspect fracture

4. Treatment

a. Almost always takes four people – work as team
b. Traction applied to neck and maintained by hand until a cervical collar or other padding is available
c. Speed is not important – complete immobilization of head, neck and back is important.
d. Follow shock treatments

5. Practice

VI Fractures and Dislocations

1. Broken or cracked bone. Most commonly caused by direct blows, indirect blows or twisting forces.

a. Compound fracture (open)
b. Simple fracture (closed)

2. Signs and Symptoms

a. Pain and tenderness
b. Deformity
c. Loss of function
d. Moderate or severe swelling
e. Discoloration
f. Victims information (felt bone snap)
g. Grating

3. First Aid Treatment

a. Treat for shock
b. Immobilize joint above and below fracture site

4. Types of Splints

a. Air or plastic inflatable
b. Cardboard
c. Board splint
d. Improvised splints

Addendum 6

5. Guidelines for Splinting

a. Remove all clothing from fracture site
b. Never attempt to replace or re-align bones
c. Do NOT attempt to re-align limb
d. Cover open wounds
e. Pad hard splint with soft material
f. Pad all natural arches – knees, wrist, etc…
g. Support injured part with hand traction while splint is being applied
h. Splint firmly, but not so tight as to interfere with circulation – leave fingers and toes visible to perform a capillary refill test
i. Elevate injured part if possible
j. Keep reassuring victim and transport to doctor

6. Practice

VII. Burns

1. Types and classes of burns

a. 1st, 2nd and 3rd degree
b. Thermal, Chemical, Electrical and Radiation

2. Severity of burns (Rule of 9)

a. Face – 9%
b. Body front – 9%
c. Body back – 9%
d. Arm – 9%
e. Leg – 18%
f. Genitals – 1%

3. Critical Burns

a. 2nd degree – 25% of body
b. 3rd degree – 10% of body
c. 3rd degree – Critical areas – face, hands, feet or genitals

4. Moderate Burns

a. 1st degree sunburn over 25% of body
b. 2nd degree burn up to 25% of body
c. 3rd degree burn up to 10% of body

Addendum 6

5. First Aid treatment for Burns

   a. Remove victim from source
   b. Maintain airway and assure breathing
   c. Control any bleeding and treat for shock
   d. Remove any clothing from burn area except if it adheres to the skin
   e. Separate burned surfaces when it could contact one another such as fingers, toes, inside arms or legs
   f. Cover with clean sterile sheet or burn blanket or dry dressings
   g. Use cool moist dressings if moderate or minor burn
   h. If chemical burn, flush with water for a minimum of 15 minutes
   i. Use of Water-Gel blankets

6. Electrical Burns

   a. Make sure source is removed or de-energized
   b. Look for entrance and exit
   c. Cover both with dry cloth dressings
   d. Be ready to provide Basic Life Support

VIII. Other First Aid Topics

1. Transportation
2. Medical emergencies
   a. Heat stroke
   b. Heat exhaustion
   c. Heat cramps
   d. Frost bite
   e. Hypothermia
   f. Diabetic emergencies
   g. Epileptic seizure
   h. Stroke
   i. Poisons and drugs
   j. Snake bites

DUSA

First Aid Training

" Medical Emergencies In The Workplace"

Pre-Test # 1

1. Always___________________ the surrounding area before you attempt first aid to an injured employee.

2. If a co-worker slips, trips, or falls what is the worst thing you can do?
____.

3. When you have to report an emergency by phone, you should give:

______________________________	__________________________
______________________________	__________________________
______________________________	__________________________

4. You must assume that every accident victim is suffering from_________________.

5. Hands-on training is absolutely necessary to be able to :

   A. Treat snakebite
   B. Control severe bleeding
   C. Administer first aid
   D. All answers are correct

6. What is the proper treatment for a deep cut on the arm? ______________________
____.

7. If a co-worker receives an electrical jolt, what is the first thing you should look for? ____.

8. Apply ______________________________ to bleeding wounds.

9. If a co-worker gets chemical in his eye, what should you do? _________________
____.

DUSA

First Aid Training

" Choking Emergencies "

Pre-Test # 2

1. Choking in adults is usually due to:

    a. Cutting food too large to swallow.
    b. Chewing improperly.
    c. Talking while eating.
    d. Excessive alcohol intake, which impairs swallowing.
    e. All of the above.

2. What should you do if an injured person is not breathing? ________________
____.

3. When a person is coughing violently because they are choking on food, you should:
    a. Use abdominal thrusts to clear his airway.
    b. Watch and be ready to help if he looses consciousness.
    c. Use back blows to help him clear his airway.
    d. None of the above.

4. List the steps for performing " Mouth to Mouth" Resuscitation.
    a. ______________________________
    b. ______________________________
    c. ______________________________
    d. ______________________________

5. How do you check an unconscious victim to see if they are breathing?
____
____.

6. When you are administering mouth-to-mouth resuscitation, you must see the victim's chest rise and fall while during it. True or False

DUSA

First Aid Training

" Control of Bleeding "

Pre-Test # 3

1. What do the letters "ABC stand for in the "ABC's of Life Support"?

   A. ________________ B. ________________ C.________________

2. To control bleeding at the accident scene, apply________________ to bleeding wounds.

3. To help slow the flow of blood in a limb, always________________ it, if it is not broken.

4. If no clean cloths or compresses are available to help stop the bleeding, use________________________________.

5. List as many symptoms of internal bleeding as you can:

   ________________________ ________________________

   ________________________ ________________________

   ________________________ ________________________

6. Severe loss of blood means you should you must always treat the victim for ____________________ as well.

7. The average adult human body has ___________ quarts of blood in their circulatory system.

8. A tourniquet is considered the ________________ method of controlling bleeding from a wound.

9. If a wound is bleeding in spurts, pumping out blood, it is obvious that a ____________________ has been cut.

DUSA

First Aid Training

" Shock - The Silent Killer "

Pre-Test # 4

1. List as many symptoms of shock as you can:

_______________ _______________ _______________
_______________ _______________ _______________
_______________ _______________ _______________

2. Briefly explain why the standard treatment for shock is to elevate the victim's legs.

____
____

3. Simple loss of body fluids, such as blood, sweat, or stomach fluids can cause the victim to go into shock.
True or False

4. The reason shock victims can become belligerent and disoriented is ___________
____.

5. Accident victims who are suffering from internal injuries must be treated at an emergency room or hospital.
True or False

6. If you suspect that an injured person could be bleeding internally, you should always____.

7. There are three basic types of shock. Name one of them. All three if possible.

_______________ _______________ _______________

8. An injured person whose pulse is weak and irregular is probably suffering from
______________________.

9. Shock can kill an injured victim, just as like a severe injury. True or False

DUSA

First Aid Training

" Proper Treatment of Fractures "

Pre-Test # 5

1. A dislocation happens in a joint of the body.
   True or False

2. Open, or compound, fractures are far more serious than closed fractures.
   True or False

3. Before you treat an accident victim for broken bones, you must attend to their basic medical needs, which are ____.

4. What is the biggest danger present with open, or compound fracture? ____.

5. An injured joint should be immobilized in the position you found it.
   True or False

6. If an accident victim cannot use a limb, treat the limb as if it is broken.
   True or False

7. List two symptoms of a closed or simple fractured arm.
   a.________________________ b. ________________________

8. A ________________ is defined as partial tearing of ligaments around a joint.

9. If you must move a victim with a fracture, you must ________________ the fracture before moving.

DUSA

First Aid Training

"Burn Emergency "

Pre-Test # 6

1. A burn is defined as an injury caused by the destruction of tissue by heat.
   True or False

2. The heat, which causes tissues to burn, can come from:
   a. Steam   c. Burning liquids or gas
   b. Chemicals   d. All of the above

3. To treat a minor burn, you should spread butter/margarine, creams, or oils on it.
   True or False

3. Burns are classified by the depth of tissue they penetrate.
   True or False

5. List the three degrees of burns. ________ ________ ________

6. First degree burns look like a ______________________________.

7. Second degree burns can be identified by______________________
   ____.

8. The worst degree of burn is ____________________, because__________
   ____.

9. Burning of the body tissue causes the body to lose fluids. Thus, the burn victims may also suffer from ______________________________.

10. It is possible to treat severe burns at the accident site.
    True or False

11. What are some potential burn sources at the White Mesa Mill? List as many as you can. ____
    ____

Addendum 7

Hazard Recognition

1. Scale House Injury Hazards

    a. Delivery trucks – See attached sheet
    b. Ore haulers – See attached sheet
    c. Product haulers – See attached sheet
    d. Loaders – Haulage Trucks (DUSA)
    e. Jaw Crusher and drying unit in bucking room – pinch points – heat
    f. Stockpile hazards

        i. Falling rocks on stockpiles
        ii. Tripping hazards during sampling operation
        iii. Radiation hazards from stockpile
        iv. Lifting of sampling buckets
        v. See Sampling SOP for additional hazards

2. Scale House Health Hazards

    a. Hearing protection when operating equipment
    b. Silica dust
    c. Radiation

        i. Airborne uranium – sampled monthly
        ii. Beta/gamma – sampled monthly
        iii. Radon Daughters – sampled monthly

3. Mill Feed and Stockpile Injury Hazards

    a. Delivery Trucks – Speed Limit is 15 mph
    b. Ore Haulers – Speed Limit is 15 mph
    c. Product Haulers – Speed Limit is 15 mph
    d. DUSA equipment has right-of-way. **BE AWARE OF ALL PERSONNEL AND TRUCKS IN YOUR AREA.**
    e. Grizzly

        i. Safety belt must be used during work on the grizzly. Safety chain must be installed during maintenance work.

    f. Dust collection

        i. System must be started before ore is fed to SAG Mill – possible electrical shock.

g. Cleaning of reclaim tunnel

    i. Conveyor must be locked out to clean underneath
    ii. Respirator required – radiation and silica dust.
    iii. Hearing protection must be worn when dust collection system is operating
    iv. Replace guards when finished cleaning
    v. Biggest hazard in tunnel is moving conveyor

h. SAG Mill area – Hazards

    i. Rotating mill
    ii. Moving conveyor
    iii. Vibrating feeder
    iv. Guards must be in place
    v. Falling rocks from SAG Mill feed chute - above vibrating feeder
    vi. Hot oil system
    vii. Foaming of #1 and #2 Pre-Leach Tanks
    viii. Traffic in North Door of Mill building
        1. Use of forklift equipment to remove rejects – **BEWARE OF TRAFFIC AND PERSONNEL**
    ix. Lifting of sample buckets

4. Mill Feed and Stockpile Health Hazards

    a. Silica
    b. Hearing Protection
    c. Radiation

        i. Airborne Uranium
        ii. Radon Daughters
        iii. Beta/Gamma

5. Hazard Recognition – SAG Mill Operator

    a. Conveyor
    b. Rotating Mill
    c. Vibrating feeder – apron feeder
    d. Hot oil system
    e. Falling rock from SAG Mill feed chute above vibrating feeder
    f. Foaming of #1 and #2 Pre-Leach Tanks
    g. Use of forklift equipment to remove reject bin – **BE AWARE OF PERSONNEL AND TRAFFIC** near north door of Mill Building
    h. Acid lines – pump storage

Addendum 7

i. Steam lines
j. High pressure air lines
k. Guards
l. Pinch points

   i. Idlers and rollers
   ii. Head and tail pulley
   iii. All guards must be in place before running
   iv. Cleaning up around pumps

m. Overhead crane use during loading grinding balls into SAG Mill
n. Overhead crane use during relining SAG Mill – Must be roped off
o. Overhead crane must not be used when SAG Mill is rotating
p. Caution wet decks are slick and present fall hazard

6. Health Hazards – SAG Mill Operator

a. Radiation

   i. Radon Daughters
   ii. Airborne Uranium
   iii. Beta/Gamma

b. Silica
c. Hearing Protection

7. Hazard Recognition – Leach Circuit

a. Sulfuric Acid

   i. Hot liquor in tanks
   ii. Leak detection of tanks
   iii. Leak detection of lines and valves

b. Steam lines

   i. Insulated
   ii. Opening and closing of valves
   iii. Valves hot – use gloves

c. High pressure air lines

   i. Caution when operating valves
   ii. Whip checks on connections

iii. Do not use to blow off clothing

d. Water lines

   i. Open slowly – 100 psi
   ii. No water fights

e. Safety belts

   i. Leach tank tops
   ii. Work beyond hand rail requires safety belt

f. Obstructions in walkways

   i. Hoses
   ii. Drums
   iii. Tools
   iv. Sampling equipment

g. Overhead crane

   i. Assume it is always in use
   ii. Needs roped off during use
   iii. Look up when entering Mill Building
   iv. Rope off area and check safety latch on hook

h. Ladders

   i. Claricone

i. Guards

   i. Drive units
   ii. Pumps

j. Health hazards

   i. Radon build-up when SAG Mill is in operation
   ii. Leach #7 overflow line to CCD
   iii. Gamma radiation in SX feed line
   iv. H_2S fumes above leach tanks, and pulp storage tanks when adding acid
   v. Hearing protection needed when SAG Mill is running
   vi. Respirator usage
   vii. Airborne uranium

k. Decks and walkways

   i. Slippery when wet
   ii. Slippery when reagents are spilled on walkways and decks

8. Hazard Recognition – CCD Circuit

a. Sulfuric acid lines

   i. Hot solutions in CCD #1
   ii. Detection of leaks in area

b. Air lines

   i. Open valve slowly
   ii. Whip checks on hose connections
   iii. Do not use to blow off clothing

c. Ladders

   i. East tails system
   ii. Ladders used on tanks must be tied off

d. Safety belts

   i. Must be worn when outside handrails

e. Trip and fall hazards

   i. Hoses in walkway
   ii. Spilled floc
   iii. Tools
   iv. Cleanup bottom floor
   v. Deck and walkways slippery when wet
   vi. Matting under control panels
   vii. Ice build u during winter months

f. Guards

   i. Guards must be in place before starting any equipment
   ii. Do not remove guard on floc mix device during mixing

g. Health hazards

   i. Sulfuric acid solutions

ii. Gamma radiation in SX feed line
iii. All raffinate lines
iv. Airborne uranium
v. Radon daughters
vi. Silica

9. Hazard Recognition – SX Circuit

a. Sulfuric acid lines

i. Open slowly
ii. Use personal protective equipment (PPE)

b. Caustic tank and lines

i. Open valve slowly
ii. Use PPE
iii. Air pressure during unloading is to be no more than 30 psi

c. Ammonia tanks and lines

i. Open valves slowly
ii. Use PPE
iii. Report leaks promptly

d. Kerosene tanks and lines

i. Open valves slowly
ii. Use caution around pumps – guards
iii. Use PPE

e. Soda ash bins and tanks

i. Use caution around pumps, feed auger
ii. PPE
iii. Open valve slowly
iv. Open steam lines slowly

f. Sodium chlorate tanks and lines

i. Open valves slowly
ii. Caution around pumps
iii. Use PPE

g. Amines

    i. Burning – itching
    ii. Caution when dumping drums

h. Air lines

    i. Open valves slowly
    ii. Whip checks on hose connections
    iii. Do not use to blow off clothing

i. Steam lines

    i. Open valves slowly
    ii. Valves hot

j. Fire systems

    i. Overhead foam sprinkler system
    ii. Fire extinguishers
    iii. 3 – 5 minute escape bottles under observation platform
    iv. 4 – SCBA's, two each located on the north and south end of the building
    v. Know where the exits are

k. Health hazards

    i. Sulfuric acid

        1. burns – flush with water at least 15 minutes
        2. fumes – respirator required

    ii. Caustic soda

        1. burns – flush with water at least 15 minutes

    iii. Ammonia

        1. fumes – respirator required
        2. large spill or fire requires SCBA
        3. burning – flush with water at least 15 minutes

    iv. Kerosene

        1. burning – itching – wash with soap and water

Addendum 7

v. Amines

1. burning – itching – wash with soap and water

vi. Soda ash

1. burning – itching – flush with water at least 15 minutes

vii. Sodium chlorate

1. fire hazard
    a. rubber gear, boots, gloves, goggles or face shield
    b. discard clothing if contamination with chlorate shows
2. chlorine gases
    a. pH adjustment tank
        i. times when respirator is required

l. Gamma radiation

i. Posted for Gamma radiation on SX uranium extractor mix tanks
ii. Uranium SX feed line

m. Ladders

i. Ladder on caustic tank
ii. Ladders on soda ash tanks
iii. Ladders on salt tanks
iv. Ladder to sump – chain must be in place
v. SX VPL feed tank
vi. Strip make up tank

n. Decks and grating

i. Slippery when wet

o. Airborne uranium
p. Radon daughters

10. Hazard Recognition – Yellowcake Precipitation and Yellowcake Packaging

a. Sulfuric acid lines

i. Open valves slowly
ii. Use PPE

b. Ammonia

i. Open valves slowly
ii. Use PPE
iii. Report leaks promptly
iv. Adjust pH properly so as not to use excessive ammonia

c. Steam lines and valves

i. Open valves slowly
ii. Caution hot valve handles

d. Air lines and valves

i. Open valves slowly
ii. Whip checks on hose connections
iii. Do not use to blow off clothing

e. Guards

i. Pump
ii. Drive units
iii. Centrifuges
iv. Driven rollers
v. Augers

f. Centrifuges

i. Lock out when operator changes keys
ii. Check guards on auger before working on centrifuges

g. Health hazards

i. Ammonia
ii. Sulfuric acid – H_2S in area
iii. Airborne uranium
iv. Beta/Gamma – Radon daughters

1. yellowcake precipitation
2. enclosure
3. centrifuge area
4. packaging area
5. scrubber – barometric tank

v. Radiation Wok Permit will be issued for any work in departments other than Operations.
vi. Sampling will be done in this area on regular basis

1. radon – monthly
2. airborne
    a. weekly
    b. monthly
3. ammonia
    a. monthly – or whenever need arises
4. silica
    a. at least two samples yearly

h. Decks and walkways

i. Slippery after washdown
ii. Hoses in walkway and on deck
iii. Sampling equipment

i. Heat

i. Dryer enclosure – up to 150°F
ii. Scrubber deck – off gas dryer ducting
iii. Scrubbers

11. Hazard Recognition – AMV (vanadium) Precipitation

a. Sulfuric acid lines and valves

i. Open slowly
ii. Use PPE
iii. Report leaks immediately

b. Ammonium sulfate

i. Open valves slowly
ii. Caution when lifting and dumping bags
iii. Use PPE

c. Anhydrous ammonia

i. Open valves slowly
ii. Report leaks promptly
iii. Use PPE

Addendum 7

d. Soda ash

  i. Open valves slowly
  ii. Caution when lifting and dumping bags
  iii. Use PPE

e. Steam lines

  i. Open valves slowly
  ii. Caution hot valve handles
  iii. Use PPE

f. Air lines

  i. Open valves slowly
  ii. Whip checks on hose connections
  iii. Do not use to blow off clothing

g. Roof

  i. Caution when climbing ladders – pipe in deck at bottom of roof access ladder
  ii. Cleaning bucket elevator on roof requires equipment lock out
  iii. Caution when cover plate is removed on bucket elevator

h. Precipitation area

  i. Guards

    1. drives
    2. demister fan

  ii. Low roof beams

    1. above #1 precipitation tank
    2. above #2 precipitation tank

  iii. decking

    1. sections lift up for sampling
    2. holes for sampling
    3. decks slippery when wet
    4. ladders and stairs slippery when wet
    5. slip and trip hazard when carrying and dumping soda ash

i. Filtrate belts

    i. Head and tail pulleys – pinch point
    ii. Return idlers – pinch points
    iii. Drive – pinch points

j. Augers

    i. #1 auger has to be stepped over
    ii. Guards
    iii. Concrete floor slippery when wet

k. Hoisting and dumping Wet AMV from drums

    i. Caution around drum dumper
    ii. Caution around rollers
    iii. Caution around propane gas lines
    iv. Caution around auger with covers removed

l. Hazards at Ammonium Sulfate Mix Area

    i. Guards
    ii. Augers
    iii. Deck and stairs slippery when wet
    iv. Caution while lifting and dumping ammonium sulfate bags

m. Hazards at VPL tanks

    i. Hot liquid
    ii. Steam lines and controls – PPE
    iii. Deck slippery when wet
    iv. Guards on pumps

n. Hazards at Ammonium Sulfate pump area

    i. Guards on pump
    ii. Deck slippery when wet

o. Hazards at Wet Storage Bin

    i. Augers
    ii. Guards
    iii. Head and tail pulleys on feed belt
    iv. Deck and stairs slippery when wet

Addendum 7

p. Hazard at Bucket Elevator Bottom

   i. Lock out before cleaning
   ii. Caution when shoveling wet material into bucket elevator – with bottom cover removed
   iii. Caution around cyclone – very hot

q. Health Hazards

   i. Ammonia fumes

      1. full face respirator required

   ii. Hearing protection – required in Vanadium Building
   iii. Radiation

      1. airborne – sampled monthly
      2. beta/gamma – sampled monthly
      3. radon daughters – sampled monthly

   iv. PPE – gloves, rubber boots

12. Hazard Recognition – AMV (vanadium) Dryer Area

a. Rotary dryer

   i. Guards must be in place
   ii. Open carrier rollers
   iii. Dryer is hot
   iv. Propane gas lines
   v. Auger and conveyor

      1. feed belt – guards
      2. return idlers – covered
      3. feed belt to Deammoniator – idlers not covered
      4. auger to Deammoniator feed belt

   vi. Bucket elevator

      1. caution when cleaning up with door off
      2. cyclone is hot
      3. fan east of bucket elevator

Addendum 7

b. Health hazards

   i. Fumes – ammonia and vanadium required full face respirator with dual cartridges
   ii. Vanadium dust from rotary dryer
   iii. Heat from dryer and heat rising from Deammoniator and fusion furnaces
   iv. Decks and stairways are slippery when wet after washdown
   v. Hearing protection
   vi. Radiation

      1. airborne uranium
      2. radon daughters
      3. beta/gamma

13. Hazard Recognition – AMV (vanadium) Packaging Area

a. Drums
   i. Stacking of empty drums
   ii. Rolling full drums on rollers
   iii. Training and forklift safety

      1. seat belts must be worn at all times

   iv. Strip doors

      1. cannot see through
      2. use man doors when entering vanadium area
      3. using forklift when removing full drums to outside

   v. Impact wrench – safe use of

b. Filling of drums

   i. Auger outside enclosure

      1. guard must be in place

   ii. Drum tops must be up close to feeder hood to eliminate dust exposure

c. Health hazards

   i. Vanadium dust

1. coveralls must be worn
2. full face respirators
3. gloves

ii. Heat

1. from fusion furnace area
2. hydration liquids provided

iii. Hearing protection

1. required in vanadium building

iv. Radiation

1. airborne uranium
2. radon daughters
3. beta/gamma

14. Hazard Recognition – Deammoniator Area

a. Hazards

i. Heat or hot surfaces

1. ducting (steel)
2. cyclone – auger and bin
3. deammoniator (surface)
4. doors

a. opening of outer doors

i. use of gloves
ii. close doors when finished raking

b. inner doors

i. use of gloves
ii. hearths average 500°F to 1000°F
iii. caution when raking clinkers from deammoniator
iv. caution – do not rake material past outer door
v. rake handles and doors are extremely hot

- vi. hand rails are hot in all areas around deammoniator
- vii. close doors when finished raking clinkers

ii. V_2O_5 Control Room

1. MCC panel

   a. Keep all doors closed on panel
   b. Be careful when washing down
   c. Floor is slippery when wet
   d. Air conditioner installed to relieve heat from control room

iii. Fusion furnace area

1. fusion furnace feed augers

   a. **hot** - approximately 500 - 1000°F
   b. guards on drives
   c. guards on deammoniator drive
   d. augers must be locked out before cleaning or maintenance work
   e. door on chute must be replaced prior to starting auger

2. fusion furnaces

   a. spouts

      i. be extremely cautious when drilling or chipping out spout with casting wheel running
      ii. splattering caused from material (hot) falling off casting wheel
      iii. rotating casting wheels are hot
      iv. No One is permitted beyond hand rails above casting wheel while in operation
      v. Hand rails are extremely hot

3. casting wheels

   a. points for accident potential

      i. between bucket elevator and wheels

ii. between fusion furnaces and wheels
iii. between augers and casting wheels

iv. Deammoniator

1. chipping of fused material off rabel arms

a. safe work permit
b. lock out all equipment
c. air lines – whip checks
d. PPE
    i. Leather gloves
    ii. Full face respirator
    iii. Cotton coveralls

v. Fusion furnaces

1. chipping of spouts

a. rotating casting wheels
b. using bars above rotating casting wheels
c. if completely plugged
    i. shutdown lock out
    ii. air drill – whip check, long steel and be qualified to operate air drill
    iii. lock out feed auger
    iv. adjustable spout burners will be adjusted before starting casting wheels

b. Health hazards

i. Heat

1. ice water and or Gatorade will be supplied
2. cotton coveralls – sleeves intact will be worn in this area – furnished by company
3. leather gloves

ii. Vanadium dust

1. coveralls – furnished by company
2. leather gloves – furnished by company
3. one-half hour paid for showers
4. eye wash stations
5. full face respirators are required

6. sampling for vanadium dust will be accomplished per corporate directives
7. hearing protection required

iii. Radiation

1. airborne uranium
2. radon daughters
3. beta/gamma

15. Hazard Recognition – Vanadium Blackflake Packaging Area

a. Heat

i. From fusion furnaces
ii. From V_2O_5 bin
iii. From bucket elevator
iv. Casting wheels
v. Deammoniator
vi. Coveralls long sleeved will be supplied
vii. Water or Gatorade will be supplied

b. Drums

i. Stacking of drums
ii. Rolling drums on rollers
iii. Standing on rollers to install drum lids
iv. Training and forklift safety
v. Set belts must be worn when using equipment
vi. Strip doors

1. cannot see through
2. use man doors when entering vanadium area
3. caution when removing full drums to outside

vii. Safe use of impact wrenches

c. Filling of drums

i. Hood on feeder must be on rim of drum
ii. V_2O_5 bin must not be leaking above operator area. If it leaks, report immediately.
iii. Caution when working on star feeder – MUST BE LOCKED OUT

iv. Caution around casting wheel dump chute when shoveling spilled material.
v. Use of air to blow off scales only. Use water for rest of area.
vi. Do not spray water onto fusion furnace shells.

d. Health hazards

i. Vanadium dust
   1. coveralls – long sleeve
   2. full face respirators
   3. gloves
   4. vanadium dust sampling will be done as needed
   5. ammonia fumes from V_2O_5 scrubber thickener

ii. Hearing protection
iii. Radiation

   1. airborne uranium – sampled monthly
   2. radon daughters – sampled monthly
   3. beta/gamma – sampled monthly

Addendum 8

HAZCOM

1. Hazardous Material

    a. Any substance or material in a quantity and form which may pose an unreasonable risk to Safety, Health, Property and Environment

2. Hazard Classes

    a. Corrosive – A material that causes the destruction of living tissues and metals
    b. Flammable Liquid – A liquid with a flash point below 100°F.
    c. Combustible Liquid – Liquids with a flash point between 100° - 200°F.
    d. Flammable Gas – Any compressed gas which is either a mixture of 13 present or less (by volume) with air that forms a flammable mixture or the flammable range with air is wider than 12 percent regardless of lower limit.
    e. Non-Flammable Gas – Any compressed gas other than a flammable compressed gas.
    f. Oxidizer – A substance that yields oxygen readily to stimulate the combustion of organic matter such as chlorate.
    g. Toxic – The ability of a chemical, such that very small amount are able to produce injury to susceptible tissues by a chemical action.
    h. Radioactive – A material that spontaneously emits radiation.

3. Product Identification

    a. Manufacturer
    b. Address
    c. Emergency telephone number
    d. Chemical name
    e. Trade name

4. Hazardous Ingredients

    a. Chemical names
    b. Percent of Hazardous Ingredients
    c. Exposure Limits

        i. PEL – Permissible Exposure Limit
        ii. TLV – Threshold Limit Valve
        iii. TWA – Time Weighted Average

Addendum 8

5. Physical Data

    a. Boiling Point
    b. Vapor density (Air = 1)
    c. Solubility in Water
    d. Specific Gravity ($H_20 = 1$)
    e. Percent Volatile (volume)
    f. Evaporation Rate
    g. Vapor Pressure
    h. Appearance (color)
    i. Odor

6. Fire and Explosion

    a. Flash point
    b. Flammable limits
    c. Extinguishing Media
    d. Special fire fighting procedures
    e. Unusual fire and explosion hazards

7. Health Hazard Information

    a. Threshold Limit Valve
    b. Symptoms of Overexposure

        i. Inhaled vapor
        ii. Skin contact
        iii. Eye contact
        iv. Swallowed
        v. Aspiration into lungs

    c. First aid emergency procedures

        i. Swallowed
        ii. Eye contact
        iii. Skin contact
        iv. Inhaled
        v. Suspected cancer agent

8. MSDS

    a. Material Safety Data Sheets
    b. Why are they important
    c. Information contained
    d. What chemicals must have them

Addendum 8

9. Labeling requirements

    a. New products
    b. Day use products
    c. Multiple shift products

Addendum 9

Radiation Protection Instructions

All of us have lived with radiation in some form for most of our lives. Webster defines Radiation as "the action or process of radiating, the process of emitting radiant energy in the form of waves or particles." A fire emits heat, a lamp emits light, etc.; thus, both of these are examples of radiation. However, we do not normally concern ourselves with this type of radiation.

Our schools have taught us that all matter is composed of atoms, small invisible particles that can best be visualized as miniature solar systems. Atoms themselves have a tiny center called the nucleus and around the nucleus orbit the electrons. Yet the atom is mostly open space. To give an example, suppose we could take a hydrogen atom, composed of a nucleus in the center, and one electron orbiting the nucleus and we could increase the size of the nucleus to that of a baseball which we place in St. Louis, Missouri. The electron's orbit would just touch Seattle, Washington.

To get a better picture of the atom, let's define some of the terms used to describe atoms. The nucleus or center of the atom is composed of protons and neutrons. The proton is a tiny particle carrying a positive charge. The neutron, which is approximately the same physical size, carries no net charge. These can be imagined as a little cluster of tiny balls grouped together. Around these orbit the electron which is 1/1832 the size of a proton or neutron, and carries a negative charge.

Mother Nature, in building atoms, did all right until she tried to pack more than 83 protons together in the nucleus of an atom. At this point, the nuclear glue she used didn't hold. So, all elements above number 83 (Bismuth) break down. Atoms break down by emitting particles or energy from the nucleus. Now we can define Nuclear Radiation (i.e., coming from the nucleus). This is defined as radioactivity resulting from the spontaneous emission from the atomic nucleus of a particle, or energy ray. After a great deal of study, it has been determined that there are three types of radiation emitted from the atomic nucleus: alpha particles (two protons and two neutrons), a helium nucleus, carrying two plus charges; beta particles, electrons, emitted from the atomic nucleus; gamma rays, pure energy emitted from the atomic nucleus.

What makes these types of radiation harmful?

All three types cause ionization. An atom that has gained or lost an electron is called an ion and the process of causing an atom to gain or lose an electron is ionization. To explain further, the cells of our bodies are mostly water. Water is two atoms of hydrogen and one atom of oxygen. Now, if something causes the ionization of a water molecule (Molecule – a group of two or more atoms combined to give a chemical compound), then the water molecule is no longer water, but something else. When this happens the cell does not function as a healthy cell, and radiation damage has occurred.

Addendum 9

Here at the White Mesa Mill, we work with uranium, one of those elements that are naturally radioactive. Uranium is an alpha emitter. Going back to the definitions given for each type of radiation, remember the alpha particle is composed of two protons and two neutrons. The two protons are the problem with alpha particles; the protons want to be electrically neutralized, that is the alpha particle wants two electrons, so it can become a helium atom, and it doesn't care where it gets the two electrons. Alpha particles don't travel very far, even in air. The range in air for uranium alpha is about 1.25 inches. A single sheet of paper can block alpha particles. Even the dead skin layer on our bodies stops alpha particles. So outside or our body alpha radiation is really no problem. What about inside the body? Breathing uranium dust or swallowing uranium dust is the problem. The activity of uranium (radioactivity per unit weight) is low, so the main problem is heavy metal poisoning, much like lead in paint. An added hazard is the small amount of alpha radiation being emitted. Uranium in the human body tends to seek the bones and kidneys (i.e., to collect there). In the bones, red blood cells are manufactured and the kidneys are the blood filter plants. It is obvious that it would be best not to have uranium in our bodies.

Beta radiation is not much of a problem at the White Mesa Mill except for uranium inside the body, or if you decide to sleep under the ore piles.

Gamma radiation is much like x-rays except for being of a shorter wave-length. Gamma rays are constantly being emitted from the raw ore so the people working in the ore piles or bucking room should have the highest exposure here at the mill site.

So now that we have the radiation problems defined, what can you do to minimize your exposure?

d. Avoid breathing or ingesting ore or yellowcake dust
e. Work as quickly as safety permits to shorten your exposure time.
f. Use the protective equipment issued to you.
g. Use proper methods for decontamination, (i.e. showers) wash your hands before eating.
h. Eating, drinking and smoking is permitted only in designated areas
i. Remember, the less radiation exposure you receive, the better.

The NRC has a policy of ALARA, which stands for "As Low As Reasonably Achievable". It is impossible to protect you from all sources of radiation. In San Juan County, there are many uranium ore deposits; we live at 6,000 feet altitude, etc. The dose to the average person here is about 240 mrem per year – about half of the acceptable limit for the general public.

All of you will be issued OSL badges; please wear them in a place where the badge will receive direct radiation contact, either on the front of your person or the back of the hard hat. It is not much benefit to figure the exposure of your locker or tool box. If you lose your badge, report it as soon as possible, so a correct exposure record can be made.

Addendum 9

Denison Mines (USA) Corp. is doing everything possible to minimize your exposure while at work. The mill has ventilation systems and effluent controls. Equipment has protective features designed for radiation safety. Certain areas (such as the yellowcake area) is secured and access is controlled. Measurements of radiation are taken throughout the sites and data is maintained. The responsibility is yours to follow the rules and make sure that you receive the lowest possible exposure.

We have a requirement for all personnel to be monitored before leaving the restricted area. Think of your family in this respect. Why expose them to any hazard. It is very easy to carry radioactive materials home in your hair, shoe soles, or clothing. So please, make sure that you don't take a problem home with you. Monitor before leaving the site.

Now, let's review what we have learned so far about Radiation Protection:

a. Radiation is a natural process for atoms with more than 83 protons in the nucleus
b. There are three types of radiation: Alpha, Beta and Gamma rays.
c. Alpha radiation is the most hazardous inside the body.
d. Gamma radiation is an added hazard around raw ore.
e. The less radiation dose you receive, the better.
f. Everyone should follow the ALARA principle.
g. Protect your family by monitoring before leaving work.

We have talked about the problem of radiation, so what are the rules. The regulations of radiation exposure are contained in the Code of Federal Regulations, Title 10, Part 20.

External Radiation

The limit per calendar quarter is set at 1.25 rem. The rem is measure of radiation dose. This limit of 1.25 rem per quarter adds up to 5 rem per year. If you read R313-15 or 10 CFR 20, there are other limits for the hands and skin, but since these rules are more applicable to nuclear reactors or research labs, we will not go into them.

Internal Radiation Dose Limits

The limits of the amount of radioactive material that you can have in your body are given in 10 CFR Part 20 Appendix B, Table 2 Column 1, for air. The limits are given in the amounts per milliliter of air (the volume of a typical cup of coffee is about 250 ml). These limits are known as Derived Air Concentrations (DAC). DAC for a particular work area is the concentration of the radioactive material in the air that is allowed for a 40 hour work week. We try to keep your exposure at 25 percent of the limit, or less if possible. Only you can really limit your internal exposure. Wear a respirator. If in a workplace to inside your body. Think before you put your hands near your mouth. Cleanliness of the workplace is important

Denison Mines (USA) Corp. also has additional workplace rules for you to follow. These are in the mill's Standard Operating Procedures and in the Safety Handbook and in the Radiation Protection Manual. These rules are conditions of employment. If you are required to wear a respirator, then you must be clean shaven. You must submit urine samples when requested.

Radiation Protection Refresher example outline:

1. What is radiation?
    a. Physiological Effects
    b. External Radiation
        i. Human Body Tissue
    c. Internal Radiation
        i. Lungs
        ii. Kidneys
        iii. Liver
    d. Chemical – Uranium
2. Mill Sources of Uranium Dust and Radiation
    a. Ore dust
    b. Yellowcake
    c. Tailings
    d. Obsolete Equipment
    e. Alternate Feed Materials
3. Protection Policies and Procedures
    a. Respiratory Protection Program
    b. Radiation Sign Awareness
    c. Radioactive Equipment Handling
    d. General Methods of Protection
    e. Bioassay Program
    f. ALARA Program

Addendum 9

4. Monitoring Programs – Why?
    a. General Area
    b. Personal Monitoring
        i. OSL Badges
        ii. Personal Air Sampling
        iii. Bioassay
    c. Records
        i. Availability
5. Review of Present and Future Regulatory Requirements
6. Reiteration of DUSA Policies
7. Radiation Quiz
8. Question and Answer Period

Rev 02-01-07

Name________________________________ Date_________

Radiation Protection Quiz 2007

Select the correct answer from the possible choices.

1. OSL badges are used at the Mill to monitor:

   a. Microwave radiation exposure.
   b. Radon radiation exposure.
   c. Beta-Gamma radiation exposure.
   d. Cosmic radiation exposure.

2. Radiation Exposure time cards are:

   a. Filled out the same every day.
   b. A important part in estimating your radiation exposure to airborne radioactivity
   c. Filled out by your supervisor.
   d. Filled out in pencil.

3. When issued a clean respirator you must:

   a. Fill out a respirator issuance log.
   b. Fit test with irritant smoke.
   c. Perform a field inspection of the respirator.
   d. All of the above.

4. To minimize the ingestion of uranium, you should:

   a. Wash hands before eating regardless of job assignment.
   b. Wash hands before eating only if you are working with yellowcake.
   c. Wear gloves while eating.
   d. Wash hands before eating when visibly dirty.

5. Leaving the restricted area requires you to:

   a. Monitor your hands and knees only.
   b. Monitor your self by brushing the detector over your cloths, hands, and soles of your feet.
   c. Monitor your self when you are being watched.
   d. Monitor your self only on the way home.

6. Housekeeping is:

   a. For the other shift.
   b. Not a reflection of my job performance.
   c. Not to be considered.
   d. Essential to reducing the potential for exposure.

7. If your supervisor wants you to do a task that is not routine for your job, you should:

   a. Find out what special hazards maybe encountered.
   b. Ask if any special permits are required.
   c. Contact the Radiation Office afterwards.
   d. Leave it for the next shift.
   e. A & B

8. An area posted as "Caution Radiation Area" means:

   a. Airborne uranium concentrations are above 25% of DAC.
   b. You must wear a respirator.
   c. Beta-Gamma Values are at or above 5 mrem/hr.
   d. None of the above.

9. The ways to reduce workers exposure to gamma radiation are:

   a. Decrease time.
   b. Increase distance.
   c. Shielding.
   d. All of the above.

10. Alpha radiation is the same as:

   a. Gamma radiation.
   b. Microwave radiation.
   c. X-ray radiation.
   d. None of the above.

11. An area posted as "Caution Airborne Radioactivity Area" means:

   a. Airborne uranium concentration is above 25% of DAC.
   b. Beta-Gamma levels are at or above 2 mrem/hr.
   c. You must wear a respirator when you work in the area.
   d. Both A and C.
   e. None of the above.

12. Bioassay monitoring determines:

   a. Quantity of uranium absorbed through the skin.
   b. Probable ingestion or inhalation of uranium.
   c. Probable exposure to gamma radiation.
   d. Quantity of thorium absorbed through the skin.

13. Total Effective Dose Equivalent is:

   a. Calculated external exposure.
   b. The sum of internal and external exposure.
   c. Internal exposure effect.
   d. None of the above.

14. ALARA stands for:

   a. Acceptable Level Assimilation Resonance Allowable.
   b. As Low As Reasonably Achievable.
   c. Acceptable Low-level Atomistic Rheology Allowance.
   d. As Long As Risk Allows.

15. Yellowcake is;

   a. Chemically toxic.
   b. Is not a producer of radiation.
   c. Yellow all the time.
   d. Should be eaten with ice cream.

16. D.A.C. stands for:

   a. Daily Accumulated Concentration.
   b. Daily Accumulated Contaminate.
   c. Dose Actually Calculated.
   d. Derived Air Concentration.

17. ALARA limits are:

   a. More restrictive than N.R.C. limits.
   b. Essentially the same as N.R.C. limits.
   c. Less restrictive than N.R.C. limits.
   d. Just another acronym that no one understands.

18. The Restricted Area:

    a. May be visited, with permission, regardless of age.
    b. Contains high level radioactive materials.
    c. Is an excellent hunting preserve.
    d. Consists of all operational and disposal area.

19. Uranium Mill Tailing:

    a. May go critical.
    b. Are not radioactive.
    c. Makes good sandbox filler.
    d. Must stay on site.

20. The Utah Radiation Control Division has regulatory authority for:

    a. Uranium Mills.
    b. Employee health in uranium mills.
    c. Environmental concerns while processing uranium.
    d. All of the above.

21. Alternate Feed Materials may contain:

    a. Only uranium.
    b. Only radioactive elements.
    c. Other potential toxic metals and radioactive elements.
    d. Mostly junk and spoiled flesh.

22. A "Radioactive Materials" sign signifies that in the area:

    a. There maybe a potential external exposure level greater than 2.0 mrem/hr.
    b. There maybe a potential external exposure level of 5.0 mrem/hr or greater.
    c. There maybe drums in the area that contain uranium product.
    d. All of the above.

23. Bioassay samples must be given:

    a. Whenever you feel like it.
    b. Before reporting to your job assignment.
    c. After you get ready for the day.
    d. When wearing work gloves.

24. If the personnel scanner alarm goes off, what must one do:

    a. Hit reset and leave it for the next employee to deal with.
    b. Walk on by and just sign your name.
    c. Contact the radiation department.
    d. Pick up the probe and go through the motions.

25. When required to wear certain PPE, one must wear it:

    a. Whenever the RSO walks by.
    b. Whenever you think the supervisors are watching you.
    c. Whenever you remember.
    d. Whenever you enter a job assignment that it has been required and until restriction have been lifted.

26. Which of the following materials must be surveyed prior to leaving the restricted area:

    a. Tools.
    b. Vehicles.
    c. Equipment.
    d. All of the above.

Addendum 9

Radiation Exposure Request

Attached is a copy of a form letter that is sent out requesting previous exposure information on employees that have previous radiation exposure history.

Denison Mines (USA) Corp.
P.O. Box 809
6425 South Hwy 191
Blanding, Utah 84511

Date: ____________________

Re: ____________________

SSN: ____________________

DOB : ____________________

To: ________________________________

The above named person is employed, or is being considered for employment by Denison Mines (USA) Corp. In accordance with provisions of the United States Nuclear Regulatory Commission Regulations 10 CFR 19.13 (b), we request that you provide a report of the occupational exposure to radiation while in your employ.

Sincerely,

David Turk
Radiation Safety Officer
Denison Mines (USA) Corp.

I, ____________________________ Hereby authorize release, to Denison Mines (USA) Corp., of my exposure history requested below.

TOTAL RADIATION EXPOSURE HISTORY

1. Period employed ______________________ to ______________________.
2. Place of employment ____.
3. Total exposure during period of employment _________________________.

Signed: ________________________

Date : ________________________

Position: ________________________

Addendum 9

Alpha Contamination Training

Attached is a copy of the training certification following alpha contamination monitoring training.

Training on Proper use of Personnel Alpha Monitor

On __________, I received training on the proper use of the alpha monitor, and the importance and need to conduct alpha survey of all personnel leaving the restricted area. What constitutes a proper survey with the alpha meter was discussed, along with the possible use of disciplinary actions for not complying with the survey policy. I have received the above training and understand the importance of conducting a proper personal alpha survey and the possible disciplinary actions that can be taken for non compliance with this license requirement.

Training Conducted by: ______________________________

Training Received by: ______________________________

Addendum 9

Prenatal Radiation Exposure Review

Subject: Radiation Exposure to Pregnant Women Employees

On this date, I was advised by my employer, Denison Mines (USA) Corp. of the White Mesa Mill, Utah, of the possible risks associated with prenatal radiation exposure and of the precautions that I should I become pregnant and continue to work. I was also advised of the alternatives that I might consider in this regard.

I discussed this subject with my employer and understand the possible risks to children of women who are exposed to radiation during pregnancy and the alternatives that I might consider as explained by my employer as contained in the appendix to Regulatory Guide 8.13 from the United States Nuclear Regulatory Commission, a copy of which was given to me for reference.

____________________________________ ________________

Employee Date

____________________________________ ________________

Employer Representative Date

Hire Date: ________________

SSN: ____________________

Employee Number: ________

U.S. NUCLEAR REGULATORY COMMISSION

Revision 3
June 1999

REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 8.13

(Draft was issued as DG-8014)

INSTRUCTION CONCERNING PRENATAL RADIATION EXPOSURE

A. INTRODUCTION

The Code of Federal Regulations in 10 CFR Part 19, "Notices, Instructions and Reports to Workers: Inspection and Investigations," in Section 19.12, "Instructions to Workers," requires instruction in "the health protection problems associated with exposure to radiation and/or radioactive material, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed." The instructions must be "commensurate with potential radiological health protection problems present in the work place."

The Nuclear Regulatory Commission's (NRC's) regulations on radiation protection are specified in 10 CFR Part 20, "Standards for Protection Against Radiation"; and 10 CFR 20.1208, "Dose to an Embryo/Fetus," requires licensees to "ensure that the dose to an embryo/fetus during the entire pregnancy, due to occupational exposure of a declared pregnant woman, does not exceed 0.5 rem (5 mSv)." Section 20.1208 also requires licensees to "make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman." A declared pregnant woman is defined in 10 CFR 20.1003 as a woman who has voluntarily informed her employer, in writing, of her pregnancy and the estimated date of conception.

This regulatory guide is intended to provide information to pregnant women, and other personnel, to help them make decisions regarding radiation exposure during pregnancy. This Regulatory Guide 8.13 supplements Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure" (Ref. 1), which contains a broad discussion of the risks from exposure to ionizing radiation.

Other sections of the NRC's regulations also specify requirements for monitoring external and internal occupational dose to a declared pregnant woman. In 10 CFR 20.1502, "Conditions Requiring Individual Monitoring of External and Internal Occupational Dose," licensees are required to monitor the occupational dose to a declared pregnant woman, using an individual monitoring device, if it is likely that the declared pregnant woman will receive, from external sources, a deep dose equivalent in excess of 0.1 rem (1 mSv). According to Paragraph (e) of 10 CFR 20.2106, "Records of Individual Monitoring Results," the licensee must maintain records of dose to an embryo/fetus if monitoring was required, and the records of dose to the embryo/fetus must be kept with the records of dose to the declared pregnant woman. The declaration of pregnancy must be kept on file, but may be maintained separately from the dose records. The licensee must retain the required form or record until the Commission terminates each pertinent license requiring the record.

The information collections in this regulatory guide are covered by the requirements of 10 CFR Parts 19 or 20, which were approved by the Office of Management and Budget, approval numbers 3150-0044 and 3150-0014, respectively. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number.

B. DISCUSSION

As discussed in Regulatory Guide 8.29 (Ref. 1), exposure to any level of radiation is assumed to carry with it a certain amount of risk. In the absence of scientific certainty regarding the relationship between low dose exposure and health effects, and as a conservative assumption for radiation protection purposes, the scientific community generally assumes that any exposure to ionizing radiation may cause undesirable biological effects and that the likelihood of these effects increases as the dose increases. At the occupational dose limit for the whole body of 5 rem (50 mSv) per year, the risk is believed to be very low.

The magnitude of risk of childhood cancer following in utero exposure is uncertain in that both negative and positive studies have been reported. The data from these studies "are consistent with a lifetime cancer risk resulting from exposure during gestation which is two to three times that for the adult" (NCRP Report No. 116, Ref. 2). The NRC has reviewed the available scientific literature and has concluded that the 0.5 rem (5 mSv) limit specified in 10 CFR 20.1208 provides an adequate margin of protection for the embryo/fetus. This dose limit reflects the desire to limit the total lifetime risk of leukemia and other cancers associated with radiation exposure during pregnancy.

In order for a pregnant worker to take advantage of the lower exposure limit and dose monitoring provisions specified in 10 CFR Part 20, the woman must declare her pregnancy in writing to the licensee. A form letter for declaring pregnancy is provided in this guide or the licensee may use its own form letter for declaring pregnancy. A separate written declaration should be submitted for each pregnancy.

C. REGULATORY POSITION

1. Who Should Receive Instruction

Female workers who require training under 10 CFR 19.12 should be provided with the information contained in this guide. In addition to the information contained in Regulatory Guide 8.29 (Ref. 1), this information may be included as part of the training required under 10 CFR 19.12.

2. Providing Instruction

The occupational worker may be given a copy of this guide with its Appendix, an explanation of the contents of the guide, and an opportunity to ask questions and request additional information. The information in this guide and Appendix should also be provided to any worker or supervisor who may be affected by a declaration of pregnancy or who may have to take some action in response to such a declaration.

Classroom instruction may supplement the written information. If the licensee provides classroom instruction, the instructor should have some knowledge of the biological effects of radiation to be able to answer questions that may go beyond the information provided in this guide. Videotaped presentations may be used for classroom instruction. Regardless of whether the licensee provides classroom training, the licensee should give workers the opportunity to ask questions about information contained in this Regulatory Guide 8.13. The licensee may take credit for instruction that the worker has received within the past year at other licensed facilities or in other courses or training.

3. Licensee's Policy on Declared Pregnant Women

The instruction provided should describe the licensee's specific policy on declared pregnant women, including how those policies may affect a woman's work situation. In particular, the instruction should include a description of the licensee's policies, if any, that may affect the declared pregnant woman's work situation after she has filed a written declaration of pregnancy consistent with 10 CFR 20.1208.

The instruction should also identify who to contact for additional information as well as identify who should receive the written declaration of pregnancy. The recipient of the woman's declaration may be identified by name (e.g., John Smith), position (e.g., immediate supervisor, the radiation safety officer), or department (e.g., the personnel department).

4. Duration of Lower Dose Limits for the Embryo/Fetus

The lower dose limit for the embryo/fetus should remain in effect until the woman withdraws the declaration in writing or the woman is no longer pregnant. If a declaration of pregnancy is withdrawn, the dose limit for the embryo/fetus would apply only to the time from the estimated date of conception until the time the declaration is withdrawn. If the declaration is not withdrawn, the written declaration may be considered expired one year after submission.

5. Substantial Variations Above a Uniform Monthly Dose Rate

According to 10 CFR 20.1208(b), "The licensee shall make efforts to avoid substantial variation above a uniform monthly exposure rate to a declared pregnant woman so as to satisfy the limit in paragraph (a) of this section," that is, 0.5 rem (5 mSv) to the embryo/fetus. The National Council on Radiation Protection and Measurements (NCRP) recommends a monthly equivalent dose limit of 0.05 rem (0.5 mSv) to the embryo/fetus once the pregnancy is known (Ref. 2). In view of the NCRP recommendation, any monthly dose of less than 0.1 rem (1 mSv) may be considered as not a substantial variation above a uniform monthly dose rate and as such will not require licensee justification. However, a monthly dose greater than 0.1 rem (1 mSv) should be justified by the licensee.

D. IMPLEMENTATION

The purpose of this section is to provide information to licensees and applicants regarding the NRC staff's plans for using this regulatory guide.

Unless a licensee or an applicant proposes an acceptable alternative method for complying with the specified portions of the NRC's regulations, the methods described in this guide will be used by the NRC staff in the evaluation of instructions to workers on the radiation exposure of pregnant women.

REFERENCES

1. USNRC, "Instruction Concerning Risks from Occupational Radiation Exposure," Regulatory Guide 8.29, Revision 1, February 1996.

2. National Council on Radiation Protection and Measurements, *Limitation of Exposure to Ionizing Radiation*, NCRP Report No. 116, Bethesda, MD, 1993.

APPENDIX

QUESTIONS AND ANSWERS CONCERNING PRENATAL RADIATION EXPOSURE

1. Why am I receiving this information?

The NRC's regulations (in 10 CFR 19.12, "Instructions to Workers") require that licensees instruct individuals working with licensed radioactive materials in radiation protection as appropriate for the situation. The instruction below describes information that occupational workers and their supervisors should know about the radiation exposure of the embryo/fetus of pregnant women.

The regulations allow a pregnant woman to decide whether she wants to formally declare her pregnancy to take advantage of lower dose limits for the embryo/fetus. This instruction provides information to help women make an informed decision whether to declare a pregnancy.

2. If I become pregnant, am I required to declare my pregnancy?

No. The choice whether to declare your pregnancy is completely voluntary. If you choose to declare your pregnancy, you must do so in writing and a lower radiation dose limit will apply to your embryo/fetus. If you choose not to declare your pregnancy, you and your embryo/fetus will continue to be subject to the same radiation dose limits that apply to other occupational workers.

3. If I declare my pregnancy in writing, what happens?

If you choose to declare your pregnancy in writing, the licensee must take measures to limit the dose to your embryo/fetus to 0.5 rem (5 millisievert) during the entire pregnancy. This is one-tenth of the dose that an occupational worker may receive in a year. If you have already received a dose exceeding 0.5 rem (5 mSv) in the period between conception and the declaration of your pregnancy, an additional dose of 0.05 rem (0.5 mSv) is allowed during the remainder of the pregnancy. In addition, 10 CFR 20.1208, "Dose to an Embryo/Fetus," requires licensees to make efforts to avoid substantial variation above a uniform monthly dose rate so that all the 0.5 rem (5 mSv) allowed dose does not occur in a short period during the pregnancy.

This may mean that, if you declare your pregnancy, the licensee may not permit you to do some of your normal job functions if those functions would have allowed you to receive more than 0.5 rem, and you may not be able to have some emergency response responsibilities.

4. Why do the regulations have a lower dose limit for the embryo/fetus of a declared pregnant woman than for a pregnant worker who has not declared?

A lower dose limit for the embryo/fetus of a declared pregnant woman is based on a consideration of greater sensitivity to radiation of the embryo/fetus and the involuntary nature of the exposure. Several scientific advisory groups have recommended (References 1 and 2) that the dose to the embryo/fetus be limited to a fraction of the occupational dose limit.

5. What are the potentially harmful effects of radiation exposure to my embryo/fetus?

The occurrence and severity of health effects caused by ionizing radiation are dependent upon the type and total dose of radiation received, as well as the time period over which the exposure was received. See Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational Exposure" (Ref. 3), for more information. The main concern is embryo/fetal susceptibility to the harmful effects of radiation such as cancer.

6. Are there any risks of genetic defects?

Although radiation injury has been induced experimentally in rodents and insects, and in the experiments was transmitted and became manifest as hereditary disorders in their offspring, radiation has not been identified as a cause of such effect in humans. Therefore, the risk of genetic effects attributable to radiation exposure is speculative. For example, no genetic effects have been documented in any of the Japanese atomic bomb survivors, their children, or their grandchildren.

7. What if I decide that I do not want any radiation exposure at all during my pregnancy?

You may ask your employer for a job that does not involve any exposure at all to occupational radiation dose, but your employer is not obligated to provide you with a job involving no radiation exposure. Even if you receive no occupational exposure at all, your embryo/fetus will receive some radiation dose (on average 75 mrem (0.75 mSv)) during your pregnancy from natural background radiation.

The NRC has reviewed the available scientific literature and concluded that the 0.5 rem (5 mSv) limit provides an adequate margin of protection for the embryo/fetus. This dose limit reflects the desire to limit the total lifetime risk of leukemia and other cancers. If this dose limit is exceeded, the total lifetime risk of cancer to the embryo/fetus may increase incrementally. However, the decision on what level of risk to accept is yours. More detailed information on potential risk to the embryo/fetus from radiation exposure can be found in References 2-10.

8. What effect will formally declaring my pregnancy have on my job status?

Only the licensee can tell you what effect a written declaration of pregnancy will have on your job status. As part of your radiation safety training, the licensee should tell you the company's policies with respect to the job status of declared pregnant women. In addition, before you declare your pregnancy, you may want to talk to your supervisor or your radiation safety officer and ask what a declaration of pregnancy would mean specifically for you and your job status.

In many cases you can continue in your present job with no change and still meet the dose limit for the embryo/fetus. For example, most commercial power reactor workers (approximately 93%) receive, in 12 months, occupational radiation doses that are less than 0.5 rem (5 mSv) (Ref. 11). The licensee may also consider the likelihood of increased radiation exposures from accidents and abnormal events before making a decision to allow you to continue in your present job.

If your current work might cause the dose to your embryo/fetus to exceed 0.5 rem (5 mSv), the licensee has various options. It is possible that the licensee can and will make a reasonable accommodation that will allow you to continue performing your current job, for example, by having another qualified employee do a small part of the job that accounts for some of your radiation exposure.

9. What information must I provide in my written declaration of pregnancy?

You should provide, in writing, your name, a declaration that you are pregnant, the estimated date of conception (only the month and year need be given), and the date that you give the letter to the licensee. A form letter that you can use is included at the end of these questions and answers. You may use that letter, use a form letter the licensee has provided to you, or write your own letter.

10. To declare my pregnancy, do I have to have documented medical proof that I am pregnant?

NRC regulations do not require that you provide medical proof of your pregnancy. However, NRC regulations do not preclude the licensee from requesting medical documentation of your pregnancy, especially if a change in your duties is necessary in order to comply with the 0.5 rem (5 mSv) dose limit.

11. Can I tell the licensee orally rather than in writing that I am pregnant?

No. The regulations require that the declaration must be in writing.

12. If I have not declared my pregnancy in writing, but the licensee suspects that I am pregnant, do the lower dose limits apply?

No. The lower dose limits for pregnant women apply only if you have declared your pregnancy in writing. The United States Supreme Court has ruled (in *United Automobile Workers International Union v. Johnson Controls, Inc.*, 1991) that "Decisions about the welfare of future children must be left to the parents who conceive, bear, support, and raise them rather than to the employers who hire those parents" (Reference 7). The Supreme Court also ruled that your employer may not restrict you from a specific job "because of concerns about the next generation." Thus, the lower limits apply only if you choose to declare your pregnancy in writing.

13. If I am planning to become pregnant but am not yet pregnant and I inform the licensee of that in writing, do the lower dose limits apply?

No. The requirement for lower limits applies only if you declare in writing that you are already pregnant.

14. What if I have a miscarriage or find out that I am not pregnant?

If you have declared your pregnancy in writing, you should promptly inform the licensee in writing that you are no longer pregnant. However, if you have not formally declared your pregnancy in writing, you need not inform the licensee of your nonpregnant status.

15. How long is the lower dose limit in effect?

The dose to the embryo/fetus must be limited until you withdraw your declaration in writing or you inform the licensee in writing that you are no longer pregnant. If the declaration is not withdrawn, the written declaration may be considered expired one year after submission.

16. If I have declared my pregnancy in writing, can I revoke my declaration of pregnancy even if I am still pregnant?

Yes, you may. The choice is entirely yours. If you revoke your declaration of pregnancy, the lower dose limit for the embryo/fetus no longer applies.

17. What if I work under contract at a licensed facility?

The regulations state that you should formally declare your pregnancy to the licensee in writing. The licensee has the responsibility to limit the dose to the embryo/fetus.

18. Where can I get additional information?

The references to this Appendix contain helpful information, especially Reference 3, NRC's Regulatory Guide 8.29, "Instruction Concerning Risks from Occupational Radiation Exposure," for general information on radiation risks. The licensee should be able to give this document to you.

For information on legal aspects, see Reference 7, "The Rock and the Hard Place: Employer Liability to Fertile or Pregnant Employees and Their Unborn Children—What Can the Employer Do?" which is an article in the journal *Radiation Protection Management.*

You may telephone the NRC Headquarters at (301) 415-7000. Legal questions should be directed to the Office of the General Counsel, and technical questions should be directed to the Division of Industrial and Medical Nuclear Safety.

You may also telephone the NRC Regional Offices at the following numbers: Region I, (610) 337-5000; Region II, (404) 562-4400; Region III, (630) 829-9500; and Region IV, (817) 860-8100. Legal questions should be directed to the Regional Counsel, and technical questions should be directed to the Division of Nuclear Materials Safety.

REFERENCES FOR APPENDIX

1. National Council on Radiation Protection and Measurements, *Limitation of Exposure to Ionizing Radiation,* NCRP Report No. 116, Bethesda, MD, 1993.

2. International Commission on Radiological Protection, *1990 Recommendations of the International Commission on Radiological Protection,* ICRP Publication 60, Ann. ICRP 21: No. 1-3, Pergamon Press, Oxford, UK, 1991.

3. USNRC, "Instruction Concerning Risks from Occupational Radiation Exposure," Regulatory Guide 8.29, Revision 1, February 1996.[1] (Electronically available at www.nrc.gov/NRC/RG/index.html)

4. Committee on the Biological Effects of Ionizing Radiations, National Research Council, *Health Effects of Exposure to Low Levels of Ionizing Radiation* (BEIR V), National Academy Press, Washington, DC, 1990.

5. United Nations Scientific Committee on the Effects of Atomic Radiation, *Sources and Effects of Ionizing Radiation,* United Nations, New York, 1993.

[1]Single copies of regulatory guides, both active and draft, and draft NUREG documents may be obtained free of charge by writing the Reproduction and Distribution Services Section, OCIO, USNRC, Washington, DC 20555-0001, or by fax to (301)415-2289, or by email to <DISTRIBUTION@NRC.GOV>. Active guides may also be purchased from the National Technical Information Service on a standing order basis. Details on this service may be obtained by writing NTIS, 5285 Port Royal Road, Springfield, VA 22161. Copies of active and draft guides are available for inspection or copying for a fee from the NRC Public Document Room at 2120 L Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

6. R. Doll and R. Wakeford, "Risk of Childhood Cancer from Fetal Irradiation," *The British Journal of Radiology,* 70, 130-139, 1997.

7. David Wiedis, Donald E. Jose, and Timm O. Phoebe, "The Rock and the Hard Place: Employer Liability to Fertile or Pregnant Employees and Their Unborn Children—What Can the Employer Do?" *Radiation Protection Management, 11,* 41-49, January/February 1994.

8. National Council on Radiation Protection and Measurements, *Considerations Regarding the Unintended Radiation Exposure of the Embryo, Fetus, or Nursing Child,* NCRP Commentary No. 9, Bethesda, MD, 1994.

9. National Council on Radiation Protection and Measurements, *Risk Estimates for Radiation Protection,* NCRP Report No. 115, Bethesda, MD, 1993.

10. National Radiological Protection Board, *Advice on Exposure to Ionising Radiation During Pregnancy,* National Radiological Protection Board, Chilton, Didcot, UK, 1998.

11. M.L. Thomas and D. Hagemeyer, "Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1996," Twenty-Ninth Annual Report, NUREG-0713, Vol. 18, USNRC, 1998.[2]

[2]Copies are available at current rates from the U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20402-9328 (telephone (202)512-1800); or from the National Technical Information Service by writing NTIS at 5285 Port Royal Road, Springfield, VA 22161. Copies are available for inspection or copying for a fee from the NRC Public Document Room at 2120 L Street NW., Washington, DC; the PDR's mailing address is Mail Stop LL-6, Washington, DC 20555; telephone (202)634-3273; fax (202)634-3343.

FORM LETTER FOR DECLARING PREGNANCY

This form letter is provided for your convenience. To make your written declaration of pregnancy, you may fill in the blanks in this form letter, you may use a form letter the licensee has provided to you, or you may write your own letter.

DECLARATION OF PREGNANCY

To:________________________

In accordance with the NRC's regulations at 10 CFR 20.1208, "Dose to an Embryo/Fetus," I am declaring that I am pregnant. I believe I became pregnant in________________ (only the month and year need be provided).

I understand the radiation dose to my embryo/fetus during my entire pregnancy will not be allowed to exceed 0.5 rem (5 millisievert) (unless that dose has already been exceeded between the time of conception and submitting this letter). I also understand that meeting the lower dose limit may require a change in job or job responsibilities during my pregnancy.

____

(Your signature)

____

(Your name printed)

____

(Date)

REGULATORY ANALYSIS

A separate regulatory analysis was not prepared for this regulatory guide. A regulatory analysis prepared for 10 CFR Part 20, "Standards for Protection Against Radiation" (56 FR 23360), provides the regulatory basis for this guide and examines the costs and benefits of the rule as implemented by the guide. A copy of the "Regulatory Analysis for the Revision of 10 CFR Part 20" (PNL-6712, November 1988) is available for inspection and copying for a fee at the NRC Public Document Room, 2120 L Street NW, Washington, DC, as an enclosure to Part 20 (56 FR 23360).

Addendum 10

Respiratory Protection Training Program

Each employee who may wear a respirator will be required to receive training for the proper use of the device. The following outline will be followed during the training process. DUSA's policies and procedures governing the use of respirators at the White Mesa Mill are contained in the Respirator Protection Manual.

A. Need for respiratory protection equipment:

1. Mechanics of breathing
2. Types of respiratory particles

    i. Dust
    ii. Fumes
    iii. Mists

3. Read company standard operating procedures

B. Respiratory hazards

1. Uranium airborne and effect
2. Radon daughters and effect
3. Chloride and effect
4. Ammonia and effect
5. Airborne vanadium dust and effect
6. Acid gases and effect
7. Other effects

C. Engineering controls

1. Demister and failure of
2. Ventilation fans and failure of
3. Ventilating systems for the yellowcake packaging rooms

D. Respirator selection

1. Types of respirators, their function, limitations

    i. Full-face with combo cartridges
    ii. PAPR's
    iii. SCBA's
    iv. NIOSH and MSHA approved respirators only

Addendum 10

2. Identification of hazards

   i. O_2 content
   ii. Routine hazards
   iii. Non-routine hazards

E. Instructions for inspection, donning, fitting and wearing of the respirator

1. Field inspection

   i. Valves
   ii. Body of mask
   iii. Straps
   iv. Lens
   v. Air Lines

2. Wearing Instructions and training
   i. Donning, wearing and removing the respirator
   ii. Adjusting the respirator so that its respiratory-inlet covering is properly fitted on the wearer and so that the respirator causes a minimum of discomfort to the wearer
   iii. Allowing the respirator wearer to wear the respirator in a safe atmosphere for an adequate period of time to ensure that the wearer is familiar with the operational characteristics of the respirator

3. Respirator sealing problems
   i. A person who has hair (stubble, mustache, sideburns, beard, low hairline, bangs) which passes between the face and the sealing surface of the facepiece of the respirator shall not be permitted to wear such a respirator
   ii. A person who has hair (mustache, beard) which interferes with the function of a respirator valve(s) shall not be permitted to wear such a respirator.
   iii. A spectacle which has temple bars or straps which passes between the sealing surface of a respirator full facepiece and the wearer's face shall not be used
   iv. A head covering which passes between the sealing surface of a respirator facepiece and the wearer's face shall not be used.
   v. The wearing of a spectacle, or goggle, a face shield, a welding helmet, or other eye and face protective device which interferes with the seal of a respirator to the wearer shall not be allowed.

Addendum 10

vi. If scars, hollow temples, excessively protruding cheekbones, deep creases in facial skin, the absence of teeth or dentures, or unusual facial configurations prevent a seal of a respirator facepiece to a wearer's face, the person shall not be permitted to wear the respirator.
vii. If missing teeth or dentures prevent a seal of a respirator mouthpiece in a person's mouth, the person shall not be allowed to war a respirator equipped with a mouthpiece.
viii. If a person has a nose of a shape or size which prevents the closing of the nose by the nose clamp of a mouthpiece/nose-clamp type of respirator, the person shall not be permitted to wear this type of respirator.

F. Maintenance, storage and respirator exchange procedures

1. Cleaning, sanitizing, and maintenance techniques for all types of respirators.
2. The frequency of respirator exchange (clean exchanged for used)

    i. Heavy Use
    ii. Occasional use.

3. The steps that are to be taken to exchange respirators.
4. When, how, and why emergency respirators are used.

G. Leaving a hazardous area

1. A respirator wearer shall be permitted to leave the hazardous area for any respirator-related cause. Reasons which may cause a respirator wearer to leave a hazardous area include, but are not limited to, the following:

    i. Failure of the respirator to provide adequate protection
    ii. Malfunction of the respirator
    iii. Detection of leakage of air contaminant into the respirator
    iv. Severe discomfort in wearing the respirator
    v. Increase resistance to breathing
    vi. Illness of the wearer, including: sensation of dizziness, nausea, weakness, fatigue, breathing difficulty, coughing, sneezing, vomiting, fever, or chills

Addendum 10

vii. Claustrophobia, anxiety or other psychological factors that may affect the wearer

viii. Emergency respirator use

1. SCBA – self-contained breathing apparatus
2. Emergency respirator issuance

ix. Regulations for respirator use

1. 10 CFR part 20:103

WHITE MESA MILL

SECURITY PROGRAM

The following security procedures are followed at the White Mesa Mill:

1.1 Visitation

Visitors to the Mill are required to register at the administration office prior to entry into the restricted area. All personnel will be accompanied by designated Mill employees during the site visit. Access to areas requiring respiratory protection will only be permitted after visitors receive documented site respiratory protection training in accordance with MSHA and NRC guidance and have demonstrated that they have received the requisite medical examination and approvals.

1.2 Contractors

Contractors employed at the facility are to receive documented site safety and radiation protection training, as outlined under the Mills Training Program prior to working within the restricted area of the Mill. Training is the responsibility of the Radiation Safety Officer and the Safety Coordinator.

1.3 Yellow Cake Product Storage

Yellowcake product is stored within a locked fenced enclosure. Access to the enclosure is restricted by limiting key access only to Mill management personnel. Employees working within the enclosure require the authorization of such personnel prior to access. These crews will also be monitored through the use of a closed circuit video surveillance system.

1.4 Reagent and Ore Carriers

Truck drivers hauling reagent and ore into the restricted area of the facility are to receive documented site safety and radiation protection training prior to access to the site. Access is limited by controlling and documenting gate access. Safety and radiation protection training consists of appropriate training for the activity involved.

1.5 Site Access

The restricted area is enclosed by a combination of barbed wire and chain line security fences. All access gates are padlocked. Caution-Radioactive Material signs are posted along the perimeter restricted area fence, and Authorized Access Only signs are posted at all access gates. Signs are posted at intervals allowing for direct visibility of signs for any access point to the fenceline.

Personnel will be present on-site, 24 hours per day, whether or not the mill is operating.

RESPIRATORY PROTECTION PROGRAM

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RESPIRATORY PROTECTION PROGRAM

1.0 APPLICABILITY

The Respiratory Protection Program coordinates the

1. Air sampling sufficient to identify the potential hazard, select the proper equipment, and estimate exposures;
2. Surveys and bioassays, as appropriate, to evaluate actual intakes;
3. Testing of respirators for operability prior to each use;
4. Written procedures regarding selection, fitting, issuance, maintenance, and testing of respirators, including testing for operability immediately prior to each use; supervision and training of personnel; monitoring, including air sampling and bioassays; and record keeping; and
5. Determination by a physician prior to the initial fitting of respirators, and either every 12 months thereafter or at a greater frequency determined by a physician, that the individual user is medically fit to use the respiratory protection equipment (over the age of 45) or every five years for individuals under 45 years of age.

1.1 Respiratory Protection Policy

The Respiratory Protection Program is established for this facility as a policy of Denison Mines (USA) Corp. (DUSA) to protect its employees from occupational exposure to harmful concentrations of radioactive and/or toxic materials in the air.

The following is DUSA's policy with respect to respiratory protection:

1. Process or other engineering controls will be used whenever feasible to reduce the need for use of respirators.
2. For work in areas in which respirators must be routinely used to reduce exposures, SOP's will detail use of respiratory protection. Non-routine use of respirators will be performed under Safe Work Permits. Self Contained Breathing Apparatus ("SCBA") respirators will only be used for evacuation and emergency response situations.
3. Due to the added physical stress of working while using a respirator, work periods will be alternated with rest periods.
4. Respirators will not be issued to employees unless they are to be used.

1.2 Responsibilities

As noted in NRC Regulatory Guide 8.15, "it is widely recognized among safety professionals that the use of respiratory protection devices in the workplace can impose physiological and psychological stresses on workers, obstruct their vision, hinder their movements, and make effective communications difficult. These factors increase the risk of physical injury to respirator wearers that, in many cases, far exceeds any potential risk associated with the inhalation of a small quantity of airborne radioactive material." Therefore, the NRC recommends that process or engineering controls be used to the extent practical to control the concentration of radioactive material in air, and that the use of respiratory protection devices be contemplated only after other measures to limit intake have been considered.

In general, the Mill Manager is responsible for providing the equipment and resources necessary for the successful implementation of the Respiratory Protection Program and for facilitating the application of engineering controls to reduce the need for the use of respiratory protection devices. The Radiation Safety Officer ("RSO") has primary responsibility for implementation and oversight of all aspects of the respiratory protection program. The Mill Manager and the RSO will coordinate efforts to use, to the extent practical, procedures and engineering controls based on sound protection principles to achieve ALARA.

1.2.1 Mill Manager

The Mill Manager is responsible for ensuring that a respiratory protection program, meeting or exceeding that specified by regulation, is established and maintained for the employees under his or her jurisdiction.

1.2.2 Radiation Safety Officer

The (RSO) is responsible for the implementation and direct control of the respiratory protection program. The RSO is charged with the following responsibilities:

1. Supervision of respirator selection procedures.

2. Establishment of training sessions about respiratory equipment for employees.

3. Establishment of a continuing program of cleaning and inspecting the equipment.

4. Designation of proper storage areas for respiratory equipment.

5. Establishment of issuance and accounting procedures for uses of respiratory equipment.

6. Establishment of medical screening programs and procedures for employees assigned to wear respiratory equipment.

7. Establishment of a periodic inspection schedule of those work places/conditions requiring respiratory equipment to determine exposure and/or changing situations.

8. A continuing evaluation of the above aspects to assure their continued functions and effectiveness.

1.2.3 Employees

Respirators are provided to employees for their personal protection and the proper use of respirators in areas in which such protection is required is a condition of their employment. Violating the established rules for respirator use may result in disciplinary action up to and including dismissal.

1.3 Policy Regarding Facial Hair

The proper fitting of a respiratory device is necessary to ensure that it will function adequately. Facial hair (beards, mustaches, and long sideburns) will not allow an airtight seal to be formed between the face and mask, as contaminated air will enter into the wearer's breathing zone if the proper seal is not achieved. Leakage of air into the mask will nullify the purpose of the respiratory device.

The policy of DUSA concerning facial hair is:

> As a condition of employment, those employees who may at any time be required to wear a respirator as part of their employment, will not have any facial hair that will restrict the proper fitting of a respiratory device.

1.4 Physiological or Psychological Limitations to Respirator Use

This section describes physiological and psychological (including emotional) factors, which may limit an individual's ability to wear or work in a respirator. Any questions or problems concerning respirators or their use, such as the types described in this section, should be addressed to the RSO.

1.4 1 Physiological Limitations

As described below in Section 3.1, medical qualification will be required of each employee that might be using a respirator in their normal work duties. This is necessary to evaluate the individual's limitations to wearing respirator devices. A licensed physician to determine that the individual user is medically fit to use the respiratory protection equipment will perform the medical evaluation. The physician will report on any physiological factors that may limit an individual's ability to wear a respirator.

1.4.2 Psychological Limitations

Mental factors must also be taken into consideration when employees are required to wear respirators. Some individuals become claustrophobic when wearing a respirator. These individuals should not be required to wear respirators if the condition is severe enough to cause panic.

1.4.3 Other Factors

Other factors, which may cause problems in respirator sealing, must be considered when performing fit testing. These may include such factors as facial structure, scars, skin creases, or dentures.

2.0 PROCEDURES FOR RESPIRATOR USE

2.1 Supervision of the Program, Including Program Audits

The Respiratory Protection Program is administered by the RSO. Quarterly ALARA Reports from the RSO are sent to members of the ALARA Committee. The effectiveness of the Respiratory Protection Program is reviewed and exposure data evaluated during annual ALARA audits.

2.2 Training and Minimum Qualifications of Supervisors

A supervisor, that is, a person who has the responsibility of overseeing the work activities of one or more persons who must wear respirators, shall be given adequate training to ensure the proper use of respirators. Supervisor training shall include but shall not necessarily be limited to the following subjects:

1. Basic respiratory protection practices.
2. Nature and extent of respiratory hazards to which persons under his/her supervision may be exposed.
3. Principles and criteria of selecting respirators.
4. Training of respirator wearers.
5. Issuance of respirators.
6. Inspection of respirators.
7. Use of respirators, including monitoring their use.
8. Maintenance and storage of respirators.
9. Regulations concerning respirator use.

2.3 Training of Respirator Users

Each employee who may wear a respirator will be required to receive training for the proper use of the device. The following outline will be followed during the training process.

A. Need for Respiratory Protection Equipment

B. Mechanics of Breathing

C. Types of Respiratory Particles

1. Dust
2. Fumes
3. Mists

D. DUSA's Respiratory Company Respiratory Protection Policy Statement

E. Respiratory Hazards

1. Airborne uranium and effect
2. Radon daughters and effect
3. Chlorine and effect
4. Ammonia and effect
5. Airborne vanadium and effect
6. Acid gases and effect
7. Other effects

F. Engineering Controls

1. De-mister
2. Ventilation
3. Ventilating systems for the yellowcake dryer and packaging rooms

G. Respirator Selection

1. Type of respirators, their function, limitations

   a) Full-face with combination cartridges
   b) Powered Air Purifying Respirators (PAPR) with radiological dust cartridges
   c) Self-contained breathing apparatus
   d) NIOSH and MSHA approved respirators only

H. Identification of Hazards

1. O_2 content
2. Routine hazards
3. Non-routine hazards

I. Instructions on Field Inspection of the Respirator

1. Valves
2. Body of mask
3. Straps
4. Lens
5. Air hoses

J. Fitting, Donning and Wearing Instructions and Training

Wearing instructions and training (including practice demonstrations) shall be given to each respirator wearer and shall cover the following items.

a) Donning (including seal check), wearing, and removing the respirator.
b) Adjusting the respirator so that its respiratory-inlet covering is properly fitted on the wearer and so that the respirator causes minimum of discomfort to the wearer.
c) Allow the respirator wearer to wear the respirator in a safe atmosphere for an adequate period of time to ensure that the wearer is familiar with the operational characteristics of the respirator.

K. Respirator Sealing Problems

Respirators shall not be worn when conditions prevent a seal of the respirator to the wearer's face. For example:

a) A person who has hair (beard stubble, mustache, sideburns, beard, low hairlines, or bangs) that passes between the face and the sealing surface of the face piece of the respirator shall not be permitted to wear such a respirator.
b) A person who has facial hair (mustache or beard) which interferes with the function of a respirator valve(s) shall not be permitted to wear such a respirator.
c) Glasses, which have temple bars, or straps, which passes between the sealing surface of a respirator's full-face piece and the wearer's face, shall not be used.
d) A head covering which passes between the sealing surface or a respirator face piece and the wearer's face shall not be used.
e) The wearing of glasses or goggles, a face shield, a welding helmet, or other eye and face protective device, which interferes with the seal of a respirator to the wearer, shall not be allowed.
f) If scars, hollow temples, excessively protruding cheekbones, deep creases in facial skin, the absence of teeth or dentures, or unusual facial configurations prevent the seal of a respirator face piece to a wearer's face, the person shall not be permitted to wear the respirator.
g) If missing teeth or dentures prevent the seal of a respirator mouthpiece in a person's mouth, the person shall not be allowed to wear a respirator equipped with a mouthpiece.
h) If a person has a nose of a shape or size that prevents the closing of the nose by the nose clamp of a mouthpiece/nose

clamp type of respirator, the person shall not be permitted to wear this type of respirator.

L. Maintenance, Storage, and Respirator Exchange Procedures

1. Cleaning, sanitizing, and maintenance techniques for all types of respirators.
2. The frequency of respirator exchange (clean exchanged for used).

   a) Heavy use
   b) Occasional use

3. The steps that are to be taken to exchange respirators.

4. When, how, and why SCBA are used.

M. Leaving a Hazardous Area

1. A respirator wearer shall be permitted to leave the hazardous area for any respirator-related cause. Reasons which may cause a respirator wearer to leave a hazardous area included but are not limited to the following:

   a) Failure of the respirator to provide adequate protection.
   b) Malfunction of the respirator.
   c) Detection of leakage of air contaminant into the respirator.
   d) Increase resistance to breathing.
   e) Severe discomfort in wearing the respirator.
   f) Illness of the wearer including sensation of dizziness, nausea, weakness, fatigue, breathing difficulty, coughing, sneezing, vomiting, fever, or chills.
   g) Claustrophobia, anxiety, or other psychological factors that may affect the wearer.

N. Emergency respirator use:

1. SCBA (self-contained breathing apparatus)
2. Emergency respirator issuance

O. Regulations for respirator use:

1. 10 CFR Part 20 Subpart H

2.4 Fit Testing

Frequency – annually for every employee who is required to wear a respiratory protective device.

Equipment needed – MSA ventilation smoke tube, Part No. 5645 or equivalent, aspirator bulb. Steps for annual fit testing are:

1. Respirators equipped with high-efficiency filters will be used for this test (red/green filters).

2. Both ends are broken on an MSA ventilation smoke tube. One end is inserted into the tube connected to the positive pressure of a two-way aspirator bulb and the other end covered by a ½ inch length of tygon, surgical or rubber tubing. The test aerosol is generated by squeezing the aspirator bulb.

3. The test subject will don the respirator and a visual inspection of the facepiece to face seal made by the tester. An obvious leak in the facepiece to face seal shall be reason to abort the test and record the mask as unsatisfactory. Expression of discomfort created by the mask shall also be reason to abort the test.

4. The smoke will be generated in all areas surrounding the mask. The smoke is not harmful however it is sufficiently irritating that if there is a leak in the seal of the mask, it will be discovered immediately.

5. Any indication of detection of the smoke by the test subject during fitting indicates a failure of that respirator. If leakage is detected the facepiece to face seal shall be visually inspected for obvious leakage. If any doubt about the condition of the respirator or the filter exists, another like respirator shall be tested to assure the leakage was due to the facepiece to face seal.

2.5 Selecting Respirators

Respirator selection will be determined by the type of environment in which the employee will be working. The concentration of oxygen and the type and concentration of hazardous contaminants in the work area atmosphere must be considered during the selection process.

Prior to selecting a specific type of respirator, the work environment must be thoroughly evaluated for respiratory hazards. The following questions must then be answered:

1. What are the hazards the employee will be exposed to?

2. What are the contaminants and their concentration?

3. Are there any contaminants in the workplace environment that may damage or irritate the eyes, nose, or skin?
    a) Yes – a full-face style is recommended.

4. Is the oxygen concentration in the workplace atmosphere between 19.5% to 23%?
   a) Yes – combination cartridges will be used if the concentration of the contaminant is within the acceptable limits for the cartridge.
   b) No – The workplace or area may only be entered if the O_2 concentration is between 19.5 and 23%. The workplace environment will be remediated (i.e., ventilated) by safety engineering controls such that the oxygen concentration falls between these limits before it may be entered.

5. Do the contaminant concentrations in the work environment exceed the limits listed for the combination cartridge being used?
   a) Yes –Modify the air contaminant concentration by safety engineering measures.
   b) No – combination cartridges may be used if oxygen concentration is between 19.5% and 23%.

2.5.1 Air Purifying Respirators

Only MSHA and NIOSH approved and accepted respirators will be used. The inventory will consist of full face and PAPR units and SCBAs.

There is only one type of air purifying respirator cartridge used for air contaminants for the full-face respirators. This is a red/green GME-H universal cartridge, which is normally effective for removing all air contaminants and atmospheric hazards, and is approved by NIOSH for use under the following conditions:

1. Organic Vapors – less than 1,000 ppm
2. Pesticides
3. Mists of Paints, Lacquers, and Enamels
4. Dust – less than 0.5 mg/m^3
5. Fumes – less than 0.5 mg/m^3
6. Mists – less than 0.5 mg/m^3

The PAPR units are not designed for areas that may come in contact with chemical mists or high humidity. The PAPR units use an Optifilter XL Filter Assembly HE that is only good for dusty environments. These units are ideal for the packaging enclosure, Yellowcake Dryers, Ore Storage, and Tails.

The PAPR's must have the battery fully charged prior to usage. The battery charge on each unit will last approximately eight continuous working hours. All maintenance and cleaning techniques utilized with the full-face respirators will be used for the PAPR units.

2.5.2 Supplied Air Apparatus

SCBA versus supplied air respirators

Self-contained breathing apparatus will only be used for evacuation or emergency purposes.

Supplied air respirators will be the apparatus of choice when:

1. The length of the work exceeds 20 minutes
2. There is adequate time to hook up hoses and filter boards

If at any time the atmosphere contains materials that might be corrosive to the employee or respiratory device, the area will be evacuated. The area must be ventilated until the corrosive materials fall to a safe level before work may resume.

2.6 Maintaining Breathing Air Quality

The quality of air delivered to all supplied-air respirators shall meet the requirements for Grade D air for breathing air systems as defined in CGA G-7.1-1997, as cited in Regulatory Guide 8.15 under 6.5.2 "Air Quality Requirements". The ANSI/CGA G.7-1 1989 specifies the contents of Grade D breathing air as: oxygen (volume/volume) of 19.5 to 23.5%; hydrocarbon (condensed) of 5 mg/m^3 of air or less; carbon monoxide of 10 ppm or less; carbon dioxide of 1,000 ppm or less; and the lack of a noticeable odor.

2.7 Inventory and Control of Respiratory Protection Equipment

Storage cabinets that will be used for routine respirator issuance will be located in the respirator cleaning facility. Only persons authorized to use respirators are to access the storage cabinets.

When an employee needs a clean respirator, he or she will obtain one from the storage location where clean respirators are packaged and kept. After obtaining a clean respirator, the employee will enter the pertinent information on the log sheet that is kept in the cabinet with the clean respirators.

When a used respirator is exchanged for a clean unit, the dirty respirator will be placed in the receptacle provided for such use.

Employees who routinely wear a respirator for more than four hours each day or work in areas of higher exposure potential (i.e., yellowcake packaging or precipitation), will be required to exchange respirators daily.

Employees that need to be issued a PAPR unit will need to see the RSO or his designee to be checked out on the proper usage of the unit. All PAPR's are inventoried and only key operators or RWP individuals will be issued one of these units.

Those employees who do not use respirators routinely will exchange them as they become ineffective in eliminating the hazardous contaminant. This determination is made by the employee by physical inspection of the respirator, by impaired breathing, (i.e. by plugging of a cartridge) or by the detection of irritant smoke or other conditions which may indicate a defective device.

2.8 Storage of Respiratory Protection Equipment

Respirators shall be stored in a manner sufficient to protect the device against dust, sunlight, extreme cold, excessive moisture, or damaging chemicals.

The cleaned respirators will be stored in cabinets in the respirator cleaning facility outside the safety department. The respirators will be stored in single layers with the facepieces and exhalation valves in a more or less normal position to prevent the rubber or plastic from cracking.

When respirators are not being used, they must be stored in the plastic bags in which they were issued. Dirty respirators will be placed in receptacles located in the mill central control room and at the maintenance shop. They will be gathered from these locations for cleaning and repairs.

The frequency that a dirty respirator must be exchanged for a clean one will be determined by the amount of time it is used. If the employee's use is greater than four hours per day, the exchange will be made daily. Occasional use will require a weekly exchange. Infrequent use will require monthly exchanges.

The cabinets containing emergency respirators will be located in areas that are readily accessible and in areas in which a hazard may arise. Emergency cabinets are located on the north side of the mill building outside of the SAG Mill doors, outside the SX on the north wall, on the south end of SX on the fire cabinet and at the fire hose station at the front gate. All employees should be made aware of these locations.

The cabinets will not be locked, but they will have seals attached to the hasps. The seals will prevent employees from using the respirators for routine use, but will allow emergency access. During emergencies, the seal will be broken and a respirator may be selected in a matter of seconds.

2.9 Maintenance, Repair, Testing, and Quality Assurance of Respiratory Protection Equipment

Respirators and component parts shall be maintained and repaired only by persons specifically trained to perform this work. Repairs and maintenance shall be performed in accordance with the procedures detailed below.

2.9.1 Maintenance, Cleaning, Repair, and Testing

Each used respirator must be disassembled before cleaning; the cartridges must be removed and discarded and any hoses or regulators must be removed and washed separately. Some of the units have elastic head straps; these should also be removed and washed separately.

The respirators will be cleaned and rinsed in a commercially available dishwasher. The radiation and safety staff will perform cleaning and washing of respirators. The respirators will be washed and then aired dried.

Each reassembled respirator must be inspected for radiation contamination before it is used. An instrument survey or a swipe test may be conducted to determine if any item is contaminated. The equipment check must indicate levels of less than 100 dpm/100 cm^2 of alpha radiation or 1,000 dpm/100 cm^2 of beta-gamma radiation to be serviceable. If repeated washings do not decrease contamination to acceptable levels, that item must be disposed of.

Respirators shall be inspected in accordance with NRC Regulatory Guide 8.15, Revision 1, October 1999. The following conditions should be checked during any type of inspection:

Air Purifying Respirators

Routinely used air purifying respirators should be checked as follows before and after each use.

A. Examine the facepiece for:

    1. Excessive dirt
    2. Cracks, tears, holes, or distortion from improper storage
    3. Inflexibility (stretch and massage to restore flexibility)
    4. Cracked or badly scratched lenses in full facepieces
    5. Incorrectly mounted full facepiece lens or broken, or missing mounting clips
    6. Cracked or broken air purifying element holder(s), badly worked threads, or missing gasket(s), if required

B. Examine the head straps or head harness for:

    1. Breaks
    2. Loss of elasticity
    3. Broken or malfunctioning buckles and attachments
    4. Full facepieces only – excessively worn serrations on the head harness which might permit slippage

C. Examine the exhalation valve for the following after removing its cover:

    1. Foreign material such as detergent residue, dust particles, or human hair under the valve seat
    2. Cracks, tears, or distortion in the valve material
    3. Improper insertion of the valve body in the facepiece

4. Cracks, breaks, or chips in the valve body, particularly in the sealing surface
5. Missing or defective valve cover
6. Improper installation of the valve in the valve body

D. Examine the air purifying elements for:

1. Incorrect installation, loose connections, missing or warn gaskets, or cross-threading in holder
2. Cracks or dents in outside case of filter, cartridge, or canister

E. If the device has a corrugated breathing tube, examine it for:

1. Broken or missing end connectors
2. Missing or loose hose clamps
3. Deterioration (determined by stretching the tube and looking for cracks)

F. Examine the harness of a front or back mounted gas mask for:

1. Damage or wear to the canister holder which may prevent its being held securely in place
2. Broken harness straps or fastenings

G. Blower mechanism on the PAPR units only:

1. Damage to the outer casing of the blower unit will result in the replacement of the blower.
2. Missing or broken pins that connect the blower to the battery pack will result in replacing of damaged pieces.

Supplied Air Respirators

The following shall be checked:

A. If the device has a tight fitting facepiece, use the procedures outlined above for air purifying respirators.

B. Examine the air supply for:

1. Integrity and good condition of air supply lines and hoses including attachments and end fittings

2. Correct operation and condition of all regulators, valves, or other air flow regulators

2.9.2 Quality Assurance

To prevent the use of faulty or defective respiratory equipment, the following steps will be taken:

A. New Equipment

All new equipment will be thoroughly inspected before it is put into service. Only MSHA/NIOSH approved equipment will be used. Parts used for repairs will be purchased only from the manufacturer of the unit being repaired or their agents.

B. Cleaning and Repairs

All respiratory devices will be inspected before and after cleaning and before and after repairs are made. The inspection procedures that are to be used are listed above under Section 2.9.1.

Any replacement items that will be used for repairs will be inspected prior to assembly.

C. Periodic Checks of Items in Storage

At lease once during each quarter, all of the respirators that are in storage will be checked for serviceability and to make sure that they will be ready for immediate use.

2.10 Recordkeeping

Inspections of all respiratory devices will be conducted in accordance with the provisions contained in NRC Reg. Guide 8.15 and section 2.9.1 above, and under no circumstances shall a device that is known to be defective be used.

Freshly cleaned and inspected respirators will be placed in plastic bags and sealed.

The individual who serviced the respirator shall write the date on each bag and initial it to indicate the work has been done properly.

Respirators used for emergency use are inspected, and the inspection recorded, once per month.

2.11 Limitations on Periods of Respirator Use and Relief from Respirator Use

As noted above under Section 1.2, the NRC has noted that the use of respiratory protection devices in the workplace can impose physiological and psychological stresses on workers, obstruct their vision, hinder their movements, and make effective communications difficult. In consideration of this, a respirator wearer shall be permitted to leave the work area for any respirator-related cause. Reasons, which may cause a respirator wearer to leave a work area, include, but are not limited to, the following:

1. Failure of the respirator to provide adequate protection.

2. Malfunction of the respirator.

3. Detection of leakage of air contaminant into the respirator.

4. Increased resistance to breathing.

5. Severe discomfort in wearing the respirator.

6. Illness of the wearer including: sensation of dizziness, nausea, weakness, fatigue, breathing difficulty, coughing, sneezing, vomiting, fever, or chills.

7. Claustrophia, anxiety, or other psychological factors that may affect the wearer.

2.12 Monitoring, Including Air Sampling and Bioassays

2.12.1 Evaluation of Respiratory Hazards

Before a respiratory protective device is used, the work area must be evaluated as to the type of hazards that may be encountered. The type of respiratory protection may be selected only after the hazard has been classified.

Most areas of the mill have been evaluated for hazards during routine work assignments. Signs will be posted in the different areas that will indicate the type of respiratory device to be used under normal conditions.

Equipment needed:

- Oxygen and Combustible Gas Detector
- MSA Orion or equivalent
- MSA Samplair Pump Kit (or similar) with the following detector tubes:

  Carbon Dioxide
  Carbon Monoxide
  Sulfur Dioxide
  Ammonia
  Hydrogen Sulfide
  Nitrous Oxide
  Halogen Gases (Chlorine)
  Acid fumes and mists
  Organic vapors

Many environmental designs were incorporated into the mill's construction to keep exposures to most hazards at a minimum. This environmental equipment is checked frequently to ensure that it is functioning properly.

To ensure the reliability of these controls, monthly gross alpha and radon daughters samples will be collected at numerous locations throughout the mill. Routine samples will also be collected in the vanadium precipitation and packaging areas and analyzed for airborne vanadium.

The routine samples have already identified some areas that require respirator use at all times during normal working conditions. These areas are inside the yellowcake dryer and packaging enclosures and the vanadium dryer area and the packaging area. Other areas that may require respirator use may include, but would not be limited to the sample bucking room, and the SAG mill.

Respirators need not be worn routinely during normal working conditions in other areas of the mill. At these locations, usage will be determined by the hazard level or at the employee's request. Occasionally, a condition may exist that the environmental controls cannot handle. At that time, the appropriate respirator must be used until the workplace atmosphere is returned to normal.

Infrequently, maintenance work will have to be performed in areas that are not normally sampled or areas that may have questionable air quality. Prior to anyone entering one of these areas, the environment must be evaluated to determine what hazards exist.

A Safe Work Permit is issued for all work tasks that are anticipated to present unidentified or unusual hazardous environmental conditions. A Radiation Work Permit is issued for work in unassessed areas or for nonrecurring tasks for which engineering controls are not in place or practical. The safety department will be responsible for the evaluation of the areas before work begins.

When the oxygen concentration is listed as potentially hazardous, a portable detector will be used to determine the exact oxygen-air mixture. NIOSH defines that air which contains less than 19.5% O_2 is an oxygen-deficient atmosphere, and attempting to breathe such air is considered to present a hazard that would be immediately dangerous to life and health. Any area having less than 19.5% O_2 will not be entered until or unless the O_2 concentration returns to and is maintained at a level above 19.5%. If an area is identified as having an oxygen-deficient atmosphere, the oxygen levels must be remedied by engineering controls prior to entry by personnel. The use of a SCBA will only be for emergency escape or emergency response purposes.

Other atmospheric hazards will be identified and quantified by using air sampling equipment, such as the MSA Samplair Pump (or similar device) with detector tubes for the specific contaminant in question. The instructions must be carefully read for every test as each type of detector tube is handled differently.

After exposure to the atmosphere, the tubes will indicate the presence and concentration of the chemical for which that tube is designed. Chemical cartridges are good only in atmospheres in which the chemical concentration is less than the limit set by the manufacturer and the oxygen concentration is equal to or greater than 19.5%. As noted above, the company policy is not to enter an area in which the O_2 level is below 19.5%, but to enter such areas only in emergency situations, such as to retrieve an injured worker, and then with the use of a SCBA.

There are many other hazards that are very obvious but are often overlooked. The following are examples:

- dust concentrations have an adverse affect on breathing and/or the comfort of the individual;
- some substances may cause irritation to the eyes, nose, throat, etc., but may not be chemically toxic.

These and other such conditions should always be considered in evaluating respiratory hazards. If there is any doubt about the conditions within the work area, a respiratory device should be used. Always be conservative.

2.11.2 Breathing Zone Air Samples

Breathing zone samples are collected to determine the air contamination concentration an individual may be exposed to during the execution of his job. The respiratory protection factor is used to calculate the individual's exposure during the work task duration. The application of a respiratory protection factor assigned to the particular respiratory device is used to reduce an individual's exposure to an air contaminant concentration as determined by breathing zone sampling. Routine breathing zone samples are collected by the use of a small belt-mounted pump attached to a hose that is, in turn, attached to the person's clothing close to the head (or breathing zone). The sample is collected for a period of time that would be representative of one eight hour workday. They are collected in such a manner that the material collected will be representative of that being inhaled by the individual wearing the sampler.

2.11.3 Bioassay Program

Evaluation of the effectiveness of the respiratory protection program will be accomplished by air sampling (described above in 2.12.1) and by the Mill Bioassay Program.

Those employees who are working in areas that require the use of respirators will submit a urine specimen for analysis on a biweekly basis. Employees who use respirators during maintenance may also be required to submit specimens after maintenance ceases. The samples will be collected from individuals who have performed maintenance tasks in atmospheres that are significantly elevated in contaminant concentration or they are working in such an area for an extended period of time.

The specimens will be analyzed for uranium content.

3.0 PROCEDURES FOR MEDICAL EVALUATIONS AND AUDITS

3.1 Performing and Documenting the Required Medical Evaluation

Medical qualification will be required of each employee that might be using a respirator in their normal work duties. This is necessary to evaluate the individual's limitations to wearing respirator devices. The medical evaluation will be performed by a licensed physician to determine that the individual user is medically fit to use the respiratory protection equipment. Medical evaluation will be performed prior to the initial fitting of a respirator use and either every 12 months thereafter or periodically at a frequency to be determined by the physician.

The medical screening process will include a medical history and will be sufficient (in the opinion of the physician) to identify any person who should not use respiratory devices for medical reasons, or who should be limited to the use of specific types of respirators. The physician will report any medical restrictions the employee has that would limit an individual's ability to use a respirator. Based on the physician's recommendations, any employee may be subject to additional or more frequent medical evaluation as deemed necessary by the physician.

3.2 Maintaining TEDE ALARA and Performing ALARA Evaluations of Respiratory Protection

As stated in the Policy Statement in 1.0, DUSA shall use, to the extent practical, procedures and engineering controls based on sound protection principles to achieve ALARA, and shall limit intakes by means of engineering controls or procedures, along with the use of respirators, consistent with maintaining the TEDE ALARA. When a specific ALARA evaluation is performed to justify the use or nonuse of respirators, the evaluation shall consider the elements detailed in Section 2.1 of Regulatory Guide 8.15.

4.0 PROCEDURES FOR RESPIRATOR APPLICATIONS

4.1 Routine Respirator Use

As noted above under 2.8, the cabinets for routine use respirators will be located in the respirator cleaning facility outside the safety department.

Respirators will not be issued to employees unless they are to be used. Only employees having current authorization to use respirators are to access the storage cabinets and obtain respirators.

When respirators are not being used, they must be stored in the plastic bags in which they were issued. Dirty respirators will be placed in receptacles located in the mill central control room and at the maintenance shop. They will be gathered from these locations for cleaning and repairs.

Donning the respirator must be performed in accordance with the training provided. At least one type of user seal check must be performed immediately prior to exposure to ensure that the respirator is properly seated on the face.

The frequency that a dirty respirator must be exchanged for a clean one will be determined by the amount of time it is used. If the employee's use is greater than four hours per day, the exchange will be made daily. Occasional use will require a weekly exchange. Infrequent use will require monthly exchanges.

4.2 Nonroutine Respirator Use

Nonroutine Respirator Use shall be defined as use of respirators in unassessed areas or for nonrecurring tasks for which engineering controls are not in place of practical.

4.3 Emergency Respirator Use

Emergency Respirator Use shall be used for recovery of an injured person from an area where air concentrations of radioactive material may be high, the breathing quality of the ambient air has not been assessed, or the area may become immediately dangerous to life or health (IDLH) because of the presence of nonradiological hazards.

Respirators designed for emergency use will be stored in areas that are readily accessible to all employees. Emergency cabinets are located on the north side of the mill building outside of the SAG Mill doors, outside the SX on the north wall, on the south end of SX on the fire cabinet, and at the fire hose station at the front gate.

WHITE MESA URANIUM MILL

GROUND WATER MONITORING QUALITY ASSURANCE PLAN (QAP)

STATE OF UTAH
GROUNDWATER DISCHARGE PERMIT No. UGW370004

Denison Mines (USA) Corp.
P.O. Box 809
Blanding, UT 84511

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1. INTRODUCTION

This Groundwater Monitoring Quality Assurance Plan (the "Plan") details and describes all sampling equipment, field methods, laboratory methods, qualifications of environmental analytical laboratories, data validation, and sampling and other corrective actions necessary to comply with UAC R317-6-6.3(I) and (L) at the White Mesa Uranium Mill (the "Mill"), as required under paragraph I.H.6 of State of Utah Groundwater Discharge Permit No. UGW370004 (the "GWDP") for the Mill. This Procedure incorporates the applicable provisions of the United States Environmental Protection Agency ("EPA") *RCRA Groundwater Monitoring Technical Enforcement Guidance Document* (OSWER-9950.1, September, 1986), as updated by EPA's *RCRA Ground-Water Monitoring: Draft Technical Guidance* (November 1992).

Activities in an integrated program to generate quality data can be classified as management (i.e., quality assurance or "QA") and as functional (i.e., quality control or "QC"). The objective of this Plan is to ensure that monitoring data are generated at the Mill that meet the requirements for precision, accuracy, completeness, representativeness and comparability required for management purposes and to comply with the reporting requirements established by applicable permits and regulations.

2. ORGANIZATION AND RESPONSIBILITIES

2.1. Functional Groups

This Plan specifies roles for a QA Manager as well as representatives of three different functional groups: the data users; the data generators, and the data reviewers/approvers. The roles and responsibilities of these representatives are described below.

2.2. Overall Responsibility For the QA/QC Program

The overall responsibility for ensuring that the QA/QC measures are properly employed is the responsibility of the QA Manager. The QA Manager is typically not directly involved in the data generation (i.e., sampling or analysis) activities. At the Mill, the QA Manager is the Mill's Radiation Safety Officer ("RSO") or other qualified person designated by Denison Mines (USA) Corp. ("DUSA") corporate management.

2.3. Data Requestors/Users

The generation of data that meets the objectives of this Plan is necessary for management to make informed decisions relating to the operation of the Mill facility, and to comply with the reporting requirements set out in the GWDP and other permits and applicable regulations. Accordingly, the data requesters/users (the "Data Users") are therefore DUSA's corporate management and regulatory authorities through the implementation of such permits and regulations. The data quality objectives ("DQOs") required for any groundwater sampling event, such as acceptable minimum detection limits, are specified in this Plan.

2.4. Data Generators

The individuals who carry out the sampling and analysis activities at the request of the Data Users are the data generators. For Mill activities, this involves sample collection, record keeping and QA/QC activities conducted by one or more sampling and quality control/data monitors (each a "Sampling and QC Monitor"). The Sampling and QC Monitors are radiation and environmental technicians or other qualified Mill personnel as designated by the QA Manager. The Sampling and QC Monitors perform all field sampling activities, collect all field QC samples and perform all data recording and chain of custody activities in accordance with this Plan. Data generation at the contract analytical laboratory (the "Analytical Laboratory") utilized by the Mill to analyze the environmental samples is performed by or under an employee or agent (the "Analysis Monitor") of the Analytical Laboratory, in accordance with specific requirements of the Analytical Laboratory's own QA/QC program.

The responsibilities of the data generators are as follows:

2.4.1. Sampling and QC Monitors

The Sampling and QC Monitors are responsible for field activities. These include:

a) Ensuring that samples are collected, preserved, and transported as specified in Plan;

b) Checking that all sample documentation (labels, field data worksheets, chain-of-custody records, packing lists) is correct and transmitting that information, along with the samples, to the Analytical Laboratory in accordance with this Plan;

c) Maintaining records of all samples, tracking those samples through subsequent processing and analysis, and, ultimately, where applicable, appropriately disposing of those samples at the conclusion of the program;

d) Preparing quality control samples for field sample collection during the sampling event;

e) Preparing QC and sample data for review by the QA Manager; and

f) Preparing QC and sample data for reporting and entry into a computer data base, where appropriate.

2.4.2. Analysis Monitor

The Analysis Monitor is responsible for QA/QC activities at the Analytical Laboratory. These include:

a) Training and qualifying personnel in specified Analytical Laboratory QC and analytical procedures, prior to receiving samples;

b) Receiving samples from the field and verifying that incoming samples correspond to the packing list or chain-of-custody sheet; and

c) Verifying that Analytical Laboratory QC and analytical procedures are being followed as specified in this Plan, by the Analytical Laboratory's QA/QC program, and in accordance with the requirements for maintaining National Environmental Laboratory Accreditation Program ("NELAP") and/or National Voluntary Laboratory Accreditation Program ("NAVLAP") certification.

2.4.3. Data Reviewers/Approvers

The QA Manager has broad authority to approve or disapprove project plans, specific analyses and final reports. In general, the QA Manager is responsible for reviewing and advising on all aspects of QA/QC, including:

a) Ensuring that the data produced by the data generators meet the specifications set out in this Plan;

b) Making on-site evaluations and submitting audit samples to assist in reviewing QA/QC procedures;

c) Determining (with the Sampling and QC Monitor and Analysis Monitor) appropriate sampling equipment and sample containers, in accordance with this Plan, to minimize contamination; and

d) Supervising all QA/QC measures to assure proper adherence to this Plan and determining corrective measures to be taken when deviations from this Plan occur.

The QA Manager may delegate certain of these responsibilities to one or more Sampling and QC Monitors or to other qualified Mill personnel.

2.5. Responsibilities Of Analytical Laboratory

Unless otherwise specified by DUSA corporate management, all environmental analysis of groundwater sampling required by the GWDP or by other applicable permits, will be performed by a contract Analytical Laboratory.

The Analytical Laboratory is responsible for providing sample analyses for groundwater monitoring and for reviewing all analytical data to assure that data are valid and of sufficient quality. The Analytical Laboratory is also responsible for data validation in accordance with the requirements for maintaining NELAP and/or NAVLAP certification.

In addition, to the extent not otherwise required to maintain NELAP and or NAVLAP certification, the Analytical Laboratory must adhere to U. S. EPA Guideline SW-846 and, to the extent consistent with NELAP and EPA practices, the applicable portions of NRC Regulatory Guide 4.14.

The Analytical Laboratory will be chosen by DUSA and must satisfy the following criteria: (1) experience in analyzing environmental samples with detail for precision and accuracy, (2) experience with similar matrix analyses, (3) operation of a stringent internal quality assurance program meeting NELAP and/or NAVLAP certification requirements and that satisfies the criteria set out in Section 8 below, (4) ability to satisfy radionuclide requirements as stipulated in the applicable portions of NRC Regulatory Guide 4.14, and (5) certified by the State of Utah for and capable of performing the analytical methods set out in Table 1. The analytical procedures used by the Analytical Laboratory will be in accordance with Utah Administrative Code R317-6-6.3L.

3. QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT OF DATA

The objective of this Plan is to ensure that monitoring data are generated at the Mill that meet the requirements for precision, accuracy, representativeness, completeness, and comparability required for management purposes and to comply with the reporting requirements established by applicable permits and regulations (the Field and Analytical QC samples described in Sections 4.3 and 8.1 below are designed to ensure that these criteria are satisfied). Data subject to QA/QC measures are deemed more reliable than data without any QA/QC measures.

3.1. Precision

Precision is defined as the measure of variability that exists between individual sample measurements of the same property under identical conditions. Precision is measured through the analysis of samples containing identical concentrations of the parameters of concern. For duplicate measurements, precision is expressed as the relative percent difference ("RPD") of a data pair and will be calculated by the following equation:

$$RPD = ((A-B)/(A+B)/2) \times 100$$

Where A (original) and B (duplicate) are the reported concentration for field duplicate samples analyses (or, in the case of analyses performed by the Analytical Laboratory, the percent recoveries for matrix spike and matrix spike duplicate samples) (EPA SW-846, Chapter 1, Section 5.0, page 28).

3.2. Accuracy

Accuracy is defined as a measure of bias in a system or as the degree of agreement between a measured value and an accepted or measured value. The accuracy of laboratory analyses is evaluated based on analyzing standards of known concentration both before and during analysis. Accuracy will be evaluated by the following equation (EPA SW-846, Chapter 1, Section 5.0, page 24):

$$\% \text{ Recovery} = (|A-B|/C) \times 100$$

Where:

A = the concentration of analyte in a sample
B = the concentration of analyte in an unspiked sample
C = the concentration of spike added

3.3. Representativeness

Representativeness is defined as the degree to which a set of data accurately represents the characteristics of a population, parameter, conditions at a sampling point, or an environmental condition. Representativeness is controlled by performing all sampling in compliance with this Plan.

3.4. Completeness

Completeness refers to the amount of valid data obtained from a measurement system in reference to the amount that could be obtained under ideal conditions. Laboratory completeness is a measure of the number of samples submitted for analysis compared to the number of analyses found acceptable after review of the analytical data. Completeness will be calculated by the following equation:

Completeness = (Number of valid data points/total number of measurements) x 100

Where the number of valid data points is the total number of valid analytical measurements based on the precision, accuracy, and holding time evaluation. Completeness is determined at the conclusion of the data validation.

Executive Secretary approval will be required for any completeness less than 100 percent.

3.5. Comparability

Comparability refers to the confidence with which one set of data can be compared to another measuring the same property. Data are comparable if sampling conditions, collection techniques, measurement procedures, methods, and reporting units are consistent for all samples within a sample set.

4. FIELD SAMPLING QUALITY ASSURANCE METHODOLOGY

4.1. Controlling Well Contamination

Well contamination from external surface factors, is controlled by installation of a cap over the surface casing and cementing the surface section of the drill hole. Wells have surface covers of mild steel with a lockable cap cover. Radiation Safety staff has access to the keys locking the wells.

Subsurface well stagnation, for pumped wells, is reduced by pumping two well casing volumes of water from the wells, to the extent practicable. This ensures, to the extent practicable, that the aquifer zone water is being drawn into the well and is a representative sample.

4.2. Controlling Depth to Groundwater Measurements

Monitoring of depth to groundwater is controlled by comparing historical field log data to actual measurement depth. This serves as a check of the field measurements.

4.3. Water Quality QC Samples

Quality assurance for ground water monitoring consists of the following QC samples:

4.3.1. VOC Trip Blanks

Trip blanks will be used to assess contamination introduced into the sample containers by volatile organic compounds ("VOCs") through diffusion during sample transport and storage. At a minimum (at least) one trip blank will be in each shipping container containing samples to be analyzed for VOCs. Trip blanks will be prepared by the Analytical Laboratory, transported to the sampling site, and then returned to the Analytical Laboratory for analysis along with the samples collected during the sampling event. The trip blank will be unopened throughout the transportation and storage processes and will accompany the technician while sampling in the field (DTG, Field and Laboratory Quality Assurance/Quality control, 7.8, pages 7-30, 7-31)

4.3.2. Equipment Rinsate Samples

Where a portable (non-dedicated) pump is used, a rinsate sample will be collected prior to using and after decontaminating the sampling equipment at the beginning of each sampling event and at the beginning of each day of the sampling event (TEGD) Field QA/QC Program, page 119). Therefore, if a portable (non-dedicated) pump and a non-disposable or non-dedicated bailer are used for purging and sampling there would be two equipment rinsate blank samples. In the case of equipment rinsate blank samples for a pump, the sample will be prepared by pumping de-ionized water into the sample containers. In the case of equipment rinsate blank samples for a non-disposable or non-dedicated bailer, the sample will be prepared by pouring de-ionized water over and through the bailer and into the sample containers. The equipment rinsate blank(s) will be analyzed for the contaminants listed in Table 2 of the GWDP.

4.3.3. Field Duplicates

One Duplicate set of samples submitted with each Batch (defined in Section 4.3.4) of samples (DTG, Field and Laboratory Quality Assurance/Quality Control, 7.8), taken from one of the wells being sampled and will be submitted to the Analytical Laboratory and analyzed for all contaminants listed in Table 2 of the GWDP (EPA SW-846, Chapter 1, Section 3.4.1).

4.3.4. Definition of "Batch"

For the purposes of this Plan, a Batch is defined as 20 or fewer samples (PA SW-846, Chapter 1, Section 5.0, page 23).

5. CALIBRATION

A fundamental requirement for collection of valid data is the proper calibration of all sample collection and analytical instruments. Sampling equipment shall be calibrated in accordance with manufacturers' recommendations, and Analytical Laboratory equipment shall be calibrated in accordance with Analytical Laboratory procedures.

5.1. Depth to Groundwater Measurements

Equipment used in depth to groundwater measurements will be checked prior to each use to ensure that the Water Sounding Device is functional.

5.2. Water Quality

The Field Parameter Meter will be calibrated prior to each sampling event and at the beginning of each day of the sampling event according to manufacturer's specifications (for example, by using two known pH solutions and one specific conductance standard.) Temperature will be checked comparatively by using a thermometer. Calibration results will be recorded on the Field Data Worksheet.

6. GROUND WATER SAMPLING AND MEASUREMENT OF FIELD PARAMETERS

6.1. Groundwater Head Monitoring

6.1.1. Location and Frequency of Groundwater Head Monitoring

Depth to groundwater shall be measured quarterly in the following wells and piezometers:

a) All Point of Compliance wells listed in paragraphs 6.2.1 a), b) and c) below;

b) Monitoring wells MW-20 and MW-22;

c) All piezometers (P-1, P-2, P-3, P-4 and P-5);
d) All chloroform contaminant investigation wells required to be monitored during the quarter under State of Utah Notice of Violation and Groundwater Corrective Action Order UDEQ Docket No. UGQ-20-01, not already included in paragraph (a). On November 17, 2006, such chloroform contaminant investigation wells were the following:

- MW-4
- TW4-A
- TW4-1
- TW4-2
- TW4-3
- TW4-4
- TW4-5
- TW4-6
- TW4-7
- TW4-8
- TW4-9
- TW4-10
- TW4-11
- TW4-12
- TW4-13
- TW4-14
- TW4-16
- TW4-18
- TW4-19
- TW4-20
- TW4-21

TW4-22; and

e) In any other wells or piezometers required by the Executive Secretary of the Utah Radiation Control Board, as indicated by the Mill's RSO.

6.1.2. Equipment Used For Groundwater Head Monitoring

Measurement of depth to groundwater is accomplished by using a Solinist – IT 300 or equivalent device (the "Water Sounding Device").

6.1.3. Field Sampling Procedure for Groundwater Head Monitoring

In the case of any well that is being sampled for groundwater quality, depth to groundwater is measured prior to sampling.

Depth to groundwater is measured from the top of the inner well casing, or for the piezometers, from the top of the casing, and is recorded on the Field Data Worksheet for Groundwater described in Section 7.1 (the "Field Data Worksheet"). Readings are taken by lowering the Water Sounding Device into the casing until the Device alarms, indicating that the water surface has been reached. The depth to groundwater is then determined by reference to the distance markings on the line attached to the Device. Data is recorded on the Field Data Worksheet as Depth to Water, to the nearest 0.01 of a foot.

6.2. Ground Water Compliance Monitoring

6.2.1. Location and Frequency of Groundwater Compliance Monitoring

Groundwater quality shall be measured in the following wells at the following frequencies:

a) Semi-annually in the following Point of Compliance wells: MW-1, MW-2, MW-3, MW-5, MW-12, MW-15, MW-17, MW-18 and MW-19;

b) Quarterly in the following Point of Compliance wells: MW-11, MW-14, MW-26 and MW-32; and

c) Quarterly in the following new Point of Compliance wells, until 8 quarters of background data are obtained: MW-23, MW-24, MW-25, MW-27, MW-28, MW-29, MW-30 and MW-31. Thereafter, these wells will be sampled on a quarterly or semi-annual basis, as required by the GWDP.

In addition, quarterly or monthly sampling may be required for certain parameters in certain wells for which accelerated monitoring is required under paragraph I.G.1 or I.G.2 of the GWDP. It is important to confirm with the Mill's RSO prior to conducting any monitoring well sampling, whether or not any parameters in any wells are subject to this accelerated monitoring.

6.2.2. Quarterly and Semi-Annual Sampling Required Under Paragraphs I.E.1.a) or I.E.1.b) of the GWDP

All quarterly and semi-annual samples collected under paragraphs 6.2.1 a), b) and c) above (paragraphs I.E.1.a) or I.E.1.b) of the GWDP) shall be analyzed for the following parameters:

a) Field parameters – depth to groundwater, pH, temperature, specific conductance, redox potential (Eh) and turbidity in the manner specified in paragraph 6.2.7 d) (v); and

b) Laboratory Parameters:

(i) All parameters specified in Table 2 of the GWDP; and

(ii) General inorganics – chloride, sulfate, carbonate, bicarbonate, sodium potassium, magnesium, calcium, and total anions and cations.

6.2.3. Quarterly or Monthly Sampling Required Under Paragraphs I.G.1 or I.G.2 of the GWDP

Any quarterly or monthly sampling required under paragraphs I.G.1. or I.G.2. of the GWDP shall be in the wells and for the specific parameters required by those paragraphs of the GWDP, as specified by the Mill's RSO.

6.2.4. Sampling Equipment for Groundwater Compliance Monitoring

Groundwater compliance monitoring is accomplished by using the following equipment, or the equivalent:

a) Bailer made of inert materials for purging (DTG, 7.3, page 7-10)

b) If a dedicated pump is installed in the well, use the dedicated pump, otherwise use a 1.8 inch (outside diameter) air-driven sampling pump, or equivalent;

c) 150 psi air compressor and ancillary equipment, or equivalent;

d) Field parameter measuring instrument, a Hydrolab Surveyor 4a with Mini Sonde 4a or comparable instrument (the "Field Parameter Meter"). The Field Parameter Meter measures the following parameters:

(i) Water temperature;
(ii) Specific conductivity;

(iii)Total Dissolved Solids (TDS);
(iv)Standard pH;
(v) Redox potential (Eh).

Field parameters are measured by using a flow cell system that enables the measurements to be taken on a real-time basis without exposing the water stream to the atmosphere;

e) Turbidity measuring instrument capable of determining if turbidity is ≤ 5 NTU;

f) 0.45 micron high capacity disposable inline filters;

g) Field preservation chemicals (as provided by the Analytical Laboratory);

h) Five gallon calibrated sample bucket;

i) Stopwatch;

j) Sealed sterile Polyethylene sample containers as provided by the Analytical Laboratory;

k) De-ionized water;

l) One new, unused, clean disposable single check valve bailer, or the equivalent, for each well to be sampled for VOCs; and

m) If any portable (non-dedicated) pumps are used, the following equipment, supplies and solutions, or the equivalent, necessary for decontamination procedures:

(i) 15 gallons of de-ionized water
(ii) 5 gallons of de-ionized water/nonphosphate detergent (such as Liqui-Nox);
(iii)5 gallons of de-ionized water/HNO3 solution (a mixture of approximately 4 and 1/2 gallons of de-ionized water and ½ gallon of HNO3);
(iv)Rubber gloves; and
(v) Sterile sample containers from the Mill laboratory.

6.2.5. Decontamination Procedure

If a portable (non-dedicated) pump is to be used, prior to each sampling event, at the beginning of each day during the sampling event, and between each sampling location (well), decontaminate the portable (non-dedicated) sampling pump prior to its use for purging or sampling using the following procedure:

a) wash the pump probe, probe sheath and other pump equipment that may come in contact with the sampling well inner casing or well water (the "Sampling Equipment") with a nonphosphate detergent;

b) rinse the Sampling Equipment with de-ionized water;

c) rinse the Sampling Equipment with dilute (.1N) hydrochloric or nitric acid; and

d) rinse the Sampling Equipment with de-ionized water.

The probe should then be placed in the decontaminated probe sheath, or otherwise protected from contamination until used for purging or sampling.

All water produced during decontamination will be containerized. Containerized water will be disposed of in Tailings Cell 1.

All sampling and purging equipment that has been decontaminated as per the foregoing procedure shall be covered with a plastic sheet to shield such equipment from dust or other materials that may contaminate the equipment when traveling to and between purging/sampling locations.

6.2.6. Pre-Purging/ Sampling Activities

a) If a portable (non-dedicated) pump is to be used, prior to commencing the event's sampling activities, check the pumping equipment to ensure that no air is leaking into the discharge line, in order to prevent aeration of the sample;

b) If a portable (non-dedicated) pump is to be used, prior to each sampling event and at the beginning of each day during the sampling event, decontaminate the sampling pump using the procedure set forth in Section 6.2.5;

c) If a portable (non-dedicated) pump is to be used, after completion of decontamination and prior to the beginning of each day of each sampling event, prepare one Equipment Rinsate Sample by following the procedure set forth in Section 4.3.2; and

d) Prior to leaving the Mill office, carry the Trip Blank samples, provided by the Analytical Laboratory, to the field.

6.2.7. Well Purging/Measurement of Field Parameters

a) Remove the well casing cap and measure and record depth to groundwater by following the procedures set out in paragraph 6.1.3 above;

b) Determine the casing volume (V) in gallons, where h is column height of the water in the well (calculated by subtracting the depth to groundwater in the well from the total depth of the well), $V = 0.653*h$, for a 4" casing volume and $V = .367*h$ for a 3" casing volume. Record the casing volume on the Field Data Worksheet;

c) If the RSO has advised the field technician that immiscible contaminants (i.e., LNAPLs or DNAPLs) are known to occur or could potentially occur in the subsurface at the location of the well, follow the additional procedures, to be provided by the RSO, prior to well purging;

d) Purging, Where Use of Pump is Effective (See paragraph 6.2.7 e)) below, where bailer is required)

If a portable (non-dedicated) pump is used, ensure that it has been decontaminated in accordance with Section 6.2.5 since its last use in a different well, lower the pump into the well, making sure to keep the pump at least five feet from the bottom of the well. Be sure never to drop the pump into the well, as this will cause degassing of the water upon impact. Once the pump is lowered into the well, or if the well has a dedicated pump, perform the following steps:

(i) Commence pumping;

(ii) Determine pump flow rate by using a stopwatch and a calibrated bucket by measuring the number of seconds required to fill to the one-gallon mark. Record this in the "pumping rate" section of the Field Data Worksheet;

(iii) Calculate the amount of time to evacuate two casing volumes;

(iv) Evacuate two casing volumes (if possible) by pumping for the length of time determined in paragraph (iii);

(v) Take measurements of field parameters (pH, specific conductance, temperature, redox potential and turbidity) during well purging, using the Field Parameter Meter and turbidity measuring instrument. These measurements will be recorded on the Field Data Worksheet. Purging is completed after two casing volumes have been removed and the field parameters pH, temperature, specific conductance, redox potential (Eh) and turbidity have stabilized to within 10% over at least two consecutive measurements. The groundwater in the well should recover to within at least 90% of the measured groundwater static surface before sampling. In addition, turbidity measurement in the water should be ≤ 5 NTU prior to sampling (DTG Well Development 6.7, page 6-48) unless the well is characterized by water that has a higher turbidity. A flow-cell needs to be used for field parameters. If the well is purged to dryness or is purged such that full recovery exceeds two hours, the well should be sampled as soon as a sufficient volume of groundwater is available to fill sample containers (DTG, Well Purging, 7.2.4, page 7-9);

(vi) If the well yields two casing volumes, the individual performing the sampling should immediately proceed to Section 6.2.8);

(vii) If the well cannot yield two casing volumes,

A. Evacuate the well to dryness and record the number of gallons evacuated on the Field Data Worksheet; and

B. Prior to sampling, measure and record depth to groundwater on the Field Data Worksheet following the procedures set out in paragraph 6.1.3 above;

e) Purging, Where Use of Pump is Not Effective

For wells where a pump is not effective for purging and/or sampling (wells with shallow water columns, i.e., where the water column is less than five feet above the bottom of the well casing or the well takes over two days to recover from purging), a disposable bailer, made of inert materials, may be used. If a bailer is used, the following procedure will be followed:

(i) Use the sound level instrument to determine the water column and figure the amount of water that must be evacuated;

(ii) Attach a 3" disposable bailer to a rope and reel;

(iii)Lower the bailer into the well and listen for contact with the solution. Once contact is made, allow the bailer to gradually sink in the well, being careful not to allow the bailer to come in contact with the bottom sediment;

(iv)After the bailer is full, retrieve the bailer and discharge the water from the bailer into 5 gallon buckets. By doing this, one can record the number of gallons purged;

(v) After the bailer is emptied, lower the bailer back into the well and gain another sample as before. This process will continue until the two casing volumes have been collected or until no more water can be retrieved.

When the process is finished for the well, the bailer will be disposed of; and

(vi) Take field measurements referred to in paragraph 6.2.7 (v) above from the water in the buckets;

6.2.8. Samples to be taken and order of taking samples

For each sampling event, unless sampling for a specific parameter under the accelerated monitoring requirements of paragraphs I.G.1 or I.G.2 of the GWDP as specified by the RSO, the following separate samples shall be taken in the following order from each monitoring well:

a) VOCs, 3 sample containers, 40 ml each, (a bailer is used);

b) Nutrients (ammonia, nitrate and nitrite), 1 sample container, 100 ml (a bailer is used);

c) Heavy metals, 1 sample container, 250 ml, filtered;

d) All other non-radiologics (fluoride, general inorganics, TDS, total cations and anions), 1 sample container, 250 ml, filtered; and

e) Gross alpha, 1 sample container, 1,000 ml, filtered.

The number of sample containers and the quantities taken shall be as set out above, unless otherwise dictated by the Analytical Laboratory, as specified by the RSO.

6.2.9. Field Duplicate Samples

a) One duplicate set of samples is required for each Batch of samples (see Section 4.3.4) for definition of Batch) (EPA SW-846, Chapter 1, Section 3.4.1). Field duplicate samples will be analyzed for the contaminants listed in Table 2 of the GWDP;

b) The duplicate samples should be as near to split samples as reasonably practicable, rather than merely taking a second set of samples from the same well after the field samples have been taken from that well. This can be accomplished by alternately partially filling the field sample containers and duplicate containers until both sets of containers are full.

6.2.10. VOCs and Nutrient Sampling

When sampling for VOCs and Nutrients, the following procedure shall be followed:

a) Obtain specifically identified sample containers for the type of sample to be taken, as provided by the Analytical Laboratory;

b) Add the quantity of specified preservative provided by the Analytical Laboratory to each sample container;

c) Sample the well using an unused, clean, disposable, single check valve bailer, or the equivalent;

d) Sample water should be transferred to sample containers in a controlled manner that will minimize sample agitation and aeration;

e) In the case of VOC samples, be sure that the sample containers are filled as full as possible with no airspace in the containers;

f) After each sample container is filled, rinse the lid of the container with water, and tighten lid onto container; and,

g) Discard the bailer.

6.2.11. Heavy Metals, All Other Non-Radiologics and Gross Alpha Sampling

When sampling for heavy metals, all other non-radiologics and for gross alpha, the following procedure shall be followed:

a) Obtain the specifically identified sample container for the type of sample to be taken, as provided by the Analytical Laboratory;

b) Add the quantity of specified preservative provided by the Analytical Laboratory to each sample container;

c) When using a pump to sample (wells without shallow water columns, i.e., where the water column is more than five feet above the bottom of the well casing or the well takes less than two days to recover from purging):

   (i) Place a new 0.45 micron filter on the sample tubing;

   (ii) Pump the sample through the filtration unit, and into the sample container at the same rate or a lesser pumping rate than was used to purge the well;

(iii)The pump should be operated in a continuous manner so that it does not produce samples that are aerated in the return tube or upon discharge;

(iv)Remove pump from the well; and

(v) If using a portable (non-dedicated pump), decontaminate pump as per Section 6.2.5. Do not place decontaminated pump on the ground or on other contaminated surfaces;

d) When using a bailer to sample (wells with shallow water columns, i.e., where the water column is less than five feet above the bottom of the well casing or the well takes over two days to recover from purging), then one of the following two procedures will be used:

(i) Filtering Water Samples at the Well Head

A. The sample water is collected by use of a 3 inch Teflon bailer, or the equivalent, that is capable of being attached to a hand-operated pressure pump, or the equivalent. Only disposable parts of the pressure pump may come into contact with the sample water;

B. Attach the pump to the disposable bailer and activate the pump in accordance with manufacturer's instructions, such that the sample water in the bailer is forced through a clean, un-used, disposable 0.45 micron filter into a clean previously unused sample container, in a manner such that only disposable parts of the pump mechanism come into contact with the sample water;

C. Sample water should be transferred to sample containers in a controlled manner that will minimize sample agitation and aeration;

D. Rinse lid of sample container with any remaining filtered water, after container is filled with filtered water, and tighten lid onto container;

E. Unless dedicated to a particular well, dispose of the bailer, filter and any parts of the pump mechanism that come into contact with the sample water; and

F. No rinsate sample is needed, because everything that comes into contact with the sample water is clean and unused prior to sampling, and disposed of after sampling the well;

(ii) Filtering Water Samples at the Mill Laboratory

A. A new, clean 1 gallon raw sample container must be used to capture waters needed to be filtered;

B. The sample water is collected by use of a 3 inch Teflon bailer, or the equivalent, and then discharged into the 1 gallon container;

C. After all the samples have been collected for the well and placed in the field sample container, which contains blue ice to keep the samples at the required temperature, the sampler will then proceed directly back to the Mill laboratory and perform the filtration on the sample;

D. Unless the bailer is dedicated to a particular well, it will be disposed of after completion of sampling in the well;

E. Upon arrival at the administration building, all other samples from the well (that do not require filtration) will be placed in the sample holding refrigerator in the locked sample storage room;

F. The sampler will then carry the sample that requires filtration in the cooler to the laboratory and set up the equipment to be used for filtration of the sample;

G. The equipment needed for this process consists of:
- 2000 ml glass filter flask
- 250 ml bell and glass frit for a micro-filtration 0.45 micron filter setup
- 0.45 micron filter paper

H. The glass filter flask and micro-filtration equipment will go through a cleaning and rinsate process. The processing will included the following:
- Rinsing of the equipment using DI water
- Rinsing the equipment with a mixture of DI water and HNO_3
- Rinsing the equipment with a mixture of DI water and Liqui-Nox soap
- Rinsing the equipment with DI water
- Finally the collection of the final process rinsate solutions are placed in the sample collection cooler and labeled as a filtration equipment rinsate sample;

I. The flask is attached to the vacuum system in the laboratory using Tygon Vacuum Tubing, or the equivalent;

J. The micro-filtration system is then inserted into the filter flask;

K. A 0.45 micron filter paper is then placed between the bell and the glass frit and clamped in place to prevent solution leaking out;

L. The water sample is then slowly added into the bell and the vacuum is turned on;

M. As the vacuum draws the water through the filter paper, additional solutions are added until the flask is full;

N. When the flask is full, the vacuum is turned off and the bell is unclamped from the frit. The Tygon tubing is then removed from the flask. The glass frit is then pulled out of the flask;

O. The filtered solutions are then poured into the various remaining sample collection bottles. Sample water should be transferred to sample containers in a controlled manner that will minimize sample agitation and aeration;

P. Rinse lid of sample container with any remaining filtered water, after container is filled with filtered water, and tighten lid onto container;

Q. If additional filtered water is required to complete the sample requirements, the sample bottles will be placed in the field cooler along with the raw sample and housed there while the filtration system is being hooked back up and the procedures set out in paragraphs I to P above are repeated until sufficient sample water has been filtered to fill up the required number of sample bottles;

R. After all samples from the well that require filtration have been filtered in accordance with the foregoing procedure and placed in the proper sample bottles, the remainder of the raw sample is then discharged into the laboratory sink, which runs to tails; and

S. The filtered samples are then transported to the locked sample storage room and placed in the sample holding refrigerator.

The time lapse between the actual sampling times to the completion of the filtration process is approximately ½ hour. Samples are always in the field sample container, except for when the raw sample is pulled from the cooler and poured in the bell on the filter flask.

6.2.12. Procedures to Follow After Sampling

a) In each case, once a sample is taken, identify and label the sample container with:

- Sample location/facility
- Date and time of sample
- Any preservation method utilized
- Sampler's initials
- Filtered or unfiltered
- Parameters requested to be analyzed

b) Place each sample in an ice-packed cooler, immediately upon taking the sample and labeling the sample container;

c) Replace the casing cap on the well. Lock the well;

d) Before leaving the sampling location, thoroughly document the sampling event on the Field Data Worksheet, by recording the items required in paragraph 7.1; and

e) Upon returning to the office, the samples must be stored in a refrigerator at approximately 4° C until transferred to the Analytical Laboratory. Samples will then be re-packed in the plastic ice-packed cooler and transported via these sealed plastic containers by postal contract services to the Analytical Laboratory.

7. SAMPLE DOCUMENTATION TRACKING AND RECORD KEEPING

7.1. Field Data Worksheets

Documentation of observations and data from sampling provide important information about the sampling process and provide a permanent record for sampling activities. All observations and field sampling data will be recorded in waterproof ink on the Field Data Worksheets, which will be maintained on file at the Mill.

The Field Data Worksheets will contain the following information:

- Name of the site/facility
- description of sampling event
- location of sample (well name)
- sampler's name(s) and signature(s)
- date(s) and time(s) of well purging and sample collection
- type of well purging equipment used (pump or bailer)
- previous well sampled during the sampling event
- well depth
- depth to groundwater before purging and sampling
- results of in-field measurements (pH, specific conductance, water temperature)
- redox potential (Eh) measurements
- turbidity measurements
- calculated well casing volume
- volume of water purged before sampling
- volume of water purged when field parameters are measured
- type and condition of well pump
- description of samples taken
- sample handling, including filtration and preservation
- volume of water collected for analysis
- types of sample containers and preservatives
- weather conditions and external air temperature
- name of certified Analytical Laboratory.

The Field Data Worksheets will also contain detailed notes describing any other significant factors during the sampling event, including, as applicable: condition of the well cap and lock; water appearance, color, odor, clarity; presence of debris or solids; any variances from this Procedure; and any other relevant feature or condition. An example of a form of Field Data Worksheet that incorporates this information is attached as Attachment 1.

7.2. Chain-Of-Custody and Analytical Request Record

A Chain-of-Custody and Analytical Request Record form (the "COC Form"), provided by the Analytical Laboratory, will accompany the samples being shipped to the Analytical Laboratory. An example of the Analytical Laboratory's Chain of Custody Form is attached as Attachment 2. If the Chain of Custody Form changes at any time, the Company shall provide a copy of the new or revised Chain of Custody Form to the Executive Secretary and substitute the new form for the old form in Attachment 2. Standard Chain-of-Custody protocol is initiated for each sample set. A COC Form is to be completed for each set of samples collected in a shipping container (cooler) and is to include the following:

- sampler's name
- company name
- date and time of collection
- sample type (e.g., water)
- sample location
- number of sample containers in the shipping container
- analyses requested
- signatures of persons involved in the chain of possession
- internal temperatures of the shipping container when opened at the laboratory
- remarks section to identify potential hazards or to relay other information to the Analytical Laboratory.

Chain-of-Custody reports will be placed inside a re-sealable bag and taped to the inside lid. Custody seals will be placed on the outside of each cooler.

The person shipping the samples to the Analytical Laboratory will sign the COC Form, document shipment method, and send the original and the second copy of the COC Form with the samples. Upon receipt of the samples, the person receiving the samples will sign the COC Form and return the second copy to the Mill's RSO.

Copies of the COC Forms and other relevant documentation will be retained at the Mill.

7.3. Record Keeping

The Field Data Worksheets are retained at the Mill.

Original Certificates of Analysis from the Analytical Laboratory, showing the laboratory analytical results for the water samples, are maintained at the Mill.

Once all the data for the quarter (all wells sampled during the quarter) is completed, key data from the Field Data Worksheets and from the Certificates of Analysis are typed into a computer file. Key data entered into the computer file will include well I.D., sample date, depth to groundwater, average field data, and all laboratory analytical data. These computer files are maintained at the Mill.

8. ANALYTICAL PROCEDURES AND QA/QC

Analytical Laboratory QA provides a means for establishing consistency in the performance of analytical procedures and assuring adherence to analytical methods utilized. Analytical Laboratory QC programs include traceability of measurements to independent reference materials and internal controls.

8.1. Analytical Quality Control

Analytical QA/QC will be governed by the QA/QC program of the Analytical Laboratory. In choosing and retaining the Analytical Laboratory, DUSA shall ensure that the Analytical Laboratory is certified by the State of Utah and by NELAP and/or NAVLAP, is capable of performing the analytical procedures specified in Section 8.2, and that the QA/QC program of the Analytical Laboratory includes the spikes, blanks and duplicates described in Section 8.1.2.

8.1.2. Spikes, Blanks and Duplicates

Analytical Laboratory QC samples will assess the accuracy and precision of the analyses. The following describes the type of QC samples that will be used by the Analytical Laboratory to assess the quality of the data. The following procedures shall be performed at least once with each Batch of samples:

a) <u>Duplicate Spike (Matrix Spike)</u>

A split/spiked field sample shall be analyzed with every analytical batch. Analytes stipulated by the analytical method, by applicable regulations, or by other specific requirements must be spiked into the sample. Selection of the sample to be spiked and/or split depends on the information required and the variety of conditions within a typical matrix. The duplicate spike (matrix spike) sample serves as a check evaluating the effect of the sample matrix on the accuracy of analysis.

b) <u>Blanks</u>

Each batch shall be accompanied by a reagent blank. The reagent blank shall be carried through the entire analytical procedure. Contamination detected in analysis of reagent blanks will be used to evaluate any Analytical Laboratory contamination of environmental samples which may have occurred.

c) Field Samples/Surrogate Compounds

Every blank, standard, and environmental sample (including matrix spike/matrix duplicate samples) shall be spiked with surrogate compounds prior to purging or extraction. Surrogates are organic compounds which are similar to analytes of interest in chemical composition, extraction, and chromatography, but which are not normally found in environmental samples. Surrogates shall be spiked into samples according to the appropriate organic analytical methods.

d) Check Sample

Each analytical batch shall contain a number of check samples. For each method, the Analytical Laboratory will normally analyze the following check samples or their equivalents: a method blank, a laboratory control spike, a matrix spike, and a matrix spike duplicate, or the equivalent, with relative percent difference reported.

8.2. Analytical Laboratory Procedures

The analytical procedures to be used by the Analytical Laboratory will be as specified in Table 1, or as otherwise authorized by the Executive Secretary.

Table 1

Contaminant	Analytical Methods to be Used	Reporting Limit[1]	Maximum Holding Times	Sample Preservation Requirements	Sample Temperature Requirements
Nutrients					
Ammonia (as N)	A4500-NH3 G	0.05 mg/L	28 days	H_2SO_4 to pH<2	4°C
Nitrate & Nitrite (as N)	E353.2	0.1 mg/L	28 days	H_2SO_4 to pH<2	4°C
Heavy Metals					
Arsenic	E200.8	5 µg/L	6 months	HNO_3 to pH<2	None
Beryllium	E200.8	0.50 µg/L	6 months	HNO_3 to pH<2	None
Cadmium	E200.8	0.50 µg/L	6 months	HNO_3 to pH<2	None
Chromium	E200.8	25 µg/L	6 months	HNO_3 to pH<2	None
Cobalt	E200.8	10 µg/L	6 months	HNO_3 to pH<2	None
Copper	E200.8	10 µg/L	6 months	HNO_3 to pH<2	None
Iron	E200.7	30 µg/L	6 months	HNO_3 to pH<2	None
Lead	E200.8	1.0 µg/L	6 months	HNO_3 to pH<2	None
Manganese	E200.8	10 µg/L	6 months	HNO_3 to pH<2	None
Mercury	E200.8	0.50 µg/L	28 days	HNO_3 to pH<2	None
Molybdenum	E200.8	10 µg/L	6 months	HNO_3 to pH<2	None
Nickel	E200.8	20 µg/L	6 months	HNO_3 to pH<2	None
Selenium	E200.8	5 µg/L	6 months	HNO_3 to pH<2	None
Silver	E200.8	10 µg/L	6 months	HNO_3 to pH<2	None
Thallium	E200.8	0.50 µg/L	6 months	HNO_3 to pH<2	None
Tin	E200.8	100 µg/L	6 months	HNO_3 to pH<2	None
Uranium	E200.8	0.30 µg/L	6 months	HNO_3 to pH<2	None
Vanadium	E200.8	15 µg/L	6 months	HNO_3 to pH<2	None
Zinc	E200.8	10 µg/L	6 months	HNO_3 to pH<2	None
Radiologics					
Gross Alpha	E900.1	1.0 pCi/L	6 months	HNO_3 to pH<2	None
Volatile Organic Compounds					
Acetone	SW8260B	20 µg/L	14 days	HCl to pH<2	4°C
Benzene	SW8260B	1.0 µg/L	14 days	HCl to pH<2	4°C
2-Butanone	SW8260B	20 µg/L	14 days	HCl to pH<2	4°C

Contaminant	Analytical Methods to be Used	Reporting Limit[1]	Maximum Holding Times	Sample Preservation Requirements	Sample Temperature Requirements
(MEK)					
Carbon Tetrachloride	SW8260B	1.0 µg/L	14 days	HCl to pH<2	4^oC
Chloroform	SW8260B	1.0 µg/L	14 days	HCl to pH<2	4^oC
Chloromethane	SW8260B	1.0 µg/L	14 days	HCl to pH<2	4^oC
Dichloromethane (Methylene Chloride)	SW8260B	1.0 µg/L	14 days	HCl to pH<2	4^oC
Naphthalene	SW8260B	1.0 µg/L	14 days	HCl to pH<2	4^oC
Tetrahydrofuran	SW8260B	1.0 µg/L	14 days	HCl to pH<2	4^oC
Toluene	SW8260B	1.0 µg/L	14 days	HCl to pH<2	4^oC
Xylenes (total)	SW8260B	1.0 µg/L	14 days	HCl to pH<2	4^oC
Others					
Field pH (S.U.)	A4500-H B	0.01 s.u.	Immediate	None	None
Fluoride	A4500-F C	0.1 mg/L	28 days	None	None
TDS	A2540 C	10 mg/L	28 days	None	4^oC
General Inorganics					
Chloride	A4500-Cl B	1 mg/L	28 days	None	None
Sulfate	A4500-SO4 E	1 mg/L	28 days	None	4^oC
Carbonate as CO3	A2320 B	1 mg/L	14 days	None	4^oC
Bicarbonate as HCO3	A2320 B	1 mg/L	14 days	None	4^oC
Sodium	E200.7	0.5 mg/L	6 months	HNO_3 to pH<2	None
Potassium	E200.7	0.5 mg/L	6 months	HNO_3 to pH<2	None
Magnesium	E200.7	0.5 mg/L	6 months	HNO_3 to pH<2	None
Calcium	E200.7	0.5 mg/L	6 months	HNO_3 to pH<2	None

1. The Analytical Laboratory will be required to meet the reporting limits ("RLs") in the foregoing Table, unless the RL must be increased due to sample matrix interference (i.e., due to dilution gain), in which case the increased RL will be used, or unless otherwise approved by the Executive Secretary.

9. INTERNAL QUALITY CONTROL CHECKS

Internal quality control checks are inherent in this Plan. The QA Manager will monitor the performance of the Sample and QC Monitors, and, to the extent practicable, the Analysis Monitor to ensure that they are following this Plan. In addition, either the QA Manager or a Sampling and QC Monitor will review and validate the analytical data generated by the Analytical Laboratory to ensure that it meets the DQOs established by this Plant. Finally, periodic system and performance audits will be performed, as detailed in Section 12 below.

9.1. Field QC Check Procedures

The QA Manager will perform the following QA/QC analysis of field procedures:

9.1.1. Review of Compliance With the Procedures Contained in this Plan

Observation of technician performance is monitored by the QA Manager on a periodic basis to ensure compliance with this Plan.

9.1.2. Analyte Completeness Review

The QA Manager will review all Analytical Results to confirm that the analytical results are complete (i.e., there is an analytical result for each required constituent in each well). Executive Secretary approval will be required for any completeness (prior to QA/QC analysis) less than 100 percent. Non-conformance will be defined as a failure to provide field parameter results and analytical results for each parameter and for each well required in Sections 6.2.2 and 6.2.3, for the sampling event, without prior Executive Secretary approval.

9.1.3. Blank Comparisons

Trip blanks, and equipment rinsate samples will be compared with original sample results. Non-conformance conditions will exist when contaminant levels in the blank(s)/samples(s) are within an order of magnitude of the original sample result. (TEGD, Field QA/QC Program, page 119).

9.1.4. Duplicate Sample Comparisons

The following analyses will be performed on duplicate field samples:

a) <u>Relative Percent Difference.</u>

RPDs will be calculated in comparisons of duplicate and original field sample results. Non-conformance will exist when the RPD $\geq$20%, unless the measured activities are less than 5 times the required detection limit (Standard Methods, 1998) (EPA Contract

Laboratory Program National Functional Guidelines for Inorganic Data Review, February 1994, 9240.1-05-01, p. 25).

b) Radiologics Counting Error Term

The reported error term shall be no greater than 20% of the original sample concentration. Non-conformance exists when the error term is greater than 20% of the reported concentration.

c) Radiologics, Duplicate Samples

Comparability of results between the original and duplicate radiologic samples will be evaluated by determining compliance with the following formula:

$$|A\text{-}B| / (sa^2+sb^2)^{-2} < 2$$

Where:

A = the first duplicate measurement
B = the second duplicate measurement
sa^2 = the uncertainty of the first measurement squared
sb^2 = the uncertainty of the second measurement squared

Non-conformance exists when the foregoing equation is ≥ 2.

(EPA Manual for the Certification of Laboratories Analyzing Drinking Water, Criteria and Procedures Quality Assurance, January 2005, EPA 815-R-05-004, p. VI-9).

If the QA Managers review finds any situations of non-conformance, see Section 10.

9.2. Analytical Laboratory QA Reviews

Full validation will include recalculation of raw data for a minimum of one or more analytes for ten percent of the samples analyzed. The remaining 90% of all data will undergo a QC review which will include validating holding times and QC samples. Overall data assessment will be a part of the validation process as well.

The Analysis Monitor or data validation specialist will evaluate the quality of the data based on SW-846, the applicable portions of NRC guide 4.14 and on analytical methods used. The reviewer will check the following: (1) sample preparation information is correct and complete, (2) analysis information is correct and complete, (3) appropriate Analytical Laboratory procedures are followed, (4) analytical results are correct and complete, (5) QC samples are within established control limits, (6) blanks are within QC limits, (7) special sample preparation and analytical requirements have been met, and (8) documentation is complete.

The Analytical Laboratory will prepare and retain full QC and analytical documentation. The Analytical Laboratory will report the data as a group of one batch or less, along with the QA/QC data. The Analytical Laboratory will provide the following information: (1) cover sheet listing samples included in report with a narrative, (2) results of compounds identified and quantified, and (3) reporting limits for all analytes. Also to be included are the QA/QC analytical results.

9.3. QA Manager Review of Analytical Laboratory Results and Procedures.

The QA Manager shall perform the following QA reviews relating to Analytical Laboratory procedures:

a) Reporting Limit (RL) Comparisons

The QA Manager shall confirm that all reporting limits used by the Analytical Laboratory are in conformance with the reporting limits set out on Table 1. Non-conformance shall be defined as: 1) a reporting limit that violates these provisions, unless the reporting limit must be increased due to sample matrix interference (i.e., due to dilution gain); or 2) a reporting limit that exceeds the respective GWQS listed in Table 2 of the GWDP.

b) Laboratory Methods Review

The QA Manager shall confirm that the analytical methods used by the Analytical Laboratory are those specified in Table 1, unless otherwise approved by the Executive Secretary. Non-conformance shall be defined when the Analytical Laboratory uses analytical methods not listed in Table 1 and not otherwise approved by the Executive Secretary.

c) Holding Time Examination

The QA Manager will review the analytical reports to verify that the holding time for each contaminant was not exceeded. Non-conformance shall be defined when the holding time is exceeded.

d) Sample Temperature Examination

The QA Manager shall review the analytical reports to verify that the samples were received by the Analytical Laboratory at a temperature no greater than the approved temperature listed in Table 1. Non-conformance shall be defined when the sample temperature is exceeded.

9.4. Analytical Data

All QA/QC data and records required by the Analytical Laboratory's QA/QC program shall be retained by the Analytical Laboratory and shall be made available to DUSA as requested.

Analytical data submitted by the Analytical Laboratory should contain the date/time the sample was collected, the date/time the sample was received by the Analytical Laboratory, the date/time the sample was extracted (if applicable), and the date/time the sample was analyzed.

All out-of-compliance results will be logged by the Analysis Monitor with corrective actions described as well as the results of the corrective actions taken. All raw and reduced data will be stored according to the Analytical Laboratory's record keeping procedures and QA program. All Analytical Laboratory procedures and records will be available for on-site inspection at any time during the course of investigation.

If re-runs occur with increasing frequency, the Analysis Monitor and the Mill's QA Manager will be consulted to establish more appropriate analytical approaches for problem samples.

10. CORRECTIVE ACTION

10.1. When Corrective Action is Required

The Sampling and QC Monitors and Analytical Laboratory are responsible for following procedures in accordance with this Plan. Corrective action should be taken for any procedure deficiencies or deviations noted in this Plan. All deviations from field sampling procedures will be noted on the Field Data Worksheets or other applicable records. Any QA/QC problems that arise will be brought to the immediate attention of the QA Manager. Analytical Laboratory deviations will be recorded by the Analysis Monitor in a logbook as well.

When non-conformance is identified, DUSA shall:

a) When non-conformance occurs as specified in Sections 9.1.3, 9.1.4 or 9.3, the data shall be qualified to denote the problem. In addition, DUSA shall determine the root cause, and provide specific steps to resolve problems(s) in accordance with the procedure set forth in Section 10.2, to ensure completeness with all requirements of this Plan before the next sampling event;
b) When a sample is lost, sample container broken, or the sample or analyte was omitted, resample within 10 days of discovery and analyze again in compliance with all requirements of this Plan. The results for this sample(s) should be included in the same quarterly monitoring report with other samples collected for the same sampling event; and

c) For any other material deviation from this Plan, the procedure set forth in Section 10.2 shall be followed.

10.2. Procedure for Corrective Action

The need for corrective action may be identified by system or performance audits or by standard QA/QC procedures. The procedures to be followed if the need for a corrective action is identified, are as follows:

a) Identification and definition of the problem;

b) Assignment of responsibility for investigating the problem;

c) Investigation and determination of the cause of the problem;

d) Determination of a corrective action to eliminate the problem;

e) Assigning and accepting responsibility for implementing the corrective action;

f) Implementing the corrective action and evaluating its effectiveness; and

g) Verifying that the corrective action has eliminated the problem.

The QA Manager shall ensure that these steps are taken and that the problem which led to the corrective action has been resolved. Upon implementation of a corrective action, a memorandum documenting the corrective action will be placed in the applicable monitoring files and in Mill Central Files, or the corrective action will be documented in a Report prepared in accordance with Section 11.

11. REPORTING

As required under paragraph I.F.1 of the GWDP, the Mill will send a groundwater monitoring report to the Executive Secretary on a quarterly basis. The reports will be prepared by Mill personnel and approved by DUSA corporate management prior to submittal. The reports shall be submitted according to the following schedule:

Quarter	Period	Due Date
First	January – March	June 1
Second	April – June	September 1
Third	July – September	December 1
Fourth	October – December	March 1

The reports will include the following information:

- Description of monitor wells sampled
- Description of sampling methodology, equipment an decontamination procedures to the extent they differ from those described in this Plan
- A summary data table of historic groundwater levels for each monitor well and piezometer
- A summary data table showing the results of the sampling event, listing all wells and the analytical results for all constituents and identifying any constituents that are subject to accelerated monitoring in any particular wells pursuant to Part I.G.1 of the GWDP or are out of compliance in any particular wells pursuant to Part I.G.2 of the GWDP
- Copies of Field Data Worksheets
- Copies of Analytical Laboratory results
- Copies of Chain of Custody Forms
- Water table contour map
- Evaluation of groundwater levels, gradients and flow directions
- Quality assurance evaluation and data validation description (see Section 9 for further details)
- Corrective actions for QA/QC problems
- Recommendations and Conclusions.

In addition, an electronic copy of all analytical results will be transmitted to the Executive Secretary in comma separated values (CSV) format, or as otherwise advised by the Executive Secretary.

Further reporting may be required as a result of accelerated monitoring under paragraphs I.G.1 and I.G.2 of the GWDP. The frequency and content of these reports will be defined by DUSA corporate management working with the Executive Secretary.

12. SYSTEM AND PERFORMANCE AUDITS

12.1. QA Manager to Perform System Audits and Performance Audits

DUSA shall perform such system audits and performance audits as it considers necessary in order to ensure that data of known and defensible quality are produced during a sampling program. The frequency and timing of system and performance audits shall be as determined by DUSA.

12.2. System Audits

System audits are qualitative evaluations of all components of field and Analytical Laboratory QC measurement systems. They determine if the measurement systems are being used appropriately. System audits will review field and Analytical Laboratory operations, including sampling equipment, laboratory equipment, sampling procedures, and equipment calibrations, to evaluate the effectiveness of the QA program and to identify any weakness that may exist. The audits may be carried out before all systems are operational, during the program, or after the completion of the program. Such audits typically involve a comparison of the activities required under this Plan with those actually scheduled or performed. A special type of systems audit is the data management audit. This audit addresses only data collection and management activities.

12.3. Performance Audits

The performance audit is a quantitative evaluation of the measurement systems of a program. It requires testing the measurement systems with samples of known composition or behavior to evaluate precision and accuracy. With respect to performance audits of the analytical process, either blind performance evaluation samples will be submitted to the Analytical Laboratory for analysis, or the auditor will request that it provide results of the blind studies that the Analytical Laboratory must provide to its NELAP and/or NAVLAP accreditation agency on an annual basis. The performance audit is carried out without the knowledge of the analysts, to the extent practicable.

12.4. Follow-Up Actions

Response to the system audits and performance audits is required when deviations are found and corrective action is required. Where a corrective action is required, the steps set out in Section 10.2 will be followed.

12.5. Audit Records

Audit records for all audits conducted will be retained in Mill Central Files. These records will contain audit reports, written, records of completion for corrective actions, and any other documents associated with the audits supporting audit findings or corrective actions.

13. PREVENTIVE MAINTENANCE

Preventive maintenance concerns the proper maintenance and care of field and laboratory instruments. Preventive maintenance helps ensure that monitoring data generated will be of sufficient quality to meet QA objectives. Both field and laboratory instruments have a set maintenance schedule to ensure proper functioning of the instruments.

Field instruments will be maintained as per the manufacturer's specifications and established sampling practice. Field instruments will be checked and calibrated prior to use, in accordance with Section 5. Batteries will be charged and checked daily when these instruments are in use. All equipment out of service will be immediately replaced. Field instruments will be protected from adverse weather conditions during sampling activities. Instruments will be stored properly at the end of each working day. Calibration and maintenance problems encountered will be recorded in the Field Data Worksheets or logbook.

The Analytical Laboratory is responsible for the maintenance and calibration of its instruments in accordance with Analytical Laboratory procedures and as required in order to maintain its NELAP and/or NAVLAP certifications. Preventive maintenance will be performed on a scheduled basis to minimize downtime and the potential interruption of analytical work.

14. QUALITY ASSURANCE REPORTS TO MANAGEMENT

14.1. Ongoing QA/QC Reporting

The following reporting activities shall be undertaken on a regular basis:

a) The Sample and QC Monitors shall report to the QA Manager regularly regarding progress of the applicable sampling program. The Sample and QC Monitors will also brief the QA Manager on any QA/QC issues associated with such sampling activities.

b) The Analytical Laboratory shall maintain detailed procedures for laboratory record keeping. Each data set report submitted to the Mill's QA Manager or his staff will identify the analytical methods performed and all QA/QC measures not within the established control limits. Any QA/QC problems will be brought to the QA Manager's attention as soon as possible; and

c) After sampling has been completed and final analyses are completed and reviewed, a brief data evaluation summary report will be prepared by the Analytical Laboratory for review by the QA Manager, by a Sampling and QC Monitor or by such other qualified person as may be designated by the QA Manager. The report will be prepared in accordance with NELAP and/or NAVLAP requirements and will summarize the data validation efforts and provide an evaluation of the data quality.

14.2. Periodic Reporting to Management

The QA Manager shall present a report to DUSA's ALARA Committee at least once per calendar year on the performance of the measurement system and the data quality. These reports shall include:

a) Periodic assessment of measurement quality indicators, i.e., data accuracy, precision and completeness;

b) Results of any performance audits, including any corrective actions;

c) Results of any system audits, including any corrective actions; and

d) Significant QA problems and recommended solutions.

15. AMENDMENT

This Plan may be amended from time to time by DUSA only with the approval of the Executive Secretary.

16. REFERENCES

16.1. United States Environmental Protection Agency, November 2004, Test Methods for Evaluating Solid Waste, EPA SW-846.

16.2. United States Environmental Protection Agency, September, 1986, RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGD), Office of Solid Waste and Emergency Response, OSWER-9950.1.

16.3. United States Environmental Protection Agency, November 1992, RCRA Ground-water Monitoring Draft Technical Guidance (DTG), Office of Solid Waste.

16.4. Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998. American Public Health Association, American Water Works Association, Water Environment Federation. Washington, D.C. p. 1-7.

ATTACHMENT 1
WHITE MESA URANIUM MILL
FIELD DATA WORKSHEET FOR GROUND WATER

Description of Sampling Event:____

Location (well name)____________________ Sampler Name and initials____________________

Date and Time for Purging ______________and Sampling (if different)____________________

Well Purging Equip Used: __pump or __bailer Well Pump (if other than Bennet)___________

Sampling Event______________________ Prev. Well Sampled in Sampling Event_______

pH Buffer 7.0______________________ pH Buffer 4.0______________________

Specific Conductance_________uMHOS/cm Well Depth______________________

Depth to Water Before Purging____________ Casing Volume (V) 4" Well:__________(.653h)
3" Well:__________(.367h)

Conductance (avg)____________________ pH of Water (avg)____________________

Well Water Temp. (avg)_____________ Redox Potential (Eh)_____Turbidity _______

Weather Cond.__________________ Ext'l Amb. Temp.(prior to sampling event)__________

Time:__________ Gal. Purged___________ Time:__________ Gal. Purged_____________

Conductance________________________ Conductance________________________

pH________________________ pH________________________

Temperature________________________ Temperature________________________

Redox Potential (Eh)_________________ Redox Potential (Eh)_________________

Turbidity________________________ Turbidity________________________

Time:__________ Gal. Purged___________ Time:__________ Gal. Purged___________

Conductance________________________ Conductance________________________

pH________________________ pH________________________

Temperature________________________ Temperature________________________

Redox Potential (Eh)_________________ Redox Potential (Eh)_________________

Turbidity______________________________ Turbidity________________________________

Volume of Water Purged When Field Parameters are Measured___________________________

Pumping Rate Calculation

Flow Rate (Q), in gpm.
S/60 = =_________________________

Time to evacuate two casing volumes (2V)
T = 2V/Q = ________________________________

Number of casing volumes evacuated (if other than two)_____________________________

If well evacuated to dryness, number of gallons evacuated____________________________

Name of Certified Analytical Laboratory if Other Than Energy Labs____________________

Type of Sample	**Sample Taken (circle)**	**Sample Volume (indicate if other than as specified below)**	**Filtered (circle)**	**Preservative Added (circle)**
VOCs	Y N	3x40 ml	Y N	HCL Y N
Nutrients	Y N	100 ml	Y N	H_2SO_4 Y N
Heavy Metals	Y N	250 ml	Y N	HNO_3 Y N
All Other Non-Radiologics	Y N	250 ml	Y N	No Preservative Added
Gross Alpha	Y N	1,000 ml	Y N	H_2SO_4 Y N
Other (specify) ________________ ________________ ________________	Y N	Sample volume ____________	Y N	Y N If a preservative is used, Specify Type and Quantity of Preservative: ________________ ________________

Comments ____
____
____
____
____
____

ENERGY LABORATORIES

Chain of Custody and Analytical Request Record

Page ____ of ____

PLEASE PRINT, provide as much information as possible. Refer to corresponding notes on reverse side.

Company Name:	Project Name, PWS #, Permit #, Etc.:		
Report Mail Address:	Contact Name, Phone, Fax, E-mail:	Sampler Name if other than Contact:	
Invoice Address:	Invoice Contact & Phone #:	Purchase Order #:	ELI Quote #:

Report Required For: POTW/WWTP ☐ DW ☐ Other ____________

Special Report Formats - ELI must be notified prior to sample submittal for the following:

NELAC ☐ A2LA ☐ Level IV ☐

Other____________

EDD/EDT ☐ Format____________

Notify ELI prior to RUSH sample submittal for additional charges and scheduling

Comments:

Shipped by:

Cooler ID(s)

Receipt Temp ______ °C

Custody Seal Y N

Intact Y N

Signature Match Y N

SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX (Number of Containers; Sample Type: A W S V B O — Air Water Soils/Solids Vegetation Bioassay Other)	ANALYSIS REQUESTED									SEE ATTACHED	Normal Turnaround (TAT)	RUSH Turnaround (TAT)	Comments	Lab ID (LABORATORY USE ONLY)
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Custody Record MUST be Signed						
	Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
	Relinquished by (print):	Date/Time:	Signature:	Received by (print):	Date/Time:	Signature:
	Sample Disposal:	Return to client: ______	Lab Disposal: ______	LABORATORY USE ONLY Sample Type: ______	# of fractions ______	

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

Visit our web site at *www.energylab.com* for additional information, downloadable fee schedule, forms, & links.

ATTACHMENT 2

Chain of Custody Form

DENISON MINES (USA) CORP.

WHITE MESA URANIUM MILL

TRANSPORTATION ACCIDENT RESPONSE PLAN

For a

URANIUM CONCENTRATE SPILL

PLAN SUMMARY

TRANSPORTATION ACCIDENT RESPONSE PLAN FOR URANIUM CONCENTRATE

Driver or carrier instructions will be given to each driver of each transport leaving the plant site with a load of uranium concentrate. These instructions will consist of an explanation of the product, preliminary precautions at the accident site, whom to notify and what to do in case of fire.

In the event of a transportation-related accident, immediate containment of the product will be achieved by covering the spill area with a plastic sheeting or equivalent material to prevent wind and water erosion. If sheeting is not available, and depending on where the spill occurs, soil from the surrounding area may be used. Perimeter ditching will be used to contain the spill if it should occur in an area where runoff could result from precipitation.

All human and vehicular traffic through the spill area will be restricted. The area would be cordoned off if possible. All persons not participating in the accident response will be restricted to 50 feet from the accident site. Local law enforcement officers will be notified and may be asked to assist in controlling traffic and keeping unauthorized persons out of the spill area.

Covered containers and removal equipment, i.e., large plastic sheeting, radioactive signs, ropes, hoses, shovels, vacuums, axes, stakes, heavy equipment (front-end loaders, graders, etc.), will be available to clean up the yellowcake. If conditions warrant, water will be applied to the spilled yellowcake in a fine spray to assist in dust abatement.

Gloves, protective clothing, and any personal clothing contaminated during cleanup operations will be encased in plastic bags and kept in the plant area for decontamination or disposal.

Response team members will have a thorough knowledge in basic first aid and of the physical hazards in inhalation, ingestion, or absorption of radionuclides. Team members will adequately protect themselves.

The cleanup operation will involve removing small amounts of pavement, topsoil and vegetation in the immediate area of the accident. The material that will have to be removed from the affected area will be returned to the mill for reprocessing, if possible, or disposed of in a manner approved by the NRC or the Executive Secretary. Following cleanup of the affected area, an alpha survey will be conducted to insure that radioactivity is within the limits outlined in NRC Guidelines for Decontamination of Facilities and Equipment prior to release for unrestricted use, dated November, 1976. An investigation will be conducted by the Radiation Protection Department. Results and recommendations of the investigation and of the decontamination survey will be documented and maintained for at least five years.

The NRC will be notified promptly of any accident of this type.

EMERGENCY RESPONSE MANUAL FOR A URANIUM CONCENTRATE SPILL
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4-1 Emergency Response Plan Communication Directory

1.0 INTRODUCTION

1.1 Needs

The Nuclear Regulatory Commission requires that uranium producers implement an emergency response plan for containment 'and cleanup of a uranium concentrate spill. Although the DOT regulations place the responsibility for these activities on the carrier, the regulatory agencies have taken the position that the shipper has an obligation to assist because of his knowledge of the radioactive hazard of the concentrate.

1.2 Scope

Transportation accidents involving radioactive materials such as yellowcake consist of the following four phases:

a. Initial
During the first 15 to 30 minutes after the accident occurs emergency action is taken by local authorities (local or state police) to help the injured, evaluate the problem, and take action to prevent further contamination, i.e., rerouting traffic and crowd control.

b. Confinement
This phase is accomplished by the transport vehicle operator or local service units to complete isolation or cover the spilled material, make proper notification, and identify contaminated areas.

c. Cleanup
This action includes the removal of any radioactive material or contamination from the site and restoring it to original conditions. This action is the carrier's responsibility.

d. Cost Recovery
The cost of cleanup and liability for damage to life and property are borne by the carrier.

The Company's emergency response plan must address confinement and cleanup activities outlined above; the initial and "cost recover" phases are outside the scope of this manual.

1.3 Description of Company Shipments

The type of product shipped by each plant, the carrier responsible, the specific activity, and the total activity in a shipment are summarized below:

Plant	Carrier	Type of Concentrate	Approximate Activity Per Load (Ci)/UNat
White Mesa Mill	Truck Shipment	Calcined U_3O_8	10.16

The transportation routes for these shipments are presented in Addendum 2.

2.0 ORGANIZATION

The Executive Vice President - Operations is responsible for implementing this response plan. Among his duties are:

1. Notify the Mill Manager, who will subsequently notify the response team leaders, plant personnel, and consultants per procedures in Section 4.0.

2. Contact local authorities to ensure timely and clear communications with respect to incident details.

3. Notify and keep informed the President and COO

4. Direct press inquiries to the President and COO.

The other elements of the organization and their responsibilities are:

1. Mill Manager
   Designate an on-site responsible person as necessary. Coordinate the activities of the response team with those of the regulatory agencies.

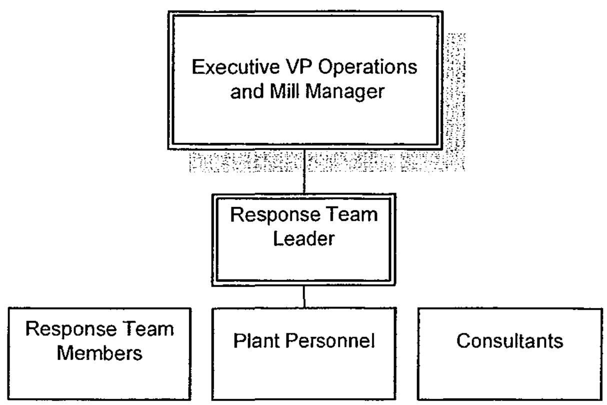
2. Response Team Leader
   Supervise the cleanup and decontamination of the spill area and coordinate site activities with local, state and federal authorities.

3. Response Team Member
   Carry out the activities involved in the cleanup and decontamination as outlined in Section 6.10.

4. Plant Personnel
   Provide assistance in stabilizing the spill, if possible, and in the cleanup and decontamination operations.

5. <u>Consultants</u>
   Recommend procedures for the cleanup and decontamination operations and/or provide personnel and equipment for these operations.

The chain of command is shown schematically below:



3.0 <u>TRAINING REQUIREMENTS</u>

Transport vehicle operators and emergency response personnel are given a basic indoctrination with respect to radioactivity, personal protection, identification and decontamination associated with natural uranium. Additionally, a field demonstration and exercise including all emergency response personnel is conducted on a periodic basis to assure preparedness. Addendum 1 is the detailed "Emergency Response Training Outline".

4.0 <u>NOTIFICATION OF COMPANY PERSONNEL, GOVERNMENT AGENCIES, AND INITIAL MEDIA CONTACTS</u>

The key to a successful emergency response plan is good communication to and within the Company. This section provides information to assure that key Company personnel and required Governmental Agencies are properly notified of the accident. Additionally, guidance regarding release of information to the general public is provided.

Figure 4.1 shows, schematically, the notifications and critical telephone numbers required in making the contacts. Table 4-1 lists the telephone numbers for the President and COO, Executive Vice President – Operations, Mill Manager, response team leaders and members, plant personnel, consultants, and DOE assistance teams.

Figure 4-1 shows network that will be utilized to contract people and organizations in the event of an emergency involving a uranium concentrate spill. The individuals and organizations are shown on Table 4-1. Supplementary information on these procedures are presented below.

4.1 Company or Private Carrier

The accident report form, Figure 4-2, is carried by the driver with his emergency instructions. (See Addendum 3) The form should be completed prior to calling the Executive Vice President – Operations or the Mill Manager. This document provides the information required for other notifications.

4.2 DOT Notification

The DOT reporting procedures require that an accident involving hazardous materials which results in any of the following must be reported:

1. A person is killed.
2. A person requires hospitalization.
3. An evacuation of the general public occurs lasting one or more hours.
4. One or more major transportation arteries or facilities are closed or shut down for one hour or more.
5. The operational flight pattern or routine of an aircraft is altered.
6. Fire, breakage, spillage, or suspected radioactive contamination occurs following an accident involving radioactive materials.
7. A situation exists in the judgment of the carrier that there is a continuing danger to life.
8. Release; i.e. rupture of drums in excess of 0.1 Ci U-Nat (approximately 1/2 drum) constitutes a CERCLA Reportable Quantity (RQ) under 40 CFR 302 and 49 CFR 171 and requires immediate notification to the National Response Center.

As soon as practical but no later than 12 hours after the occurrence of any incident described above, each person in physical possession of the hazardous material must provide notice by telephone to the National Response Center at 800.424.8802 (toll free) or 202.267.2675 (toll call). Note that the private carriers are responsible for reporting accidents involving their vehicles.

Hazardous Materials Incident Report on DOT Form F-5800.1 (Rev. 01/2004) must be filed within 30 days of discovery of the accident.

4.3 NRC and Executive Secretary Notification

Notification must be submitted to the NRC Operations Center at 301.816.5100 and to the Executive Secretary at 801.536.4250 (after hours to the UDEQ Duty Officer at 801.536.4123) within 24 hours of an incident..

4.4 State Notification

Notification to the State or States involved where the incident is involved should take place as soon as possible. Promptly recommend to authorities specific protective action to limit the danger to the public including evacuation and sheltering and the prophylactic use of potassium iodide (KI) as appropriate.

4.5 DOE Assistance Teams

These teams would only be alerted in situations such as widespread contamination in a metropolitan area.

4.6 Media

The responsible company representative at the accident scene will be required to make statements to the press providing general information regarding the accident and status of emergency activities. To simplify this matter during the initial stages of emergency response, a "canned" press release form, outlined below is used. State that additional comments on the status of the situation will be available later in the day. Other information released to the general public must have prior approval of the Director of Operations.

Press Release Form for Uranium Concentrate Accident

At approximately (time) ___________ on (date) _____________ an accident involving a truck carrying natural uranium concentrate from Denison Mines (USA) Corp.'s White Mesa Mill occurred near (location)_________________________________

There (were or were not) __________________ injuries to the public or the driver of the truck.
There (was or was not) ______________________ spillage of the concentrate from the truck.

The accident occurred at________________ near_________________________

If no spillage: State that your purpose is to make a routine check to insure that the shipment can continue without presenting a hazard.

If spillage has occurred: State that this group which has been trained to clean up spills of concentrate will act in cooperation with government authorities to clean up the spill as quickly as possible and that there is minimal risk to the public.

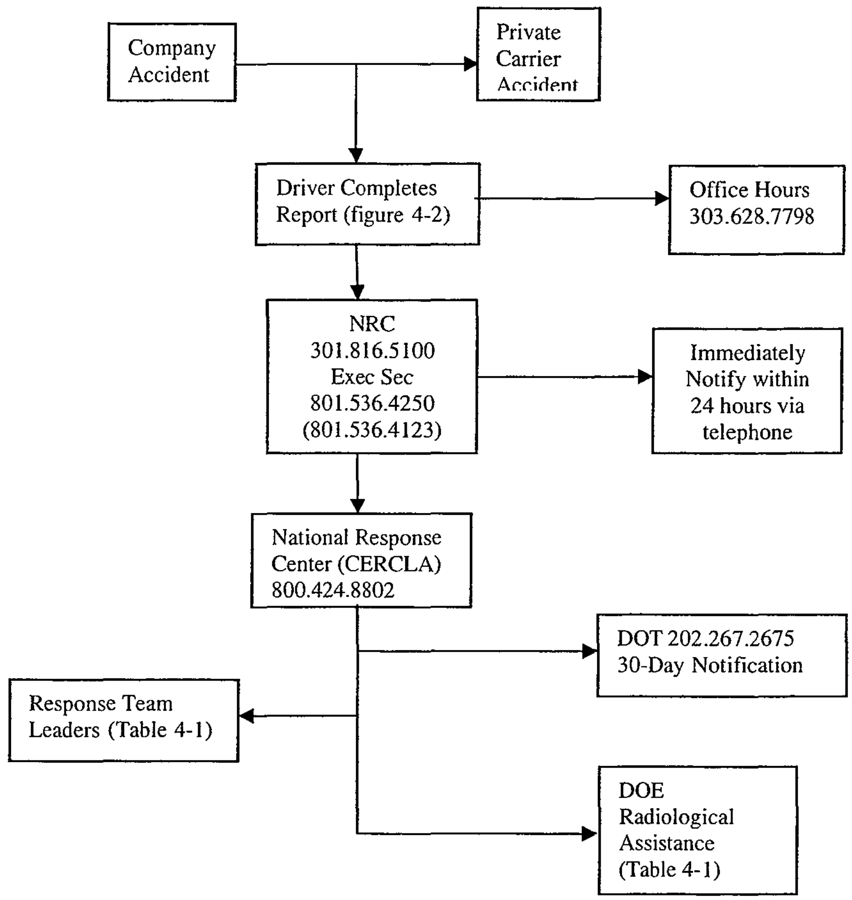


Figure 4-1: Notification Procedures for Transportation Accidents Involving Concentrate Spill

Table 4-1

Emergency Response Plan Communications Directory

Function	Name	Daytime Phone	Night Contact No.
President & COO	Ron F. Hochstein	604.806.3589	604.377.1167
Executive Vice President - Operations	Harold R. Roberts	303.628.7798	303.756.9050
Mill Manager	Richard E. Bartlett	435.678.2221	435.678.2495
Response Team Leaders	David Turk	435.678.2221	435.678.7802
	Michael Spillman	435.678.2221	435.678.2761
White Mesa Mill	David Turk	435.678.2221	435.678.7802
	Daniel Mower	435.678.2221	435.678.2654
	Ron Wallace	435.678.2221	
	Michael Spillman	435.678.2221	435.678.2761

DOE Radiological Team
Idaho Operations 208-526-0111 Ext. 1515 CO, WY, UT

Albuquerque	
Operations	(505) 845-4666
TX, NM, OK, KA, AK	(505) 845-4667
Chicago Operations	(708) 972-4800-Duty hours
ND, SD, NB, IA	(708) 972-5731- Off Days

ACCIDENT REPORT

1.0 Date ______________________ Time ________________________

2.0 Person Calling ______________________ Capacity ________________

From Telephone No. ________________ Who Else Notified ____________

3.0 Accident Location ____

____

____

____

4.0 Description of the Accident

Persons Injured ___________ Name(s) ____________________

Treatment ____

Accident Description _____________________________________

____

____

____

5.0 Was Any Company Material Spilled from the Vehicle(s)? ____________

____

6.0 What Action Has Been Taken to Contain the Material? ______________

____

____

____

7.0 Please report this information to one of the following:

Monday - Friday 8:00 a.m. to 4:30 p.m. MST
Harold R. Roberts, Executive Vice President – Operations, Denver, Colorado.
Telephone No. 303-628-7798 day time, work days
Night and weekend contact Telephone No. (303) 756-9050, Cell Phone (303) 902-2870

Rich E. Bartlett, Mill Manager, White Mesa Mill, Blanding, Utah
Telephone No. 435-678-2221 day time, work days
Night and weekend contact Telephone No. (435) 678-2495

Figure 4-2

5.0 EQUIPMENT

This section lists equipment for emergency response as well as its location and intended use.

5.1 Mobilization and General Support

Qty.	Description	Location	Use
2	Pickup	Radiation Department	Equip. & Personnel
As Needed	Pool Vehicles	Office	Personnel
*1	Portable AC Generator	Radiation Department	On-Site Electricity
*4	Exten. Cord/Light (50')	Radiation Department	AC Powered Equipment
**2	Flashlights	Radiation Department	Initial Set-Up
*1	Digital Camera	Radiation Department	Documentation
1	First Aid Kit	Radiation Department	First Aid

* Carried by Response Team
** Carried by Response Team and Plant Representative

5.2 Containment and Personnel Protection

5.2.1 Carried in transport vehicle for operator use:

Quantity	Description
1	Box w/Lid
1	1,000 Ft^2 Plastic Sheet
1	Army Shovel
24	Spikes
1	Urethane "Dike-Pak"
1	Roll, Aluminum Tape
1	Hammer
4	Respirators, Half Mask
2	Coveralls
2	Pairs Gloves

5.2.2 Carried by Response Team (Stored in Radiation Department):

Quantity	**Description**
1	Plastic Sheet, 20 Ft. X 1,000 Ft.
1,000 ft.	Barricade Tape
20	Metal Stakes
4	Radiation Warning Signs
1	Urethane "Dike-Pak"
1	Water Sprayer – Portable
1 Roll	Aluminum Tape
4 Rolls	Duct Tape
6	Respirators, Full Face, Type Combo Canister
24	Coveralls, Disposable Paper
24	Pair Gloves, Plastic Impregnated
6	Pair Gloves, Rubber
24	Pair Shoe Covers
24	Head Covers, Nun Hood

5.3 Radiation Monitoring/Measuring (Carried by Response Team and Stored in the White Mesa Radiation Department)

Quantity	**Description**	**Use**
1	Aluminum Suitcase containing the following:	
	Ludlum Instruments	
1	Count Rate Meter, Model 3 (or equivalent)	Gamma, Beta, Alpha Monitoring
1	G.M. Probe, Model 44-6 (or equivalent)	Beta Monitoring
1	Na I (tl) Scintillation Probe, Model 44-2 (or equivalent)	Gamma Monitoring
1	ZnS (Ag) Scintillation Probe, Model 43-5 (or equivalent)	Gamma Monitoring
2	Geiger Counters, Portable, W/Thin Wall G.M. Probe (or equivalent)	Beta Monitoring
1	Eberline PRM-7 (or equivalent)	Gamma Monitoring
1	Set - Check Sources, Eberline (Cs-137, Te-99, Th-230)	Instrument Operational Checks
2	Air Samplers, High-Vol. (50 Cubic Ft/Mm.), AC Powered 2/50 Each Filters	Site Air Sampling
20	Sample Bottles, Urine W/Labels	Urinalysis
50	Nose Swipes, Q-Tip, W/Envelopes	Detection of Radioactive Particle Inhalation

5.4 Decontamination Equipment (Carried by Response Team, Stored in White Mesa Office):

Quantity	Description
2	Shovels
1	Vacuum Cleaner, Pullman Model JB-75, WI Absolute Filter and Drum Adapter (or equivalent)
40	Drum Liner Bags
4	Metal Drums, 55-Gallon
2	Drum Closure Wrenches
1	Drum Cleaning Rags w/ 1 Gallon Acetone
50	D.O.T. Labels; Yellow II
1	Can Waterless Hand Cleaner
1	Wash Basins
2	Bars Soap
3	Washcloths
3	Towels

6.0 PROCEDURES FOR HANDLING THE ACCIDENT:

Vehicle accidents involving yellowcake can be categorized in three basic radiological severity types as follows:

1. No apparent release of concentrate from its drum containers (drums may or may not be outside the vehicle).

2. Concentrate is released from the drum but contained within the van.

3. Concentrate is spilled from its container outside the transport vehicle.

This characterization, as it applies to UPL shipments, consists of no apparent leakage from the tank trucks, or a spill of solution. Section 6.9 outlines the procedures for handling this type of accident.

Situations arising from each of these accident types can be highly variable depending on;

a. Proximity of waterways and populated areas;
b. Weather conditions at the accident site;
c. The condition of the vehicle operator after the accident; and
d. Availability of local emergency response personnel (police, firemen, etc.).

In view of these variables, this section is intended as a basic guide requiring certain judgmental decisions on a case-by-case basis.

6.1 Transport Vehicle Operator (Driver)

Filling out the accident form and notifying the Director of Operations. They will then follow the following emergency instructions carried in his kit.

a. If there is not apparent leakage (drums may or may not be thrown from the vehicle):

1. Caution people not to tamper with containers (use civil authorities to assist if necessary) and have them stay 10 to 15 feet away.

2. Containers lying on the road should be moved to the road edge (if assistance can be obtained), and

3. Assure local authorities there is no danger in handling closed containers.

6.2 Response Team Mobilization

The response team leader will access available accident information and assemble the required personnel at the White Mesa Mill Office. Required vehicle and facility keys are stored in the White Mesa Mill Office (labeled "Y. C. Response"). Mobilization will be accomplished in the following sequence:

a. Obtain radiation monitoring/measuring equipment (Section 5.3),

b. Proceed to the Radiation Department storage containers,

c. Load emergency equipment in the vehicle (Section 5.0),

d. Obtain pool vehicles as required to transport all personnel, and

e. Proceed to the accident site.

The response team leader will check to make certain that available air samplers (including filters), flashlights, and Geiger counters are dispatched with the plant representative.

6.3 Emergency Containment

Upon arrival at the accident site inform local authorities of your presence, purpose, and proposed activities. Gather information regarding current status of activities and assign one individual to record this information as well as names and positions of persons present at the site. If the spilled material is not stabilized, proceed with this activity in completing the procedures outlined in Section 6.1.

6.4 Protective Clothing

Protective clothing is normally required when spillage is evident. The need and use for these are established by the response team leader on a case-by-case basis. Refer to Addendum 1 for details. He is also responsible for controlling, maintaining, decontamination, testing and instructing in the proper use of protective clothing and respiratory protective equipment.

6.5 Radiation Measurements and Sampling

Response team members are trained in proper operation of portable radiation detectors as well as monitoring techniques (Addendum 1). Initial monitoring for spread of contamination is accomplished with portable, open window, Geiger counters. Additionally high volume air samples are located and activated 50 feet upwind and downwind from the spill.

6.6 Establish Radiation Exclusion Area

The boundaries of the yellowcake spill area, whether inside the transport vehicle or outside, are defined through a combination of visual observation (identifying yellow color) and radiation monitoring (GM detectors). The area is then roped off, leaving about ten feet between the tape barricade and the spill boundary, and "Caution Radioactive Materials" signs are installed on the barricade. The barricaded area is referred to as the "radiation exclusion" (RADEX) area and unauthorized equipment or personnel are not allowed to enter.

6.7 Control Point

A base of operations where needed equipment or data is stored and maintained is established outside the RADEX area (normally about ten feet away from the barricade). This base is referred to as the "control point". The control point is also used as a debriefing area and personnel contamination station.

6.8 Check Station Operation

Receptacles (plastic bags) for used protective clothing and equipment are fastened to the inside tape barricade, near the "control point," of the RADEX area. This location is used as the only area where ingress and egress to the RADEX area is allowed, and it is referred to as the "check station". One response team member is assigned to man the check station and his responsibilities are:

a. Assure only required people enter the area and they are properly equipped with protective clothing and respirators (Section 6.4).

b. When personnel exit the RADEX area, make certain protective clothing is properly removed and placed in receptacles with the shoe covers being the last items removed.

c. Monitor the person's exposed skin areas (hands, face, etc.) and clothing using the alpha scintillation detector probe.

d. If personal clothing monitoring reveals contamination, remove the involved clothing and monitor skin beneath it.

e. Collect nose swipes and monitor same.

f. If contamination is evident on nose swipes, label a urine sample bottle (name and date) and request a donation at the earliest convenience; follow up this sampling on a 24-hour basis.

g. If monitoring reveals skin contamination, direct the individual to the personnel decontamination station.

h. Equipment being removed from the RADEX area is monitored for alpha radiation at the check station and sealed in plastic bags or decontaminated if found contaminated.

6.9 Transportation Accidents Involving IX Eluate or Uranium Product Liquor

The shipment of a solution in a tank truck is less hazardous than shipping a U_3O_8 concentrate. The reasons are as follows:

1. The activity released to the environment by spillage of the contents of the tank truck is approximately 8e-3 Ci/U-Nat per 300 gallons of solution.

2. There is no hazard from airborne material.

3. If a transportation accident occurred which resulted in the loss of the tank content, the material released would not constitute a regulatory notification as defined in 40 CFR 302 or 49 CFR 171.

4. In the event of a fire, the solution would tend to extinguish it. The type of accident that must be considered is a rupture of the vessel wall, and the resultant need to contain the spillage.

   The driver carries with the truck an emergency kit which contains respirators, clothing, hammer, knife, tent pegs and 1,000 square feet of plastic sheeting. In the event of an accident he is instructed to do the following:

   a. Place the plastic sheeting under the leak.

   b. If the leak is small, try to repair it with the aluminum tape.

   c. If the leak cannot be contained by the above procedure, the foam pack will be used to build a dike over the plastic sheet which is dropped on the ground.

6.10 Decontamination

This section established the criteria and procedures for personnel, ground area and equipment decontamination. Prompt decontamination is essential to avoid possible internal exposure to radioactive material.

6.10.1 Criteria

Criteria presented is based on radioactive contamination resulting from an accident involving natural uranium (yellowcake) and is excerpted from the U.S. Nuclear Regulatory Commission (NRC) "guidelines" where appropriate.

1. Personnel and Clothing

   Personal clothing, skin and hair must not have any detectable alpha contamination as measured with the Ludlum Model 3 (or equivalent) incorporating the alpha scintillation detector probe.

2. Land Areas and Equipment

   The following instructions apply in all cases:

   a. A reasonable effort must be made to completely eliminate residual contamination.

b. 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 below prior to applying the covering. A reasonable effort must be made to minimize the contamination prior to use of any covering.

c. Prior to release of equipment or abandoning the accident site, a comprehensive survey will be made and recorded to establish that contamination is within the limits specified below:

Acceptable Surface Contamination

Fixed

Average	**Maximum**	**Removable**
5,000 dpm/100 cm^2	15,000 dpm/100 cm^2	1,000 dpm/100 cm^2
0.2 mRad/hr @ 1 cm	1.0 mRad/hr @ 1 cm	
Background mR/hr	Background mR/hr	

1. Alpha measurements will be made using the Ludlum alpha scintillation probe. Multiplying observed cpm by efficiency to obtain dpm and multiplying dpm by two to convert the probe area to 100 cm^2

2. Removable contamination will be determined from a dry swipe sample if the total surface area swiped is less than 100 cm^2 , pertinent levels must be reduced proportionally.

3. Measurements of "average" contamination should not include more than one square meter.

4. The maximum contamination level applies to an area of not more than 100 cm^2

5. The acceptable mRad/hr @ 1 will be measured with the Texas Nuclear Ionization Chamber (open window) (or equivalent).

6. Background mR/hr gamma is measured with the Ludlum Model 3 (or equivalent) incorporating the gamma scintillation detector probe and determined in an area at least 200 feet away from the spill boundary for decontamination comparison.

6.10.2 Personnel and Clothing

Following are general guides for field use, harsher methods may be used under direction of a Health' Physicist or Physician.

a. All contaminated clothing should be decontaminated by applying tape to the contaminated area in an attempt to transfer the material to the tape or by vacuuming. Contaminated clothing which cannot be decontaminated should be removed and placed in plastic bags for future laundering.

b. A thorough washing with soap and water is the best general method of decontaminating the face, hands, hair and body. The water should be used only one time.

c. A soft bristled brush or nail brush may be used; however, care should exercise not to irritate or abrade the skin. In addition, care must be taken to prevent decontamination solutions from entering the body openings or cuts.

d. Several washings and rinsings may be necessary to achieve an acceptable decontamination level. To prevent chapping, lanolin or hand cream may be applied to areas which have been washed or scrubbed several times.

e. In many cases, tenacious surface-absorbed contamination may be removed, from hands and/or forearms by promoting sweating in rubber gloves sealed at the cuff between washings.

f. When contamination of a person is detected, nose swipes and urine samples should be collected (Section 6.8).

Ground Areas

The bulk spilled yellowcake will be shoveled into a lined metal drum and residual material will be vacuumed. Always clean the area ahead of you making certain to stand in a contamination free spot while working. Dusting during decontamination will be controlled by use of the water spraying unit (do not use excessive water). If the spill is contained under a plastic cover, remove the cover in one-foot increments as decontamination is accomplished.

The initial decontamination can be accomplished visually by color (yellow) observation, followed by survey with a Geiger counter and finally by alpha monitoring and monitoring with the TN Model 2590 equipment (or equivalent).

Equipment

Field decontamination is limited in most instances to the removal of radioactive contamination that is loosely attached in grease, dirt or mud. Contamination that is impacted, ground-in or caught up in rust demands more abrasive measures and fairly sophisticated techniques often not available if the field. Basic field guidelines are:

a. A plastic sheet or other "drop cloth" should be spread on the floor or ground to catch any loose contaminant prior to commencement of decontamination operations.

b. Dry items may be vacuumed thoroughly incorporating scraping or wire brushing to loosen surface material.

c. Items may be wet wiped using rags, or they may be sloshed in or sprayed with water to remove loose contamination provided the items will not be damaged or impaired by moisture.

d. Acetone dampened rags may be used to remove more tenacious surface-bound contamination.

e. Failing the above, sandpaper or steel wool may be used to remove a thin layer of the surface material followed by vacuuming or damp wiping.

f. Rags used for cleaning should be infolded and changed often to avoid spreading the contamination. (Used rags are placed in plastic bags.)

g. If all above fails, and after thorough documentation of circumstances and contamination levels, the contaminant may be released from the accident site with prior government agency approval.

ADDENDUM 1

PERSONNEL TRAINING PROGRAM

FOR

URANIUM CONCENTRATE SPILL EMERGENCY RESPONSE

INTRODUCTION

This Appendix outlines personnel training requirements to ensure emergency preparedness in the event of a transportation accident involving natural uranium (yellowcake). The training consists of classroom discussion and demonstration as well as practical field exercise.

SESSION I - CLASSROOM DISCUSSION AND DEMONSTRATION

A. General Information

Natural uranium (yellowcake) decays through a complex scheme that results in emanation of alpha, beta, and gamma radiation. The amount of radiation associated with a specific volume of yellowcake is very low when compared to other natural radioactive materials such as radium; therefore, small amounts of spilled yellowcake are relatively difficult to measure with portable instrumentation. In practical application, the beta/gamma radiation associated with small quantities of yellowcake can be detected more readily than alpha or gamma only; although alpha is more abundant, it does not travel a significant distance in air, and it is easily shielded making field measurements very time consuming and impractical for an emergency situation. Therefore, beta-gamma monitoring with a portable Geiger Mueller (GM) detector is the primary survey instrument used.

B. Biological Hazards

The primary hazard associated with yellowcake is the effect of alpha radiation. Since alpha is a relatively large particle, it cannot penetrate the skin and must be inhaled or ingested to cause biological damage. Because of the low specific activity associated with yellowcake, it takes about 17 milligrams within the body to represent a maximum permissible body burden as compared to 0.0002 milligrams of radium-226 required to produce the same effect.

C. Protective Clothing and Respirators

This equipment is provided to prevent contamination of personal clothing and the body as well as to avoid transfer of contamination to locations outside the spill area. The protective clothing and respirators are discussed in this section (demonstration and practice included).

1. Coveralls
Coveralls are provided to prevent particulate contamination from coming in contact with the skin or clothing.

Coveralls are donned in the normal dressing manner directly over personal clothing. All openings (front, pockets, collar, and leg and sleeve cuffs) are sealed with tape before entering the spill area. When exiting the spill area, coveralls are removed as follows:

a. All tape is removed;

b. The front of the coveralls is pulled open, and;

c. Coveralls are removed by pulling them off the shoulders and off the trunk and legs by turning legs inside out as the garment is removed. Used coveralls are placed in a plastic bag.

2. <u>Shoe Covers</u>
These are used to prevent liquid or particulate contamination from coming in direct contact with the wearer's shoes and to avoid tracking contamination outside the spill area. They are pulled on over the wearer's shoes and removed by grasping the top edge and pulling downward which results in turning the shoe cover inside out. Used shoe covers are placed inside a plastic bag.

3. <u>Head Covers</u>
These are used to prevent contamination from coming in direct contact with the hair, ears, head and neck. The head cover is placed directly on the head underneath other head wear (hard hats, if required). Head covers are removed by opening the front snaps, grasping the top, and pulling off toward the back of the head. Used head covers are placed in a plastic bag.

4. <u>Gloves</u>
Gloves are used to prevent contamination of hands from radioactive particulates and to protect the hands from corrosive materials. When exiting the contaminated (spill) area or after handling contaminated material, the glove is removed by grasping it by the cuff and pulling downward off the hand; this results in turning the glove inside out. Used gloves are then placed inside a plastic bag.

5. <u>Respirators (Demonstration and Practice)</u>
Respirators (full) are provided to prevent inhalation of particulate material which may become air-borne during spill containment or decontamination operations. Prior to.use, the mask shall be checked as follows:

a. Cleanliness of mask facepiece; valves, and eyepiece is visually checked.

b. The head harness is checked to assure all straps and fasteners are functional.

c. The canister is examined to assure free flow of air and tightness of connections.

d. The integrity of the facepiece is visually checked by flexing the unit inside out and observing any cracks or holes.

Respirators are donned by placing the chin in first, then pulling the head harness or straps over the head, and tightening the straps.

To avoid contamination transfer when disrobing, protective clothing shall be removed in the following sequence:

1. Remove glasses;

2. Remove head cover;

3. Remove coveralls;

4. Remove respirator; and

5. Remove shoe covers.

Disrobing will take place at the "RADEX" area "control point".

D. Radiation Monitoring and Sampling

Various portable radiation detection instruments are radiation sampling devices are provided to assist in identifying the boundaries of the spill area, determining radiation exposure rates, documenting contamination levels, and determining if internal personnel exposures have resulted. Since yellowcake has a very distinctive color, response team members should incorporate visual observation with radiation monitoring and sampling to asses contamination extent. This section discusses types of equipment provided and application of each (demonstration and practice included).

1. Beta-Gamma Monitoring

The Geiger Counters and Ludlum Model 3 with the Model 44-6 thin wall GM tube detector are used for beta monitoring (or equivalent). These instruments measure most of the beta and some (about ten percent) gamma radiation. This is the primary tool used for monitoring ground areas and equipment associated with a spill. Basic steps are as follows:

a. Turn the instrument on and check the batteries.

b. Turn the scale selector switch to the appropriate scale.

c. Move the detector shield to the open window position.

d. Place the U-238 check source on a flat, clean surface.

e. Grasp the detector probe with fingers in a manner assuring not to cover the open window.

f. Place the detector probe open window grill in contact with the check source.

g. The meter should indicate cpm equal to about one-fifth (20 percent) of the total dpm of the source. (Since measurements are used for relative comparison with background radiation, and not for accurate exposure or analytical measurements, the object of this check is to ascertain instrument response to a radiation source.)

h. Monitor desired area by moving the open window detector slowly (about one foot per second) over the area about one-inch above the surface.

2. <u>Gamma Monitoring</u>
The Ludlum Model 3 with the Model 44-2 gamma scintillation detector probe (or equivalent) is used for these measurements. Gamma measurements are not normally required in conjunction with a yellowcake spill; however, they can be used to supplement monitoring normally accomplished with a Geiger counter in the event Geiger counters are not available or operable. The instrument operational checks and subsequent monitoring are performed in the same manner as those discussed for beta, except the Cs-137 check source is used, and the detector probe does not have an open window (the lower one inch of the probe is the sensitive portion).

3. <u>Alpha Monitoring</u>
The Ludlum Model 3 with the Model 43-5 alpha scintillation probe (or equivalent) is used to make alpha measurements as follows:

a. Turn the instrument on and push the "BAT" button to assure batteries are in good condition.

b. Place the Th-230 check source on a flat, clean surface.

c. Grasp the detector probe in the palm of the hand extending thumb and fingers about 0.5 cm below the detector window (to avoid damaging the mylar when monitoring rough surfaces).

d. Turn the range selector switch to the appropriate position and center the detector probe over the check source.

e. The meter should indicate counts per minute (cpm) equal to about 20 percent of the total disintegrations per minute (dpm) of the source (the decimal equivalent of this percentage is called the "efficiency factor").

f. Counts per minute are converted to dpm through dividing them by the efficiency factor.

g. Move the detector probe to surface requiring monitoring and hold in one place until meter reaches its maximum deflection.

h. Since the detector probe covers about 50 cm^2, it is necessary to multiply measured dpm by 2 to obtain dpm/100 cm^2 for criteria comparison.

i. Continue process in (g) above until entire surface is monitored.

4. Swipe Samples

Surface swipes are used to identify the presence of loose or removable contamination on the areas or items of interest for comparison with "acceptable surface contamination levels". Swipes are spot checks for the presence or spread of contamination but they do not provide quantitative reproducible data which can be used to document contamination levels. Therefore, swipe samples and analysis results are treated more informally than direct instrument measurements obtained from the surface of concern.

The person collecting swipe samples must wear gloves. A surface area of approximately 100 cm^2 is wiped with a dry Whatman filter paper to collect any larger contaminated particles. The filter paper is dampened with acetone to wipe surfaces for collection of very fine particles. Swipes are monitored with the alpha scintillation detector and resulting data is converted to dpm/100 cm^2. After monitoring, the swipe is placed in an envelope (using tweezers to avoid scraping material off the swipe), the envelope is sealed with tape, and the sampling location and date of collection is recorded on the tape.

Nose swipes, consisting of "Q tips", are collected from all persons working in or otherwise exposed to the yellowcake spill. Collection is accomplished by extending the cotton tip into each nostril and gently swirling it. These swipes are monitored and handled in the same manner as other surface swipes.

5. Air Sampling

High-volume air samplers are used to monitor presence of airborne radioactivity. One unit is located about 50 feet upwind from the yellowcake spill and another is located about 50 feet downwind from the spill as follows:

a. Locate air sampler at least three feet above the ground in an area with no obstructions between the source (spill) and the sampler.

b. Connect extension cords between samplers and the portable generator.

c. Make certain filters are securely in place on the air sampler head.

d. Turn the air sampler on and record the date, start time, sampler flow rate, and location.

e. At the end of the sampling period (normally 24 hours), record the sampler flow rate, time of day and date, and secure the sampler.

   Remove the sample filter and place in a plastic Petri-dish using care to assure particles are not removed from the filter.

f. Mark the filter Petri-dish with pertinent data (d and e above) and commence another sampling period (c through g above).

E. Contamination Control

This section combines individual subjects covered in A, B, C, and D above in the practical manner they would be used in the field. Presentation will include questioning class members regarding actions for each subject as well as demonstration. Since the subjects in this section have previously been discussed in detail, a simple outline is used.

1. Radiation Exclusion (RADEX Area)
   a. Establish spill boundaries
      1) Visual
      2) Radiation monitoring
   b. Erect barricade
      1) Rope off
      2) Attach signs
         a) May not be required if spill is minor and easily guarded
   c. Install air samplers

2. Control Point
   a. Equipment storage
   b. Personnel decontamination station
      1) Wash basins
      2) Soap, etc.
   c. Personnel debriefing

3. Check Station

a. Access control
b. Radiation monitoring
    1) Personnel
        a) Beta-gama, alpha
        b) Nose swipes
        c) Urine samples

    2) Equipment
        a) Beta-gamma, alpha
        b) Swipes
        c. Protective clothing
            1) Disrobe at check station
                a) Place in receptacles

4. <u>Spill Containment</u>
    a. Diking
        1) Soil
        2) Use of "dike-pak"

    b. Trenching
        1) To avoid liquid passing into spill area

    c. Covering
        1) Plastic sheet
        2) "Dike-pakTM
        3) Soil

F. <u>Decontamination</u>

This section presents a simple outline to be presented in a question and answer type of discussion.

1. <u>Land Areas</u>
    a) Shoveling
    b) Vacuuming

2. <u>Personnel</u>
    a) Clothing
        1) Taping
        2) Vacuuming
        3) Removal
            a) Sealed in plastic bag
            b) Body
                1) Vacuuming
                2) Taping

- 3) Washing
- 4) Promoting sweating
- 5) Ear openings
  - a) Swabs
- 6) Eyes
  - a) Flush

3. <u>Equipment</u>
   - a) Vacuuming
     - 1) Scraping
     - 2) Chipping
   - b) Damp wipe
     - 1) Rags and acetone
     - 2) Water
   - c) Washing
     - 1) Detergent scrubbing
   - d) Sealing
     - 1) Only after reasonable decontamination efforts
       - a) Tape
       - b) Seal in plastic
       - c) Paint

SESSION II - FIELD EXERCISE

This portion of the training program will be conducted outdoors on Company-owned property. An accident involving yellowcake spillage inside the van and on the surrounding ground area will be simulated using a readily visible material (corn meal, flour, lime, etc.). A few radioactive sources (probably uranium ore) will be scattered within the spilled material to accommodate practical radiation monitoring experience. The sequence of events following a yellowcake transportation accident will be enacted by the driver and response team members as outlined in this Section. A least one person will act as a local authority to ask questions and provide assistance when requested.

A. Driver Responsibilities
  1. Emergency Information
    a. What is yellowcake and associated hazards.

  2. Emergency Containment
    b. Dike
    c. Rope off
    d. Cover (if appropriate)
    a. Access control

  3. Accident Notification
    a. Accident report form
    b. Notification by telephone

B. Response Team Responsibilities
  1. Mobilization
  2. Press Release
  3. Containment
    a. Assessment (visual)
    b. Rope barricade and signs
    c. Cover (if appropriate) or dike

  4. Contamination Control
    a. Radiation survey of ground area (document)
    b. Establish RADEX area
    c. Establish control point
      1) Personnel decontamination
    d. Establish check station
    e. Start-up air samplers (document)

  5. Decontamination (clean up entire spill)
    a. Ground area
      1) Shovel

2) Vacuum

b. Personnel
1) Clothing
2) Body
3) Nose swipes and urine sample (document)

c. Equipment
1) Vacuum
a) Scrape
2) Damp wipe
3) Wash
4) Scale

6. <u>Equipment and Personnel Release</u>
a. Final radiation surveys
1) Documentation

b. Final sampling
1) Documentation
a) Personnel
b) Air
c) Swipes

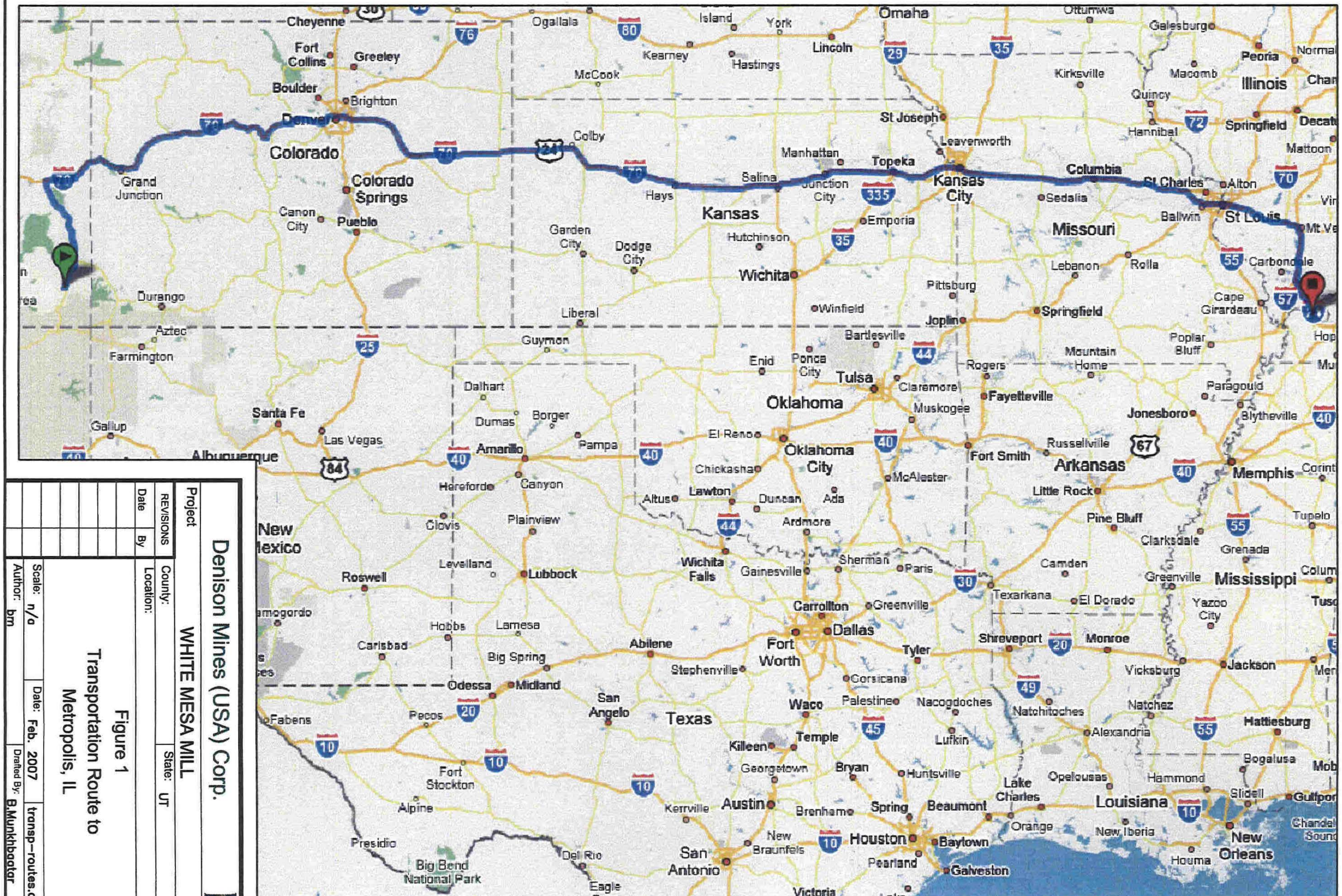
c. Authorization
1) Company representative
2) Government agency

7. Documentation and Reports
a. Accident Report Form
b. News release
c. Radiation surveys
d. Sampling data
e. D.O.T. Reports

ADDENDUM 2

TRANSPORTATION ROUTES

Z:\White Mesa Mill\2007 License Renewal Application\Figures\Transp-routes.dwg, Figure 1, 02/26/2007 2:36:57 PM,
Adobe PDF.pc3, Letter



Denison Mines (USA) Corp.

Project	WHITE MESA MILL
County:	State: UT
Location:	

Figure 1
Transportation Route to Metropolis, IL

Scale: n/a	Date: Feb. 2007	transp-routes.dwg
Author: bm	Drafted By: B.Munkhbaatar	

REVISIONS	
Date	By

Denison Mines (USA) Corp.

Project	WHITE MESA MILL	
REVISIONS	County:	State: UT
Date / By	Location:	
	Figure 2 Transportation Route to Port Hope, Ontario, Canada	
	Scale: N/A	Date: Feb. 2007 — transp-routes.dwg
	Author: bm	Drafted By: B.Munkhbaatar

Z:\White Mesa Mill\2007 License Renewal Application\Figures\Transp-routes.dwg, Figure 2, 02/26/2007 2:38:20 PM, Adobe PDF.pc3, 11 x 17

ADDENDUM 3

DRIVER INSTRUCTIONS

ADDENDUM 3

These instructions will be reviewed with the Company's drivers and become a part of their standing instructions. These instructions cover items that should be checked before and after shipment, as well as emergency procedures.

The representatives of the commercial carriers will be asked to fill out the accident questionnaire, notify us of the accident and state whether clean-up assistance is required.

Shipment of Uranium Concentrate
Driver's Checklist

1.0 Preshipment Activities

1.1 Insure that the emergency procedures are included with the shipping papers.

1.2 Check to insure that the closure on the rear door of the truck is properly sealed.

1.3 Check package of emergency equipment to insure items shown in Section 8 are available.

2.0 During Transport

2.1 Vehicle should be attended at all times while on the highway. It may be left unattended to obtain assistance during a breakdown.

2.2 The vehicle should not be parked on or within five feet of the public highway.

2.3 Check on parking and before start-up to insure rear door is properly sealed.

Figure 4.2

ACCIDENT REPORT

1.0 Date ______________________ Time ______________________

2.0 Person Calling ______________________ Capacity ______________________

From Telephone No. ______________________ Who Else Notified ______________________

3.0 Accident Location ______________________

____

____

____

4.0 Description of the Accident

Persons Injured ______________________ Name(s) ______________________

Treatment ______________________

Accident Description ______________________

____

____

____

5.0 Was Any Company Material Spilled from the Vehicle(s)? ______________________

____

6.0 What Action Has Been Taken to Contain the Material? ______________________

____

____

____

7.0 Please report this information to one of the following:

Monday - Friday 8:00 a.m. to 4:30 p.m. MST
Harold R. Roberts, Executive Vice President – Operations, Denver, Colorado.
Telephone No. 303-628-7798 day time, work days
Night and weekend contact Telephone No. (303) 756-9050, Cell Phone (303) 902-2870

Rich E. Bartlett, Mill Manager, White Mesa Mill, Blanding, Utah
Telephone No. 435-678-2221 day time, work days
Night and weekend contact Telephone No. (435) 678-2495

EMERGENCY INFORMATION AND PROCEDURES

YOUR CARGO IS: Uranium Concentrate

THIS MATERIAL:

1. Is NOT explosive.

2. Will not burn.

3. Is a naturally radioactive material of low specific activity. It should not be inhaled, eaten, or allowed to get into an open wound.

4. Can be approached without danger of injury from external radiation.

IN THE EVENT OF ACCIDENT, AS SOON AS POSSIBLE:

1. Take preliminary precautions below. Display these instructions as necessary to local authorities on the scene to obtain their help (see item 2 below).

2. Collect the information on the accident form attached.

3. Call (or have local authority call for you) the Executive Vice President - Operations, Denison Mines (USA) Corp., Telephone No. 303-628-7798, Denver, Colorado, collect, between 8:00 a.m. - 4:30 p.m. MST. At all other times call 301-816-5100.

4. If local authorities need radiological assistance have them call the DOE offices at 208-526-0111 Ext. 1515.

5. Make no other statements or phone calls except on instructions from Denison Mines (USA) Corp. Management.

PRELIMINARY PRECAUTIONS

CONTAINERS ARE NOT LEAKING, and are not seriously damaged. Container may or may not be thrown from vehicle. Vehicle may or may not be damaged.

1. Caution people not to tamper with the containers. Use civil authorities to help you if necessary.

2. It is not necessary to have a specific distance between humans and the containers or truck, but for ease of controlling the situation, ask people to stay back 10 to 15 feet.

3. If closed containers are lying on the road, obtain assistance from whatever civil authority is available to move containers to the side of the road.

4. Assure local authorities that there is no danger in handling closed containers.

CONTAINERS ARE LEAKING OR DAMAGED TOO SERIOUSLY to be moved. Truck or railroad car may or may not be damaged.

1. Caution people to stay away from the material. Keep them at a distance of at least 25 feet. Extreme distance is not necessary. Use civil authorities to help if necessary.

2. Assure local authorities that there is no danger from radiation but that people should avoid breathing any dust from the material.

3. Avoid trackage of material by people or vehicle. Obtain help from local civil authorities if necessary to reroute traffic around the spill area.

4. Keep material from running into streets, gutters, sewers, etc., if possible. A simple method for doing this might be to dig a trench around the material or throw up an earthen dike several inches high.

5. If required, cover the spilled uranium concentrate. The vehicle's emergency kit contains four approved dust respirators, respirator user instructions, 1,000 square feet of plastic sheeting, tent stakes, nails, a hammer and a knife.

   Don a respirator and cover the spilled material with the plastic sheeting and secure the edges of the plastic to the ground using tent stakes or to the bed of the truck with nails. Undamaged containers can be moved to the side of the road.

6. Avoid breathing dust from the material. When covering the material, obtain a simple respirator if possible. If none is available, work the material in such a manner as not to stir up excessive dust.

FIRE involving vehicle or in immediate vicinity of vehicle.

1. Isolate the vehicle from other people and property if possible. Use civil authorities for help.

2. Obtain fire fighting help from local group.

3. The material you are hauling will not burn.

4. Keep fire away from uranium containers if possible.

5. Use respirator if necessary to avoid breathing smoke from any fire involving your cargo because of the possibility of airborne particles, if the drums are ruptured.

6. Do not spray water into open or leaking containers. There is no reaction with water but a heavy stream of water will spread the material and make cleanup more difficult

APPENDIX O

NRC AND DRC INSPECTION REPORTS AND NOTICES OF VIOLATION SINCE MARCH 31, 1997

Notice of Violation May 8, 1997
Issued by Uranium Recovery Branch
(not as a result of an inspection)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 3, 1997

MAY 1 2 1997

Mr. Harold R. Roberts, President
Energy Fuels Nuclear, Inc.
Three Park Central, Suite 900
1515 Arapahoe Street
Denver, CO 80202

SUBJECT: NOTICES OF VIOLATION - RENO CREEK AND WHITE MESA FACILITIES

Dear Mr. Roberts:

This refers to a review of the Energy Fuels Nuclear, Inc. (EFN) Reno Creek, Wyoming, and White Mesa, Utah, licensing files, including: (1) the Reno Creek submittal dated January 8, 1997, and (2) the White Mesa submittal dated November 29, 1996. As a result of that review, the U.S. Nuclear Regulatory Commission has determined that EFN is in violation of the requirements of Source Material Possession-Only License SUA-1558 (Reno Creek) and Source Material License SUA-1358 (White Mesa). Two Notices of Violation (NOVs) are included as enclosures to this letter. The violations stem from surety-related matters for the Reno Creek and White Mesa sites.

The Reno Creek surety violation results from your failure to request NRC authorization prior to decreasing the currently approved surety as required by License Condition No. 12. The currently approved surety shall "be continuously maintained in an amount no less than $142,890.00 for the purpose of complying with 10 CFR Part 40, Appendix A, Criterion 9, until a replacement is authorized by both the State and the NRC." Following its annual Reclamation Performance Bond review the State of Wyoming Department of Environmental Quality (State) notified EFN by letter of November 13, 1996, that EFN had the option, within 45 days, of: (1) either maintaining the currently authorized NRC/State surety bond of $142,890.00, or (2) decreasing the bond by $4,658.00. EFN failed to request NRC approval to reduce the bond value to be consistent with the State-accepted value. Rather, EFN permitted the bond to be decreased on December 30, 1996, and set at an amount ($138,232.00) which is $4,658.00 less than the currently NRC-approved surety of $142,890.00. The State letter of November 13, 1996, clearly indicates that reduction of the currently approved surety bond is elective, not mandatory. EFN informed NRC by letter of January 8, 1997, of its having permitted the surety bond to be reduced. Although the sequence of events in previous years leading to NRC's approval of the surety bond has included: (1) bond approval by the State, (2) revision of the bond amount, and (3) NRC review of the revised, approved bond as acceptable, the previous annual surety bond amounts as determined by the State resulted in an <u>increase</u> of the bond, not a <u>decrease</u>. NRC would obviously have no objection to the State having increased the surety bond to an amount exceeding the amount previously authorized by both the State and by the NRC. As required by License Condition No. 12, any decrease in the currently-approved surety is to be approved by the NRC <u>prior</u> to reduction.

The White Mesa surety violation results from your failure to submit a revised surety instrument within three months of NRC's written approval as required by License Condition No. 20 to SUA-1358. This approval was provided to EFN by letter dated August 8, 1996. An original copy of the revised surety was not provided to NRC by EFN until November 29, 1996, three months and three weeks following NRC's written approval.

Your failures to meet the required surety-related license conditions are not acceptable. NRC expects future surety-related submittals as well as all other activities to be in full compliance with your licenses.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notices of Violation when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to take to prevent a recurrence. After reviewing your response to the Notices of Violation, including your proposed corrective actions, the NRC will determine whether further enforcement action is necessary to ensure compliance with NRC regulatory requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, and its enclosures will be placed in the NRC Public Document Room.

If you have any questions concerning this subject, please contact the NRC Reno Creek Project Manager, Mr. Harold E. Lefevre, at (301) 415-6678 or the NRC White Mesa Project Manager, Mr. James R. Park, at (301) 415-6699, as appropriate.

Sincerely,

Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material
Safety and Safeguards

Docket Nos. 40-8681, 40-9024
License Nos. SUA-1358, SUA-1558

Enclosures: 1) Notice of Violation - Reno Creek Surety
2) Notice of Violation - White Mesa Surety

cc: G. Mooney, Wyoming DEQ/LQD
W. Sinclair, Utah, DRC
M. Socolof, ORNL

NOTICE OF VIOLATION

Energy Fuels Nuclear, Inc.
Denver, Colorado

Docket No. 40-8824
License No. SUA-1558

During a U.S. Nuclear Regulatory Commission staff review of the licensee's Reno Creek docket file, including the licensee's submittal dated January 8, 1997, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

> License Condition No. 12 states, in part, that the currently approved surety shall "be continuously maintained in an amount no less than $142,890.00 for the purpose of complying with 10 CFR Part 40, Appendix A, Criterion 9, until a replacement is authorized by both the State and the NRC."
>
> Contrary to the above, the licensee, having been notified by letter of November 13, 1996, from the State of Wyoming Department of Environmental Quality (State) that the licensee had the option, within 45 days, (1) of either maintaining the currently authorized NRC/State surety bond of $142,890.00 or (2) of decreasing the bond by $4,658.00, failed to notify the NRC of these options, and permitted the bond to be decreased on December 30, 1996, and set at an amount ($138,232.00) not authorized by NRC. The licensee informed the NRC by letter of January 8, 1997, of its having permitted the surety bond to be reduced without NRC authorization.
>
> This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, Energy Fuels Nuclear, Inc., is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with copies to (1) the Director, Office of Enforcement, Washington, D.C. 20555, (2) the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, Harris Tower, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-8064, and (3) the Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, Washington, D.C. 20555, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

NOTICE OF VIOLATION

Energy Fuels Nuclear, Inc.
Denver, Colorado

Docket No. 40-8681
License No. SUA-1358

During a U.S. Nuclear Regulatory Commission staff review of the licensee's White Mesa docket file, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedures for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

> License Condition No. 20 states, in part, that the revised annual surety shall "be in effect within 3 months of written NRC approval."
>
> Contrary to the above, the licensee failed to submit a revised surety instrument within three months of the NRC's written approval, provided to the licensee by letter dated August 8, 1996. The licensee provided the NRC with an original copy of the revised instrument on November 29, 1996.
>
> This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, Energy Fuels Nuclear, Inc., is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with copies to (1) the Director, Office of Enforcement, Washington, D.C. 20555, (2) the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, Harris Tower, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011-8064, and (3) the Chief, Uranium Recovery Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, Washington, D.C. 20555, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. However, if personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you <u>must</u> specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withhold-

Enclosure 2

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. However, if personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information).

Dated at Rockville, Maryland
this 8th day of May 1997

ing (e.g.. explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790-(b) to support a request for withholding confidential commercial or financial information).

Dated at Rockville, Maryland
this 5th day of May 1997

Enclosure 2

IUC
Corporation
Independence Plaza, Suite 950 • 1050 Seventeenth Street • Denver, CO 80265 • 303 628 7798 (main)

June 6, 1997

VIA OVERNIGHT UPS

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Re: Reply to Notices of Violation for Reno Creek and White Mesa Mill Facilities
License No. SUA-1558, Docket No. 40-9024
License No. SUA-1358, Docket No. 40-8681

Dear Sir/Madam:

As the NRC is aware, effective May 10, 1997, International Uranium (USA) Corporation ("IUSA") assumed ownership and became the licensee of the Reno Creek ISL project and the White Mesa Uranium Mill. Pursuant to the provisions of 10 CFR 2.201, IUSA hereby submits written replies to the Notices of Violation ("NOV") for the licenses for these facilities issued by the U.S. Nuclear Regulatory Commission ("NRC") to Energy Fuels Nuclear, Inc. ("EFN") (the previous licensee for these facilities) on May 8, 1997. I can be reached at (303) 389-4131.

Sincerely,

Michelle R. Rehmann

Michelle R. Rehmann
Environmental Manager

MRR/pl

cc: U.S. Nuclear Regulatory Commission
Director, Office of Enforcement
Washington, DC 20555

Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
Harris Tower
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

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RENO CREEK ISL PROJECT
RESPONSE TO NOTICE OF VIOLATION DATED MAY 8, 1997
LICENSE NO. SUA-1558
DOCKET NO. 40-9024

1. The reason for the violation, or, if contested, the basis for disputing the violation.

In issuing this NOV, the NRC excerpted language from Possession-Only License SUA-1558, License Condition 12, which states that surety shall "be continuously maintained in an amount no less than $142,890.00 for the purpose of complying with 10 CFR Part 40, Appendix A, Criterion 9, until a replacement is authorized by both the State and the NRC." IUSA acknowledges that EFN's reduction of the POL surety to $138,232.00 conflicts with the wording of the excerpted language. However, we believe that reading the remainder of License Condition 12 creates a different impression to the reader regarding the adequacy requirements for surety:

> "Financial surety for the full amount of the NRC-approved decommissioning cost estimate shall not lapse for any time period prior to license termination." "The licensee must also ensure that the surety, ..., expressly identifies the NRC-related portion of the surety, and covers the cost of resin disposal."

Consistent with this statement, EFN at no time allowed the surety to lapse for the NRC-approved amount for decommissioning related to the POL. In other words, while EFN did in fact reduce the total surety amount, the portion identified for resin disposal was not reduced.

The reduction of the surety by $4,658.00 violates the portion of License Condition 12 cited by NRC. However, the remainder of License Condition 12 language seems to have the intent of ensuring adequate surety for the NRC-related portion of the total surety amount, and ensuring that the surety shall not lapse for any period. Therefore, there is confusion as to whether the intent of License Condition 12 was violated.

2. The corrective steps that have been taken and the results achieved.

IUSA has requested a change rider to increase the current bond amount from $138,232.00 to $142,890.00. The change rider will be prepared by Lockton Companies as agent for the surety company, National Union Fire Insurance Company of Pittsburgh, PA. Lockton Companies will also obtain the countersignature of its Wyoming agent, as required by Wyoming Law. Upon its return to Lockton Companies, IUSA will execute the change rider, and submit the original to the Wyoming DEQ with a copy to the NRC.

3. The corrective steps that will be taken to avoid further violations.

The action of increasing the surety bond amount back to $142,890.00, the amount specified under License Condition 12, corrects the immediate violation. However, as noted in EFN's letter, of January 8, 1997 (copy attached), the challenge of meeting both NRC and State of Wyoming requirements for updating and revising surety is further complicated by the existing license conditions. We again request that NRC consider the proposed language submitted in the letter of January 8 to amend the license, as we believe this would facilitate improved compliance.

4. The date when full compliance will be achieved.

It normally takes six to eight working days to obtain a change rider; however, IUSA has requested that overnight mail be used when obtaining all signatures so that we can submit the revised surety to the NRC as soon as possible. In any event, we anticipate full compliance no later than June 30, 1997.

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Joseph J. Holonich, Chief
Uranium Recovery Branch
Division of Waste Management
Office of Nuclear Material Safety and Safeguards
Washington, DC 20555

Ronald E.Berg
William N. Deal
David C. Frydenlund
Earl E. Hoellen
Mark B. Mathisen
Harold R. Roberts
Terry V. Wetz

energy fuels nuclear, inc.

three park central • suite 900
1515 arapahoe street • denver colorado 80202

fax 303-595-0930

November 19, 1996

Via Overnight UPS
Mr. Joseph J. Holonich, Chief
U.S. Nuclear Regulatory Commission
Uranium Recovery Branch
Office of Nuclear Materials
Safety and Safeguards
Mail Stop T7J9
Washington, DC 20555-0001

Re: Revised Surety for White Mesa Uranium Mill
Source Material License SUA-1358
Docket No. 40-8681

Dear Mr. Holonich:

As per our recent conversations with James Park of your staff, the purpose of this letter is to confirm that a revised surety for the White Mesa Mill will be transmitted to the NRC by November 22, 1996. Energy Fuels Nuclear, Inc. ("EFN") received NRC License Amendment No. 42 on August 14, 1996, which reflected NRC approval of a revised surety in the amount of $10,915,467. In accordance with our contractual arrangement with Umetco, EFN forwarded the NRC approval to Umetco so that Umetco could make arrangements for the revision. Based on my discussions with Umetco, there was a delay in processing of a request for the surety adjustment, primarily due to communications between Umetco's Grand Junction office and their parent, Union Carbide.

We regret that notification of this revised surety has yet to reach NRC, but have asked Umetco to expedite completion of this revision and to send notification to the NRC by the end of this week. As always, I can be reached at (303) 899-5630.

Very truly yours,

Harold R. Roberts

Harold R. Roberts
President

HRR/pl

cc: Michelle R. Rehmann
William N. Deal
Ronald E. Berg
Richard A. Munson
James Park (via fax)

ENERGY FUELS NUCLEAR, INC.

Three Park Central, Suite 900
1515 Arapahoe Street
Denver, Colorado 80202

fax 303-595-

January 8, 1997

Mr. Joseph J. Holonich, Chief
U.S. Nuclear Regulatory Commission
Uranium Recovery Branch
Office of Nuclear Materials
Safety and Safeguards
Mail Stop T7J9
Washington, DC 20555-0001

Re: Possession-Only License SUA-1558
Annual Reclamation Surety Update, 1996-1997

Dear Mr. Holonich:

Attached are three correspondences pertaining to the recent revision of the Reclamation Performance Bond for the Reno Creek Project in Wyoming. As required under the Reno Creek Possession-Only License (POL) SUA-1558, notification of the updated bond amount is being forwarded to NRC for its review and incorporation into the SUA-1558 records. Also as required under SUA-1558, the amount required for the transport and disposal of the resin stored at Reno Creek has been specifically identified in the bond calculation.

The following attachments are provided for inclusion in the SUA-1558 records:

1. 1995-96 Annual Report for Permit No. 479, including the Wyoming Department of Environmental Quality's review of the reclamation bond estimate, November 5, 1996.

2. Notification from the Director of the Wyoming Department of Environmental Quality setting the reclamation bond amount at $138,232, November 13, 1996.

3. United States Fire Insurance Company rider approved by the Administrator of the Land Quality Division of the Wyoming Department of Environmental Quality to set the reclamation bond amount at $138,232, December 30, 1996.

These attachments document the current revision of the Reno Creek Reclamation Bond. This bond amount is for the October 16, 1996 to October 15, 1997 period.

The current bond estimate is based on the Means Heavy Construction Cost Data for 1996 and current quotes from local contractors. Therefore, the cost factors used are in current dollars, and a universal inflation factor is not used. This approach was reviewed and found acceptable by the Wyoming Department of Environmental Quality.

This letter and transmittal of the enclosed correspondence constitute the annual update to the surety amount required under License Condition 12, which is to be submitted to the NRC annually, no later than May 16.

As shown in the November 13, 1996 letter from the Director of the Wyoming Department of Environmental Quality, Energy Fuels is required to revise the bond (if the bond is increased) or notify the appropriate State official (if the bond is decreased and Energy Fuels elects not to change it accordingly) within 45 days of notification. To comply with this mandate, we proceeded to revise our bond accordingly. However, License Condition 12 of SUA-1558 states that the bond shall be maintained "... in an amount no less than $142,890.00 ... until a replacement is authorized by both the State and NRC." EFN is concerned that compliance with the State requirement may be construed as a concurrent violation of this License Condition. Since original issuance of POL SUA-1558 in August 1993, this issue of conflicting requirements has never been formally raised. Our understanding has been that the sequence of bond approval by the State, revision of the bond amount, and the NRC review of the revised, approved bond has been acceptable to the NRC.

We would appreciate your review regarding the timing of bond revisions. As License Condition 12 language seems inconsistent with the State requirement to revise the bond within 45 days, perhaps a wording change in License Condition 12 should be considered. The following revised language would resolve this issue:

> "... until a replacement is authorized by ~~both~~ the State ~~and the NRC~~. The portion of any such replacement reclamation performance bond designated for transport and disposal of the resin shall be approved by NRC by August 16 of each year, so that any required adjustments can be incorporated into the subsequent replacement bond authorized by the State."

I can be reached at (303) 899-5647 if you have any questions.

Sincerely,

Michelle R. Rehmann
Environmental Manager

MRR/pl
Attachments

cc:w/attachments
Harold LeFevre, NRC
Harold R. Roberts
Terry V. Wetz
Mark B. Mathisen

WHITE MESA MILL
RESPONSE TO NOTICE OF VIOLATION DATED MAY 8, 1997
LICENSE NO. SUA-1353
DOCKET NO. 40-9024

1. The reason for the violation.

License Condition No. 20 states, in part, that the revised annual surety shall "be in effect within three months of written NRC approval".

Contrary to the above, the licensee failed to submit a revised surety instrument within three months of the NRC's written approval, provided to the licensee by letter dated August 8, 1996. The licensee provided the NRC with an original copy of the revised instrument on November 29, 1996.

2. The corrective steps that have been taken and the results achieved.

As soon as EFN became aware that Umetco Minerals (the party responsible under the terms of our contractual agreement to maintain the bond) had failed to submit the revised surety instrument, EFN sought out the cause of the delay and urged Umetco management to expedite transmittal of the surety instrument to the NRC. On November 19, 1996, EFN advised the NRC, by overnight mail, that EFN had identified the cause of the delay in the processing of the Surety Amendment (copy of letter attached).

3. The corrective steps that have been taken to avoid further violations.

With the recent transaction completing the sale of the White Mesa Mill to IUSA, Umetco Minerals is no longer involved in the chain of responsibility for updates on the surety, thus eliminating the additional step in the procedures for surety modifications. In addition, IUSA has reviewed the NRC license condition and developed a compliance/update schedule to ensure adequate time for surety instruments to be updated and submitted to the NRC in a timely manner.

4. The date when full compliance will be achieved.

IUSA is in full compliance with this license requirement at this time.

H:\USERS\MRR\LETTERS.97\NRC6697.LTR

cc w/enclosure:
Mr. William N. Deal, Mill Manager
International Uranium (USA) Corporation
6425 South Highway 191
P. O. Box 789
Blanding, Utah 84511

Mr. William J. Sinclair, Director
State of Utah
Department of Environmental Quality
Division of Radiation Control
168 North 1950 West
Salt Lake City, Utah 84115-4850

Mr. Pat Mackin, Assistant Director
Systems Engineering & Integration
Center for Nuclear Waste Regulatory Analyses
6220 Culebra Road
San Antonio, Texas 78238-5166

Dr. Amitava Ghosh
Center for Nuclear Waste Regulatory Analyses
6220 Culebra Road
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ENCLOSURE 1

NOTICE OF VIOLATION

International Uranium (USA) Corporation
White Mesa Mill
Blanding, Utah

Docket: 40-8681
License: SUA-1358

During an NRC inspection conducted on July 15-17, 1997, three violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG 1600, the violations are listed below:

A. License Condition 29 requires, in part, that the licensee establish written Standard Operating Procedures (SOPs) for all operational activities involving radioactive materials that are handled, processed, or stored.

   Section 2 of the licensee's Radiation Protection Procedures Manual, requires, in part, that a set of air samples are to be taken annually at various mill sites and are to be analyzed for natural uranium, thorium-230, radium-226, lead-210, and polonium-210.

   Contrary to the above, the licensee did not take the set of air samples specified in the application for radioisotopic analyses during 1996.

   This is a Severity Level IV violation (Supplement VI).

B. License Condition 9.3 requires, in part, that the licensee conduct operations in accordance with statements, representations, and conditions contained in the license renewal application submitted by letter dated August 23, 1991. Section 2.3 of the renewal application states, in part, that fixed and removable alpha surveys will be conducted weekly at various site locations.

   Contrary to the above, during 1997 weekly alpha surveys were not conducted as specified. The number of alpha surveys not conducted represented 20 percent of the required total for that duration.

   This is a Severity Level IV violation (Supplement VI).

C. License Condition 48.A requires, in part, that the licensee implement a groundwater detection monitoring program to ensure compliance to 10 CFR Part 40, Appendix A. The detection monitoring program is required to be in accordance with the licensee's August 1, 1989, submittal. The program is to include the following actions. The leak detection system for all ponds are to be checked weekly. If liquid is present, the water is to be analyzed for chloride, sulfate, selenium, and pH. The samples are to be statistically analyzed to determine if significant linear trends exist and the results are to be submitted to the NRC for review.

Contrary to the above, the licensee analyzed seven pond water samples in 1997 and 28 pond water samples in 1996 from Cell 2 and Cell 4A; however, the samples were not statistically analyzed to determine whether significant linear trends existed and the results were not submitted to the NRC for review.

This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, International Uranium (USA) Corporation is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, with a copy to the Regional Administrator, Region IV, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

Because the response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. However, if it is necessary to include such information, it should clearly indicate the specific information that should not to be placed in the PDR, and provide the legal basis to support the request for withholding the information from the public.

Dated at Arlington, Texas
this 12th day of August 1997

ENCLOSURE 2

U. S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket No.:	40-8681
License No.:	SUA-1358
Report No.:	40-8681/97-02
Licensee:	International Uranium (USA) Corporation (IUC)
Facility:	White Mesa Mill
Location:	Blanding, Utah
Inspection Dates:	July 15-17, 1997
Inspector:	M. Linda McLean, Senior Health Physicist
Accompanied by:	James R. Park, Project Manager Uranium Recovery Branch Nuclear Material Safety and Safeguards Amitava Ghosh, Ph.D., Senior Research Engineer Center for Nuclear Waste Regulatory Analyses
Approved By:	Charles L. Cain, Chief Nuclear Materials Licensing Branch
Attachment:	Supplemental Inspection Information

EXECUTIVE SUMMARY

White Mesa Mill Facility
NRC Inspection Report 40-8681/97-02

This inspection included a review of site status, management organization and controls, site operations, and the licensee's radiation protection and environmental monitoring programs.

Management Organization and Controls

- One change had been made to the organizational structure since the last inspection with the addition of an industrial safety manager. The site staffing was appropriate for the amount of work in progress at the facility. The licensee was operating under a performance-based license with an expiration date of March 31, 2007 (Section 2).

- Adequate Standard Operating Procedures (SOPs) had been established at the site; however, several procedures needed to be updated and better maintained (Section 2).

Operations Review

- Site fences were in good condition, and perimeter postings were appropriate; however, some radiation area signs needed to be replaced. No safety hazards were identified (Section 3).

Radiation Protection

- Two violations were identified. The first violation involved the licensee's failure to take air samples specified in their license application and analyze them for various radioisotopes. In the second instance, the licensee failed to perform weekly alpha surveys on numerous occasions during 1997 (Section 3).

Environmental Monitoring

- The licensee's implementation of its environmental monitoring program appeared effective with one exception. A violation was identified that involved the failure to statistically analyze pond water sample results to determine if significant linear trends exist and to submit the results to the NRC for review (Section 4).

Report Details

1 **Site Status**

The International Uranium (USA) Corporation's White Mesa uranium mill was in operation during this inspection. License Conditions 10.6, 10.7, and 10.8 authorized IUC to process alternate feed materials through the uranium mill circuit. Three alternate feed materials were approved: potassium hydroxide [KOH], calcium fluoride [CaFl], and Cotter concentrate material. The mill processed approximately 12 thousand drums of the CaFl material from May through August 1996. Processing of the KOH material began in May 1997, and the dryer was started up on July 12, 1997. A total of 28 drums (approximately 32 thousand pounds) of U_3O_8 had been packaged as of July 15, 1997. The licensee planned to begin processing the Cotter concentrate alternate feed material at the conclusion of the KOH run, which was expected to be in August.

Alternate feed material on site included 1,979 drums remaining from the original lot of 15,787 55-gallon drums of CaFl, approximately 300 remaining drums of KOH out of the original 1,744, and 810 drums of Cotter concentrate. At least another 310 drums of Cotter concentrate were expected to be received this year. The licensee also planned to initiate mining activities.

2 **Management Organization and Controls (88005)**

a. Inspection Scope

The organizational structure was reviewed to ensure that the licensee had established an organization with defined responsibilities and functions.

b. Observations and Findings

One change had been made to the organizational structure since the last inspection with the addition of an industrial safety manager. At the time of the inspection, the licensee was operating under a renewed NRC license with an expiration date of March 31, 2007. IUC's source material license includes a performance-based license condition (PBLC) (License Condition 9.4) which provides that the licensee may (1) make changes in the facility or process as presented in the application; (2) make changes in the procedures presented in the application; or (3) conduct tests or experiments not presented in the application, without prior NRC approval, if the licensee ensures that the following conditions are met:

- The change, test, or experiment does not conflict with any requirement specifically stated in the license or impair the licensee's ability to meet all applicable NRC regulations.

- There is no degradation in the essential safety or environmental commitments in the license application, or provided by the approved reclamation plan.

- The change, test, or experiment is consistent with the conclusions of actions analyzed and selected in the licensee's Environmental Assessment dated February 1997.

The licensees's determinations as to whether the above conditions are satisfied are to made by a Safety and Environmental Review Panel (SERP), and the licensee is to maintain records of any changes made pursuant to this condition until license termination. In addition, IUC is required to function in accordance with the SOPs submitted by letter dated June 10, 1997.

In addition, License Condition 9.4 requires the licensee to make determinations assuring changes conform to radiation safety and environmental requirements. Records of the SERP reviews are required to be submitted to the NRC annually. The inspectors reviewed one SERP document generated since the issuance of the PBLC. The record documented the SERP meeting that discussed potential SERP activities. The licensee had appointed the appropriate individuals as members of the SERP.

The performance-based license was issued March 14, 1997. This inspection reviewed compliance with both the old and the new license.

As specified in License Condition 9.6, the licensee is required, in part, to establish written SOPs for all operational activities involving radioactive materials that are handled, processed, or stored. The licensee's SOPs were reviewed during the inspection. The SOPs appeared to contain, in most cases, an adequate level of detail; however, it was noted that some needed to be updated and expanded to adequately cover the site activities. For example, the SOP for radiation work permits (RWPs) did not describe the mechanism for review (e.g., who reviews and signs the RWP). Additionally, the SOP for tailings monitoring did not describe all aspects of the leak detection monitoring requirements.

Furthermore, many of the SOPs were not easily accessible in that they were located in the license application only. Specifically, the environmental and radiation protection procedures could only be found in the license application. The licensee agreed that maintaining separate books of these SOPs would be appropriate. The mill operating SOPs were located in the areas of use and available to the workers. In addition, employee training included reviews of the procedures. The SOPs had been reviewed during the previous year (July 1996) by the radiation safety officer (RSO), and they were in the process of being reviewed as required by License Condition 9.6 at the time of this inspection.

c. <u>Conclusions</u>

One change had been made to the organizational structure since the last inspection with the addition of an industrial safety manager. The site staffing was appropriate for the amount of work in progress at the facility. The licensee was operating under a performance-based license with an expiration date of March 31, 2007.

SOPs had been established at the site; however, several procedures needed to be updated and better maintained.

3 Operations (88020)

a. Scope

The inspector reviewed licensee operations to determine compliance with applicable requirements specified in the license, and site tours were performed to verify that site activities were being conducted in accordance with applicable regulations and the conditions of the license.

b. Observations and Findings

During the site tours, site buildings, fences, gates, and operating equipment were observed. Site fences were in good condition. Area perimeter and building postings were in accordance with the requirements of the license and 10 CFR Part 20. However, it was noted that some of the signs were faded and in need of replacement. The central plant areas were being kept clean and orderly. No evidence of leaking valves or tanks was observed.

Independent radiation surveys were conducted by the inspector with a microrem meter. Dose rates were consistent with the licensee's survey results. Measurements at the ore pad were measured as high as 0.7 millirem per hour (mr/hr). Mill spoils were still stored on the ore pad as well as the alternate feed material. Dose rates on contact of the drums storing the KOH material were measured as high as 0.3 mr/hr. For As Low As is Reasonably Achievable (ALARA) purposes, the licensee was constructing a remote handling system for emptying the drums into the mill circuit. The licensee stated that the mill spoils would be reprocessed through the mill sometime in the future.

During a tour, the inspectors observed the receipt of 45 drums of the Cotter material. The licensee performed all the required surveys for receipt of the material. Also the inspectors observed the yellowcake packaging operation. The operator was wearing required protective equipment including a respirator, rubber boots, gloves, and coveralls. No problems were identified with either activity.

c. Conclusions

Site fences were in good condition and perimeter postings were appropriate; however, some radiation area signs needed to be replaced. No safety hazards were identified.

4 Radiation Protection (83822)

4.1 Inspection Scope

The purpose of this portion of the inspection effort was to determine if the licensee's radiation safety program was in compliance with requirements established in the license and 10 CFR Part 20 regulations.

4.2 Observations and Findings

a. Employee Exposures\Bioassay Program

The licensee's internal and external monitoring programs were reviewed. The licensee's personnel monitoring program consisted of issuance of thermoluminescent dosimeters (TLDs), sampling for airborne natural uranium and radon, and obtaining urine bioassay samples from site workers. The information gained from the TLDs and the air samples were then used by the licensee to determine the site employee's occupational exposures to radiation. The workers' total effective dose equivalent (TEDE) was a combination of external exposures (as measured by the TLDs) and internal exposures as calculated based on data obtained through radiological sampling.

The licensee's personnel exposure records were reviewed. The licensee issued TLDs to all operations, maintenance, management, and technical staff quarterly. Based on the 1996 TLD records, the highest deep dose equivalent was 449 millirems, less than 10 percent of the limit specified in 10 CFR Part 20.

Internal exposures were calculated based on time spent in areas with known airborne uranium and radon progeny concentrations. As part of the licensee's radiation protection program, airborne uranium and radon progeny concentration sampling were performed during periods of plant operations on a weekly basis in areas associated with yellowcake production and on a monthly basis in other areas. Airborne particulate samples were collected in 26 locations. Radon progeny samples were collected in 27 locations.

During 1996, airborne uranium concentrations were less than 25 percent of the derived air concentration (DAC) (year class) established in 10 CFR Part 20, Appendix B, with the exceptions of the yellowcake dryer and packaging enclosures, the yellowcake packaging area, the SAG mill area, and the CaFl dump tank area. These areas were posted as airborne radioactivity areas. Full face respirators were required in the yellowcake dryer and packaging enclosures. The highest committed effective dose equivalent for 1996 was 490 millirems, less than 10 percent of the limit.

During the inspection, on July 15, 1997, the result of the weekly particulate air sample by the south dryer door was 172 percent of the DAC for natural uranium and 263 percent on July 16, 1997. The dryer was shut down on July 16, 1997, and the sampling frequency increased. Also, the area was posted as an airborne radioactivity area, and the RSO was investigating the cause of the increased concentration in the area. No conclusions had been made prior to the end of the inspection.

The licensee used the modified Kusnetz method for measuring radon progeny concentrations. The procedure consisted of sampling radon progeny on a high efficiency filter paper and measuring the alpha counts on the filter. In 1997 to date, the highest radon progeny concentration was 0.02 working levels.

At the end of 1996, the licensee calculated the TEDE for site workers. The TEDEs were a combination of TLD exposures, as well as the working level months and potential uranium uptakes converted to millirem values. The licensee's records indicated that the highest TEDE was 550 millirems, a little more than 10 percent of the 5000 millirem per year limit.

Occupational doses appeared consistent with the level of activity in progress at the site. In compliance with 10 CFR 19.13, the licensee provided to each worker, required to be monitored for radiation exposure a record, of their dose for 1996.

The urine bioassay program was reviewed to determine compliance with the license application commitments and 10 CFR Part 20. Urine bioassays were performed quarterly during periods of mill stand-by or when specified by an RWP. During mill operation, yellowcake packaging workers supplied bi-weekly samples while other workers were sampled monthly. The licensee used an action level of 15 micrograms per liter (μg/l) uranium in urine samples. During this inspection period, no samples exceeded the action limit. No problems were identified with the bioassay program.

b. Annual ALARA Audit

An ALARA audit is required to be performed on an annual basis by 10 CFR 20.1101 and License Condition 33 of the old license. The licensee conducted the 1996 ALARA audit in November 1996 and in compliance with License Condition 33 submitted a copy of the ALARA report to the NRC by letter dated March 28, 1997. The audit report summarized the results of the radiation safety activities during 1996 and contained all of the required information required by the license and 10 CFR Part 20.

c. Employee Training

In compliance with 10 CFR Part 19, the licensee had provided radiation safety training to all radiation workers. A review of records relating to personnel training including new employees and female employees was performed. The last 8-hour refresher training was conducted in February 1997. The course included written and graded examinations at the conclusion of the training. The inspector reviewed the agenda and found that it covered the topics specified in 10 CFR Part 19.

d. Decommissioning Recordkeeping

Records required by 10 CFR 40.36, "Financial Assurance and Recordkeeping for Decommissioning," were reviewed. The files were maintained in the licensee's Spill Containment and Countermeasures Plan and Reports file. No additions to the file had been made since 1995. A separate file was used for the licensee's financial surety information. The inspector discussed the requirements of 10 CFR 40.36 with the licensee.

e. Radiation Surveys/Radiation Work Permits (RWPs)

The radiation safety program activities included weekly, monthly, and quarterly inspections. The RSO prepared monthly radiation safety reports for submission to facility management. The inspector reviewed a representative sample of the monthly reports since January 1997 and noted that the reports included appropriate topics and concerns for the activities in progress.

Section 5.0 of the license application dated July 1991 describes the RWP program at White Mesa. Seventeen RWPs were issued since the last inspection in January 1997. The inspector reviewed a representative sample of the RWPs issued since the last inspection and concluded that the RWPs adequately addressed safety hazards involved with the activities. However, it was noted that the RWPs were not being signed by a reviewer in the space provided on any of the permits. Additionally, the RWP procedure did not describe the mechanism for review (e.g., who reviews and signs RWPs).

Section 2 of the licensee's Radiation Protection Procedures Manual, requires, in part, that the licensee take a set of air samples annually at various mill sites and analyze them for natural uranium, thorium-230, radium-226, lead-210, and polonium-210. The licensee did not take the set of air samples specified in their application for radioisotopic analyses during 1996. This was identified as a violation of License Condition 11 of the old license (40-8681/9702-01).

A second violation was identified involving the failure to perform alpha surveys at the required frequency. In Section 2.3 of the renewal application, submitted by letter dated August 23, 1991, the licensee stated that fixed and removable alpha surveys will be conducted weekly at various site locations.

It was noted that during 1997 numerous weekly alpha surveys were not conducted as specified. Specifically, alpha surveys were not conducted in the required areas on January 1, March 7, March 23, 1997, May 30 and June 9, 1997. The number of alpha surveys not conducted represented 20 percent of the required total for that duration. This was identified as a violation of License Condition 9.3 (40-8681/9702-02).

f. Radioactive Waste Management\Transportation

The licensee was authorized by License Condition 10.5 to dispose of byproduct material generated at licensed in-situ leach facilities. No material had been received for disposal since the last inspection. The disposal of material received in December 1996 was delayed until April 1997, due to inclement weather. The material was disposed of in Cell No. 3, the authorized site of disposal. By letter dated February 13, 1997, the licensee provided to the NRC the annual summary of amounts of waste disposed of from off-site generators. Approximately 411 cubic yards and 52 cubic yards were received from the two generators, respectively, during 1996. The license authorizes a total of 5000 cubic yards per generator.

No yellowcake shipments had been made since October 1996. The inspector reviewed the Department of Transportation shipping papers for shipments for the alternate feed material received and identified no problems. No transportation incidents have occurred during this inspection period.

4.3 Conclusions

Two violations were identified. The first violation involved the licensee's failure to take air samples specified in their radiation safety procedures for radioisotopic analysis. In the second instance the licensee failed to perform weekly alpha surveys on numerous occasions.

5 Environmental Protection (88045)

5.1 Inspection Scope

The environmental monitoring program at the site was reviewed to assess the effectiveness of the licensee's program and to evaluate the effects, if any, of site activities on the local environment.

5.2 Observations and Findings

The environmental program requirements are identified in License Condition 11.2. The environmental program consisted of stack sampling, surface water samples, and groundwater sampling. In addition, the program included ambient air particulate sampling at four environmental stations, as well as measurement of the ambient gamma exposure rates at five sample stations. Furthermore, water, soil, and vegetation samples were collected to comply with the license application commitments. Compliance with environmental radon was demonstrated by the MILDOS computer code.

a. Airborne Effluent Environmental Monitoring

Air particulate samples were obtained at four sample stations surrounding the facility. The samples were analyzed quarterly for their natural uranium, radium-226, lead-210, and thorium-230 concentrations. In 1996, the highest sample result measured was obtained for thorium-230 from the BHV-5 station at the restricted area boundary and within the property boundary. The concentration was measured at 11.9 percent of the effluent concentration established in 10 CFR Part 20, Appendix B. All other air particulate sample results were less than 10 percent of the limits during 1996. No significant trends were identified by the licensee.

Ambient gamma exposure rate measurements were obtained using TLDs at five locations. The background station measured 90 millirems during calendar year 1996. The highest exposure was measured at the east tailings area (BHV-5) station. This station measured 97 millirems during 1996 or 7 millirems above background. This value was well below the total effective dose equivalent dose limit (100 millirems per year) established in 10 CFR 20.1301 for individual members of the public.

b. Soil and Vegetative Sampling

Vegetation and soil samples were obtained at the three sample stations twice during 1996. The license application specified that samples would be taken three times per year; however, the second quarter of 1996 was declared a disaster due to drought conditions in Utah and the third set of samples were not taken. These samples were analyzed for radium-226 and lead-210 concentrations. The sample results indicated that the radionuclide concentrations were comparable to the previous year's sample results.

c. Groundwater and Surface Water Monitoring Program

The groundwater detection monitoring program requirements are described in License Condition 48 of the old license and License Condition 11.3 of the new license. These conditions require, in part, that the licensee implement a groundwater detection monitoring program to ensure compliance with 10 CFR Part 40, Appendix A. The detection monitoring program is to be in accordance with the licensee's August 1, 1989, and October 5, 1994, submittals. The program is to include the following actions. The leak detection system for all ponds are to be checked weekly. If liquid is present, the water is to be analyzed for chloride, sulfate, selenium, and pH. The pond water sample results are to be statistically analyzed to determine if significant linear trends exist, and the results are to be submitted to the NRC for review.

The licensee analyzed seven pond water samples in 1997 and 28 pond water samples in 1996 from Cell 2 and Cell 4A; however, the samples were not statistically analyzed to determine whether significant linear trends existed, and the results were not submitted to the NRC for review. This was identified as a violation of conditions of the license (40-8681/9702-03).

4.3 Conclusions

The licensee's implementation of its environmental monitoring program appeared effective with one exception. A violation was identified that involved the failure to statistically analyze pond water sample results to determine if significant linear trends exist and to submit the results to the NRC for review.

5 Exit Meeting Summary

The inspector presented the inspection results to the site representatives of the licensee at the conclusion of the inspection on July 17, 1997. Licensee representatives acknowledged the findings as presented.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

William N. Deal, Mill Manager
Michelle R. Rehmann, Environmental Manager
Ron E. Berg, Radiation Safety Officer
Shannon Clark, Environmental Technician
Wayne Palmer, Radiation Technician

INSPECTION PROCEDURES USED

IP 88005: Management Organization and Controls
IP 88020: Operations Review
IP 83822: Radiation Protection
IP 88035: Radioactive Waste Management
IP 88045: Environmental Protection
IP 88010: Operator Training
IP 86740: Transportation

ITEMS OPENED, CLOSED AND DISCUSSED

Opened:

40-8681/9701-01	VIO	Failure to take the annual set of air samples for radioisotopic analyses during 1996.
40-8681/9701-02	VIO	Failure to statistically analyzed pond water sample results to determine whether significant linear trends existed and to submit this information to the NRC.
40-8681/9701-03	VIO	Failure to conduct several required weekly alpha surveys during 1997.

Closed: None

Discussed: None

LIST OF ACRONYMS USED

ALARA	As Low As is Reasonably Achievable
DAC	derived air concentration
IUC	International Uranium Corporation
PBLC	performance-based license condition
RSO	radiation safety officer
RWP	radiation work permit
SERP	Safety and Environmental Review Panel
SOPs	standard operating procedures
TEDE	total effective dose equivalent
TLD	thermoluminescent dosimeter

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
WASHINGTON, D.C. 20555

May 1, 1996

NRC INFORMATION NOTICE 96-28: SUGGESTED GUIDANCE RELATING TO DEVELOPMENT AND IMPLEMENTATION OF CORRECTIVE ACTION

Addressees

All material and fuel cycle licensees.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to provide addressees with guidance relating to development and implementation of corrective actions that should be considered after identification of violation(s) of NRC requirements. It is expected that recipients will review this information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not new NRC requirements; therefore, no specific action nor written response is required.

Background

On June 30, 1995, NRC revised its Enforcement Policy (NUREG-1600)[1] 60 FR 34381, to clarify the enforcement program's focus by, in part, emphasizing the importance of identifying problems before events occur, and of taking prompt, comprehensive corrective action when problems are identified. Consistent with the revised Enforcement Policy, NRC encourages and expects identification and prompt, comprehensive correction of violations.

In many cases, licensees who identify and promptly correct non-recurring Severity Level IV violations, without NRC involvement, will not be subject to formal enforcement action. Such violations will be characterized as "non-cited" violations as provided in Section VII.B.1 of the Enforcement Policy. Minor violations are not subject to formal enforcement action. Nevertheless, the root cause(s) of minor violations must be identified and appropriate corrective action must be taken to prevent recurrence.

If violations of more than a minor concern are identified by the NRC during an inspection, licensees will be subject to a Notice of Violation and may need to provide a written response, as required by 10 CFR 2.201, addressing the causes of the violations and corrective actions taken to prevent recurrence. In some cases, such violations are documented on Form 591 (for materials licensees)

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[1]Copies of NUREG-1600 can be obtained by calling the contacts listed at the end of the Information Notice.

which constitutes a notice of violation that requires corrective action but does not require a written response. If a significant violation is involved a predecisional enforcement conference may be held to discuss those actions. The quality of a licensee's root cause analysis and plans for corrective actions may affect the NRC's decision regarding both the need to hold a predecisional enforcement conference with the licensee and the level of sanction proposed or imposed.

Discussion

Comprehensive corrective action is required for all violations. In most cases, NRC does not propose imposition of a civil penalty where the licensee promptly identifies and comprehensively corrects violations. However, a Severity Level III violation will almost always result in a civil penalty if a licensee does not take prompt and comprehensive corrective actions to address the violation.

It is important for licensees, upon identification of a violation, to take the necessary corrective action to address the noncompliant condition and to prevent recurrence of the violation and the occurrence of similar violations. Prompt comprehensive action to improve safety is not only in the public interest, but is also in the interest of licensees and their employees. In addition, it will lessen the likelihood of receiving a civil penalty. Comprehensive corrective action cannot be developed without a full understanding of the root causes of the violation.

Therefore, to assist licensees, the NRC staff has prepared the following guidance, that may be used for developing and implementing corrective action. Corrective action should be appropriately comprehensive to not only prevent recurrence of the violation at issue, but also to prevent occurrence of similar violations. The guidance should help in focusing corrective actions broadly to the general area of concern rather than narrowly to the specific violations. The actions that need to be taken are dependent on the facts and circumstances of the particular case.

The corrective action process should involve the following three steps:

1. Conduct a complete and thorough review of the circumstances that led to the violation. Typically, such reviews include:

   - Interviews with individuals who are either directly or indirectly involved in the violation, including management personnel and those responsible for training or procedure development/guidance. Particular attention should be paid to lines of communication between supervisors and workers.

- Tours and observations of the area where the violation occurred, particularly when those reviewing the incident do not have day-to-day contact with the operation under review. During the tour, individuals should look for items that may have contributed to the violation as well as those items that may result in future violations. Reenactments (without use of radiation sources, if they were involved in the original incident) may be warranted to better understand what actually occurred.

- Review of programs, procedures, audits, and records that relate directly or indirectly to the violation. The program should be reviewed to ensure that its overall objectives and requirements are clearly stated and implemented. Procedures should be reviewed to determine whether they are complete, logical, understandable, and meet their objectives (i.e., they should ensure compliance with the
<u>current</u> requirements). Records should be reviewed to determine whether there is sufficient documentation of necessary tasks to provide an auditable record and to determine whether similar violations have occurred previously. Particular attention should be paid to training and qualification records of individuals involved with the violation.

2. <u>Identify the root cause of the violation.</u>

Corrective action is not comprehensive unless it addresses the root cause(s) of the violation. It is essential, therefore, that the root cause(s) of a violation be identified so that appropriate action can be taken to prevent further noncompliance in this area, as well as other potentially affected areas. Violations typically have direct and indirect cause(s). As each cause is identified, ask what other factors could have contributed to the cause. When it is no longer possible to identify other contributing factors, the root causes probably have been identified. For example, the direct cause of a violation may be a failure to follow procedures; the indirect causes may be inadequate training, lack of attention to detail, and inadequate time to carry out an activity. These factors may have been caused by a lack of staff resources that, in turn, are indicative of lack of management support. Each of these factors must be addressed before corrective action is considered to be comprehensive.

3 <u>Take prompt and comprehensive corrective action that will address the immediate concerns and prevent recurrence of the violation.</u>

It is important to take immediate corrective action to address the specific findings of the violation. For example, if the violation was issued because radioactive material was found in an unrestricted area, <u>immediate</u> corrective action must be taken to place the material under licensee control in authorized locations. After the immediate safety concerns have been addressed, timely action must be taken to prevent future recurrence of the violation. Corrective action is sufficiently comprehensive when corrective action is broad enough to reasonably prevent recurrence of the specific violation as well as prevent similar violations.

In evaluating the root causes of a violation and developing effective corrective action, consider the following:

1. Has management been informed of the violation(s)?

2. Have the programmatic implications of the cited violation(s) and the potential presence of similar weaknesses in other program areas been considered in formulating corrective actions so that both areas are adequately addressed?

3. Have precursor events been considered and factored into the corrective actions?

4. In the event of loss of radioactive material, should security of radioactive material be enhanced?

5. Has your staff been adequately trained on the applicable requirements?

6. Should personnel be re-tested to determine whether re-training should be emphasized for a given area? Is testing adequate to ensure understanding of requirements and procedures?

7. Has your staff been notified of the violation and of the applicable corrective action?

8. Are audits sufficiently detailed and frequently performed? Should the frequency of periodic audits be increased?

9. Is there a need for retaining an independent technical consultant to audit the area of concern or revise your procedures?

10. Are the procedures consistent with current NRC requirements, should they be clarified, or should new procedures be developed?

11. Is a system in place for keeping abreast of new or modified NRC requirements?

12. Does your staff appreciate the need to consider safety in approaching daily assignments?

13. Are resources adequate to perform, and maintain control over, the licensed activities? Has the radiation safety officer been provided sufficient time and resources to perform his or her oversight duties?

14. Have work hours affected the employees' ability to safely perform the job?

15. Should organizational changes be made (e.g., changing the reporting relationship of the radiation safety officer to provide increased independence)?

16. Are management and the radiation safety officer adequately involved in oversight and implementation of the licensed activities? Do supervisors adequately observe new employees and difficult, unique, or new operations?

17. Has management established a work environment that encourages employees to raise safety and compliance concerns?

18. Has management placed a premium on production over compliance and safety? Does management demonstrate a commitment to compliance and safety?

19. Has management communicated its expectations for safety and compliance?

20. Is there a published discipline policy for safety violations, and are employees aware of it? Is it being followed?

This information notice requires no specific action nor written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below.

Elizabeth Q. Ten Eyck, Director
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and Safeguards

Donald A. Cool, Director
Division of Industrial and Medical Safety
Office of Nuclear Material Safety and Safeguards

Technical contacts:

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NRC Inspection Report 40-8681/97-02
Dated August 12, 1997
and Notice of Violation

NRC Inspection of July 15-17, 1997

and
Corrective Action/Response to Notice of Violation,
September 11, 1997

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

August 12, 1997

Earl E. Hoellen, President
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

RECEIVED AUG 15 1997

SUBJECT: NRC INSPECTION REPORT 40-8681/97-02 AND NOTICE OF VIOLATION

Dear Mr. Hoellen:

On July 17, 1997, the NRC completed an inspection of your White Mesa Mill facility located near Blanding, Utah. This letter also acknowledges the receipt of your letter dated August 6, 1997, providing additional inspection information. The inspection was an examination of activities conducted under the license as they relate to radiation safety and to compliance with the Commissions's rules and regulations and the conditions of the license. The enclosed report presents the results of that inspection.

Based on the results of this inspection, certain licensed activities appeared to be in violation of NRC requirements, as specified in the enclosed Notice of Violation (Notice). Three violations were identified. The first violation involved the failure to take the annual set of air samples for radioisotopic analyses during 1996. The second violation involved the failure to conduct several required weekly alpha surveys during 1997. In the third instance, you failed to statistically analyze pond water sample results to determine whether significant linear trends existed and to submit this information to the NRC. Please note that your are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. For your consideration and convenience, an excerpt from the NRC Information Notice 96-28, "SUGGESTED GUIDANCE RELATING TO DEVELOPMENT AND IMPLEMENTATION OF CORRECTIVE ACTION," is enclosed. The NRC will use your response, in part, to determine whether further enforcement is necessary to ensure compliance with regulatory requirements.

You have been issued an NRC performance-based license delegating to you substantial regulatory authority of your licensed activities. The license was issued to you with the expectation that you would conduct your operations to include effective internal audits that would identify and correct potential NRC violations promptly. This aspect of your program is critical to maintaining effective program oversight. We are concerned, because the violations were identified by the NRC rather than your internal audit program. Please include in the response, your perspective on this issue.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your responses will be placed in the NRC Public Document Room. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction.

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

Ross A. Scarano, Director
Division of Nuclear Materials Safety

Docket: 40-8681
License: SUA-1358

Enclosures:
1. Notice of Violation
2. NRC Inspection Report 40-8681/97-02
3. NRC Information Notice 96-28

cc w/enclosure:
Mr. William N. Deal, Mill Manager
International Uranium (USA) Corporation
6425 South Highway 191
P. O. Box 789
Blanding, Utah 84511

Mr. William J. Sinclair, Director
State of Utah
Department of Environmental Quality
Division of Radiation Control
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Mr. Pat Mackin, Assistant Director
Systems Engineering & Integration
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6220 Culebra Road
San Antonio, Texas 78238-5166

Dr. Amitava Ghosh
Center for Nuclear Waste Regulatory Analyses
6220 Culebra Road
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ENCLOSURE 1

NOTICE OF VIOLATION

International Uranium (USA) Corporation
White Mesa Mill
Blanding, Utah

Docket: 40-8681
License: SUA-1358

During an NRC inspection conducted on July 15-17, 1997, three violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG 1600, the violations are listed below:

A. License Condition 29 requires, in part, that the licensee establish written Standard Operating Procedures (SOPs) for all operational activities involving radioactive materials that are handled, processed, or stored.

   Section 2 of the licensee's Radiation Protection Procedures Manual, requires, in part, that a set of air samples are to be taken annually at various mill sites and are to be analyzed for natural uranium, thorium-230, radium-226, lead-210, and polonium-210.

   Contrary to the above, the licensee did not take the set of air samples specified in the application for radioisotopic analyses during 1996.

   This is a Severity Level IV violation (Supplement VI).

B. License Condition 9.3 requires, in part, that the licensee conduct operations in accordance with statements, representations, and conditions contained in the license renewal application submitted by letter dated August 23, 1991. Section 2.3 of the renewal application states, in part, that fixed and removable alpha surveys will be conducted weekly at various site locations.

   Contrary to the above, during 1997 weekly alpha surveys were not conducted as specified. The number of alpha surveys not conducted represented 20 percent of the required total for that duration.

   This is a Severity Level IV violation (Supplement VI).

C. License Condition 48.A requires, in part, that the licensee implement a groundwater detection monitoring program to ensure compliance to 10 CFR Part 40, Appendix A. The detection monitoring program is required to be in accordance with the licensee's August 1, 1989, submittal. The program is to include the following actions. The leak detection system for all ponds are to be checked weekly. If liquid is present, the water is to be analyzed for chloride, sulfate, selenium, and pH. The samples are to be statistically analyzed to determine if significant linear trends exist and the results are to be submitted to the NRC for review.

Contrary to the above, the licensee analyzed seven pond water samples in 1997 and 28 pond water samples in 1996 from Cell 2 and Cell 4A; however, the samples were not statistically analyzed to determine whether significant linear trends existed and the results were not submitted to the NRC for review.

This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, International Uranium (USA) Corporation is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555, with a copy to the Regional Administrator, Region IV, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

Because the response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. However, if it is necessary to include such information, it should clearly indicate the specific information that should not to be placed in the PDR, and provide the legal basis to support the request for withholding the information from the public.

Dated at Arlington, Texas
this 12th day of August 1997

ENCLOSURE 2

U. S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket No.:	40-8681
License No.:	SUA-1358
Report No.:	40-8681/97-02
Licensee:	International Uranium (USA) Corporation (IUC)
Facility:	White Mesa Mill
Location:	Blanding, Utah
Inspection Dates:	July 15-17, 1997
Inspector:	M. Linda McLean, Senior Health Physicist
Accompanied by:	James R. Park, Project Manager Uranium Recovery Branch Nuclear Material Safety and Safeguards
	Amitava Ghosh, Ph.D., Senior Research Engineer Center for Nuclear Waste Regulatory Analyses
Approved By:	Charles L. Cain, Chief Nuclear Materials Licensing Branch
Attachment:	Supplemental Inspection Information

EXECUTIVE SUMMARY

White Mesa Mill Facility
NRC Inspection Report 40-8681/97-02

This inspection included a review of site status, management organization and controls, site operations, and the licensee's radiation protection and environmental monitoring programs.

Management Organization and Controls

- One change had been made to the organizational structure since the last inspection with the addition of an industrial safety manager. The site staffing was appropriate for the amount of work in progress at the facility. The licensee was operating under a performance-based license with an expiration date of March 31, 2007 (Section 2).

- Adequate Standard Operating Procedures (SOPs) had been established at the site; however, several procedures needed to be updated and better maintained (Section 2).

Operations Review

- Site fences were in good condition, and perimeter postings were appropriate; however, some radiation area signs needed to be replaced. No safety hazards were identified (Section 3).

Radiation Protection

- Two violations were identified. The first violation involved the licensee's failure to take air samples specified in their license application and analyze them for various radioisotopes. In the second instance, the licensee failed to perform weekly alpha surveys on numerous occasions during 1997 (Section 3).

Environmental Monitoring

- The licensee's implementation of its environmental monitoring program appeared effective with one exception. A violation was identified that involved the failure to statistically analyze pond water sample results to determine if significant linear trends exist and to submit the results to the NRC for review (Section 4).

Report Details

1 **Site Status**

The International Uranium (USA) Corporation's White Mesa uranium mill was in operation during this inspection. License Conditions 10.6, 10.7, and 10.8 authorized IUC to process alternate feed materials through the uranium mill circuit. Three alternate feed materials were approved: potassium hydroxide [KOH], calcium fluoride [CaFl], and Cotter concentrate material. The mill processed approximately 12 thousand drums of the CaFl material from May through August 1996. Processing of the KOH material began in May 1997, and the dryer was started up on July 12, 1997. A total of 28 drums (approximately 32 thousand pounds) of U_3O_8 had been packaged as of July 15, 1997. The licensee planned to begin processing the Cotter concentrate alternate feed material at the conclusion of the KOH run, which was expected to be in August.

Alternate feed material on site included 1,979 drums remaining from the original lot of 15,787 55-gallon drums of CaFl, approximately 300 remaining drums of KOH out of the original 1,744, and 810 drums of Cotter concentrate. At least another 310 drums of Cotter concentrate were expected to be received this year. The licensee also planned to initiate mining activities.

2 **Management Organization and Controls (88005)**

a. Inspection Scope

The organizational structure was reviewed to ensure that the licensee had established an organization with defined responsibilities and functions.

b. Observations and Findings

One change had been made to the organizational structure since the last inspection with the addition of an industrial safety manager. At the time of the inspection, the licensee was operating under a renewed NRC license with an expiration date of March 31, 2007. IUC's source material license includes a performance-based license condition (PBLC) (License Condition 9.4) which provides that the licensee may (1) make changes in the facility or process as presented in the application; (2) make changes in the procedures presented in the application; or (3) conduct tests or experiments not presented in the application, without prior NRC approval, if the licensee ensures that the following conditions are met:

- The change, test, or experiment does not conflict with any requirement specifically stated in the license or impair the licensee's ability to meet all applicable NRC regulations.

- There is no degradation in the essential safety or environmental commitments in the license application, or provided by the approved reclamation plan.

- The change, test, or experiment is consistent with the conclusions of actions analyzed and selected in the licensee's Environmental Assessment dated February 1997.

The licensees's determinations as to whether the above conditions are satisfied are to made by a Safety and Environmental Review Panel (SERP), and the licensee is to maintain records of any changes made pursuant to this condition until license termination. In addition, IUC is required to function in accordance with the SOPs submitted by letter dated June 10, 1997.

In addition, License Condition 9.4 requires the licensee to make determinations assuring changes conform to radiation safety and environmental requirements. Records of the SERP reviews are required to be submitted to the NRC annually. The inspectors reviewed one SERP document generated since the issuance of the PBLC. The record documented the SERP meeting that discussed potential SERP activities. The licensee had appointed the appropriate individuals as members of the SERP.

The performance-based license was issued March 14, 1997. This inspection reviewed compliance with both the old and the new license.

As specified in License Condition 9.6, the licensee is required, in part, to establish written SOPs for all operational activities involving radioactive materials that are handled, processed, or stored. The licensee's SOPs were reviewed during the inspection. The SOPs appeared to contain, in most cases, an adequate level of detail; however, it was noted that some needed to be updated and expanded to adequately cover the site activities. For example, the SOP for radiation work permits (RWPs) did not describe the mechanism for review (e.g., who reviews and signs the RWP). Additionally, the SOP for tailings monitoring did not describe all aspects of the leak detection monitoring requirements.

Furthermore, many of the SOPs were not easily accessible in that they were located in the license application only. Specifically, the environmental and radiation protection procedures could only be found in the license application. The licensee agreed that maintaining separate books of these SOPs would be appropriate. The mill operating SOPs were located in the areas of use and available to the workers. In addition, employee training included reviews of the procedures. The SOPs had been reviewed during the previous year (July 1996) by the radiation safety officer (RSO), and they were in the process of being reviewed as required by License Condition 9.6 at the time of this inspection.

c. Conclusions

One change had been made to the organizational structure since the last inspection with the addition of an industrial safety manager. The site staffing was appropriate for the amount of work in progress at the facility. The licensee was operating under a performance-based license with an expiration date of March 31, 2007.

SOPs had been established at the site; however, several procedures needed to be updated and better maintained.

3 Operations (88020)

a. Scope

The inspector reviewed licensee operations to determine compliance with applicable requirements specified in the license, and site tours were performed to verify that site activities were being conducted in accordance with applicable regulations and the conditions of the license.

b. Observations and Findings

During the site tours, site buildings, fences, gates, and operating equipment were observed. Site fences were in good condition. Area perimeter and building postings were in accordance with the requirements of the license and 10 CFR Part 20. However, it was noted that some of the signs were faded and in need of replacement. The central plant areas were being kept clean and orderly. No evidence of leaking valves or tanks was observed.

Independent radiation surveys were conducted by the inspector with a microrem meter. Dose rates were consistent with the licensee's survey results. Measurements at the ore pad were measured as high as 0.7 millirem per hour (mr/hr). Mill spoils were still stored on the ore pad as well as the alternate feed material. Dose rates on contact of the drums storing the KOH material were measured as high as 0.3 mr/hr. For As Low As is Reasonably Achievable (ALARA) purposes, the licensee was constructing a remote handling system for emptying the drums into the mill circuit. The licensee stated that the mill spoils would be reprocessed through the mill sometime in the future.

During a tour, the inspectors observed the receipt of 45 drums of the Cotter material. The licensee performed all the required surveys for receipt of the material. Also the inspectors observed the yellowcake packaging operation. The operator was wearing required protective equipment including a respirator, rubber boots, gloves, and coveralls. No problems were identified with either activity.

c. Conclusions

Site fences were in good condition and perimeter postings were appropriate; however, some radiation area signs needed to be replaced. No safety hazards were identified.

4 Radiation Protection (83822)

4.1 Inspection Scope

The purpose of this portion of the inspection effort was to determine if the licensee's radiation safety program was in compliance with requirements established in the license and 10 CFR Part 20 regulations.

4.2 Observations and Findings

a. Employee Exposures\Bioassay Program

The licensee's internal and external monitoring programs were reviewed. The licensee's personnel monitoring program consisted of issuance of thermoluminescent dosimeters (TLDs), sampling for airborne natural uranium and radon, and obtaining urine bioassay samples from site workers. The information gained from the TLDs and the air samples were then used by the licensee to determine the site employee's occupational exposures to radiation. The workers' total effective dose equivalent (TEDE) was a combination of external exposures (as measured by the TLDs) and internal exposures as calculated based on data obtained through radiological sampling.

The licensee's personnel exposure records were reviewed. The licensee issued TLDs to all operations, maintenance, management, and technical staff quarterly. Based on the 1996 TLD records, the highest deep dose equivalent was 449 millirems, less than 10 percent of the limit specified in 10 CFR Part 20.

Internal exposures were calculated based on time spent in areas with known airborne uranium and radon progeny concentrations. As part of the licensee's radiation protection program, airborne uranium and radon progeny concentration sampling were performed during periods of plant operations on a weekly basis in areas associated with yellowcake production and on a monthly basis in other areas. Airborne particulate samples were collected in 26 locations. Radon progeny samples were collected in 27 locations.

During 1996, airborne uranium concentrations were less than 25 percent of the derived air concentration (DAC) (year class) established in 10 CFR Part 20, Appendix B, with the exceptions of the yellowcake dryer and packaging enclosures, the yellowcake packaging area, the SAG mill area, and the CaFl dump tank area. These areas were posted as airborne radioactivity areas. Full face respirators were required in the yellowcake dryer and packaging enclosures. The highest committed effective dose equivalent for 1996 was 490 millirems, less than 10 percent of the limit.

During the inspection, on July 15, 1997, the result of the weekly particulate air sample by the south dryer door was 172 percent of the DAC for natural uranium and 263 percent on July 16, 1997. The dryer was shut down on July 16, 1997, and the sampling frequency increased. Also, the area was posted as an airborne radioactivity area, and the RSO was investigating the cause of the increased concentration in the area. No conclusions had been made prior to the end of the inspection.

The licensee used the modified Kusnetz method for measuring radon progeny concentrations. The procedure consisted of sampling radon progeny on a high efficiency filter paper and measuring the alpha counts on the filter. In 1997 to date, the highest radon progeny concentration was 0.02 working levels.

At the end of 1996, the licensee calculated the TEDE for site workers. The TEDEs were a combination of TLD exposures, as well as the working level months and potential uranium uptakes converted to millirem values. The licensee's records indicated that the highest TEDE was 550 millirems, a little more than 10 percent of the 5000 millirem per year limit.

Occupational doses appeared consistent with the level of activity in progress at the site. In compliance with 10 CFR `9.13, the licensee provided to each worker, required to be monitored for radiation exposure a record, of their dose for 1996.

The urine bioassay program was reviewed to determine compliance with the license application commitments and 10 CFR Part 20. Urine bioassays were performed quarterly during periods of mill stand-by or when specified by an RWP. During mill operation, yellowcake packaging workers supplied bi-weekly samples while other workers were sampled monthly. The licensee used an action level of 15 micrograms per liter (μg/l) uranium in urine samples. During this inspection period, no samples exceeded the action limit. No problems were identified with the bioassay program.

b. Annual ALARA Audit

An ALARA audit is required to be performed on an annual basis by 10 CFR 20.1101 and License Condition 33 of the old license. The licensee conducted the 1996 ALARA audit in November 1996 and in compliance with License Condition 33 submitted a copy of the ALARA report to the NRC by letter dated March 28, 1997. The audit report summarized the results of the radiation safety activities during 1996 and contained all of the required information required by the license and 10 CFR Part 20.

c. Employee Training

In compliance with 10 CFR Part 19, the licensee had provided radiation safety training to all radiation workers. A review of records relating to personnel training including new employees and female employees was performed. The last 8-hour refresher training was conducted in February 1997. The course included written and graded examinations at the conclusion of the training. The inspector reviewed the agenda and found that it covered the topics specified in 10 CFR Part 19.

d. Decommissioning Recordkeeping

Records required by 10 CFR 40.36, "Financial Assurance and Recordkeeping for Decommissioning," were reviewed. The files were maintained in the licensee's Spill Containment and Countermeasures Plan and Reports file. No additions to the file had been made since 1995. A separate file was used for the licensee's financial surety information. The inspector discussed the requirements of 10 CFR 40.36 with the licensee.

e. Radiation Surveys/Radiation Work Permits (RWPs)

The radiation safety program activities included weekly, monthly, and quarterly inspections. The RSO prepared monthly radiation safety reports for submission to facility management. The inspector reviewed a representative sample of the monthly reports since January 1997 and noted that the reports included appropriate topics and concerns for the activities in progress.

Section 5.0 of the license application dated July 1991 describes the RWP program at White Mesa. Seventeen RWPs were issued since the last inspection in January 1997. The inspector reviewed a representative sample of the RWPs issued since the last inspection and concluded that the RWPs adequately addressed safety hazards involved with the activities. However, it was noted that the RWPs were not being signed by a reviewer in the space provided on any of the permits. Additionally, the RWP procedure did not describe the mechanism for review (e.g., who reviews and signs RWPs).

Section 2 of the licensee's Radiation Protection Procedures Manual, requires, in part, that the licensee take a set of air samples annually at various mill sites and analyze them for natural uranium, thorium-230, radium-226, lead-210, and polonium-210. The licensee did not take the set of air samples specified in their application for radioisotopic analyses during 1996. This was identified as a violation of License Condition 11 of the old license (40-8681/9702-01).

A second violation was identified involving the failure to perform alpha surveys at the required frequency. In Section 2.3 of the renewal application, submitted by letter dated August 23, 1991, the licensee stated that fixed and removable alpha surveys will be conducted weekly at various site locations.

It was noted that during 1997 numerous weekly alpha surveys were not conducted as specified. Specifically, alpha surveys were not conducted in the required areas on January 1, March 7, March 23, 1997, May 30 and June 9, 1997. The number of alpha surveys not conducted represented 20 percent of the required total for that duration. This was identified as a violation of License Condition 9.3 (40-8681/9702-02).

f. Radioactive Waste Management\Transportation

The licensee was authorized by License Condition 10.5 to dispose of byproduct material generated at licensed in-situ leach facilities. No material had been received for disposal since the last inspection. The disposal of material received in December 1996 was delayed until April 1997, due to inclement weather. The material was disposed of in Cell No. 3, the authorized site of disposal. By letter dated February 13, 1997, the licensee provided to the NRC the annual summary of amounts of waste disposed of from off-site generators. Approximately 411 cubic yards and 52 cubic yards were received from the two generators, respectively, during 1996. The license authorizes a total of 5000 cubic yards per generator.

No yellowcake shipments had been made since October 1996. The inspector reviewed the Department of Transportation shipping papers for shipments for the alternate feed material received and identified no problems. No transportation incidents have occurred during this inspection period.

4.3 Conclusions

Two violations were identified. The first violation involved the licensee's failure to take air samples specified in their radiation safety procedures for radioisotopic analysis. In the second instance the licensee failed to perform weekly alpha surveys on numerous occasions.

5 Environmental Protection (88045)

5.1 Inspection Scope

The environmental monitoring program at the site was reviewed to assess the effectiveness of the licensee's program and to evaluate the effects, if any, of site activities on the local environment.

5.2 Observations and Findings

The environmental program requirements are identified in License Condition 11.2. The environmental program consisted of stack sampling, surface water samples, and groundwater sampling. In addition, the program included ambient air particulate sampling at four environmental stations, as well as measurement of the ambient gamma exposure rates at five sample stations. Furthermore, water, soil, and vegetation samples were collected to comply with the license application commitments. Compliance with environmental radon was demonstrated by the MILDOS computer code.

a. Airborne Effluent Environmental Monitoring

Air particulate samples were obtained at four sample stations surrounding the facility. The samples were analyzed quarterly for their natural uranium, radium-226, lead-210, and thorium-230 concentrations. In 1996, the highest sample result measured was obtained for thorium-230 from the BHV-5 station at the restricted area boundary and within the property boundary. The concentration was measured at 11.9 percent of the effluent concentration established in 10 CFR Part 20, Appendix B. All other air particulate sample results were less than 10 percent of the limits during 1996. No significant trends were identified by the licensee.

Ambient gamma exposure rate measurements were obtained using TLDs at five locations. The background station measured 90 millirems during calendar year 1996. The highest exposure was measured at the east tailings area (BHV-5) station. This station measured 97 millirems during 1996 or 7 millirems above background. This value was well below the total effective dose equivalent dose limit (100 millirems per year) established in 10 CFR 20.1301 for individual members of the public.

b. Soil and Vegetative Sampling

Vegetation and soil samples were obtained at the three sample stations twice during 1996. The license application specified that samples would be taken three times per year; however, the second quarter of 1996 was declared a disaster due to drought conditions in Utah and the third set of samples were not taken. These samples were analyzed for radium-226 and lead-210 concentrations. The sample results indicated that the radionuclide concentrations were comparable to the previous year's sample results.

c. Groundwater and Surface Water Monitoring Program

The groundwater detection monitoring program requirements are described in License Condition 48 of the old license and License Condition 11.3 of the new license. These conditions require, in part, that the licensee implement a groundwater detection monitoring program to ensure compliance with 10 CFR Part 40, Appendix A. The detection monitoring program is to be in accordance with the licensee's August 1, 1989, and October 5, 1994, submittals. The program is to include the following actions. The leak detection system for all ponds are to be checked weekly. If liquid is present, the water is to be analyzed for chloride, sulfate, selenium, and pH. The pond water sample results are to be statistically analyzed to determine if significant linear trends exist, and the results are to be submitted to the NRC for review.

The licensee analyzed seven pond water samples in 1997 and 28 pond water samples in 1996 from Cell 2 and Cell 4A; however, the samples were not statistically analyzed to determine whether significant linear trends existed, and the results were not submitted to the NRC for review. This was identified as a violation of conditions of the license (40-8681/9702-03).

4.3 Conclusions

The licensee's implementation of its environmental monitoring program appeared effective with one exception. A violation was identified that involved the failure to statistically analyze pond water sample results to determine if significant linear trends exist and to submit the results to the NRC for review.

5 Exit Meeting Summary

The inspector presented the inspection results to the site representatives of the licensee at the conclusion of the inspection on July 17, 1997. Licensee representatives acknowledged the findings as presented.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

William N. Deal, Mill Manager
Michelle R. Rehmann, Environmental Manager
Ron E. Berg, Radiation Safety Officer
Shannon Clark, Environmental Technician
Wayne Palmer, Radiation Technician

INSPECTION PROCEDURES USED

IP 88005: Management Organization and Controls
IP 88020: Operations Review
IP 83822: Radiation Protection
IP 88035: Radioactive Waste Management
IP 88045: Environmental Protection
IP 88010: Operator Training
IP 86740: Transportation

ITEMS OPENED, CLOSED AND DISCUSSED

Opened:

40-8681/9701-01	VIO	Failure to take the annual set of air samples for radioisotopic analyses during 1996.
40-8681/9701-02	VIO	Failure to statistically analyzed pond water sample results to determine whether significant linear trends existed and to submit this information to the NRC.
40-8681/9701-03	VIO	Failure to conduct several required weekly alpha surveys during 1997.

Closed: None

Discussed: None

LIST OF ACRONYMS USED

ALARA	As Low As is Reasonably Achievable
DAC	derived air concentration
IUC	International Uranium Corporation
PBLC	performance-based license condition
RSO	radiation safety officer
RWP	radiation work permit
SERP	Safety and Environmental Review Panel
SOPs	standard operating procedures
TEDE	total effective dose equivalent
TLD	thermoluminescent dosimeter

INTERNATIONAL URANIUM (USA) CORPORATION

6425 S. Hwy. 191 • P.O. Box 809 • Blanding, UT 84511 • 801 678 2221 (phone) • 801 678 2224 (fax)

September 11, 1997

Via: Certified Mail Number P 077 021 193

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D.C. 20555

Re: International Uranium (USA) Corporation
License: SUA-1358
Docket: 40-8681
White Mesa Mill
NRC Inspection Report 40-8681/97-02 and Notice of Violation
Response to Notice of Violation

To Whom It May Concern:

Attached is the International Uranium (USA) Corporation, (IUSA), response to the Notice of Violation dated August 12, 1997. The Notice of Violation is a result of the NRC inspection conducted at the White Mesa Mill on July 15 to 17, 1997.

If you have any questions regarding this matter, please feel free to contact me at (801) 678-2221.

Sincerely,

William N. Deal
Manager, White Mesa Mill

Attachment

xc: Central file
R. A, Scarono, Regional Administrator, NRC Region IV
E. E. Hoellen, IUSA
D. C. Frydenlund, IUSA
H. R. Roberts, IUSA
M. R. Rehmann, IUSA
R. E. Berg, IUSA
W. J. Sinclair, Executive Secretary, Utah Radiation Control Board

Violation 40-8681/9701-01

Failure to take the annual set of air samples for radioisotopic analyses during 1996

License Condition No. 29 requires, in part, that the licensee establish written Standard Operating Procedures (SOPs) for all operational activities involving radioactive materials that are handled, processed, and stored.

Section 2 of the licensee's Radiation Protection Procedures Manual, requires, in part, that a set of air samples are to be taken annually at various mill sites and are to be analyzed for natural uranium, thorium-230, radium-226, lead-210, and polonium-210.

Contrary to the above, the licensee did not take the set of air samples specified in the application for radioisotopic analyses during 1996.

Reason for Violation

In the White Mesa Mill's License Application, License No. 1358, Docket No. 40-8681, appendix D, the White Mesa Mill's Radiation Protection Procedures Manual is attached. Specifically Section 2.1 of that manual identifies procedures, equipment, frequency and locations, etc. for high volume area airborne particulate sampling. Subsection 2.1.2 indicates, in part, "Annually a set of samples, covering eight hours of sampling, each at 40 slpm, will be taken at all sites on Table – Airborne Radiation Sampling Locations, and analyzed for: U-nat,Th-230, Ra-226, Pb-210 and Po-210."

License Condition 11.4 of the current Operating License, expiration date 2007 indicates: **"During extended periods of mill standby, eight-hour annual sampling for U-nat, Th-230, Ra-226, Pb-210 and Pb-210 may be eliminated, if routine airborne sampling shows levels below 10% of 10 CFR Part 20, limits"** (emphasis added). The mill went into standby status in March 1996 and returned to operational status from June 1996 until September 1996. From October 1996 through May 1997 the Mill was once again in standby status.

During that time, uranium airborne particulate sample concentrations were below 10% of the 10 CFR Part 20 limits (twenty three locations) with the exception of the north and south drying rooms and the yellowcake packaging room. These areas slightly exceeded 10% of the most restrictive DAC concentration (14 to 20%) with a maximum concentration of 30% of DAC. These areas were never entered, even on a non-routine basis. There was no maintenance activity in these areas at any time. These areas were sampled only as a matter of routine. Annual, eight-hour samples were collected and analyzed for the above isotopes on December 19, 1995.

It is our opinion that because the White Mesa Mill was in abeyant operational status for an extended period of 1996, as well as 1997, and that any area of the Mill except for non-occupied, closed, non-operating rooms were below 10% of the most restrictive 10CFR

Parts 20 limits, that no violation of the operating license occurred. It was the Licensee's interpretation of this license condition that until the Mill resumed operation, no annual eight-hour sampling was required.

Additionally, Section 2.1.2 of the License Renewal Application, in part, indicates that the Radiation Safety Officer (RSO) will designate those areas that are required to be involved in area monitoring during non-productive periods. The three unoccupied areas which exceeded 10% of the most restrictive 10 CFR Part 20 limits were not designated by the RSO as areas where sampling was required, because they were no-occupied, closed, non-operating areas. However these areas were sampled inadvertently by staff personnel, again as a matter of routine.

Circumstances that led to the violation

To review the circumstances that led to the violation, IUC has conducted interviews with management personnel and those responsible for implementing and conducting the various sampling programs required at the mill and reviewed data and other records that relate to the violation. The annual eight-hour air-sampling program was reviewed to assess the adequacy and effectiveness of the program. It was the opinion of the licensee that because of the abeyant operational status of the mill and all areas of the mill were below 10% of the 10 CFR Part 20 limits for that period except in three non-operational areas, that the exemption of License Condition 11.4 of the license was applicable. The appropriateness of this determination was supported by the discretional designation of which areas of the mill are subject to air monitoring requirement during non-operational periods. It was determined by the RSO that because of the non-operational, non-occupied areas of the yellowcake drying network that air sample collection in those closed rooms was not required. Inadvertent samples were collected in those rooms as a matter of routine.

The root cause of the violation can be attributed to the miscommunication to the staff with respect to sampling protocol during non-operational periods. Staff was not requested to sample the three areas and should not have sampled them. However once the samples had been taken, staff simply formally documented, recorded and evidenced the fact.

Corrective actions taken and results achieved

As stated above, a thorough review of the area radiation-monitoring program has begun to ensure a full understanding and compliance with the program.

Additionally, a review and analysis of the environmental and radiological impact of a change in the High Volume Airborne Particulate Sampling procedure will be conducted. If the review indicates that the program can be modified without any adverse impacts on the environment, or the radiological health and safety of the employees and public, a request for amendment will be prepared and submitted to the U. S. NRC. This request to amend the High Volume Airborne Particulate Sampling Procedure will be based on analyses and review of historical data relating to this provision with regard to meanfullness of data, applicability to radiological exposure assessments to mill personnel and scientific value.

Should this review and analysis of environmental impact provide a basis for a change in High Volume Airborne Particulate Sampling under Section 2.1.2, it is suggested in part this section be amended to: Annually a set of samples covering eight hours sampling at a high collection flow rate ($\geq$ 40 lpm) at routinely occupied or frequented areas will be taken and analyzed for gross alpha. An isotopic analysis of operation mill feed or production product will be analyzed for isotopes U-nat, Th-230, Ra-226, and PB-210 and will be used as fundamental constituent composition of air sample particulates.

Steps to Avoid Future Violations:

Implementing initiatives for continuous formal communication directives, policies and substantive plans between management and staff will eliminate violations of this nature. Management, to ensure the effectiveness and applicability to the policy will conduct a frequent review of these initiatives.

The implementation of communications initiatives is currently in place and continuously ongoing. These provisions have been and will be reviewed by management ALARA audit programs. A review and subsequent license amendment request of sample collection of area airborne samples described as deficient in this notice of violation will be completed and submitted to the U. S. NRC within 60 days from this response date.

40-8681-9701-02

Failure to statistically analyze pond water sample results to determine whether significant linear trends existed and to submit this information to the NRC.

"License Condition 48.A requires, in part, that the licensee implement a groundwater detection monitoring program to ensure compliance to 10 CFR Part 40, Appendix A. The detection monitoring program is required to be in accordance with the licensee's August 1, 1989, submittal. The program is to include the following actions. The leak detection systems for all ponds are to be checked weekly. If liquid is present, the water is to be analyzed for chloride, sulfate, selenium, and pH. The samples are to be statistically analyzed to determine if significant linear trends exist and the results are to be submitted to the NRC for review."

"Contrary to the above, the licensee analyzed seven pond water samples in 1997 and 28 pond water samples in 1997 from Cell 2 and Cell 4A; however, the samples were not statistically analyzed to determine whether significant linear trends existed and the results were not submitted to the NRC for review."

"This is a Severity Level IV violation (Supplement VI)."

Reason for the Violation

This violation concerns a failure to statistically analyze and send analytical results of Leak Detection System ("LDS") samples to the NRC for review. We note that 10 CFR Part 2, Enforcement Actions Policy and Procedure: Final Rule and Notice (NUREG-1600, June 30 1995)("NRC Enforcement Policy") states that "when a problem requiring corrective action is NRC identified, the decision on whether to give the licensee credit for activities related to identification should normally be based on an additional question: Should the licensee have reasonably identified the problem (and taken action) earlier?" See VI B. 2. b. (2.) (iii). Considering the circumstances detailed below under "Circumstances that led to the violation", as part of the Root Cause Analysis, one might question if it was reasonable to have expected International Uranium (USA) Corporation ("IUC") to have identified the problem and taken action earlier. In the following Root Cause Analysis, we attribute our failure to identify this potential violation to three factors: (A) our understanding of the specific wording used in applicable license conditions and referenced submittals; (B) previous NRC inspection report conclusions that our program was in full compliance with the applicable license conditions; and (C) our long-held understanding of the technical basis and objectives of the groundwater monitoring program.

We view the current NRC finding as an opportunity to analyze the situation with a view to ensuring that the license conditions and technical submittals are compatible and reflective of the correct technical approach. We note, for example, that at least three recent NRC inspections concluded that "the monitoring program was being conducted in accordance with license requirements". However, we also note that the reissued license has eliminated references to technical support documents which had been conditioned in the previous license, thereby eliminating reference to a key technical submittal made on August 1, 1989, that described the purpose of leak detection system monitoring.

The stated purpose of LDS monitoring was that a statistically significant increase in the volume of fluid would trigger an increased sampling frequency of compliance monitoring wells on the downgradient edge of the disposal area. Under Corrective Actions Taken and Results Achieved, we propose working with the NRC to gain concurrence on the objectives and requirements of the present license, with the goal of promptly developing modifications to our reporting program and/or license amendments to ensure compatibility between the technical and compliance aspects of the groundwater monitoring program. Under Steps to Avoid Future Violations, we find that a review of the existing program in light of present license conditions and overall program intent is needed. This analysis, which is likely to lead to an application to amend the license to meet the objectives of the groundwater monitoring program, is a comprehensive means to prevent a repeat of this violation.

ROOT CAUSE ANALYSIS

Circumstances That Led to the Violation

To review the circumstances that led to the violation, IUC has conducted interviews with management personnel and those responsible for training or procedure development/guidance, with emphasis on lines of communication between supervisors and workers; and reviewed audits and other records that relate directly or indirectly to the violation. The groundwater monitoring program was reviewed to assess whether or not its overall objectives and requirements are clearly stated and implemented. As detailed below, IUC identified weaknesses in the understanding of this particular requirement. We also found that records which relate directly or indirectly to the violation further give an impression that the existing approach to compliance was appropriate. Finally, we found that the overall program, as updated in the 1994 Point of Compliance report, is no longer conditioned in our license on earlier key submittals. In short, we believe that the root cause of this violation was our failure to reassess the associated pond monitoring requirements in light of the final Point of Compliance ("POC") approach, which was reviewed and approved by the NRC; and to ensure that the POC approach did not change the originally-stated objective of LDS monitoring.

A. Applicable License Conditions

Prior to the March, 1997 renewal of the NRC License for the Mill, the following license conditions were in effect with regard to (1) environmental monitoring and (2) monitoring of the leak detection systems ("LDS"):

1. Effluent and Environmental Monitoring

License Condition 24 in License Amendment No. 40 reads as follows (emphasis added):

24. The licensee shall implement the effluent and environmental monitoring program specified in Section 5.5 of the renewal application **as revised with the following modifications or additions:**

A. Stack sampling shall include a determination of flow rate.

B. TLD chips used for radon monitoring shall be exchanged and read quarterly.

C. Surface water samples shall also be analyzed semiannually for total and dissolved U-nat, Ra-226, and Th-230 with the exception of the Westwater Creek, which shall be sampled annually for water or sediments and analyzed as above. A sediment sample shall not be taken in place of a water sample unless a water sample was not available.

D. Groundwater samples from Monitoring wells, 1, 2, 3, 4, 5, 11, 12, 14, 15, and the culinary water well, shall be analyzed quarterly for pH, specific conductance, chlorides, sulfates, TDS, and U-nat. Quarterly water level measurements shall also be made. Groundwater samples shall be analyzed semiannually for arsenic, selenium, sodium, Ra-226, Th-230, and Pb-210.

E. Data for the quarterly groundwater parameters shall be maintained in graphical form and copies of the graphs included with the environmental monitoring reports submitted in accordance with 10 CFR 40.65.

F. The licensee shall utilize lower limits of detection in accordance with Section 5 of Regulatory Guide 4.14, Revision 1, dated April 1980, for analysis of effluent and environmental samples.

G. The inspections performed semiannually of the critical orifice assembly committed to in the submittal dated March 15, 1986, shall be documented. The critical orifice assembly shall be calibrated at least every 2 years against a positive displacement Roots meter to obtain the required calibration curve.

[Applicable Amendments: 2, 15, 28, and 31]

We have always interpreted the highlighted phrase "**as revised with the following modifications or additions**", as meaning that points A through G revise, modify and supersede provisions in License Condition 24.

2. Leak Detection System Monitoring

In addition to the groundwater monitoring described in License Condition 24, License Condition 48 of Amendment No. 40 references the licensee's August 1, 1989 submittal (emphasis added):

48. The licensee shall implement a groundwater detection monitoring program to ensure compliance to 10 CFR Part 40, Appendix A. The detection monitoring program **shall be in accordance with the licensee's August 1, 1989, submittal and include the following:**

   A. The leak detection system for all ponds will be checked weekly. If liquid is present, it shall be analyzed for chloride, sulfate, selenium and pH. The samples will be statistically analyzed to determine if significant linear trends exist and the result will be submitted to the NRC for review.

   B. If a significant trend is indicated, the licensee will submit a proposed corrective action for review and approval to the NRC. The corrective action shall include a discussion on delineation of the areal extent and concentration of hazardous constituents.

   C. To determine whether increases in the Pond 2 leak detection system are from tailings seepage or from sedimentation pond seepage, the licensee shall by April 1, 1991, implement the changes proposed in their submittal of April 3, 1990. In addition, the licensee shall collect a minimum of six samples characterizing the sedimentation pond material prior to construction and analyze for U-nat and Ra-226. A copy of the analyses shall be submitted by February 15, 1991.

   D. The licensee shall sample monitoring wells 5, 11, 12, 14, and 15 for potential hazardous constituents and submit this data to the NRC so that background can be established and groundwater protection standards set.

   [Applicable Amendments: 6, 8, 10, 22, and 38]

We have always interpreted the highlighted phrase, **"shall be in accordance with the licensee's August 1, 1989, submittal and include the following:"** as meaning something quite different from the highlighted phrase in License Condition 24. This is that points A through D do not replace or supersede the August 1, 1989 submittal, but that the August 1, 1989 submittal prevails, with the addition of points A through D. Our interpretation has been that if the NRC had meant for License Condition 48 to be intended to replace the August 1, 1989 submittal, the language would have been similar to that used in License Condition 24.

Indeed, it has long been our understanding that the NRC expected us to comply with both License Condition 48 <u>and</u> the August 1, 1989 submittal. That submittal listed a series of events which must occur prior to statistical analysis of monitoring well data to determine if significant linear trend exists for the selected, listed parameters. In particular, the following two events must first occur:

1. The Leak Detection System is checked weekly to detect the presence of any liquids. Any liquids present will be sampled; and

2. Determination of significant leakage will trigger an increased sampling frequency of the down gradient edge of the disposal area.

The August 1, 1989 submittal defines the level of "significant leakage" that would trigger increased sampling of the monitoring wells (not the LDS).

Upon review, we find that License Condition 48, in particular, was confusing as to what is required. Nevertheless we have, to the best of our abilities, diligently attempted to comply. With regard to point A of license condition 48, we have collected and analyzed samples collected from the LDS and submitted those data to the NRC for review at inspections. As discussed under (B) below, the outcome of such inspections bolstered our belief that our understanding of the requirement was correct.

With regard to point B of License Condition 48, we have assumed that this was consistent with the August 1, 1989 submittal, which provides that data from the monitoring wells be statistically analyzed. This seems reasonable from the technical perspective, as well, since the data objective would be to use the data from monitoring wells to characterize the nature and extent of contamination.

B. Conclusions from Previous NRC Inspection Reports

In an effort to ensure our common understanding of facts and root causes, and to determine whether or not our interpretation of License Conditions 24 and 48 with the NRC's view during previous years, we have reviewed four recent reports of NRC inspections of the White Mesa Mill. Please note that our summary of these reports (Table 1) shows that in three of four inspections, the inspector specifically reviewed the LDS data requirement and concluded that "the monitoring program was being conducted in accordance with license requirements".

C. Groundwater Monitoring Program Objectives

Understanding the objectives of the groundwater monitoring program is critical to ensuring that the monitoring and reporting associated with the program, and as reflected within license conditions, are consistent. While IUC believes it is vitally important to take prompt corrective actions to address the noncompliant condition, we also believe that the corrective action must be broad enough to reasonably prevent recurrence of the specific violation as well as prevent similar violations. In particular, it appears that the technical approach described in the August 1, 1989 submittal, which was referenced in License Condition 48, is no longer taken into consideration.

ROOT CAUSE ANALYSIS CONCLUSIONS

While we acknowledge that the wording of the License Condition 48 may be interpreted to suggest a need to submit analytical data for the LDS to the NRC, is has, as stated above, long been our understanding that this was a function of the criteria listed in the August 1, 1989 submittal. This approach made technical sense, in that significantly increased levels of liquid in the LDS would trigger increased sampling of monitoring wells, statistical analysis of monitoring well data, and reporting; and, we believed that the NRC had the same understanding, as our inspection reports corroborated. In addition, this approach is consistent with that defined in our Point of Compliance Proposal, which designates that the monitoring wells completed in the perched zone of groundwater, are the points used to evaluate potential leakage from tailings cells.

We have always interpreted the phrase, "**shall be in accordance with the licensee's August 1, 1989, submittal and include the following:**" in License Condition 48 as meaning something quite different from the highlighted phrase in License Condition 24. This is that points A through D do not replace or supersede the August 1, 1989 submittal, but that the August 1, 1989 submittal prevails, with the addition of points A through D. Our interpretation has been that if the NRC had meant for License Condition 48 to be intended to replace the August 1, 1989 submittal, the language would have been similar to that used in License Condition 24.

Corrective Actions Taken and Results Achieved:

As discussed previously, the August 1, 1989 submittal listed a series of events which must occur prior to statistical analysis of monitoring well data to determine if significant linear trend exists for the selected, listed parameters. In particular, the following two events must first occur:

1. The Leak Detection System is checked weekly to detect the presence of any liquids. Any liquids present will be sampled; and

2. Determination of significant leakage will trigger an increased sampling frequency of the downgradient edge of the disposal area.

The August 1, 1989 submittal defines the level of "significant leakage" that would trigger increased sampling of the monitoring wells (not the LDS). IUC is prepared to immediately compile any LDS data the NRC requires, and to seek NRC's assistance in understanding the current License Condition 11.3, to ensure full compliance. Based on our discussions with the NRC during the July 15-17 inspection, it now appears that License Condition 11.3 of our renewal license suggests that the referenced document (in this case, the report entitled "Points of Compliance, White Mesa Uranium Mill," submitted by letter dated October 5, 1994)("Point of Compliance Proposal") is modified by combined conditions for both environmental and leak detection system monitoring; with data from the LDS being submitted to the NRC for review and data from the monitoring wells being submitted in accordance with 40 CFR 40.65.

Although IUC is in the process of compiling LDS quality data for statistical analysis this will not provide a long-term solution. Concurrence between the NRC and IUC on the objectives of the groundwater monitoring program is critical to ensuring that the monitoring and reporting associated with the program, as conditioned by the license, are consistent with those objectives. White IUC desires to take prompt corrective actions to address the noncompliant condition, we also seek NRC's assistance in ensuring that the corrective action is broad enough to reasonably prevent recurrence of the specific violation as well as prevent similar violations. In particular, it appears that the technical approach described in the August 1, 1989 submittal, which was referenced in License Condition 48, be reviewed as to technical impact on the POC program. Perhaps that submittal should remain a technical element of the groundwater monitoring program. On the other hand, given that the POC submittal details criteria that would lead to increased sample frequency, perhaps the LDS approach should be revised. In either event, it would not seem appropriate to infer in any way the LDS is treated as a POC. Statistical analysis of LDS quality data was not proposed by the licensee at any time. Such analysis may result in the misconception that the LDS is viewed as a POC. The LDS clearly is not a POC.

Steps to Avoid Future Violations:

Based on our previous NRC inspections, we believe that the existing license requirement is somewhat different from previous License Condition 48. Our review to date, in fact, suggests that a crucial disconnect has occurred between the technical basis and objectives of the monitoring program, and the license condition. Therefore, IUC commits to promptly submitting a review of the technical basis of the monitoring program and to determining whether or not a license amendment is necessary to ensure compatibility between the technical objectives and the license conditions.

This review and our report of the review will be completed and submitted to the NRC within 60 days of the date of this letter. If IUC finds that a license amendment is indicated, a request to amend will be submitted together with the program review report.

Enclosures (1)

TABLE 1
SUMMARY OF RECENT INSPECTIONS
WHITE MESA MILL

INSPECTION DATE/COMMENTS	LICENSE CONDITION NUMBER	AMENDMENT NUMBER/DATE
March 1-2, 1995 (report March 31, 1995) Inspection Report Section 3.1 Inspector determined that the licensee had complied with these license conditions.	L.C. No. 48	37/December 14, 1994
August 8-11, 1995 (report September 15, 1995 Inspector noted that water was in LDS of cell 4: Concluded that program was in accordance with license requirements.	L.C. No. 48	40/August 1, 1995
January 23-25, 1996 (report March 28, 1996) Inspector noted that the LDS has solutions in it, and discussed leakage rate. Report conclusions state that the monitoring program was being conducted in accordance with license requirements.	L.C. No. 48	41/September 28, 1995
January 14-16, 1997 No mention of LDS.		

40-8681/9701-03

Failure to conduct several weekly alpha surveys during 1997

License Condition 9.3 of Source Material License SUA-1358 requires, in part, that the licensee conduct operations in accordance with statements, representations, and conditions contained in the license renewal application submitted by letter dated August 23, 1991. Section 2.3 of the renewal application states, in part, that fixed and removable alpha surveys will be conducted weekly at various site locations.

Contrary to the above, during 1997 weekly alpha surveys were not conducted as specified. The number of alpha surveys not conducted represented 20 percent of the required total for that duration.

Reason for Violation:

During the first six months of 1997 there were five (5) occasions when the weekly alpha surveys were not conducted in accordance with the license renewal application, due to scheduling oversights. On one occasion, a holiday fell on the scheduled sample date and on the other occasions, personnel assigned to the sampling were on vacation and an adequate task list was not in place at that time to ensure that all required sampling was completed.

Corrective Actions Taken and Results Achieved:

Effective July 21, 1997 all personnel in the Radiation, Safety, and Environmental Departments are being cross-trained in the various sampling requirements for each department. In addition, the weekly alpha surveys have been rescheduled to occur on Monday of each week, rather than Friday. This will allow more flexibility should conflicts arise that prevent the required sampling to take place on a certain day and will ensure that the samples are taken weekly.

Also, a detailed task list is being developed, to ensure that all sampling requirements are met in a timely manner.

Steps to Avoid Future Violations:

As stated above, all Radiation, Safety, and Environmental personnel are being cross trained in sampling requirements and protocol for the various departments.

Also in the future, as personnel in these departments schedule vacations, they will be required to review any upcoming sampling requirements with the appropriate personnel. This requirement, coupled with the implementation of a detailed task list will eliminate any future occurrence of this violation.

Date When Full Compliance Will Be Achieved

As stated above under item 2, the licensee is again in full compliance with License Condition No. 9.3 and Section 2.3 of the renewal application, in that sampling procedures have been revised.

Marah -
If file has a copy,
trash this one

cc MRR WND HRL
DCF REB

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

RECEIVED
DEC - 1 1997
By

November 21, 1997

xc: EEH
docket file

Earl E. Hoellen, President
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: RESPONSE TO NRC INSPECTION REPORT 40-8681/97-02

Dear Mr. Hoellen:

Thank you for your letters dated September 11 and November 3, 1997, in response to our letter and attached Notice of Violation both dated August 12, 1997.

In your first letter, it appeared that you had denied two of the violations identified during the inspection. After a telephonic discussion with members of your staff on October 1, 1997, it was determined that the this was not the intent of your response, and that you agree that the violations had occurred. Your letter dated November 3, 1997, confirmed this agreement and provided a clarification to your response to the Notice of Violation.

We have reviewed your reply and find it responsive to the concerns raised in our Notice of Violation. We will review the implementation of your corrective actions during future inspections or licensing actions to determine whether full compliance has been achieved and will be maintained.

We note in your response that for the two violations in question, you plan to file a request for license amendment to achieve relief from the associated requirements. You should note that you are required to comply with these requirements until a license amendment relieving you from them is issued.

Should you have any questions, we will be glad to discuss them with you.

Sincerely,

Charles L. Cain

Charles L. Cain, Chief
Nuclear Materials Licensing Branch

License: SUA-1358
Docket: 40-8681

International Uranium (USA) Corporation

Mr. William N. Deal, Mill Manager
International Uranium (USA) Corporation
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Mr. William J. Sinclair, Director
State of Utah
Department of Environmental Quality
Division of Radiation Control
168 North 1950 West
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Mr. Pat Mackin, Assistant Director
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6220 Culebra Road
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INTERNATIONAL
URANIUM (USA)
CORPORATION

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6425 S. Hwy. 191 • P.O. Box 809 • Blanding, UT 84511 • 801 678 2221 (phone) • 801 678 2224 (fax)

November 3, 1997

Ms. M. Linda McLean
U. S. Nuclear Regulatory Commission
Region IV
611 Plaza Drive
Suite 1000
Arlington, TX 76011

Via Facsimile (817) 860-8210
Original Via U. S. Mail - Certified Return Receipt

Re: International Uranium (USA) Corporation
Source Material License SUA-1358
Docket No. 40-8681
White Mesa Mill
Supplemental Information to Response to Notice of Violation,
NRC Inspection Report 40-8681/97-02

Dear Ms. McLean:

During the week of July 15-17, 1997, the U. S. Nuclear Regulatory Commission (U.S. NRC) conducted an inspection at the International Uranium (USA) Corporation [IUC] White Mesa Mill. During the course of this inspection, three (3) apparent violations of the operating license were identified.

IUC filed a Response to Notice of Violation with the NRC dated September 11, 1997, (attached). The wording in the initial Response to Notice of Violation, may have indicated, unintentionally, a challenging position with regard to two of the violations.

After discussing the nature and context of the violations and IUC's response and corrective action plan with yourself and Mr. James Park, IUC concurs with the NRC's issuance of the violations. This letter identifies more clearly IUC's corrective action plan and response to the NOVs.

The necessary actions will be implemented by IUC to correct the noted deficiencies as follow:

<u>Violation 40-8681/9701-01</u>
<u>Failure to take the annual set of air samples for radioisotopic analysis during 1996</u>.

IUC intends to forward, for review and approval, a license amendment request which will rescind the existing provision and requirements of air sampling monitoring as delineated in Section 2 of the licensee's Radiation Protection Procedures Manual, and replace them with a more effective alternative. Our request will be filed with the NRC within 30 days of this letter.

Violation 40-8681/9701-02
Failure to statistically analyze pond water sample results to determine whether significant linear trends existed and to submit this information to the NRC.

As discussed in our telephone meeting of October 1, IUC realizes that, particularly when compared with the conditions regarding this requirement as stated in the license renewal, our failure to statistically analyze and send analytical results of the Leak Detection System ("LDS") samples to the NRC for review is a violation. We are, however, concerned that the existing license condition may not be based on appropriate technical basis; therefore, we view the current NRC finding as an opportunity to analyze the situation with a view to ensuring that the license conditions and technical submittals are compatible with and reflective of the correct technical approach. It is also timely and appropriate to review the data gathered to date to ensure that the technical approach reflects those data and supports the monitoring objectives.

In view of the above, and as per our October 1 discussion, it is our intent to implement the following corrective actions:

1. Compile and analyze the analytical data gathered for samples collected from the LDS as per the existing license condition. Submit the results of this analysis to the NRC at the next inspection, together with a letter report summarizing the data analysis. Completion date: Next NRC inspection.

2. Review the existing LDS monitoring program in light of present license conditions and overall program intent; ie., the stated purpose of LDS monitoring is to increase sampling frequency of compliance monitoring wells on the downgradient edge of the disposal area. As this intent may not be reflected in the present license conditions, this analysis will result in an application to amend the license to meet the objectives of the groundwater monitoring program. Such an amendment will be a comprehensive means to prevent a repetition of this violation. Completion date (to file amendment application): January 10, 1998.

Sincerely,

William N. Deal
Manager, White Mesa Mill

Certified Number P 077 021 199

xc: Ron E. Berg
David C. Frydenlund
Michelle R. Rehmann
Harold R. Roberts
File

NRC Inspection Report 40-8681/97-01
Dated February 5, 1998

NRC Inspection of January 13-15, 1998

No notices of violation issued

Closed 40-8681/97-02
Violations issued on August 12, 1997

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

FEB 12 1998

By

February 5, 1998

Earl E. Hoellen, President
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-8681/98-01

Dear Mr. Hoellen:

This refers to the inspection conducted on January 13-15, 1998, at your White Mesa Mill near Blanding, Utah. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. The inspection findings were presented to members of your staff at the conclusion of the onsite inspection.

The NRC also performed a followup review of actions taken by your staff in response to our Notice of Violation dated August 12, 1997. Based on the corrective actions taken by your staff, we plan to close these three violations. This matter is discussed in Section 6 of the enclosed report.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Should you have any questions concerning this inspection, please contact Mr. Robert Evans at (817) 860-8234 or Mr. Charles Cain at (817) 860-8186.

Sincerely,

Ross A. Scarano, Director
Division of Nuclear Materials Safety

Docket No. 40-8681
License No. SUA-1358

Enclosure:
NRC Inspection Report 40-8681/98-01

cc w/enclosure:
Mr. William Deal, Mill Manager
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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	40-8681
License No.	SUA-1358
Report No.	40-8681/98-01
Licensee:	International Uranium (USA) Corp.
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	January 13-15, 1998
Inspector:	Robert J. Evans, P.E., Health Physicist Nuclear Materials Licensing Branch Division of Nuclear Materials Safety Region IV
Approved By:	Charles L. Cain, Chief Nuclear Materials Licensing Branch Division of Nuclear Materials Safety Region IV
Attachments:	1. Supplementary Information 2. Photographs Taken at the White Mesa Mill

EXECUTIVE SUMMARY

International Uranium (USA) Corporation
NRC Inspection Report 40-8681/98-01

This inspection included a review of site status, management organization and controls, site operations, radioactive waste management, radiation protection, and environmental protection programs. Also, a followup review was performed on several previously-identified NRC violations and other issues.

Management Organization and Controls

- The licensee had established an organizational structure that agreed with the conditions of the license. Also, the licensee had established operational procedures for the processing and control of new alternate feed materials (Sections 2.2-2.4).

Operations Review/Radioactive Waste Management

- Operational activities were being conducted safely and in accordance with the conditions of the license as well as NRC regulations (Section 3.2).

- A review of the licensee's onsite control of the alternate feed material was reviewed. The licensee was maintaining control of the radioactive waste shipments from Cabot Performance Materials in an orderly, controlled fashion (Section 3.3).

Radiation Protection

- The radiation protection program areas reviewed were found to be acceptable, including notification of occupational exposures to employees; performance of the annual, monthly and weekly audits; and recordkeeping of decommissioning activities (Sections 4.2-4.5).

Environmental Protection

- The licensee was noted to be collecting all environmental monitoring samples required by the license at the intervals specified in the license, and the licensee reported these sample results in the 1996 and 1997 semiannual effluent reports. All sample results were less than the associated effluent release limits specified in 10 CFR Part 20 during 1997. When the 1997 data was compared to the 1996 sample results, no adverse trends were identified (Section 5.2).

Report Details

1 Site Status

The NRC issued Source Material License No. SUA-1358 to Energy Fuels Nuclear during August 1979. Over time, ownership of the site was transferred to Umetco Minerals, back to Energy Fuels Nuclear, and finally to International Uranium (USA) Corporation (IUC). IUC assumed ownership of the White Mesa Mill on May 10, 1997. The NRC approved the transfer via Amendment No. 2 of the revised License No. SUA-1358. This amendment was issued to IUC on May 9, 1997.

The mill was actively processing alternate feed material during the inspection. (Alternate feed material is material other than natural uranium ore.) The licensee is authorized to receive and process four alternate feed materials from three out-of-state firms. This authorization is provided in License Conditions 10.6 through 10.9.

In accordance with License Conditions 10.6 and 10.7, IUC is authorized to process two types of material from Allied Signal. This material was referred to as the "CaF" (calcium fluoride) and "KOH" (potassium hydroxide) material. IUC began processing the KOH material during May 1997. The licensee completed processing the material during August 1997. None of the KOH alternate feed material remained in storage at the site.

IUC has about 1300 drums of CaF material still in storage, and the licensee may receive more CaF material in the near future. The licensee last processed CaF material during 1996; none was processed during 1997. The license plans to resume processing of the CaF material during May-June 1998.

In accordance with License Condition 10.8, IUC is authorized to process material received from the Department of Energy, referred to as the "Cotter concentrate" material. The remainder of this material was in the final stages of processing (drying stage) during the inspection. No Cotter concentrate material remained in storage.

Finally, in accordance with License Condition 10.9, the licensee is authorized to process material from Cabot Performance Materials (Cabot). The licensee started adding this material to portions of the process circuit (a method called "seeding") during late 1997. Solvent extraction processing of the Cabot material began on January 11, 1998. The licensee possessed about 12,000 tons of Cabot material during the inspection, and more material was being brought onsite daily via intermodal shipping containers.

In the next several weeks, the licensee plans to receive a small amount of uranium ore for sampling and analysis. The ore will be shipped from active mines in the vicinity of the mill, including mines located in both Colorado and Utah. The licensee last processed ore during February 1996. The licensee plans to resume full scale processing of uranium ore material during July 1998.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The licensee's organizational structure and management controls were reviewed to determine: (1) whether functional responsibilities and personnel qualifications had been clearly established and fulfilled in accordance with the conditions of the license, and (2) what controls were in place to ensure compliance with NRC requirements.

2.2 Management Organization

The organizational structure requirements are provided in License Condition 9.3. Also, the licensee provided details of its organizational structure to the NRC by letter dated January 30, 1997. The onsite staff consisted of 95 individuals at the time of the inspection. Also, there were 16 contractors performing piping, fiberglass, and other process development work.

The organizational structure in place at the time of the inspection was compared to the structure referenced in the license (Figure 3.1, "White Mesa Uranium Mill Organizational Chart") and the January 1997 letter. The licensee had made several changes to the structure since January 1997 that impacted the radiation safety program chain-of-command. The licensee deleted one position and added two new positions to the organizational structure during 1997. The position deleted was the safety technician while the two new positions created were the safety director and executive vice president positions.

These organizational changes appeared to strengthen the licensee's staff. The safety director position replaced the safety technician position, and the safety director's authority and responsibilities were increased above the safety technician's level of authority and responsibility. Also, the executive vice president position should help provide additional management oversight of the facility.

In summary, The recent organizational changes were determined to be an enhancement to the licensee's ability to control site activities, including the radiation protection program. The licensee's organizational structure was in agreement with the intent of License Condition 9.3.

2.3 Performance-Based License Review

License Condition 9.4 states that the licensee may, under certain conditions and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the performance-based license provisions was reviewed to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site. The NRC granted the licensee a performance-based license during March 1997.

The licensee's determinations under License Condition 9.4 are required to be made by a Safety and Environmental Review Panel (SERP). The licensee held one SERP committee meeting during 1997. The SERP summary documentation was reviewed, and SERP committee members were interviewed during the inspection. The SERP reviewed three subjects (Cell 3 freeboard limits, standard operating procedures for the Cotter concentrate material, and the procedure for KOH material processing) on July 10, 1997. Following the review of these three subject areas SERP members decided that no specific action was required on their part; therefore, the SERP did not approve any particular facility change, test, experiment, or procedure.

License Condition 9.4.D states in part that the licensee shall furnish, in an annual report to the NRC, a description of such changes, tests, or experiments approved by the SERP, including a summary of the safety and environmental evaluation of each. Since the SERP did not take any specific action for the three subjects listed above, the licensee was not required to submit a report to the NRC.

The SERP held one meeting during 1997, but took no specific action that impacted the licensing basis of the site. The licensee was noted to be in compliance with License Condition 9.4.

2.4 Site Procedures

In accordance with License Condition 9.6, standard operating procedures (SOPs) are required to be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. Additionally, written procedures must be established for non-operational activities to include in-plant and environmental monitoring, bioassay analyses, and instrument calibrations. An up-to-date copy of each written procedure must be kept in the mill area to which it applies.

One specific area reviewed during the inspection was the licensee's development and implementation of SOPs for the handling and processing of the Cabot material. The NRC inspector noted that the licensee had developed procedures for this activity.

2.5 Conclusions

The licensee had established an organizational structure that agreed with the requirements of the license. Also, the licensee had correctly implemented the performance-based conditions of the license, although only one SERP committee meeting had been held during 1997. The licensee had developed operational procedures for the control and processing of new alternate feed material (the Cabot material).

3 Operations Review (88020)
Radioactive Waste Management (88035)

3.1 Inspection Scope

The objective of this portion of the inspection was to verify that site activities were being conducted in accordance with applicable regulations and the conditions of the license, and to ensure that operational controls were adequate to protect the health and safety of the workers and the members of the general public.

3.2 Site Operations

A facility tour was performed to observe activities in progress. Site perimeter postings, required by License Condition 9.9, were noted to be in place at all entrances to the site. Also, work appeared to be progressing in a safe, orderly fashion. No significant health or safety concern was identified during the tour.

During the site tour, the licensee's four disposal cells were observed. Cell 1-I was actively being used for process solution evaporation and recycling. Cell 2 was being used for disposal of wastes generated onsite. Cell 3 was being used for tailings disposal and for disposal of wastes generated offsite (authorized in accordance with License Condition 10.5). Finally, Cell 4A was not in service during the inspection. No abnormal conditions, such as leaks or berm failures, were observed at any of the cells during the site tour.

3.3 Radioactive Waste Management

License Condition 10.5 authorizes the licensee to dispose of byproduct material generated at licensed in-situ leach facilities subject to several conditions, including a 5000 cubic yard limit from a single source. The licensee is also required to submit an annual summary to the NRC of wastes disposed of from off-site generators in accordance with Condition 10.5.D. The licensee's most current annual summary dated February 13, 1997, was reviewed during the inspection. This document summarized the wastes received during 1996 from two offsite generators. The total amount of wastes received were within the limit specified in the license.

In accordance with License Condition 10.9, IUC is authorized to receive and process material from Cabot Performance Materials. The licensee started receiving this material during early-October 1997. During the current inspection, the licensee's management of the Cabot alternate feed material was reviewed.

The Cabot material was being shipped to the site via intermodal shipping containers. Trucks were used to get the containers from an offsite rail transfer station to the White Mesa Mill. Once onsite, the material was dumped on a storage pad, and any loose plastic liner material (used to make the unloading of the material more effective) was separated and removed from the alternate feed material. Once the intermodal had been unloaded, it was cleaned at a wash down station. Following water cleaning, the empty containers were then moved to the final survey point for radiological scanning for unrestricted release. If the containers were not adequately decontaminated, then the intermodals were sand-blasted and resurveyed for contamination using the guidance provided in License Condition 9.10. (This license condition refers to the NRC's guidance document "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated May 1987.)

The NRC inspector noted that the licensee had performed special radiological surveys when the Cabot material was first received onsite, including beta-gamma exposure scans and air sampling for the ambient natural uranium concentrations. Following the analyses of these initial samples, the licensee concluded that the Cabot material did not contain any unusual radiological hazards. Therefore, the licensee suspended the special sampling program and reverted to its routine sampling program.

In summary, the licensee's handling of the intermodal containers was noted to be well controlled, and the licensee's release criteria was noted to be in accordance with the conditions of the licensee. A limited number of equipment release records were reviewed, and none of the components that had been released exceeded the NRC guideline values.

3.4 Conclusions

The licensee appeared to have maintained control of site operations in accordance with the conditions of the license and NRC regulations. No detrimental health or safety issue was identified. Also, the licensee was maintaining control of the radioactive waste shipments from Cabot in an orderly fashion.

4 Radiation Protection (83822)

4.1 Inspection Scope

Portions of the licensee's radiation protection program were reviewed to verify compliance with the conditions of the license as well as the requirements of 10 CFR Part 20.

4.2 10 CFR Part 19.13, "Notifications and Reports to Individuals"

During the January 1997 NRC inspection, a non-cited violation was identified related to the licensee's failure to notify site workers of their 1995 occupational doses during the 1996 calender year. This subject area was reviewed again during the current NRC inspection. The licensee did notify site workers of their 1996 occupational exposures by letters sent in early March 1997. Also, the licensee was in the process of creating the 1997 exposure records for distribution to site workers during the first quarter of 1998.

In summary, the licensee's corrective actions taken since this problem area was first identified appeared to have resolved the causes of the Part 19.13 violation.

4.3 Audit Program Review

In accordance with License Condition 11.6, an annual ALARA audit is required to be performed. The most current audit was conducted during November-December 1997 by two corporate-level individuals. This audit was found to be thorough and comprehensive. For example, the audit identified several potential problem areas, including less than timely updates and reviews of site SOPs and the need for improvement in documentation of employee training.

In accordance with the license application, Section 5.3.2.2, "Audit Program," the licensee is required to submit the annual audit to the NRC by April 1 of each year. The inspector noted that the licensee had submitted the 1996 audit to the NRC by letter dated March 28, 1997. This audit was reviewed during a previous NRC inspection. The licensee had not submitted its 1997 audit to the NRC by the end of the current inspection, although it was available for review during the inspection.

The radiation safety officer's monthly reports were also reviewed. These reports are required by Section 3.6.3, "Monthly Reviews," of the ALARA Program section of the license application. The reports provided useful information such as in-plant radiological sampling and survey results.

Finally, the licensee's weekly inspection reports were reviewed. These reports are required by Section 3.6.2, "Weekly Inspections," of the license application. The inspections did not identify any significant health or safety issue.

4.4 Decommissioning Recordkeeping

In accordance with 10 CFR Part 40.36(f)(1), certain records are required to be permanently maintained, including a description of the restricted area, spills, and any unusual events. The licensee was noted to be maintaining these records in onsite files, specifically the "Spill Containment and Countermeasures Plan and Reports" file. Licensee representatives stated that they had not added any new information to this file since 1995.

The licensee appeared to be operating in compliance with the recordkeeping requirements of Part 40.36.

4.5 Implementation of a New Constraint on Radioactive Air Effluents

The NRC published its new constraint rule in the Federal Register on December 10, 1996. This regulation placed a constraint on airborne emissions of radioactive material. This regulation became effective on January 9, 1997. During this inspection, the licensee's compliance with this new regulation (currently listed in 10 CFR Part 20.1101) was reviewed.

In the past, the licensee submitted annual reports to the U.S. Environmental Protection Agency (EPA) in accordance with the "NESHAPS Subpart I" requirements of 40 CFR Part 61. This requirement was rescinded by EPA during December 1996. The licensee's last Subpart I report was submitted to the EPA on March 19, 1996, and covered the 1995 calender year. The licensee determined, using the COMPLY computer program code, that offsite whole body doses were 2.3 millirems for calender year 1995. The licensee was not required to develop a report for 1996 because, as noted above, EPA rescinded that requirement.

In the future, the licensee stated that it will continue to use the COMPLY code to determine the potential offsite doses for members of the public. If the licensee subsequently determines that offsite doses are in excess of 10 millirems, then the licensee is required by Part 20.1101 to submit a report to the NRC. At the time of the inspection, the licensee had not performed the exposure calculation for the 1997 calender year. The licensee plans to perform the calculation and keep records of the results on file for future NRC review. (Assuming that the total effective dose equivalent exposures remain below 10 millirems, no report is required to be submitted to the NRC.)

4.6 Conclusions

Radiation protection program areas reviewed and found acceptable included notification of occupational exposures to site workers, performance of audits, and recordkeeping of decommissioning activities.

5 Environmental Monitoring (88045)

5.1 Inspection Scope

The environmental monitoring program was reviewed to assess the effectiveness of the licensee's program and to evaluate the effects of site activities on the local environment.

5.2 Environmental Monitoring Program Review

License Condition 11.2 states that the licensee shall implement the effluent and environmental monitoring program specified in Section 5.5 of the renewal application. Also, the results of the environmental monitoring program are required to be submitted to NRC on a semiannual basis in accordance with License Condition 11.3.C. The semiannual effluent report for the first half of 1997 was reviewed during this inspection. The licensee had not completed the report for the second half of 1997 at the time of this inspection, although some of the data that will be used to develop the report, such as the third quarter sample results, was reviewed during the inspection. Finally, the 1997 sample results were compared to the 1996 sample results to ascertain whether any adverse trends existed.

a. Air Particulate Sampling

The licensee collected particulate air samples at four locations around the site. (The operation of the air sampler at the background station was discontinued by the licensee with NRC approval several years ago.) The sample filters are required to be changed weekly, composited quarterly, and analyzed for their natural uranium, radium-226, thorium-230, and lead-210 quantities. The sample results for the first three quarters of 1997 were reviewed. The sample results were less than 3 percent of the respective 10 CFR Part 20, Appendix B, effluent concentration limits. Also, the laboratory's lower limit of detection was equal to or better than the limits specified in License Condition 11.2.D.

The 1997 sample results were compared to the 1996 sample results. Overall, the 1997 sample results were down from the previous year. Therefore, no adverse trends were noted in this area of the environmental monitoring program.

During the review of the 1996 sample results, the NRC inspector noted that the thorium-230 concentrations at the mill access road sample station had exceeded the effluent concentration limit (by 119 percent) during the first quarter of 1996. This anomaly was reported but was not discussed in the licensee's semiannual effluent report for the first half of 1996.

The inspector did note that radionuclide concentrations tend to run higher at this sample station than at the other stations. As noted in the Environmental Assessment, concentrations of radionuclides at the mill access road sample station BHV-5 tend to be elevated during mill operations due to increased dust from the ore stockpile and increased traffic around the ore stockpile and mill area. The licensee processed ore at the mill until late February 1996. The processing of the ore may have contributed to the elevated thorium-230 concentration that were measured at station BHV-5 during the first quarter of 1996.

In conclusion, the inspector determined that this issue was not a health or safety concern because the thorium-230 concentration at this sample station averaged 44 percent of the Part 20 limit during 1996.

b. Stack Sampling

The licensee is required to sample the stack emissions for natural uranium content on a quarterly basis during plant operations. Also, sampling for total particulates, thorium-230, radium-226, and lead-210 content is required on a semiannual basis. In addition, License Condition 11.2.A specifically requires the licensee to determine the stack flow rates. According to the license application, Appendix E, these samples are required to be obtained from the yellowcake stacks as well as the crusher stacks. (As stated in Section 2.4 of this Inspection Report, the crusher stacks are no longer used at the site.)

According to information provided by the licensee, the yellowcake stacks were not used during the first half of 1997; therefore, stack samples were not obtained during this time frame. The yellowcake stacks were in service during the second half of 1997, and these stacks were sampled during the third quarter (September 1997). The results for the fourth quarter of 1997 were not available during the inspection. The licensee plans to include this information in the semiannual effluent report for the second half of 1997. Therefore, the NRC will review these sample results during the next inspection.

c. <u>Ambient External Gamma Exposures</u>

Environmental gamma thermoluminescent dosimeters (TLDs) were located at all five sample stations. One duplicate sample was used at one station for quality control purposes. The TLDs were changed out and analyzed on a quarterly basis.

The sample results for the first three quarters of 1997 were reviewed during the inspection. The site perimeter sample stations measured an ambient gamma exposure that was comparable to the background value. Historically, the difference between the site stations and background rarely exceeded 10 millirems per quarter. The inspector noted that the sample results for 1997 were comparable to the 1996 sample results, and no adverse trend was observed.

d. <u>Vegetation Sampling</u>

Vegetation samples are required to be obtained three times per year from three separate locations. The samples were required to be analyzed for their radium-226 and lead-210 concentrations. Two sets of 1997 data results were available during the inspection; the third set had not been analyzed by the time of this inspection. Based on the sample results available, the 1997 sample results were noted to be down slightly from the 1996 sample results.

e. <u>Soil Sampling</u>

Soil samples are required to be obtained once each year at all sample stations, including the background station. The samples were last collected on August 27, 1997. The highest sample result from this batch of samples was 1.7 picocuries per gram of radium-226 in the BHV-5 sample. The inspector noted that the radionuclide concentrations in the soil samples were very low, and the site boundary sample results were comparable to the background value. Also, the 1997 sample results were comparable to the 1996 sample results.

f. <u>Surface Water Samples</u>

In accordance with Section 5.5 of the license application, surface water samples are required to be obtained from two locations. Water samples (or sediment samples if the streams are dry) are to be obtained annually from Westwater Canyon and quarterly from Cottonwood Creek. The samples were analyzed for their natural uranium, radium-226, and thorium-230 concentrations, as well as for the quantity of total dissolved and suspended solids.

The highest radionuclide concentration (4.7 E-9 microcuries per milliliter for natural uranium) was obtained during the first quarter of 1997 from Cottonwood Creek. This sample result was less than 2 percent of the natural uranium effluent concentration limit specified in Appendix B of Part 20. Also, the 1997 sample results were noted to be comparable to the 1996 sample results.

g. Ground Water Samples

In accordance with License Condition 11.3.C, six monitoring wells are required to be sampled quarterly. The well water samples are analyzed for their chloride, potassium, nickel, and uranium concentrations. The sample results from the first three quarters of 1997 were reviewed. The highest natural uranium concentration (6.8 E-8 microcuries per milliliter) was measured in a sample obtained from well MW-11 during the second quarter of 1997. Well MW-11 is situated between waste disposal Cells No. 3 and No. 4A. This sample result was compared to the baseline/historic data, and this data point appeared to be an outlier because it was not in line with the historical trends. A review of the original laboratory data file revealed that this sample had been reanalyzed and the revised sample result was only a fraction of the original sample result. The revised information was not included in the most recent semiannual effluent report. Other than this one point which appeared to be an outlier, no other obvious trends were observed with the groundwater sample results.

Discussions were held with licensee representatives about their policy related to the reporting of sample results. The licensee stated that they would review this subject area and would update the report data if a data point was subsequently determined to be in error.

5.3 Instrument Calibrations

a. Air Sampler Calibration

In accordance with License Condition 11.2.E, the licensee is required to perform a semiannual inspection as well as a biennial calibration of the critical orifice assembly. This device was used to check the accuracy of the environmental air sampler flow rates. During the inspection, the licensee's records for inspection and calibration of the critical orifice assembly were reviewed. The licensee possessed documentation demonstrating that the orifice assembly had been calibrated during February 1997. Since this was a biennial calibration frequency, the orifice assembly calibration will be valid until February 1999.

During the site tour, the NRC witnessed an air sampler calibration in progress. The calibration was performed using the orifice plate assembly. The licensee experienced trouble with one ancillary device, the manometer. The licensee stated that a new manometer was on order and would be received onsite within days. Despite the manometer problem, the NRC inspector noted that the licensee was adhering to the calibration process as discussed in the site implementing procedure.

Also, the NRC inspector reviewed the method used by the licensee to convert the air sampling data obtained in the field and the analysis results from the offsite laboratory into the information published in the semi-annual effluent reports. No significant problems were identified relating to results that were printed in the semiannual effluent reports.

b. Meteorological Monitoring Equipment

Operability of the meteorological monitoring equipment is required by License Condition 11.2 which references Section 5.5 of the license application. The equipment in service included an anemometer, wind vane, and digital recorder. The licensee included a summary of the site meteorological conditions in the semiannual effluent reports submitted to the NRC during 1996 and the first half of 1997. This information was reviewed during the inspection. Also, the operation of the meteorological monitoring equipment was witnessed during the site tour, and the equipment appeared to be functioning correctly.

Appendix E to the license application provides the calibration requirements for the meteorological monitoring equipment. In accordance with Section 1.3 of Appendix E, calibration of the wind speed and wind direction devices was required to be performed on a semiannual basis, or following maintenance. The calibration records for the meteorological monitoring equipment were requested for NRC review during the inspection. The licensee could not locate their copies of the equipment calibration records at the site during the course of the inspection but were able to obtain replacement records immediately after the conclusion of the inspection from the contractor who performed the semiannual calibrations. The records for 1997, reviewed after the conclusion of the onsite inspection, provided information that was consistent with the calibration procedure provided in the license application.

c. Analytical Balance

License Condition 9.3 states, in part, that the licensee shall conduct operations in accordance with statements, representations, and conditions contained in the license renewal application dated August 23, 1991. Located in the appendices to the license application were the implementing procedures for the environmental monitoring program. One procedure, Section 1.5, "Analytical Balance," provided information for performing calibration checks of the analytical balance. This device was used to weigh sample filters before and after use in the field.

During the inspection, the licensee's calibration records for the balance were reviewed. The instrument was in service and the annual calibration was up-to-date. However, the implementing procedure stated that the balance was to be checked monthly against a set of standard weights. The NRC inspector noted that the licensee had not performed and documented the monthly weight checks during October and November 1997.

Although the licensee had failed to perform two calibration checks as specified in the license application, this finding was not safety significant. The calibration of the balance was current, and the December 1997 check did not identify any problems with the balance. The most likely reasons for the missed monthly checks were the departure of a site worker who was responsible for performing the monthly check and the licensee's delay in reassigning the work to a different site employee. This failure constitutes a violation of minor significance and is being treated as a noncited violation, consistent with Section IV of the NRC Enforcement Policy.

5.4 Annual Land Use Survey

The licensee last performed an annual land use survey during August 1996. This survey was reviewed during the NRC's January 1997 inspection. During early 1997, the NRC converted the license into an updated performance-based license. The NRC intentionally dropped the requirement for the annual land use survey from the license because this activity is not required by the NRC's regulations. Therefore, the 1996 survey was the licensee's last NRC-required annual land use survey, and the licensee did not perform a land use survey during 1997.

5.5 Conclusions

A thorough review of the licensee's implementation of the environmental monitoring program requirements was performed. Also reviewed in detail was the calibration of several license-required devices, including the particulate air samplers, the meteorological monitoring equipment, and a laboratory analytical balance. The licensee was noted to be collecting all samples required by the license at the intervals specified in the license, and reporting these sample results in their 1996 and 1997 semiannual effluent reports. All sample results were less than the associated limits specified in 10 CFR Part 20 during 1997. When the 1997 data was compared to the 1996 sample results, no adverse trend was identified.

6 FOLLOWUP (92701)

6.1 NRC Information Notice 96-70: Year 2000 Effect on Computer System Software

This Notice was issued to alert licensees of the potential problems that may occur with their computer systems and associated software as a result of the upcoming change to the new century. During this inspection, the licensee's actions taken in response to this NRC Information Notice were reviewed. In summary, the licensee was aware of the problem and had a copy of the Information Notice, but had not taken any specific actions to date. The licensee planned to discuss this issue in an upcoming ALARA committee meeting.

6.2 (Closed) Violation 40-8681/9702-01: Failure to Perform Annual 8-Hour Sampling

During the July 1997 inspection (documented in NRC Inspection Report 40-8681/97-02), the inspector noted that the licensee had failed to obtain annual air samples and analyze them for specified radionuclides in various mill locations during 1996 contrary to the requirements of License Condition 29. In a revised response letter dated November 3, 1997, the licensee committed to forward, for review and approval, a license amendment request to the NRC to rescind the existing air sampling requirements and replace them with a more effective alternative. The licensee submitted this license amendment request to the NRC by letter dated December 3, 1997. The licensee obtained the calender year 1997 samples during December 1997, although the samples had not been analyzed by the time of the January 1998 onsite inspection.

Since the licensee fulfilled all commitments specified in its response letter, this violation is closed.

6.3 (Closed) Violation 40-8681/9702-02: Failure to Conduct Several Weekly Alpha Surveys

During the previous inspection, the NRC noted that the licensee had not performed five surveys during the first six months of 1997, contrary to the requirements of License Condition 9.3. Corrective actions taken included training, a commitment to create and implement a task list that lists all sample requirements, and rescheduling the weekly survey from Friday to Monday of each week.

During the current inspection, the NRC inspector noted that the licensee had performed all weekly alpha surveys during the second half of 1997. The licensee's corrective actions were effective in that the licensee subsequently performed all alpha surveys since the issuance of the violation.

6.4 (Closed) Violation 40-8681/9702-03: Failure to Statistically Analyze Pond Water Sample Results

During the July 1997 inspection, the NRC discovered that, contrary to the requirements of License Condition 11.3, the licensee failed to analyze statistically pond water sample results to determine whether significant linear trends existed and to submit this information to the NRC, contrary to the requirements of License Condition 11.3. In a revised response letter dated November 3, 1997, the licensee committed to submit the analysis of sample results to NRC during the next routine inspection, and to submit a license application amendment request to amend the license "to meet the objectives of the groundwater monitoring program."

During the January 1998 inspection, the licensee's corrective actions were reviewed. The inspector reviewed the sample results report which was conducted by a third-party contractor. The report concluded that hydraulic data (leak detection system flow rates) was more effective in identifying a liner failure than chemical data (concentrations of chemicals in fluid samples obtained from the leak detection systems). Also, the licensee was noted to have submitted the associated amendment request to the NRC by letter dated January 9, 1998.

Since the licensee fulfilled all corrective actions specified in their violation response letter, this violation is closed.

Exit Meeting Summary

The inspector presented the preliminary inspection results to the representatives of the licensee at the conclusion of the inspection on January 15, 1998. Licensee representatives acknowledged the findings as presented. The licensee did not identify any information reviewed by the inspector as propriety information.

SUPPLEMENTAL INFORMATION

Attachment 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Berg, Radiation Safety Officer
W. Deal, Mill Manager
W. Palmer, Radiation Technician
M. Rehmann, Environmental Manager

State of Utah

G. Ripley, Environmental Scientist, Division of Radiation Control

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

40-8681/9702-01	VIO	Failure to Obtain Annual Air Samples
40-8681/9702-02	VIO	Failure to Statistically Analyze Pond Water Sample Results
40-8681/9702-03	VIO	Failure To Conduct Weekly Alpha Surveys

Discussed

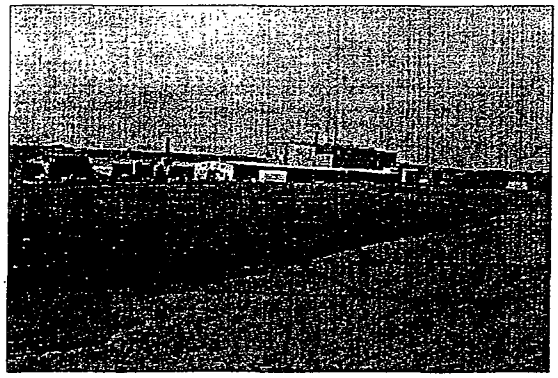
None

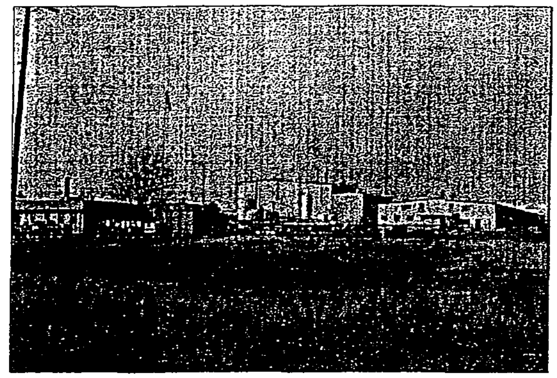
LIST OF ACRONYMS USED

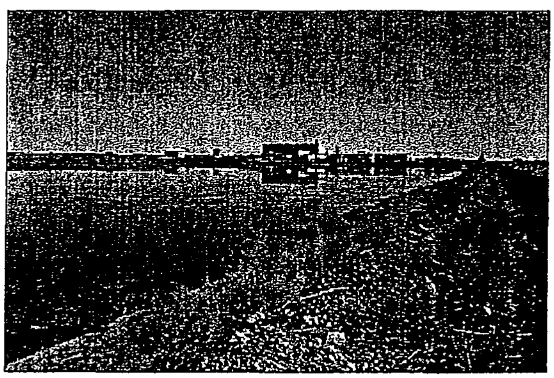
ALARA	As Low As Reasonably Achievable
CaF	Calcium Fluoride
CFR	Code of Federal Regulations
EPA	U.S. Environmental Protection Agency
IUC	International Uranium (USA) Corporation
KOH	Potassium Hydroxide
SERP	Safety and Environmental Review Panel
SOP	Standard Operating Procedure
TLD	Thermoluminescent Dosimeter

<u>Attachment 2</u>

PHOTOGRAPHS TAKEN AT THE WHITE MESA MILL

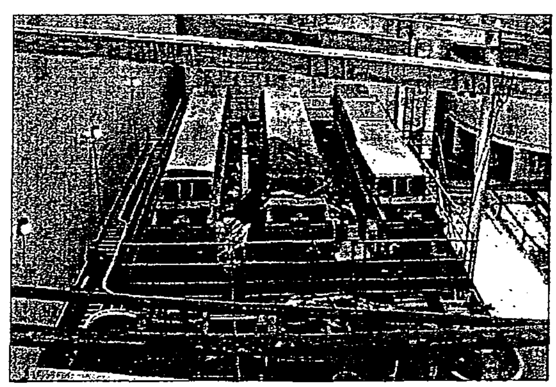

White Mesa Mill site structures


White Mesa Mill site structures

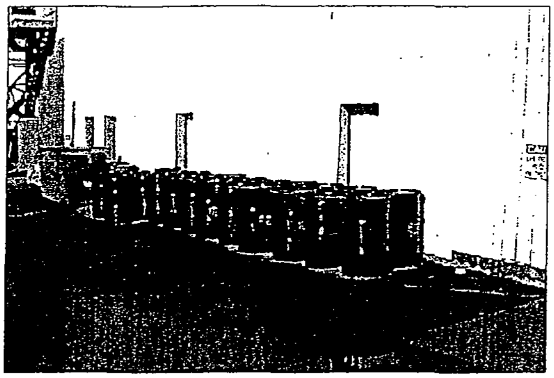

Cell 1-I with White Mesa Mill in background


Cell 3; byproduct waste material in foreground

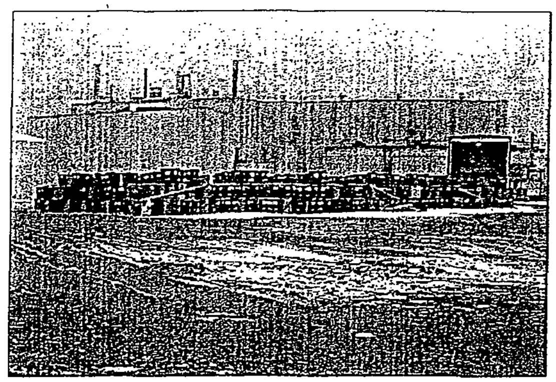

Liner leak detection system at Cell 4-A


Three new filter presses being installed for processing of Cabot material

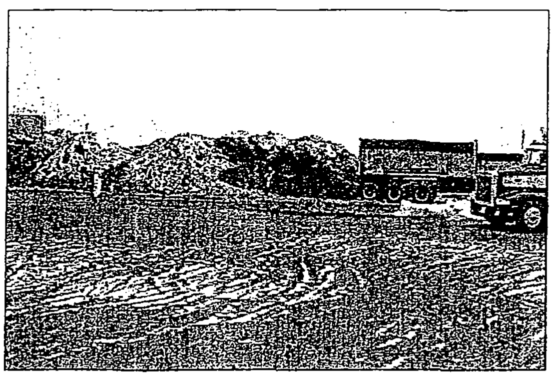
PHOTOGRAPHS TAKEN AT THE WHITE MESA MILL



Drummed yellowcake material



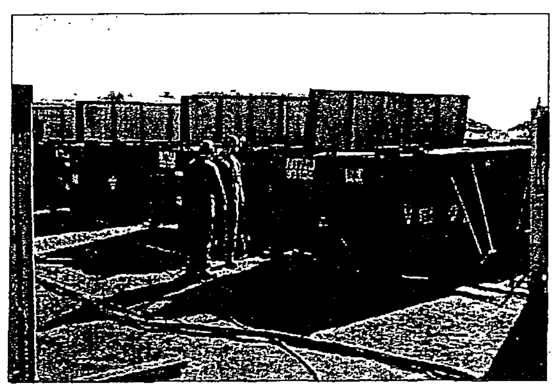
Drummed calcium fluoride material



Cabot material being unloaded from Intermodal shipping containers

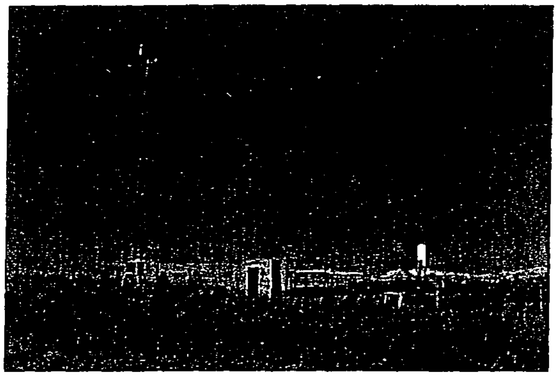
Unloading of Intermodal containers

Wash down of empty Intermodal container

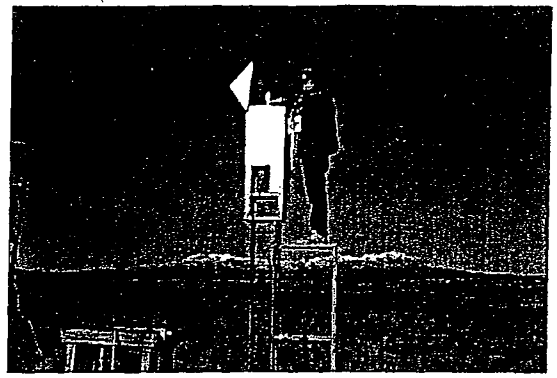


Final survey of empty Intermodal containers

PHOTOGRAPHS TAKEN AT THE WHITE MESA MILL



Meteorological monitoring tower (left) and environmental sample station BHV-1 (right)



Calibration of BHV-1 particulate air sampler

Wildlife pond on owner-controlled property

NRC Inspection Report 40-8681/98-02
Dated July 9, 1998

No notices of violation issued

NRC Inspection of June 9-11, 1998

REB

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE SUITE 400
ARLINGTON TEXAS 76011-8064

July 9, 1998

Harold R. Roberts, Executive Vice-President
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-8681/98-02

Dear Mr. Roberts:

This refers to the inspection conducted on June 9 -11, 1998, at your White Mesa Mill near Blanding, Utah. The purpose of this inspection was to determine if activities were being conducted in accordance with NRC regulations and your license which authorizes uranium milling operations and 11e.(2) byproduct material disposal. The enclosed report presents the results of that inspection.

The inspection disclosed that site operations were being conducted in accordance with NRC regulations. The facility was properly staffed, and plant operations, radiation protection, radioactive waste management, and environmental protection programs had been properly implemented.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

Should you have any questions concerning this inspection, please contact Mr. Louis C. Carson II at (817) 860-8221 or Mr. Charles Cain at (817) 860-8186.

Sincerely,

Linda Howell

for Ross A. Scarano, Director
Division of Nuclear Materials Safety

Docket No. 40-8681
License No. SUA-1358

Enclosure:
NRC Inspection Report 40-8681/98-01

cc w/enclosure:
Mr. William Deal, Mill Manager
International Uranium (USA) Corp.
6425 South Highway 191
P.O. Box 809
Blanding, Utah 84511

Mr. William J. Sinclair, Director
Utah Department of Environmental Quality
Division of Radiation Control
168 North 1950 West
Salt Lake City, Utah 84115-4850

Mr. Pat Mackin, Assistant Director
Systems Engineering & Integration
Center for Nuclear Waste Regulatory Analyses
6220 Culebra Road
San Antonio, Texas 78238-5166

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	40-8681
License No.	SUA-1358
Report No.	40-8681/98-02
Licensee:	International Uranium (USA) Corporation (IUC)
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	June 9 -11, 1998
Inspector:	Louis C. Carson II, Health Physicist Nuclear Materials Safety Branch 1 Division of Nuclear Materials Safety Region IV
Approved By:	Charles L. Cain, Chief Nuclear Materials Safety Branch 1 Division of Nuclear Materials Safety Region IV
Attachment:	Supplementary Information

EXECUTIVE SUMMARY

International Uranium (USA) Corporation
NRC Inspection Report 40-8681/98-02

This inspection included a review of site status, management organization and controls, site operations, radioactive waste management, radiation protection, and environmental protection programs.

Site Status and Operations Review

- The site was being maintained in accordance with the NRC license and applicable NRC regulations for uranium mill sites (Section 1).
- Site security, perimeter postings and security of licensed material were found to be maintained as required by License Condition 9.9, 10 CFR 20.1801, and 10 CFR 20.1902(e) (Section 1).

Management Organization and Controls

- The licensee had established an organizational structure that agreed with the conditions of the license. Also, the licensee had established a procedures improvement program (Section 2).

Radiation Protection

- The licensee had implemented a radiation protection program that was found to be in accordance with requirements established in 10 CFR Parts 19 and 20 and the license (Section 3).
- Areas of the radiation protection program that were reviewed and found to be acceptable included worker occupational dose determination, radiation work permit implementation, bioassay program, and the respiratory protection program (Section 3).

Radioactive Waste Management

- Radioactive waste management activities were being conducted safely and in accordance with the conditions of the license as well as NRC regulations (Section 4).

Environmental Protection

- A review of the licensee's environmental monitoring program and the licensee's semiannual effluent report for the second half of 1997 indicated that the licensee was in compliance with license requirements and 10 CFR 40.65. All sample results were less than the associated effluent release limits specified in 10 CFR Part 20 during 1997, and no adverse trends were identified (Section 5).

Report Details

1 Site Status and Operations Review (88020)

1.1 Scope

On May 10, 1997, Source Material License No.1358 was transferred to IUC to operate the White Mesa uranium mill and 11e.(2) byproduct disposal site. The NRC inspector reviewed the site status and the state of operations to determine: (1) if licensed activities were being conducted in accordance with the IUC license and applicable NRC regulations for uranium mill sites and (2) that operational controls were adequate to protect the health and safety of the workers and the members of the general public.

1.2 Observations and Findings

The White Mesa Mill is capable of producing 2,000 tons of yellowcake per day. During this inspection, the mill was shut down and in an outage. On April 3, 1998, the license ceased processing Cabot alternate feed material. Alternate feed material is material other than uranium ore. License Conditions (LC) 10.6 through 10.9 authorize receipt and processing of four alternate feed materials from three out-of-state firms. The licensee plans to resume processing the Cabot material and conventional uranium ore material from Colorado during July 1998. The licensee has not produced any yellowcake since January 1998. The site also produces other nonradiological products such as vanadium. Additionally, the White Mesa facility recycles alternate feed material in order to recover uranium, vanadium, and tantalum.

During this inspection, the licensee was performing maintenance on uranium mill equipment and conducting housekeeping around the mill site during the outage. The most significant maintenance activity involved the replacement of the liner material in the semiautogenous grinding (SAG) mill.

A facility tour was performed to observe activities in progress. Site perimeter postings, required by LC 9.9 and 10 CFR 20.1902(e), were noted to be in place at all entrances to the site. Site security was maintained by keeping the site access gate closed to prevent unauthorized access to the property. No significant health or safety concerns were identified during the tour. The inspector concluded that licensed material was secure within the site property as required by 10 CFR 20.1801.

1.3 Conclusion

The site was being maintained in accordance with the IUC license and applicable NRC regulations for uranium mill sites. Site security, perimeter postings and security of licensed material were found to be maintained as required by License Condition 9.9, 10 CFR 20.1801, and 10 CFR 1902(e). No significant health or safety concerns were identified.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The inspector reviewed the licensee's organization structure and management controls to determine: (1) whether functional responsibilities and personnel qualifications had been clearly established and fulfilled in accordance with the conditions of the license, and (2) what controls were in place to ensure compliance with NRC requirements.

2.2 Management Organization

The organizational structure requirements are provided in LC 9.3. Also, the licensee provided details of its organizational structure to the NRC by a letter dated January 30,1997. The onsite staff consisted of 95 individuals and six contractors.

The inspector determined that the licensee's organization and staff remained consistent with the license (Figure 3.1, "White Mesa Uranium Mill Organizational Chart").

2.3 Site Procedures and Procedure Revisions

In accordance with LC 9.6, standard operating procedures (SOPs) are required to be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. Additionally, written procedures must be established for nonoperational activities to include in-plant and environmental monitoring, bioassay analyses, and instrument calibrations. An up-to-date copy of each applicable written procedure must be kept in the mill.

The inspector noted that LC 9.6 requires that the RSO review and approve in writing all operational and nonoperational procedures before implementation and whenever a change had been proposed to assure that proper radiation protection practices were applied. Additionally, the RSO is required to perform a documented review of all operating procedures annually. The inspector found that reviews were being conducted.

The inspector reviewed the following procedures:

- SERP
- Mill equipment SOPs
- Bioassays
- Environment Protection
- Respiratory Protection
- Radiation Work Permits (RWP)

The licensee's implementation of the performance-based license provisions was reviewed to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site. The NRC granted the licensee a performance-based license in March 1997. LC 9.4 allows the licensee, under the direction of the Safety and Environmental Review Panel (SERP), to make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application without prior NRC approval.

Although the licensee had a SERP procedure for implementing LC 9.4, the procedure neither established SERP meeting frequencies nor set requirements for maintaining meeting records and distributing meeting minutes to responsible personnel. Additionally, provisions were not made for resolving SERP identified concerns. The corporate RSO and the mill manager were members of the SERP, and the site RSO was the chairman of the site As Low As is Reasonably Achievable (ALARA) Committee. The licensee, under the direction of the SERP, had undertaken an extensive site procedures revision program since the last inspection. The licensee had contracted a consultant to rewrite White Mesa procedures by August 1998. The licensee planned to have all revised procedures reviewed by the SERP. Additionally, the licensee stated that it would evaluate the need for detailed management procedures for governing the SERP, the ALARA committee, administrative control, problem identification, and quality assurance matters.

The environmental protection procedures and mill equipment SOPs were in draft form and were scheduled to be reviewed and approved by the SERP in the following weeks. The inspector found that those revised procedures represented a substantial improvement from the site's current procedures. However, many radiation protection procedures had not been revised and needed updating. For example, IUC had not developed specific procedures for RWPs or for the respiratory protection program. The bioassay procedure had not been updated with the current methods used to analyze bioassays. The SERP had not formally reviewed the results of the bioassay program changes. The inspector also observed that development of White Mesa procedures was not controlled by any administrative program. In some instances, White Mesa staff were still using radiation protection procedures that were written by a previous owner.

No violations were identified during the inspection. However, weaknesses noted above were being addressed by the licensee as a part of the procedures improvement program. Nonetheless, the inspector determined that IUC was raising the quality standards of the White Mesa operation by the procedures improvement program and concluded that the licensee was in compliance with LC 9.6.

2.4 Conclusions

The licensee had maintained organization and staff that agreed with the requirements of the license. The licensee's SERP procedure improvement program enhanced the quality standard of the White Mesa operation and was found to be in compliance with LC 9.6.

3 Radiation Protection (83822)

3.1 Inspection Scope

Portions of the licensee's radiation protection program were reviewed to verify compliance with the conditions of the license as well as the requirements of 10 CFR Part 20.

3.2 Observations and Findings

a. Occupational Radiation Exposures

The licensee's internal and external radiation exposure programs were reviewed. The inspector also reviewed personnel exposures associated with the SAG mill repair project. The licensee's program included the issuance of thermoluminescent dosimeters (TLD), sampling for airborne radioactivity using high volume air samplers and lapel air samplers, and use of urine bioassays. The licensee reported occupational radiation exposures (total effective dose equivalent) based on TLD and air sample results. Bioassay results were used to validate the air sampling program. The licensee maintained each worker's exposure data in a detailed, computerized spreadsheet that included all the worker's air sampling data, exposure time, and applicable derived air concentrations (DAC) for specific locations in the facility.

During 1997 the licensee had issued 121 TLDs to workers. Five workers had external exposures between 250 and 750 millirems, 9 workers had exposures between 100 and 249 millirems, and 107 workers had external radiation exposures of less than 100 millirems. During 1997, the highest committed effective dose equivalent was 950 millirems. The inspector determined that occupational exposures during 1997 were less than the 5000 millirems annual limit in 10 CFR 20.1201.

The inspector examined internal exposure records associated with the SAG mill project. Air sampling records indicated that uranium-238 airborne concentrations inside of the SAG mill had been measured as high as 892 percent (5.35E-10 microcuries per cubic centimeter (µCi/cc)) of the DAC value in late May 1998 and 551 percent (3.31E-10 µCi/cc) of the DAC value in June 1998. The DAC value for uranium-238 in air is 6.0E-11 µCi/cc. The inspector reviewed the air sample analysis, worker residence times, protective measures, and internal exposure calculations for 12 SAG mill project workers. At the time of the inspection, SAG mill workers were being issued full-face respirators with a protection factor (PF) of 50. Early in the project, workers had been issued positive air supply respirator protection with a PF of 1000. The inspector determined that the licensee's calculations of potential worker internal exposure were adequate. Internal exposures were found to be well below regulatory limits because the licensee had utilized respiratory protection equipment that was consistent with airborne concentrations inside the SAG mill .

b. Radiation Work Permits

The inspector reviewed the licensee's radiation work permit (RWP) program. The inspector noted that many of the licensee's procedures required that workers obtain an RWP from the radiation protection staff prior to performing work with a significant potential for radiological exposure. The inspector noted, however, that the licensee had not established a specific procedure for RWPs. Some general instructions for RWPs were located in Section 3.5.2 of the ALARA program that was written by the previous owner.

The SAG mill repair project was underway at the time of the inspection and was being conducted under RWPs-330 and 331. The inspector reviewed RWPs and found that both RWPs included the following elements: job description, requirements for radiological monitoring and sampling protective equipment, respiratory protection equipment, ALARA considerations, and a listing of personnel who were assigned to the RWP. The inspector's observation of workers performing the SAG mill project revealed that the workers were complying with RWP instructions. The inspector determined that the RWP instructions were adequate to preclude unnecessary personnel exposures.

c. Bioassays

The inspector reviewed the licensee's bioassay program. The licensee primarily used urinalysis on a monthly basis for uranium bioassay. However, for workers involved in work under certain RWPs, additional samples were required. According to the license application, the licensee analyzed urine samples by in-house fluorometrics, but the inspector found that they stopped using fluorometric analysis as the principal analytical method in February 1998. According to the licensee, the fluorometric analysis equipment was obsolete, no longer reliable, and replacement parts were hard to procure. Therefore, the chemistry department started using an inductively coupled plasma mass spectrometer (ICP-MS) for urinalysis. The licensee showed the inspector that ten percent of the urinalysis samples were sent to a certified laboratory as part of their quality control (QC) program.

The inspector reviewed the licensee's reports of investigations into potentially elevated bioassay results from 1997 and 1998. The licensee's bioassay investigation level was 15 micrograms per liter. The licensee had investigated bioassay results that were analyzed during the transition from the fluorometric method to the ICP-MS method. Based on the inspector's reviews and comparisons of ICP-MS, flurometric, and QC bioassay results, the inspector determined that the licensee's bioassay program was in compliance with license requirements.

d. Respiratory Protection Program

The inspector reviewed the licensee's respiratory protection program. The inspector observed workers wearing full-face respirators and half-face respirators during the SAG mill project. According to the RSO, the licensee did not take credit for the half-face respiratory PF during radiological work. However, credit was taken for use of full-face and positive air supply respirators during radiological work that had a significant potential for exposure like the SAG mill project.

The inspector found that the site maintained the respiratory protection program manual from a previous owner. The inspector reviewed the training records and medical certification records for some of the employees that had been issued respiratory protection equipment. The records certified all the workers who were qualified to wear respiratory protection equipment. The inspector toured the area where the licensee maintained and issued respiratory protection equipment. The inspector determined that the licensee's respiratory protection program was adequate, and the selection of respiratory protection equipment was deemed appropriate for airborne concentrations in the mill.

3.3 Conclusions

The licensee had implemented a radiation protection program that was found to be in accordance with requirement established in 10 CFR Parts 19 and 20 and the license. Areas of the radiation protection program that were reviewed and found to be acceptable included worker occupational dose determination, radiation work permit implementation, bioassay program, and the respiratory protection program.

4 Radioactive Waste Management (88035)

4.1 Inspection Scope

The objective of this portion of the inspection was to verify that site radioactive waste management activities were being conducted in accordance with applicable regulations and the conditions of the license, and to ensure that controls were adequate to protect the health and safety of the workers and the members of the general public.

4.2 Observations and Findings

During the site tour, the licensee's disposal cells were observed and found to be processing liquid waste through evaporation and recycling. No abnormal conditions, such as leaks or berm failures, were observed at any of the cells during the site tour.

LC 10.5 authorizes the licensee to dispose of byproduct material generated at licensed in-situ leach facilities subject to several conditions, including a 5000 cubic yard limit from a single source. The licensee is also required to submit an annual summary to the NRC of waste disposed of from off-site generators in accordance with LC 10.5(D). The licensee's most current annual summary dated April 6, 1998, was reviewed by the inspector. This document summarized the waste received during 1997 from offsite waste generators. The total amount of waste received was within the limit specified in the license.

4.3 Conclusions

The licensee appeared to have maintained radioactive waste in accordance with the license and NRC regulations. No health or safety issues were identified.

5 Environmental Monitoring (88045)

5.1 Inspection Scope

The environmental monitoring program was reviewed to assess the effectiveness of the licensee's program and to evaluate the effects of site activities on the local environment.

5.2 Observations and Findings

a. Environmental Monitoring Program Overview

LC 11.2 states that the licensee shall implement the effluent and environmental monitoring program specified in Section 5.5 of the renewal application. Also, the results of the environmental monitoring program are required to be submitted to NRC on a semiannual basis in accordance with LC 11.3(C) and 10 CFR 40.65. The semiannual effluent report for the second half of 1997 was submitted to the NRC on March 2, 1998, and reviewed during this inspection. The results of the 1997 effluent report were compared to the 1996 reports to ascertain whether any adverse trends existed.

b. Air Particulate Sampling

The licensee collected particulate air samples at four locations around the site. Sample filters were required to be changed weekly and analyzed for natural uranium, radium-226, thorium-230, and lead-210 quantities. Sample results for the second half of 1997 were reviewed. Sample results were less than 7 percent of the respective 10 CFR Part 20, Appendix B, effluent concentration limits. Also, the laboratory's lower limit of detection was equal to or better than the limits specified in LC11.2(D). The 1997 sample results were compared to the 1996 sample results, and no adverse trends were noted in this area of the environmental monitoring program.

c. Stack Sampling

The licensee is required to sample the stack emissions for natural uranium content on a quarterly basis during plant operations. Sampling for total particulates, thorium-230, radium-226, and lead-210 content is required on a semiannual basis. Also, LC 11.2(A) requires the licensee to determine the stack flow rates. Yellowcake stacks were in service during the second half of 1997 and were sampled. The licensee also reported the results of stack samples in the semiannual effluent report for the second half of 1997. The inspector determined that licensee calculation of stack flowrates, radioactive material release rates, and radioactive material concentrations were performed adequately.

d. Ambient External Gamma Exposures

Environmental TLDs were located at five sample stations. One duplicate sample was used at one station for quality control purposes. The TLDs were replaced and analyzed on a quarterly basis. The sample results for 1997 were reviewed during the inspection. The TLD ambient gamma exposure measurements were comparable to the background radiation and were comparable to the 1996 TLD results. No adverse trend was observed.

e. Surface Water and Groundwater Samples

Section 5.5 of the license application requires surface water samples to be obtained from two locations. Quarterly samples had been collected from Westwater Canyon and Cottonwood Creek. The samples were analyzed for natural uranium, radium-226, and thorium-230 concentrations, as well as for the quantity of total dissolved and suspended solids. Sample results were found to be less than the natural uranium effluent concentration limit specified in Appendix B of 10 CFR Part 20. Also, the 1997 sample results were noted to be comparable to the 1996 sample results.

LC 11.3(C) requires monitoring wells to be sampled quarterly and analyzed for chloride, potassium, nickel, and uranium concentrations. The sample results for the fourth quarter of 1997 were reviewed. The highest natural uranium concentration (0.05 milligrams per liter) was measured in a sample obtained from well MW-14. There were no deleterious trends.

5.3 Conclusions

A review of the licensee's environmental monitoring program and 10 CFR 40.65 report indicated that the licensee was in compliance with license requirements.

6 Exit Meeting Summary

The inspector presented the preliminary inspection results to licensee representatives at the conclusion of the inspection on June 11, 1998. Licensee representatives acknowledged the findings as presented. The licensee did not identify any information reviewed by the inspector as propriety information.

ATTACHMENT

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Berg, Radiation Safety Officer (RSO)
W. Deal, Mill Manager
W. Palmer, Radiation Technician
M. Rehmann, Environmental Manager and Corporate RSO

INSPECTION PROCEDURES USED

IP	83822	Radiation Protection
IP	88005	Management Organizational Controls
IP	88020	Operations Review
IP	88035	Radioactive Waste Management
IP	88045	Environmental Monitoring

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DAC	derived air concentration
ICP-MS	inductively coupled plasma mass spectrometer
IUC	International Uranium (USA) Corporation
LC	license condition
MW	monitoring well
PF	protection factor
QC	quality control
RSO	radiation safety officer
RWP	radiation work permit
SAG	semiautogenous grinding
SERP	Safety and Environmental Review Panel
SOP	Standard Operating Procedure
TLD	Thermoluminescent Dosimeter

NRC Dam Safety Audit Report Letter
Dated February 10, 1999

No notices of violation issued

Audit of August 18, 1998

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

DLF
HRN
WND
REB

February 10, 1999

FEB 22 1999

Ms. Michelle R. Rehmann
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

SUBJECT: RESULTS OF DAM SAFETY AUDIT RELATED TO THE TAILINGS MANAGEMENT SYSTEM FOR WHITE MESA MILL, BLANDING, UTAH

Dear Ms. Rehmann:

On August 18, 1998, an audit was conducted at the dams retaining cells 1-I, 2, 3, and 4A at the White Mesa facility in Blanding, Utah. Nuclear Regulatory Commission (NRC) staff has received and evaluated the final report from its technical assistance contractor, the Federal Energy Regulatory Commission (FERC), related to this audit. The conclusion of the audit was that there were no conditions observed that would indicate any immediate concerns regarding the integrity of the dams. Page 10 of the Operation Inspection Report (enclosed) identifies two actions that should be taken by you to ensure the continued safety of the dams consistent with the Federal Guidelines for Dam Safety (1979) and the Dam Safety Program Act defined in the Water Resources Act of 1996. It is requested that you provide a written response to these actions within 180 days of receipt of this letter. Since NRC staff is requesting actions contained in the FERC report, no additional response to findings and follow up actions to FERC is required on your part.

Certain inventory data regarding the dams are summarized on pages 3 and 4 of the report. NRC will provide these data to the Federal Emergency Management Agency and the Corps of Engineers for inclusion in the National Inventory of Dams Data Base (NATDAM). Within 60 days of receipt of this letter, it is requested that you review these data and provide the staff any corrections or missing information.

An original copy of the FERC report, dated January 6, 1999, which includes color photographs taken of various areas that were inspected during the audit, has been provided as an enclosure. As noted in the FERC report, representatives of International Uranium (USA)Corporation (IUC) accompanied the Office of Nuclear Material Safety and Safeguards and FERC personnel during this audit and participated in the discussions. No other written inspection report related to this audit was generated.

It is understood that periodic dam inspections will be performed at routine intervals by IUC personnel. Information from such inspections and evaluations, as well as any actions you have taken relative to the dams, may be of use in your response to this letter.

If you have any questions regarding the responses and information requested, the report, or schedule for submittal of information, please contact Daniel Rom at (301) 415-6704.

Sincerely,

Joseph J. Holonich
Dam Safety Officer
Division of Waste Management
Office of Nuclear Material Safety
and Safeguards

Docket No. 40-8681

Enclosure: As stated

NRC Inspection Report 40-8681/99-01
Dated April 21, 1999
and Notice of Violation

NRC Inspection of March 25, 1999

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

APR 26 1999

April 21, 1999

Harold R. Roberts, Executive Vice-President
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-8681/99-01 AND NOTICE OF VIOLATION

Dear Mr. Roberts:

On March 25, 1999, the NRC completed an inspection at your White Mesa Mill near Blanding, Utah. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. The inspection findings were presented to you and members of your staff at the conclusion of the onsite inspection. The enclosed report presents the results of that inspection. Overall, the inspection determined that you have continued to operate the uranium production facility in a safe and effective manner.

However, based on information developed during the inspection, the NRC has determined a violation of NRC requirements occurred. The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the enclosed inspection report. The violation involved the failure to follow Standard Operating Procedures (SOPs). Specifically, three examples were found of failure to follow established SOPs, a violation of License Condition 9.6. The violation is of concern because it was identified by the NRC, and demonstrates a lack of attention to detail to procedural requirements.

Since you committed to corrective actions during the inspection, you are not required to respond to this letter.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if any, will be placed in the NRC Public Document Room (PDR).

Should you have any questions concerning this inspection, please contact Mr. Douglas Simpkins at (817) 860-8220 or Dr. D. Blair Spitzberg at (817) 860-8191.

Sincerely,

Dwight D. Chamberlain

Dwight D. Chamberlain, Director
Division of Nuclear Materials Safety

Docket No.: 40-8681
License No.: SUA-1358

Enclosures: (See next page)

Enclosures:
1. Notice of Violation
2. NRC Inspection Report 40-8681/99-01

cc w/enclosure:
Ms. Michelle Rehmann
International Uranium (USA) Corp.
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

Mr. William Deal, Mill Manager
International Uranium (USA) Corp.
6425 South Highway 191
P.O. Box 809
Blanding, Utah 84511

Mr. William J. Sinclair, Director
State of Utah
Department of Environmental Quality
Division of Radiation Control
168 North 1950 West
Salt Lake City, Utah 84115-4850

Mr. Pat Mackin, Assistant Director
Systems Engineering & Integration
Center for Nuclear Waste Regulatory Analyses
6220 Culebra Road
San Antonio, Texas 78238-5166

ENCLOSURE 1

NOTICE OF VIOLATION

International Uranium (USA) Corporation
San Juan County, Utah

Docket No.: 40-8681
License No.: SUA-1358

During an NRC inspection conducted on March 23-25, 1999, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

> License Condition 9.6 states, in part, standard operating procedures shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored.
>
> Contrary to the above, the licensee did not follow established SOPs in three separate occasions:
>
> - The Health Physics Manual requires personnel donning respiratory protection equipment to conduct positive or negative face seal checks. Contrary to this requirement, on March 24, 1999 an individual was observed to have not conducted face seal checks when using respiratory protection for protection from radionuclides.
> - The Ore Receiving, Feed and Grinding Manual requires personnel conducting work under a radiation work permit to sign the permit. Contrary to this, personnel were simply listed on six radiation work permits since the previous inspection.
> - The Emergency Response Plan requires emergency evacuation drills be conducted, documented and reviewed by management semi-annually. Contrary to this, as of March 25, 1999, the last drill had been conducted in June, 1998, the last documented drill had been conducted April 29, 1996, and no record of drill reviews was found.
>
> This is a Severity Level IV violation (Supplement VI).

The NRC has concluded that information regarding the reason for the violation, the corrective actions taken and planned to correct the violation and prevent recurrence and the date when full compliance will be achieved is already adequately addressed on the docket in this inspection report. However, you are required to submit a written statement or explanation pursuant to 10 CFR 2.201 if the description therein does not accurately reflect your corrective actions or your position. In that case, or if you choose to respond, clearly mark your response as a "Reply to a Notice of Violation," and send it to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555 with a copy to the Regional Administrator, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, within 30 days of the date of the letter transmitting this Notice of Violation.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

If you choose to respond, your response will be placed in the NRC Public Document Room (PDR). Therefore, to the extent possible, the response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 21st day of April 1999

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	40-8681
License No.	SUA-1358
Report No.	40-8681/99-01
Licensee:	International Uranium (USA) Corp.
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	March 23-25, 1999
Inspector:	Douglas S. Simpkins, Health Physicist Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Accompanied By:	Ted Johnson, Senior Technical Reviewer Uranium Recovery and Low Level Waste Branch Division of Waste Management Daniel Rom, Geotechnical Engineer Uranium Recovery and Low Level Waste Branch Division of Waste Management
Approved and Accompanied By:	D. Blair Spitzberg, Ph.D., Chief Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Attachment:	Supplementary Information

EXECUTIVE SUMMARY

White Mesa Mill
NRC Inspection Report 40-8681/99-01

This inspection included a review of site status, management organization and controls, site operations, radioactive waste management, radiation protection and environmental protection programs. Overall, the licensee was operating the facility in a safe and effective manner.

Management Organization and Controls

- The licensee's organizational structure was in agreement with the license requirements, and adequate oversight had been provided for site activities (Section 2.2).

- A review of the licensee's implementation of the performance-based license showed the licensee had correctly utilized a performance-based license (Section 2.3).

- Three examples of a failure to follow established procedures were noted, a violation of License Condition 9.6 (Section 2.4).

Radioactive Waste Management

- Operational activities were being conducted safely and in accordance with the conditions of the license as well as NRC regulations (Section 3.2).

- A review of the licensee's onsite control of the alternate feed material demonstrated the licensee was maintaining control of the radioactive waste shipments in an orderly, controlled fashion (Section 3.3).

Radiation Protection

- The radiation protection program areas reviewed were found to be acceptable with the exception of the noted procedural compliance violations, including audit program review, decommissioning recordkeeping, radiation work permits (RWPs), bioassay and respiratory protection activities (Sections 4.2-4.6).

Environmental Protection

- The licensee was noted to be collecting all environmental monitoring samples required by the license at the intervals specified in the license, as reported in the 1998 semiannual effluent reports. All sample results were less than the associated effluent release limits specified in 10 CFR Part 20 during 1998. When the 1998 sample results were compared to those from 1997, no adverse trends were identified (Sections 5.2-3).

Report Details

1 Site Status

The NRC issued Source Material License No. SUA-1358 to Energy Fuels Nuclear during August 1979. Ownership of the site was eventually transferred to Umetco Minerals, back to Energy Fuels Nuclear, and finally to International Uranium (USA) Corporation (IUC). IUC assumed ownership of the White Mesa Mill on May 10, 1997. The NRC approved the transfer via Amendment No. 2 of the revised License No. SUA-1358. This amendment was issued to IUC on May 9, 1997.

The mill was actively processing alternate feed material during the inspection. (Alternate feed material is material other than natural uranium ore.) The licensee is authorized to receive and process alternate feed materials from four out-of-state firms by License Conditions 10.6 through 10.13.

In accordance with License Conditions 10.6 and 10.7, IUC is authorized to process alternate feed material from Allied Signal. This material, referred to as "CaF" (calcium fluoride), is currently being stockpiled for future processing.

In accordance with License Conditions 10.10, 10.11 and 10.13, the licensee is receiving bulk alternate feed materials in soil form from the Ashland 2 Formerly Utilized Sites Remedial Action Program near Tonowanda, New York, and drummed calcined byproduct materials from Cameco Corporation's Blind River and Port Hope facilities in Ontario, Canada. Although the Cameco material is currently being processed, only fingerprint analysis of the Ashland 2 material is being conducted in preparation for future processing.

The licensee is also receiving and processing bulk uranium ore from active mines through private contractors.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organizational structure was reviewed to ensure the licensee had established an effective organization with defined responsibilities and functions and appropriate controls were in place to ensure compliance with NRC requirements. Also, the utilization and implementation of the licensee's performance-based license was reviewed.

2.2 Management Organization

The organizational structure requirements are provided in License Condition 9.3, which references the NRC-approved license renewal application dated January 30, 1997. The licensee had made no changes to the structure since the previous inspection.

In summary, the licensee's organizational structure was in agreement with the intent of License Condition 9.3.

2.3 Performance-Based License Review

License Condition 9.4 states that the licensee may, under certain conditions and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the performance-based license provisions was reviewed to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site. The NRC granted the licensee a performance-based license during March 1997.

The licensee's determinations under License Condition 9.4 are required to be made by a Safety and Environmental Review Panel (SERP). The licensee held three SERP meetings since the previous inspection as discussed below:

August 3, 1998 - The SERP reviewed two areas:

The utilization of Cell No. 2 for storage of process tailings after dewatering from Cabot uranium/tantalum ores.

The use of resin IX for the purification and concentrating step in place of liquid IX, or solvent extraction.

August 21, 1998 - The SERP reviewed two areas:

Formal review and discussion of the Draft Sampling and Analysis Plan ("SAP") for confirmatory sampling of the Ashland 2 material.

Discussion of the detection of naphthalene in one of the 15 characterization samples obtained by ICF Kaiser Engineers.

December 2, 1998

The SERP reviewed a modification to the front-end processing procedures of Ashland 2 ore material to incorporate a trommel screening mechanism for gross separation of feed materials.

All SERP panel conclusions were technically adequate. However, the SERP review accounting process was in need of improvement. The licensee stated it would develop a formal indexing and enumeration system.

2.4 Site Procedures

In accordance with License Condition 9.6, SOPs are required to be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. However, the licensee did not follow established SOPs in three separate occasions as discussed below:

a. The Health Physics Manual requires personnel donning respiratory protection equipment to conduct positive or negative face seal checks. Contrary to this requirement, on March 24, 1999 an individual was observed to have not conducted face seal checks when using respiratory protection for protection from radionuclides. The licensee committed to a corrective action to include a review and emphasis of respiratory protection requirements at the next safety meeting.

b. The Ore Receiving, Feed and Grinding Manual requires personnel conducting work under a RWP to sign the permit. Contrary to this, personnel were simply listed on six RWPs since the previous inspection. The licensee committed to a corrective action of supervisory training on the proper use of RWPs at the next daily meeting.

c. The Emergency Response Plan requires emergency evacuation drills be conducted, documented and reviewed by management semi-annually. Contrary to this, as of March 25, 1999, the last drill had been conducted in June 1998, and the last documented drill had been conducted April 29, 1996, with no record of drill reviews found. The licensee committed to corrective actions of conducting and documenting an emergency drill in the next 7-10 days, and subsequent timely review by appropriate management personnel.

The corrective actions committed during the inspection were adequate to resolve this violation (40-8681/9901-01).

2.5 Conclusions

The licensee had established an organizational structure that agreed with the requirements of the license. Also, the licensee had correctly implemented the performance-based conditions of the license. Three examples of failing to follow procedures were observed, a violation of License Condition 9.6. The licensee committed to adequate corrective actions during the inspection.

3 Radioactive Waste Management (88035)

3.1 Inspection Scope

The objective of this portion of the inspection was to verify site activities were being conducted in accordance with applicable regulations and the conditions of the license, and to ensure operational controls were adequate to protect the health and safety of the workers and the members of the general public.

3.2 Site Operations

A facility tour was performed to observe activities in progress. Site perimeter postings, required by License Condition 9.9, were in place at all entrances to the site, although many were faded and in need of replacement. The licensee indicated an intent to replacing the signs on an as-needed basis. No significant health or safety concern was identified during the tour.

A review of the licensee's four disposal cells was conducted. Cells 1 and 3 were actively being used for process solution evaporation and recycling, with Cell 3 also used for disposal of tailings generated onsite and wastes generated offsite (as authorized in License Condition 10.5). Cell 2 was being used for disposal of solid wastes generated onsite, and was covered as the cell was filled. Any liquid recovered from Cell 2 operations was transferred to Cell 3. Finally, Cell 4 was not in service during the inspection, receiving only precipitation. Since the cell had multiple tears and channels in the liner system, the licensee stated that Cell 4 would not be used until the liner is replaced. No abnormal conditions, such as leaks or berm failures, were observed at any of the cells during the site tour. An inspection of all four cells was performed by the radiation safety technicians.

3.3 Radioactive Waste Receipts

License Condition 10.5 authorizes the licensee to dispose of byproduct material generated at licensed in-situ leach facilities subject to several conditions, including a 5000 cubic yard limit from a single source. The licensee is also required to submit an annual summary to the NRC of wastes disposed of from off-site generators in accordance with Condition 10.5.D. The licensee's most current annual summary was reviewed during the inspection. Eleven shipments from three offsite generators in 1998 and one in 1999 were conducted within the limits of the license.

3.4 Conclusions

The licensee appeared to have maintained control of site operations and radioactive waste receipts in accordance with the conditions of the license and NRC regulations. No detrimental health or safety issue was identified.

4 Radiation Protection (83822)

4.1 Inspection Scope

Portions of the licensee's radiation protection program were reviewed to verify compliance with the conditions of the license as well as the requirements of 10 CFR Part 20.

4.2 Audit Program Review

In accordance with License Condition 11.6, an annual as low as reasonably achievable (ALARA) audit of the radiation safety program is required to be performed in accordance with Regulatory Guide 8.31. The most current audit was found to be thorough and comprehensive.

The radiation safety officer's monthly reports were reviewed. These reports are required by Section 3.6.3, "Monthly Reviews," of the ALARA Program section of the license application. The reports provided useful information such as in-plant radiological sampling and survey results.

Finally, the licensee's weekly inspection reports were reviewed. These reports are required by Section 3.6.2, "Weekly Inspections," of the license application. No significant health or safety issue was identified.

4.3 Decommissioning Recordkeeping

In accordance with 10 CFR Part 40.36(f)(1), records are required to be permanently maintained, including a description of the restricted area, spills, and any unusual events. The licensee was noted to be maintaining these records in onsite files, specifically the "Spill Containment and Countermeasures Plan and Reports" file. Licensee representatives stated that they had not added any new information to this file since 1995.

The licensee was operating in compliance with the recordkeeping requirements of 10 CFR Part 40.36.

4.4 Radiation Work Permits

Radiation Work Permit (RWP) requirements are provided in the Health Physics Manual. The licensee issued six RWPs since the previous inspection. All were reviewed, and were within the scope of the RWP procedure. However, some RWP's were completed in pencil, allowing smudges and alterations to completed forms. The licensee indicated that they would have future forms completed in ink. In addition, a procedural violation, previously discussed in Section 2.4, was identified for the failure to have workers sign RWPs prior to performing the work covered by the RWP.

4.5 Bioassay Program Review

License Condition 9.6 requires written procedures for a bioassay program. The licensee had maintained extensive records related to bioassay sampling. During 1998, 220 bioassay samples were obtained from site workers and were analyzed by the onsite laboratory, including 34 blank and spiked samples for quality control purposes. At least ten percent of the samples were split and sent to an offsite laboratory for quality assurance purposes. No sample result exceeded the lowest action level of 15 micrograms of natural uranium per liter of urine.

The sample results for 1998 were compared to 1997 sample results. No individual exceeded the action level during these years, suggesting that the licensee was effectively controlling intake of radioactive materials through the use of respirators, control of the radioactive materials and engineering controls.

4.6 Respiratory Protection

The respiratory protection program was reviewed during the inspection. Respirators were maintained in the control room area with smoke tubes to assure proper fit when donning. However, of three individuals interviewed, one incorrectly stated that a half-face respirator was appropriate for protection from radionuclides, contrary to site training protocols. Upon review of various procedures, several examples were found of inconsistencies of respirator usage. For example, in the Ore Receiving, Feed and Grinding Manual, a half-face respirator is required during semiautogenous grinding mill operations, even though this area is posted as an airborne radiation area. The licensee stated it would review and update procedures to establish consistency for respiratory requirements. In addition, a procedural violation, previously discussed in Section 2.4, involved an individual observed not conducting a required face seal check when using a respirator.

4.7 Conclusions

Radiation protection program areas reviewed and found acceptable with the exception of the noted procedural compliance violations, included audit program review, recordkeeping of decommissioning activities, radiation work permits, bioassay and respiratory protection programs.

5 Environmental Monitoring (88045)

5.1 Inspection Scope

The environmental monitoring program was reviewed to assess the effectiveness of the licensee's program and to evaluate the effects of site activities on the local environment.

5.2 Environmental Monitoring Program Review

License Condition 11.2 states, in part, that the licensee shall implement the effluent and environmental monitoring program specified in Section 5.5 of the renewal application. Also. the results of the environmental monitoring program are required to be submitted to NRC on a semiannual basis in accordance with License Condition 11.3.C. The semiannual effluent report for the second half of 1998 was reviewed. The 1998 sample results were compared to those from 1997 to ascertain whether any adverse trends existed.

a. Air Particulate Sampling

The licensee collected particulate air samples at four locations around the site. (The operation of the air sampler at the background station was discontinued by the licensee with NRC approval several years ago.) The sample filters are required to be changed weekly, composited quarterly, and analyzed for their natural uranium, radium-226, thorium-230, and lead-210 quantities. The sample results were less than 3 percent of the respective 10 CFR Part 20, Appendix B, effluent concentration limits. Also, the laboratory's lower limit of detection was equal to or better than the limits specified in License Condition 11.2.D.

The 1998 sample results were compared to those from 1997. Overall, the 1998 sample results were down from the previous year. Therefore, no adverse trends were noted in this area of the environmental monitoring program.

b. Stack Sampling

The licensee is required to sample the stack emissions for natural uranium content on a quarterly basis during plant operations. Also, sampling for total particulates, thorium-230, radium-226, and lead-210 content is required on a semiannual basis. In addition, License Condition 11.2.A specifically requires the licensee to determine the stack flow rates.

According to information provided by the licensee, the yellowcake stacks were not used during the second half of 1998; therefore, stack samples were not obtained during this time frame.

c. Ambient External Gamma Exposures

Environmental gamma thermoluminescent dosimeters (TLDs) were located at all five sample stations. The TLDs were changed out and analyzed on a quarterly basis.

The site perimeter sample stations measured an ambient gamma exposure that was comparable to the background value. Historically, the difference between the site stations and background rarely exceeded 10 millirems per quarter. The sample results for 1998 were comparable to those from 1997 and no adverse trend was observed.

d. Vegetation Sampling

Vegetation samples are required to be obtained three times per year from three separate locations. The samples were required to be analyzed for their radium-226 and lead-210 concentrations. The 1998 sample results showed no increase in radionuclide concentrations from the 1997 sample results.

e. Soil Sampling

Soil samples are required to be obtained once each year at all sample stations, including the background station. The radionuclide concentrations in the soil samples were very low, and the site boundary sample results were comparable to the background value. Also, the 1998 sample results were comparable to those from 1997.

f. Surface Water Samples

In accordance with Section 5.5 of the license application, surface water samples are required to be obtained from two locations. Water samples (or sediment samples if the streams are dry) are to be obtained annually from Westwater Creek and quarterly from

Cottonwood Creek. The samples were analyzed for their natural uranium, radium-226, and thorium-230 concentrations, as well as for the quantity of total dissolved and suspended solids.

Sample results were less than 2 percent of the natural uranium effluent concentration limit specified in Appendix B of Part 20. Also, the 1998 sample results were noted to be comparable to those from 1997.

g. Ground Water Samples

The well water samples are analyzed for chloride, potassium, nickel, and uranium concentrations. No trends were observed with the groundwater sample results.

5.3 Instrument Calibrations

a. Air Sampler Calibration

In accordance with License Condition 11.2.E, the licensee is required to perform a semiannual inspection as well as a biennial calibration of the critical orifice assembly. This device was used to check the accuracy of the environmental air sampler flow rates. Records for inspection and calibration of the critical orifice assembly were reviewed, as well as calibration records for the air sampling pumps. Although the orifice assembly was due for calibration in February 1999, the licensee had used it for calibrating environmental air sampling pumps in March 1999, two weeks overdue. This finding was determined to be a violation of minor significance and was therefore not cited. The licensee committed to getting the orifice calibrated and the environmental air sampling pumps recalibrated in a timely manner.

b. Instrument Calibrations

The Health Physics Manual states all radiation and environmental monitoring, sampling, and detection equipment shall be recalibrated after repair and as recommended by the manufacturer or at least annually, whichever is more frequent. The licensee's calibration records and availability of equipment were reviewed. The licensee had maintained calibrated equipment available for use, and had maintained records indicating all equipment was routinely calibrated.

5.4 Conclusions

A thorough review of the licensee's implementation of the environmental monitoring program requirements was performed. The licensee had used an out-of-calibration orifice to calibrate the environmental air sampling pumps, but had committed to orifice calibration and pump recalibration in a timely manner. The licensee was noted to be collecting all samples required by the license at the intervals specified in the license, and reporting these sample results in their 1998 semiannual effluent report. All sample results were less than the associated limits specified in 10 CFR Part 20 during 1998. When the 1998 data was compared to the 1997 sample results, no adverse trend was identified.

6 Followup (92701)

6.1 NRC Information Notice 96-70: Year 2000 Effect on Computer System Software

This Notice was issued to alert licensees of the potential problems that may occur with their computer systems and associated software as a result of the upcoming change to the new century. During this inspection, the licensee's actions taken in response to this NRC Information Notice were reviewed. In summary, the licensee had established that there were no operational equipment controllers affected by the Year 2000 effect.

6.2 NRC Information Notice 99-03: Exothermic Reactions Involving Dried Uranium Oxide Powder (Yellowcake)

This Information Notice was issued to alert licensees to the potential for drummed yellowcake to react with hydrocarbons and generate excessive pressures. In two cases, excessive pressures were generated in drummed yellowcake from the generation of oxygen from the breakdown of process hydrogen peroxide. In two additional cases, hydrocarbon contaminants were introduced into the processes and packaged with the yellowcake. Subsequent reactions generated excessive heat and gas production.

The licensee's actions taken in response to Information Notice 99-03 were reviewed. The licensee was aware of the oxygen generation problem at other facilities and had trained dryer operators to incorporate a cool-down period prior to package sealing; therefore, the licensee had taken the appropriate corrective actions in relation to the Information Notice.

The licensee was also aware of the hydrocarbon contaminant problem. The licensee stated visual inspections of the processed yellowcake are performed while the product is being packaged. The licensee planned to take no further specific action related to the hydrocarbon contaminant incidents discussed in the Information Notice.

7 Exit Meeting Summary

The inspector presented the preliminary inspection results to the representatives of the licensee at the conclusion of the inspection on March 25, 1999. Licensee representatives acknowledged the findings as presented. The licensee did not identify any information reviewed by the inspector as propriety information.

Attachment 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee
H. Roberts, Executive Vice-President
R. Berg, Radiation Safety Officer
W. Deal, Mill Manager
M. Rehmann, Environmental Manager

State of Utah
G. Ripley, Environmental Scientist, Division of Radiation Control

Environmental Protection Agency
R. Graham, Health Physicist/Eco-Toxicologist, Office of Pollution Prevention - Toxicology
T. Brown, Environmental Engineer, Pollution-Hazardous Waste

INSPECTION PROCEDURES USED

83822	Radiation Protection
88005	Management Organization and Controls
88035	Radioactive Waste Management
88045	Environmental Monitoring
92701	Followup

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

40-8681/9901-01 VIO failure to follow procedures

Closed

None

Discussed

NRC Information Notice 96-70: Year 2000 Effect on Computer System Software
NRC Information Notice 99-03: Exothermic Reactions Involving Dried Uranium Oxide Powder (Yellowcake)

LIST OF ACRONYMS USED

ALARA	as low as reasonably achievable
CaF	calcium fluoride
CFR	Code of Federal Regulations
PDR	Public Document Room
RWP	radiation work permit
SERP	Safety and Environmental Review Panel
SOP	Standard Operating Procedure
TLD	thermoluminescent dosimeters

NRC Inspection Report 40-8681/99-02
Dated August 17, 1999

No notices of violation issued

NRC Inspection of July 29, 1999

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

August 17, 1999

Harold R. Roberts, Executive Vice-President
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-8681/99-02

Dear Mr. Roberts:

On July 29, 1999, the NRC completed an inspection at your White Mesa Mill near Blanding, Utah. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. The inspection findings were presented to you and members of your staff at the conclusion of the onsite inspection. The enclosed report presents the results of that inspection. Overall, the inspection determined that you have continued to operate the uranium production facility in a safe and effective manner.

Based on the results of this inspection, no violations or deviations were identified; therefore, no response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, if any, will be placed in the NRC Public Document Room (PDR).

Should you have any questions concerning this inspection, please contact Mr. Douglas Simpkins at (817) 860-8220 or myself at (817) 860-8191.

Sincerely,

D. Blair Spitzberg, Chief
Fuel Cycle and Decommissioning Branch

Docket No.: 40-8681
License No.: SUA-1358

Enclosure: NRC Inspection Report 40-8681/99-02

cc w/enclosure:
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Systems Engineering & Integration
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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	40-8681
License No.	SUA-1358
Report No.	40-8681/99-02
Licensee:	International Uranium (USA) Corp.
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	July 28-29, 1999
Inspector:	Douglas S. Simpkins, Health Physicist Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Accompanied By:	Randolph W. Von Till, Project Manager Uranium Recovery and Low Level Waste Branch Division of Waste Management
Approved By:	D. Blair Spitzberg, Ph.D., Chief Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Attachment:	Supplementary Information

EXECUTIVE SUMMARY

White Mesa Mill
NRC Inspection Report 40-8681/99-02

This inspection included a review of site status, management organization and controls, site operations, radioactive waste management, radiation protection and environmental protection programs. Overall, the licensee was operating the facility in a safe and effective manner.

Management Organization and Controls

- The licensee's organizational structure was in agreement with the license requirements, and adequate oversight had been provided for site activities (Section 2.2).

- The licensee had correctly implemented the requirements of its performance-based license (Section 2.3).

Radioactive Waste Management/OSHA Interface Activities

- Operational activities were being conducted safely and in accordance with the conditions of the license and NRC regulations (Section 3.2).

- A review of the licensee's onsite control of the alternate feed material demonstrated the licensee was maintaining control of the incoming alternate feed material in an orderly, controlled fashion. Several examples of OSHA health and safety findings were brought to the attention of the Safety Officer and management (Section 3.3).

Radiation Protection

- The radiation protection program areas reviewed were found to be acceptable, including audit program review, decommissioning recordkeeping, radiation and contamination surveys, bioassay and respiratory protection activities (Sections 4.2-4.6).

Environmental Protection

- The licensee was noted to be collecting all environmental monitoring samples required by the license at the intervals specified in the license, as reported in the first half of 1999 semiannual effluent report. All sample results were less than the associated effluent release limits specified in 10 CFR Part 20 during the first half of 1999. When the 1999 sample results were compared to those from 1998, no adverse trends were identified (Sections 5.2-3).

Report Details

1 Site Status

The NRC issued Source Material License No. SUA-1358 to Energy Fuels Nuclear during August 1979. Ownership of the site was eventually transferred to Umetco Minerals, back to Energy Fuels Nuclear, and finally to International Uranium (USA) Corporation (IUC). IUC assumed ownership of the White Mesa Mill on May 10, 1997. The NRC approved the transfer via Amendment No. 2 of the revised License No. SUA-1358. This amendment was issued to IUC on May 9, 1997.

The mill was actively processing alternate feed material during the inspection. (Alternate feed material is material other than natural uranium ore.) The licensee is authorized to receive and process alternate feed materials from four out-of-state firms by License Conditions 10.6 through 10.13. In accordance with License Conditions 10.6 and 10.7, IUC is authorized to process alternate feed material from Allied Signal. This material, referred to as "CaF" (calcium fluoride), is being processed as alternate feed. In accordance with License Conditions 10.10, 10.11 and 10.13, the licensee is receiving bulk alternate feed materials in soil form from the Ashland 2 Formerly Utilized Sites Remedial Action Program near Tonowanda, New York. Only fingerprint analysis of the Ashland 2 material is being conducted in preparation for future processing. The licensee is also receiving and processing bulk uranium ore from active mines through private contractors.

The licensee was conducting yellowcake and vanadium drying and packaging operations. To date, approximately 160,000 pounds of yellowcake had been produced for the year, but none had been shipped offsite. An additional 60-70 thousand pounds of yellowcake are in the process tanks.

The licensee currently employs 101 individuals, with 6 additional employee vacancies.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organizational structure was reviewed to ensure the licensee had established an effective organization with defined responsibilities and functions and appropriate controls were in place to ensure compliance with NRC requirements. Also, the utilization and implementation of the licensee's performance-based license was reviewed.

2.2 Management Organization

The organizational structure requirements are provided in License Condition 9.3, which references the NRC-approved license renewal application dated January 30, 1997. The licensee had made no changes to the structure since the previous inspection.

In summary, the licensee's organizational structure was in agreement with License Condition 9.3.

2.3 Performance-Based License Review

The NRC granted the licensee a performance-based license during March 1997. License Condition 9.4 states that the licensee may, under certain conditions and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the performance-based license provisions was reviewed to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site.

The licensee's determinations under License Condition 9.4 are required to be made by a Safety and Environmental Review Panel (SERP). No SERP reviews had been conducted since the previous inspection.

2.4 Site Procedures

In accordance with License Condition 9.6, standard operating procedures (SOPs) are required to be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. During the inspection, the inspector observed operating procedures being properly implemented.

2.5 Conclusions

The licensee had established an organizational structure that agreed with the requirements of the license. Also, the licensee had correctly implemented the performance-based conditions of the license. Standard operating procedures were correctly implemented.

3 Radioactive Waste Management (88035)
OSHA Interface Activities (93001)

3.1 Inspection Scope

The objective of this portion of the inspection was to verify site activities were being conducted in accordance with applicable regulations and the conditions of the license, and to ensure operational controls were adequate to protect the health and safety of the workers and the members of the general public.

3.2 Site Operations

A facility tour was performed to observe activities in progress. Site perimeter postings, required by License Condition 9.9, were in place at all entrances to the site. Several OSHA health and safety concerns were identified during the tour and relayed to the onsite Safety Officer and management:

- Although posted appropriately as a high noise area with hearing protection required, at least two workers were observed to be in designated high noise areas without hearing protection.

- Auger guards at the exit stage of the vanadium filter presses had been removed for maintenance. However, no compensatory measures were in place to minimize risk to personnel (e.g., actual workers, barriers, signs, etc.)

- Several hot pieces of machinery were observed, without appropriate hazard warning signs or barriers.

- An oven used to melt vanadium for processing had an approximate 2 foot flame shooting out of a vent on one end at head height with no barriers or warning mechanisms.

- Approximately one-half of the fire extinguishers had been last checked in May 1999, even though the safety program required monthly checks.

- A liquid process tank was dramatically overflowing in the process circuit, creating a 6-8" flooding condition. Several electrical wires were dangling into the liquid, creating a potential electrical hazard.

A review of the licensee's four disposal cells was conducted. Cells 1 and 3 were actively being used for process solution evaporation and recycling, with Cell 3 also used for disposal of tailings generated onsite and wastes generated offsite (as authorized in License Condition 10.5). Cell 2 was being used for disposal of solid wastes generated onsite, and was covered as the cell was filled. Any liquid recovered from Cell 2 operations was transferred to Cell 3. Finally, Cell 4 was not in service during the inspection, receiving only precipitation. Since the cell had multiple tears and channels in the liner system, the licensee stated that Cell 4 would not be used until the liner is replaced or repaired. No abnormal conditions, such as leaks or berm failures, were observed at any of the cells during the site tour. An inspection of all four cells was performed by the radiation safety technicians.

3.3 Conclusions

The licensee was maintaining control of site operations in accordance with the conditions of the license and NRC regulations. Although several OSHA health and safety issues were identified, both the Safety Officer and management committed to increased attention to these safety concerns.

4 Radiation Protection (83822)

4.1 Inspection Scope

Portions of the licensee's radiation protection program were reviewed to verify compliance with the conditions of the license as well as the requirements of 10 CFR Part 20.

4.2 Audit Program Review

The radiation safety officer's monthly reports were reviewed. These reports are required by Section 3.6.3, "Monthly Reviews," of the ALARA Program section of the license application. The reports provided useful information such as in-plant radiological sampling and survey results.

Finally, the licensee's weekly inspection reports were reviewed. These reports are required by Section 3.6.2, "Weekly Inspections," of the license application. No significant health or safety issue was identified.

4.3 Decommissioning Recordkeeping

In accordance with 10 CFR Part 40.36(f)(1), records are required to be permanently maintained, including a description of the restricted area, spills, and any unusual events. The licensee was noted to be maintaining these records in onsite files, specifically the "Spill Containment and Countermeasures Plan and Reports" file. Licensee representatives stated that they had not added any new information to this file since 1995.

The licensee was operating in compliance with the recordkeeping requirements of 10 CFR Part 40.36.

4.4 Bioassay Program Review

License Condition 9.6 requires written procedures for a bioassay program. The licensee had maintained extensive records related to bioassay sampling. During 1999, bioassay samples were obtained from site workers at the appropriate frequency and analyzed by the onsite laboratory, including blank and spiked samples for quality control purposes. At least ten percent of the samples were split and sent to an offsite laboratory for quality assurance purposes. No verified sample result exceeded the lowest action level of 15 micrograms of natural uranium per liter of urine.

The sample results for 1999 were compared to 1998 sample results. No individual exceeded the action level during these years, suggesting that the licensee was effectively controlling intake of radioactive materials through the use of respirators, control of the radioactive materials and engineering controls.

4.5 Respiratory Protection

The respiratory protection program was reviewed during the inspection. Respirators were maintained in the control room area with smoke tubes to assure proper fit when donning. Plant personnel were interviewed and demonstrated appropriate knowledge of respiratory protection equipment usage. Since the previous inspection, the licensee had revised procedures for establishing airborne radiation areas, establishing consistency for respiratory requirements. However, airborne radiation area signs were incorrectly posted on a set of external entrance doors to the mill. The licensee stated the signs would be removed.

4.6 Radiation and Contamination Surveys

Radiation and contamination surveys were reviewed, including breathing zone, alpha, beta-gamma, radon and personnel contamination as required by the license and NRC requirements. Surveys had been conducted as required. Although extensive surveys were conducted, no levels exceeding regulatory limits were found.

4.6 Conclusions

Radiation protection program areas reviewed and found acceptable included audit program review, recordkeeping of decommissioning activities, bioassay, radiation and contamination surveys and respiratory protection programs.

5 Environmental Monitoring (88045)

5.1 Inspection Scope

The environmental monitoring program was reviewed to assess the effectiveness of the licensee's program and to evaluate the effects of site activities on the local environment.

5.2 Environmental Monitoring Program Review

License Condition 11.2 states, in part, that the licensee shall implement the effluent and environmental monitoring program specified in Section 5.5 of the renewal application. Also, the results of the environmental monitoring program are required to be submitted to NRC on a semiannual basis in accordance with License Condition 11.3.C. The semiannual effluent report for the second half of 1998 was reviewed. The 1998 sample results were compared to those from 1997 to ascertain whether any adverse trends existed.

a. Air Particulate Sampling

The licensee collected particulate air samples at four locations around the site. (The operation of the air sampler at the background station was discontinued by the licensee with NRC approval several years ago.) The sample filters are required to be changed weekly, composited quarterly, and analyzed for their natural uranium, radium-226, thorium-230, and lead-210 quantities. The sample results, all appropriately sampled as required by the license and NRC regulations, were less than 3 percent of the respective 10 CFR Part 20, Appendix B, effluent concentration limits. Also, the laboratory's lower limit of detection was equal to or better than the limits specified in License Condition 11.2.D.

The 1998 sample results were compared to those from 1997. Overall, the 1998 sample results were down from the previous year. Therefore, no adverse trends were noted in this area of the environmental monitoring program.

b. Ambient External Gamma Exposures

Environmental gamma thermoluminescent dosimeters (TLDs) were located at all five sample stations. The TLDs were changed out and analyzed on a quarterly basis.

The site perimeter sample stations measured an ambient gamma exposure that was comparable to the background value. Historically, the difference between the site stations and background rarely exceeded 10 millirems per quarter. The sample results for 1999 were comparable to those from 1998 and no adverse trend was observed.

c. Surface Water Samples

In accordance with Section 5.5 of the license application, surface water samples are required to be obtained from two locations. Water samples (or sediment samples if the streams are dry) are to be obtained annually from Westwater Creek and quarterly from Cottonwood Creek. The samples were analyzed for their natural uranium, radium-226, and thorium-230 concentrations, as well as for the quantity of total dissolved and suspended solids.

Sample results were less than 2 percent of the natural uranium effluent concentration limit specified in Appendix B of Part 20. Also, the 1999 sample results were noted to be comparable to those from 1998.

d. Ground Water Samples

The well water samples, all appropriately sampled per the license and NRC regulations, were analyzed for chloride, potassium, nickel, and uranium concentrations. No trends were observed with the groundwater sample results.

5.3 Instrument Calibrations

a. Air Sampler Calibration

In accordance with License Condition 11.2.E, the licensee is required to perform a semiannual inspection as well as a biennial calibration of the critical orifice assembly. This device was used to check the accuracy of the environmental air sampler flow rates.

Records for inspection and calibration of the critical orifice assembly were reviewed satisfactorily, as well as calibration records for the air sampling pumps.

b. Instrument Calibrations

The Health Physics Manual states all radiation and environmental monitoring, sampling, and detection equipment shall be recalibrated after repair and as recommended by the manufacturer or at least annually, whichever is more frequent. The licensee's calibration records and availability of equipment were reviewed. The licensee had maintained calibrated equipment available for use, and had maintained records indicating all equipment was routinely calibrated.

5.4 Conclusions

A cursory review of the licensee's implementation of the environmental monitoring program requirements was performed. The licensee was noted to be collecting all samples required by the license at the intervals specified in the license, and reporting these sample results in their 1999 semiannual effluent report. All sample results were less than the associated limits specified in 10 CFR Part 20. When the 1999 data was compared to the 1998 sample results, no adverse trend was identified. Sampling equipment and instruments had been calibrated as required.

6 Followup (92701)

6.1 NRC Information Notice 96-70: Year 2000 Effect on Computer System Software

This Notice was issued to alert licensees of the potential problems that may occur with their computer systems and associated software as a result of the upcoming change to the new century. During this inspection, the licensee's actions taken in response to this NRC Information Notice were reviewed. In summary, the licensee had established that there were no operational equipment controllers affected by the Year 2000 effect.

6.2 (Closed) Violation 40-8681/9901-01 Failure to Follow Procedures

During the previous inspection, three examples were observed of failure to follow procedures: 1) an individual did not conduct face seal checks when donning respiratory protection equipment, 2) personnel did not sign in on Radiation Work Permits but rather were listed, and 3) an emergency evacuation drill had not been conducted within the semiannual periodicity.

During this inspection, several individuals were observed donning respiratory protection equipment and properly conducting face seal checks, personnel were trained to sign in on Radiation Work Permits, and an emergency evacuation drill had been conducted within the previous six months. Corrective actions for this violation have been completed. This violation is now closed.

7 Exit Meeting Summary

The inspector presented the preliminary inspection results to the representatives of the licensee at the conclusion of the inspection on July 29, 1999. Licensee representatives acknowledged the findings as presented. The licensee did not identify any information reviewed by the inspector as propriety information.

Attachment 1

PARTIAL LIST OF PERSONS CONTACTED

Licensee
H. Roberts, Executive Vice-President
R. Berg, Radiation Safety Officer
W. Deal, Mill Manager
M. Rehmann, Environmental Manager

INSPECTION PROCEDURES USED

83822	Radiation Protection
88005	Management Organization and Controls
88035	Radioactive Waste Management
88045	Environmental Monitoring
92701	Followup
93001	OSHA Interface Activities

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

40-8681/9901-01	VIO	failure to follow procedures

Discussed

NRC Information Notice 96-70: Year 2000 Effect on Computer System Software

LIST OF ACRONYMS USED

ALARA	as low as reasonably achievable
CaF	calcium fluoride
CFR	Code of Federal Regulations
PDR	Public Document Room
RWP	radiation work permit
SERP	Safety and Environmental Review Panel
SOP	Standard Operating Procedure
TLD	thermoluminescent dosimeters

NRC Inspection Report 40-8681/99-03
Dated December 13, 1999

No notices of violation issued

NRC Inspection of November 18, 1999

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

December 13, 1999

Mr. Harold R. Roberts
Executive Vice-President
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-8681/99-03

Dear Mr. Roberts:

On November 18, 1999, the NRC completed a reactive inspection at your White Mesa Mill near Blanding, Utah. The inspection consisted of the review of several recent events including your receipt of hazardous waste material and an unrelated offsite transportation incident. The inspection findings were presented to members of your staff at the conclusion of the onsite inspection. The enclosed report presents the results of that inspection.

Based on the results of this inspection, no violations or deviations were identified; therefore, no response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room (PDR).

Should you have any questions concerning this inspection, please contact Mr. Robert Evans at (817) 860-8234 or the undersigned at (817) 860-8191.

Sincerely,

D. Blair Spitzberg, Ph.D., Chief
Fuel Cycle and Decommissioning Branch

Docket No.: 40-8681
License No.: SUA-1358

Enclosure:
NRC Inspection Report
40-8681/99-03

EN 990685

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	40-8681
License No.	SUA-1358
Report No.	40-8681/99-03
Licensee:	International Uranium (USA) Corp.
Facility:	White Mesa Mill
Location:	Mill in San Juan County, Utah Cisco Transload Facility, Cisco, Utah
Dates:	November 17-18, 1999
Inspector:	Robert J. Evans, P.E., Health Physicist Nuclear Materials Inspection Branch
Approved By:	D. Blair Spitzberg, Ph.D., Chief Fuel Cycle and Decommissioning Branch
Attachment:	Supplementary Information

EXECUTIVE SUMMARY

White Mesa Mill
NRC Inspection Report 40-8681/99-03

This inspection was a reactive inspection of three events; the onsite receipt of hazardous waste material, an offsite transportation incident, and an onsite poaching incident.

Radioactive Waste Management

- The licensee accidently received and accepted hazardous waste material from a third-party generator primarily because of a duplication in shipping container numbers. Several programmatic weaknesses helped contribute to the error including poor control of shipping manifests and use of generic versus specific ore receipt inspection procedures (Sections 2.2.2 and 2.2.3).

- An NRC Inspection Followup Item was issued to ensure that the licensee properly disposes of the waste material and implements corrective actions to prevent recurrence (Section 2.2.2).

- The licensee's random sampling program would not have identified the problem with the waste because the hazardous constituent (lead) was not one of the constituents that the licensee tested for in incoming material (Section 2.2.4).

- The shipment of the Ashland I material was determined not to be under the jurisdiction of the NRC (Section 2.2.5).

Followup

- A transportation event occurred on September 29, 1999 involving a spill of Ashland 1 alternate feed material in route to the White Mesa mill. The event required an immediate response by the licensee. The licensee and their contractors took prompt and effective corrective actions. The spill was adequately remediated and the area properly surveyed for residual contamination (Section 3.1).

- The licensee reported to the NRC Project Manager a poaching incident that occurred on November 2, 1999 that may have involved site workers. The licensee was taking effective corrective actions in response to the incident, and the incident was being correctly handled by licensee management as an employee conduct problem (Section 3.2).

Report Details

1 Site Status

The NRC issued Source Material License SUA-1358 to Energy Fuels Nuclear during August 1979. Ownership of the site was eventually transferred to Umetco Minerals, back to Energy Fuels Nuclear, and finally to International Uranium (USA) Corporation (IUC). IUC assumed ownership of the White Mesa Mill on May 10, 1997. The NRC approved the transfer via Amendment 2 of the revised License SUA-1358 on May 9, 1997.

Since the previous inspection, the licensee processed conventional uranium ore in the mill. The mill was actively processing vanadium/uranium ore obtained from local mines during this inspection. The licensee plans to continue processing this type of material until about January 2000. The licensee plans to discontinue mill operations while it performs plant maintenance between January-April 2000.

The licensee is authorized to receive and process alternate feed materials from five out-of-state firms by License Conditions 10.6 through 10.13. Alternate feed material is matter that is processed in the mill to remove uranium, but which is different from natural uranium ore. During this inspection, the licensee was receiving alternate feed material from the Ashland I project (License Condition 10.12) and Cameco Corporation's Blind River and Port Hope facilities (License Condition 10.11). The Ashland I material was being shipped to the site in intermodal containers, while the Cameco material was being shipped in 55-gallon drums. The licensee plans to start processing alternate feed material from the Ashland I project starting in April or May 2000.

The licensee is authorized by License Condition 10.5 to dispose of byproduct material generated at licensed in-situ uranium mine facilities. During 1999, the licensee received and disposed of one load of 11e.(2) waste material from a facility in Nebraska and 15 loads of waste material from a facility in South Texas. The licensee stated that the total amount of material disposed in Cell 3 from these two facilities was well below the 5000 cubic yard limit that is specified in the license.

The licensee currently employs 85 individuals, down from the previous inspection when 101 individuals were employed. Based on the anticipated workload, the licensee planned to decrease the workforce by another 15 individuals by the end of the year. There were no changes in the organizational structure that directly impacted the radiation safety officer's reporting responsibilities.

With regard to Year 2000 issues, the licensee claimed that the plant processing equipment was not computerized. Therefore, the licensee believes that the plant will not be adversely impacted by the change to the new year. The licensee did upgrade the office local area network equipment so it would be Year 2000 compliant.

2 Radioactive Waste Management (88035)

2.1 Inspection Scope

The objective of this portion of the inspection was to verify that site activities were being conducted in accordance with applicable regulations and the conditions of the license, and to ensure that operational controls were adequate to protect the health and safety of the workers and members of the general public.

2.2 Receipt of Hazardous Waste Material

2.2.1 Background

License Condition 10.12 states that the licensee is authorized to receive and process source material from the Ashland I Formerly Utilized Sites Remedial Action Program (FUSRAP) site located near Tonowanda, New York, in accordance with statements, representations, and commitments contained in the amendment request dated October 15, 1998, as amended.

The Ashland I material was being shipped from New York to the White Mesa mill in 20-cubic yard intermodal containers. The remediation contractor excavated the material and prepared the intermodal containers for shipment. The material was being shipped by rail to a transfer station in Cisco, Utah. At Cisco, the intermodals were removed from the rail cars and placed directly on specially designed trailers. The intermodals were then transported as exclusive-use shipments by third-party carriers to the White Mesa mill.

The licensee received about 12-15 intermodal containers per day. Once the material arrived onsite, the material was placed into 100 or 500-cubic yard piles. At the time of this inspection, the licensee had received roughly 60,000 cubic yards of Ashland I material.

2.2.2 Receipt of Hazardous Waste Material at the White Mesa Mill

On October 26, 1999, the licensee became aware that it had received and accepted a third-party shipment of potentially hazardous waste material. The material originated from the Massachusetts Highway Department Central Artery Tunnel project. The material contained characteristic lead hazardous waste. The material had been classified as hazardous wastes based on a single sample result that identified a lead concentration of 5.75 milligrams per liter (mg/l). This sample was above the criteria of 5.0 mg/l for classifying the material as hazardous waste. The lead contaminant most likely originated from automotive exhaust particles that had settled into the soil prior to excavation.

The material arrived onsite as a result of several errors. The errors were caused primarily by confusion over the intermodal container number. On August 20, 1999, "Baker" intermodal container 25115 was loaded in Alliston, Massachusetts, for rail transport to Detroit, Michigan, while on August 28, 1999, "Premier" intermodal container 25115 was loaded in New York for rail transport to Cisco, Utah. The Baker intermodal contained the hazardous wastes, while the Premier intermodal contained the Ashland I material.

On September 3, 1999, the railroad company erroneously generated a billing for the Baker box which re-routed this container from Detroit to Cisco, Utah. On September 20, 1999, the Baker container was unloaded at Cisco and was shipped by truck to the White Mesa mill. This load was accepted by the licensee the following day. Upon arrival at the site, the Baker container with the approximately 20 tons of hazardous waste material was unloaded onto a 500-cubic yard pile referred to as Ashland Lot No. 78.

On or about September 29, 1999, the Premier container arrived at Cisco and was eventually shipped by truck to the mill. This second load was accepted by the licensee on October 11, 1999.

The shipping contractor at the Cisco transfer station noted that the Baker box had arrived without the correct shipping paper attached to the box. Without questioning the origin of the box, the contractor attached a copy of the shipping paper for the Premier box that was on file at the transfer station to the Baker box, and the container was trucked to the site. The contractor made this error primarily because the Baker box number was identical to the Premier box number. Once at the mill, the licensee accepted the box, in part, based on the Baker box number.

However, neither the transfer station or the licensee's receipt inspection personnel held up the delivery of the Baker box because it did not have the unique number that was assigned to each shipment by the shipper. This error may have been made, in part, because the individuals may have assumed that the unique number, which was attached via stick-on lettering, may have become detached during transit.

The Premier box eventually arrived at the Cisco transfer station. The shipping contractor did not detain this box because the shipping paper was attached to the box. The contractor and subsequently the licensee did not immediately recognize that a box with the same number had previously been unloaded at the transfer station and shipped to the site. Further, the licensee's electronic database spreadsheet apparently erased the original shipment information when the second shipment information was added to the spreadsheet.

On October 22, 1999, the Baker box was returned to the Texas company that controlled the container. This third-party company apparently recognized that the box was supposed to be in Detroit, and an investigation led to the discovery of the shipment error. Once informed of the error, the licensee covered the 500-cubic yard pile into which the material had been placed with plastic wrapping, and the licensee sampled the pile for lead concentration pending final disposition of the material.

The NRC inspector noted that several programmatic weaknesses resulted in the hazardous wastes being transported to and accepted by the licensee. These weaknesses included control of the shipment manifests and container receipt inspections. First, the shipping contractor did not control shipment/manifest papers in a well organized manner. For example, the transfer station had papers on file that were supposed to be originals, but appeared to be marked-up copies. Second, the licensee routinely signed copies of shipping papers upon receipt of the loads at the site, making these documents "original" documents. Finally, a copy of the shipping paper was supposed to be attached to each box, but on occasion these documents are lost in transit. When this occurs, the transfer station adds a copy of the shipping paper to the box for shipment to the mill.

The second programmatic weakness involved the receipt inspection process. The Cisco transfer station incorrectly accepted the Baker box although there were a number of discrepancies with the shipment at time of arrival. These discrepancies included missing shipping paper, missing shipper labels, and a wrong railcar number. Next, the licensee accepted the material following guidance provided in generic ore receipt procedures. (This issue is further discussed in Section 2.2.3 of this Inspection Report.) Finally, the licensee did not question the hazardous waste material when it was unloaded although it did not resemble the Ashland I material in appearance.

Corrective actions planned by the shipper included strengthening the receipt inspection program at the transfer station, use of one type of box and discontinuing the use of Baker boxes, and improved control of shipping papers. Corrective actions planned by the rail company included use of a Uniform Machine Language Equipment Register on each item shipped in lieu of box numbers. The Baker box did not have this unique designator in it, while the Premier box did have this designator. The rail company stated in a letter to the licensee that in the near future it would not accept any container for shipment unless it had this unique designator number.

Immediately after the onsite inspection, the licensee submitted a letter to the NRC dated November 22, 1999, which included four alternatives for managing the 20-cubic yards of hazardous waste material that was co-mingled with 480-cubic yard pile of alternate feed material. The four options included: (1) reclassification of the wastes from hazardous to non-hazardous and processing the material; (2) applying for a license amendment to process the commingled material as alternate feed material; (3) attempting to separate the 20-cubic yards of hazardous waste material from the 480-cubic yards of alternate feed material; and (4) removing the 500-cubic yards of material from the site property.

By letter dated November 26, 1999, the NRC reminded the licensee that the commingled alternate feed material and the hazardous wastes were considered "mixed" wastes, and the licensee was not allowed to process mixed wastes. Further, the NRC requested that the licensee take immediate action to manage this material in accordance with appropriate state and federal regulations.

The licensee's actions taken to resolve the mixed waste problem as well as the corrective actions taken by the licensee to prevent a recurrence will be reviewed by the NRC during a future inspection (Inspection Followup Item 40-8681/9903-01).

2.2.3 Standard Operating Procedures

License Condition 9.6 states that standard operating procedures shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. The licensee used their "Ore Receiving" procedure to accept, dump, and store conventional ore as well as alternate feed material on their ore pad. This procedure was written primarily for receipt of ore by trucks and trailers from local mines.

Although the licensee had a procedure that met the intent of License Condition 9.6, the procedure was not specific for Ashland I material. For example, the procedure did not clearly specify that intermodal containers containing Ashland I material not be accepted unless the unique designator number (the Uniform Machine Language Equipment Register number) was confirmed.

In summary, the licensee had procedures that met the intent of the license, but the procedures were non-specific. If the licensee had developed detailed procedures for the receipt of Ashland I material, then the hazardous waste material may have been identified and rejected prior to its receipt and acceptance at the mill.

2.2.4 Material Sampling

License Condition 10.12 requires the licensee to perform random sampling of the Ashland I alternate feed material prior to processing. The licensee collected a sample from each 100 and 500-cubic yard piles of material and analyzed the sample for volatile organic compounds and semi-volatile organic compounds. Lead was not one of the metals that would have been directly detected by this random sampling methodology. Therefore, the licensee's random sampling program would not have detected the lead in the hazardous waste material.

Since the licensee became aware of their possession of the hazardous waste material, the licensee obtained two additional samples from the 500-cubic yard pile that contained the waste material. The two sample results revealed that the lead concentration was 1.3 mg/l and 1.0 mg/l, respectively, with a regulatory limit of 5.0 mg/l.

2.2.5 Transportation Issues

The licensee committed in their October 15, 1998, application that the intermodal containers will be appropriately labeled, placarded, and manifested. The license application also states that radiation surveys and radiation levels consistent with U.S. Department of Transportation requirements will be applied to returning vehicles and cargo. The waste generator packaged and shipped the material as Radioactive Low Specific Activity (LSA)-I, natural uranium, exclusive-use shipments.

During the inspection, the inspector performed a review of the methodologies used to transport the intermodal containers. However, since this material was FUSRAP material, the material was determined not to be under the jurisdiction of the NRC during transportation and did not become regulated by the NRC until it was received by the licensee under their NRC license.

2.3 Conclusions

The licensee accidently received and accepted hazardous waste material from a third-party generator. The waste material was erroneously shipped to the site primarily because of a duplication in shipping container numbers. Several programmatic weaknesses helped contribute to the problem including poor control of shipping manifests and use of generic versus specific ore receipt inspection procedures. The licensee's random sampling program would not have identified the wastes because the hazardous constituent (lead) was not one of the constituents that the licensee tested for in incoming material. Finally, the shipment of the material was determined not to be under the jurisdiction of the NRC.

An NRC Inspection Followup Item was issued to ensure the licensee properly disposes of the waste material and implements corrective actions to prevent recurrence of the incident.

3 Followup (92701)

3.1 Offsite Transportation Incident (NMED Event No.990685)

On September 29, 1999, at 6:35 p.m. MDT, a truck carrying roughly 20 tons of Ashland I material veered off U.S. Highway 50/6 near Cisco, Utah, and tipped over. The contaminated soil was being shipped in an intermodal container from the rail transfer station in Cisco to the licensee's White Mesa mill. The Ashland I material was radioactive LSA waste material that was being shipped from Tonowanda, New York, to the mill for processing as alternate feed material. The truck veered off the road to avoid oncoming traffic, and the truck driver was unable to recover. The truck tipped over and spilled about half of its load on the side of the highway.

Immediate corrective actions taken by the licensee's shipping contractor included notification of the Utah Highway Patrol and recovery of the material. The truck was severely damaged, and the driver was treated and released from a local hospital. The accident was subsequently reported to the NRC on September 30, 1999.

The spill boundary was about 10 feet wide by 30 feet long. During the cleanup process, the spilled material was removed from the container and from the ground surface, and the affected surface was excavated to an additional depth of about 4-6 inches. The recovered material was eventually loaded into another intermodal container and shipped to the mill.

Following the spill, radiological surveys were separately performed by the licensee and the trucking company. (The truck and driver were sub-contractors to the company that was responsible for shipping the material to the mill.) These surveys were submitted to the NRC by letter dated October 13, 1999. Both surveys were noted to be thorough, and all final survey readings were at background levels.

The NRC inspector toured the accident site, and the inspector concluded that the area had been properly remediated and final surveyed. The licensee informed the inspector that the Utah Division of Radiation Control was satisfied with the final survey results; therefore, the licensee did not plan to conduct any further radiological surveys.

The inspector concluded that the incident did not violate any NRC requirement in part because the material was not regulated by the NRC. The material was from a site being managed under the FUSRAP program; therefore, the shipment of the material to the site was not under the jurisdiction of the NRC. FUSRAP material is not regulated by the NRC until received and processed by the licensee.

In summary, a transportation event occurred that required an immediate response by the licensee. The licensee and their contractors took prompt and effective corrective actions. The spill was adequately remediated and the area properly surveyed for residual contamination. No violation of NRC requirements or the license conditions occurred because of this incident.

3.2 Onsite Poaching Incident

On or about November 2, 1999, the licensee became aware of a poaching incident that occurred inside of the site's restricted area. Apparently, a deer was shot on site property during the midnight shift and was removed from the restricted area. The licensee suspects that site personnel were involved in the incident. The licensee questioned several individuals who denied the accusations. The local game warden was also informed of the incident because the shooting of deer out-of-season may result in a felony poaching charge against the individuals involved.

The NRC was informed of the incident on November 16, 1999. This incident was of concern to the NRC for several reasons. First, the individuals involved may have removed items (the deer, firearm(s), vehicles, and/or themselves) out of the restricted area without a proper contamination release survey. Second, the individuals may have committed a felony inside the restricted area. Finally, site employees may have been involved in the incident.

Although the poaching incident was not a direct violation of NRC license requirements, the individuals (if they were site employees) violated the licensee's written safety rules. In particular, the individuals violated employee conduct rules related to carrying firearms into the plant area without specific written permission and giving false information or testimony during an investigation of the incident.

At the end of the inspection period, the licensee and the local game warden were still investigating the incident. The inspector concluded that the licensee was taking effective corrective actions in response to the incident, and the incident was being correctly handled by licensee management as an employee conduct problem.

4 Exit Meeting Summary

The inspector presented the preliminary inspection results to the representatives of the licensee at the conclusion of the inspection on November 18, 1999. Licensee representatives acknowledged the findings as presented. The licensee did not identify any information reviewed by the inspector as propriety information.

Attachment

PARTIAL LIST OF PERSONS CONTACTED

Licensee

H. Roberts, Executive Vice-President
R. Berg, Radiation Safety Officer
W. Deal, Mill Manager
M. Rehmann, Environmental Manager

State of Utah

D. Finerfrock, Section Manager
W. Sinclair, Director, Division of Radiation Control

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

40-8681/9903-01	IFI	NRC review of actions taken by licensee to resolve the mixed waste problem and corrective actions taken to prevent recurrence

Closed

None

Discussed

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
FUSRAP	Formerly Utilized Sites Remedial Action Program
IFI	Inspection Followup Item
IUC	International Uranium (USA) Corporation
LSA	Low Specific Activity
mg/l	milligrams per liter
PDR	Public Document Room

NRC Dam Safety Audit Report
Dated March 5, 2001

No notices of violation issued

Audit of July 25, 2000

cc RFH, DCF, MRR, WND, REB
cf

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 5, 2001

RECEIVED
MAR 12 2001
By

Ms. Michelle R. Rehmann
International Uranium (USA) Corporation (IUSA)
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

SUBJECT: RESULTS OF DAM SAFETY AUDIT RELATED TO THE TAILINGS MANAGEMENT SYSTEM FOR WHITE MESA MILL, BLANDING, UTAH

Dear Ms. Rehmann:

On July 25, 2000, an audit was conducted at the dams retaining cells 1-I, 2, 3, and 4A at the White Mesa facility near Blanding, Utah. The NRC staff has received and evaluated the final report from its technical assistance contractor, the Federal Energy Regulatory Commission (FERC), related to this audit. The conclusion of the audit was that there were no conditions observed that would indicate any immediate concerns regarding the integrity of the dams. Page 11 of the Operation Inspection Report (enclosed) identifies two actions that should be taken by you to insure the continued safety of the dams consistent with the Federal Guidelines for Dam Safety (1979) and the Dam Safety Program Act defined in the Water Resources Act of 1996. It is requested that you provide a written response to these actions within 180 days of date of this letter. Since the NRC staff is requesting actions contained in the report, no additional response to findings and follow-up actions to FERC is required on your part.

Certain inventory data regarding the dams are summarized on pages 3 and 4 of the report. NRC will provide these data to the U.S. Federal Emergency Management Agency and the U.S. Army Corps of Engineers for inclusion in the National Inventory of Dams Data Base (NATDAM). Within 60 days of date of this letter, it is requested that you review these data and provide the staff any corrections or missing information.

An original copy of the FERC report, dated February 15, 2001, which includes color photographs taken of various areas that were inspected during the audit, has been provided as an Enclosure. As noted in the FERC report, representatives of IUSA accompanied NRC and FERC personnel during this audit and participated in the discussions. No other written inspection report related to this audit was generated.

It is understood that periodic dam inspections will be performed at routine intervals by IUSA personnel. Information from such inspections and evaluations, as well as any actions you have taken relative to the dams, may be of use in your response to this letter.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publically Available Records (PARS) component of NRC's document system, ADAMS. ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

If you have any questions regarding the responses and information requested, the report, or schedule for submittal of information, please contact Daniel Rom at (301) 415-6704.

Sincerely,

Philip Ting, Chief
Fuel Cycle Licensing Branch
Division of Fuel Cycle Safety and Safeguards
Office of Nuclear Material Safety and
and Safeguards

Docket No. 40-8681

Enclosure:
FERC/NRC Operation Inspection Rpt

Operation Inspection Report
for
Nuclear Regulatory Commission
Inspected by
San Francisco Regional Office
Federal Energy Regulatory Commission

For the Period August 18, 1998 **to** July 25, 2000

Licensee International Uranium Corporation (IUSA)

Project No. NRC Docket No. 40-8681, License No. SUA-1358

Project Name White Mesa Mill

Location Unnamed Drainage on White Mesa, San Juan, Utah
(Waterway) **(County)** **(State)**

Inspected By Takeshi Yamashita **Date** 07/25/00

Features Inspected Cells 1-I, 2, 3, & 4A and Dikes 1, 2, 3, & 4A-E, 4A-S, & 4A-W

Weather Clear and warm

Accompanied By Jill Caverly, NRC; William Deal[1], Mill Mgr., Michelle Rehmenn[1], Ron Berg[1], Wayne Palmer, IUSA

1/ Present during debriefing

Summary

The White Mesa Mill is located just south of Blanding, Utah (see Figure 1). The mill is classified in operating status but currently is not processing material; however, the mill has processed material during the report period. The mill tailings management facilities consist of four cells: 1-I, 2, 3, and 4A (see Figure 2). No conditions or evidence such as seepage, slumping, instability, or internal distress affecting the safety of the dikes were observed. The cells and dikes on the project are well maintained and operated. The project is located on private posted property and appears to meet public safety requirements.
(continued on next page)

Project layout, features, and photo locations are shown on Figure 2. A typical dike section is shown on Figure 3. Inspection photos of project features are attached.

Submitted: 2/15/2001

Takeshi Yamashita

Takeshi Yamashita, P. E.
Civil Engineer

Pertinent Data

Cell 1-I

Dike:	Type: Random Fill
	Height[2]: 8 feet (2.44 m)
	Gross Head: 5 feet (1.52 m)
	Crest Length[2]: 2,540 feet (774.19 m)
	Crest Width: 18 feet (5.49 m)
	Crest Elevation: 5,618.2 feet (1,712.43 m)
	Upstream Slope: 1V:3H
	Downstream Slope: 1V:3H
	Completion Date: June 29, 1981
Spillway:	Type: None
Outlet works:	Type: None
Reservoir:	Gross Capacity: 116 acre feet (0.14×10^6 m^3)
	(liquids plus sedimentation)
	Elevation: 5,615.4 feet (1,711.57 m)

Cell 2

Dike:	Type: Random Fill
	Height[2]: 34 feet (10.36 m)
	Gross Head: 30 feet (9.14 m)
	Crest Length: 3,130 feet (954.02 m)
	Crest Width: 18 feet (5.49 m)
	Crest Elevation: 5,615 feet (1,711.45 m)
	Upstream Slope: 1V:3H
	Downstream Slope: 1V:3
	Completion Date: May 4, 1980
Spillway:	Type: Concrete lined trapezoidal channel
	Invert Width: 18 feet (5.49 m)
	Depth: 2.2 feet (0.67 m)
Outlet works:	Type: None
Cell:	Gross Capacity: 2,419,707 tons (21,526,681 kN)
Volume Placed:	2,299,708 tons (20,459,122 kN)

Cell 3

Dike:	Type: Random Fill
	Height[2]: 38 feet (11.58 m)
	Gross Head: 33 feet (10.06 m)
	Crest Length: 3,390 feet (1,033.27 m)
	Crest Width: 18 feet (5.49 m)
	Crest Elevation: 5608 feet (1,709.32 m)
	Upstream Slope: 1V:3H
	Downstream Slope: 1V:3H
	Completion Date: September 2, 1982
Spillway:	Type: None
Outlet works:	Type: None
Cell:	Gross Capacity: 2,091,717 tons (18,608,751 kN)
	Volume Placed: 1,249,040 tons (11,111,959 kN)
	Liquid Volume: 775 acre feet (0.93×10^6 m^3)

Pertinent Data
(continued)

Cell 4A

Dike 4A-E, 4A-S,4A-W:	Type: Random Fill
	Height[2]: 36 feet (10.97 m)
	Gross Head: 34.4 feet (10.49 m)
	Crest Length: 3,100 feet (944.88 m)
	Crest Width: 18 feet (5.49 m)
	Crest Elevation: 5598 feet (1,706.27 m)
	Upstream Slope: 1V:3H
	Downstream Slope: 1V:3H, w/ toe berm on 4A-S
	Completion Date: December 21, 1989
Spillway:	Type: None
Outlet works:	Type: None
Cell:	Gross Capacity: 1,855,000 tons 16,502,822 kN)
	Volume Placed: 0 tons
	Liquid Volume: 1150 acre feet (1.38×10^6 m^3)

2/ Dimensions obtained from General Reclamation Plan, dated 6/21/88

Project Description.

The mill tailings management facilities consist of four cells: 1-I, 2, 3, and 4A (see Figure 2). The cells have been constructed by excavating below grade in the pond area and constructing dikes. Cell 1-I is used as a disposal pond for liquid solutions used in the solvent extraction circuit and small volumes of other liquid waste that may affect the extraction process. Cells 2, and 3 are used as mill tailings disposal repositories. Cell 4A will be used for mill tailings in the future but is currently not being used. Cell 2 is 95% filled with mill tailings and partially covered with reclamation cover except a small pond area (see Figure 2). Cell 3 is approximately 60% filled with tailings located in the eastern half of the cell (see Figure 2). The tailings are partially covered with the reclamation fill. The remainder of the cell contains liquid solution from the mill operation. Cell 4-A is currently not used. During the inspection, the liquid solution covered only a part of the bottom of the cell. The cell bottom was visible in the northeast corner.

Dike design and construction are in general similar for the four cells. The dikes are constructed of random fill materials consisting of sandy clays and silts. Sandy clays and silts classified primarily as CL and ML under the Unified Soils Classification System, were obtained from the excavation of the cell. The dike foundation typically consists of sandy clays and silts varying in thickness from 2 to 12 feet overlying bedrock. Bedrock consists predominantly of sandstones of the Dakota Sandstone Formation. The dike side slopes are 1V:3H. Cells 1-I, 2, and 3 are lined with 30-mil PVC. Cell 4A is lined with 40-mil HDPE. A leak detection system is located beneath each of the cell liners. The system consists of a clay liner over the subgrade, drain layer over the clay liner, and a collection system.

Engineering Data

Embankment stability analysis for Dike 4A is presented in "Cell 4 Design tailings Management System" by Umetco Minerals Corporation, August, 1988. The slope stability analysis evaluated a compacted fine silty sand embankment with an effective shear strength of $\phi = 30°$ and $c = 0$ psf and a fine silty sand foundation with an effective shear strength of $\phi = 28°$ and $c = 0$ psf. The phreatic surface was assumed to represent steady state after a complete liner failure. This assumption is conservative due to the low probability of a complete liner failure and the early warning provided by the leak detection system located beneath the liner. The dike meets minimum static slope stability requirements with the conservative assumptions.

The section on Seismic Risk Assessment, "Reclamation Plan, White Mesa Project, Blanding, Utah," UMETCO Minerals Corporation, dated June 1988, described the maximum credible earthquake to be a magnitude 6.4 occurring on a mapped suspected Quaternary fault located 25 miles (40.23 km) north of the site. The MCE produces an estimated peak horizontal acceleration of 0.07g at the project site. The seismic risk assessment adequately assesses and defines the MCE and peak site horizontal motion.

Liquefaction potential of predominantly CL and ML foundation and embankment materials under the postulated MCE loading was determined to be nil based upon the low MCE loading and the resistance of CL and ML soils to liquefaction. Seismic stability of the dike was evaluated using the pseudostatic method with a seismic coefficient of 0.10g representing the seismic loading condition. The dike meets the minimum requirement for seismic stability.

Cell freeboard requirements are defined in License Condition 51. NRC memorandum for Docket File No. 40-8681, Subject: Amendment No. 20 to Source Material License SUA-1358; Request to Construct Cell 4A at the White Mesa Mill, Blanding, Utah, March 1, 1990, summarizes the staff evaluation for the cell design. The memorandum discusses and defines the required maximum operating elevations and freeboard requirements for each cell to provide adequate volume to store the probable maximum flood. The cells operating pool and freeboard have been adequately defined to contain the PMF.

A. Downstream Hazard Potential. Dike failure would allow liquids to flow into Cottonwood Wash for approximately 18 miles to the confluence with the San Juan River. Based upon visual inspection, there are no residences, structures or populated areas immediately downstream of Cell 3 and 4A. A map review verifies the lack of populated areas in the potential flood area. The licensee confirmed that the area downstream is sparsely populated and failure would not pose a hazard to life or cause significant property damage. The project is appropriately classified as having a low downstream hazard potential.

B. Project Safety and Maintenance

1. Dams, Dikes, and Appurtenant Structures. Based upon the following, the field inspection and safety evaluation focused on portions of Dikes 2 and 3 and on Dikes 4A-E, 4A-S, and 4A-W:

a. The nearly complete filling of Cell 2 with mill tailings and partial placement of a 4-foot thick random fill cover in Cell 2 buttresses Dike 1-I and isolates Cell 1-I (Photos 1 & 2).

b. Mill tailings along the downstream side of Dike 2 and partial placement of a 4-foot thick random fill cover in the eastern portion of Cell 3 buttresses the downstream slope of Dike 2. This reduces the failure potential to Dike 2. The filling with mill tailings and placement of a 4-foot thick random fill cover in Cell 2 (Photo 1 & 2) precludes the failure of Dike 2 and any impacts to Cell 3 due to liquid inflow.

c. The filling and covering of the eastern end of Cell 3 reduces the impacts to Cell 4A from a failure of the eastern portion of Dike 3. (Photo 2).

d. The western portion of Dike 3 is located the farthest downstream and has the potential to release significant volumes of liquid mill wastes into the downstream water course, see Figure 2.

e. Dikes 4A-E, 4A-S, and 4A-W are located around Cell 4A. For this report period Cell 4A is not operational due to the torn liner. Liquids and mill tailings cannot be stored in Cell 4A until the liner is repaired. Dikes 4A-E, 4A-S, and 4A-W are being inspected because they are part of the facilities in a stable condition.

Conditions that would affect the safety or safe operation of Dikes 2 and 3 were not observed. Cell 4-A is currently inoperable due to the degraded and torn cell liner. Because Cell

4-A is inoperable and cannot hold liquids or mill tailings, the safety or safe operation of Dikes 4A-E, 4A-S,and 4A-W is not an issue. Even though Cell 4A is not operable, Dikes 4A-E, 4A-S,and 4A-W were inspected for conditions that are indicative of distress and to assess the need for maintenance. No conditions or evidence of instability or distress such as slumping, cracking, seepage, or deformations were observed during the inspection. The dikes appear to be in good condition. The crests appear relatively level and straight with no evidence of visible settlement nor cracks indicating distress in the embankment (Photos 1 - 6). Inspection of the upstream and downstream side of the crest revealed no misalignment, cracking, or settlement (Photos 7 - 12). Upstream and downstream slopes were relatively uniform with no visible evidence of bulging, slumping, or signs of distress (Photos 7 - 12). The upstream slope of Dike I-1 had some evidence of beaching/wave erosion of the protective soil layer covering the liner (Photo 13). The beaching/wave erosion of the soil liner did not expose the liner. The licensee was informed to monitor and repair the beaching/wave erosion before the liner is exposed. The right abutment groin of Dike 3 and the contact area between Dike 3 and 4A-W were dry with no evidence of seeps or wet areas (Photos 9 & 14). The downstream toes of Dikes 3, 4A-E, 4A-S,and 4A-W were dry with no evidence of wet areas or seeps (Photos 9 - 11).

The spillway between Cells 2 and 3 consists of a trapezoidal concrete section (Photo 15). The spillway appeared to be in good condition.

During the operation inspection conducted on September 21, 1994, a fissure was observed approximately 120 feet south from the northeastern corner of Cell 4A. The fissure was repaired by excavating the fissure and placement of compacted backfill. During this inspection, fissures or large cracks were not observed.

The project is currently not in operation. The project was in operation during part of the report period. During operation, liquids were placed into Cell 1-I and mill tailings into Cell 3. The operation and maintenance of the cells appear to be adequate.

Minor erosion rills were observed on the downstream slopes of Dike 3 and 4A-W, 4A-S, and 4A-E during the previous inspections. The erosion rills are being monitored and regraded when required.

Woody bushes were observed during the previous inspection. on the slopes of Dike 3, 4A-W, 4A-S, and 4A-E. The licensee was instructed to periodically remove bushes to allow visual inspection of the dike slopes. Inspection revealed that the bushes along the western portion of Dike 3 have been removed (Photos 6 & 9). Woody bushes were observed along the northern portion of Dike 4A-W and Dike 4A-S (Photos 11 & 12). IUC were instructed to continue with their maintenance program of removing woody bushes from the dike slopes. Even though Cell 4A is inoperable, the removal of bushes on Dikes 4A-S and 4A-W is important to maintain the dikes and to preclude root penetration into the embankment or the leakage collection system.

The crests of Dikes 1-I, 2, 3, 4A-E, 4A-S, and 4A-W appear to be capable of carrying vehicular traffic to allow the safe inspection of Cells 1-I, 2, 3, and 4A in inclement weather in accordance with License Condition 26.

As reported in the previous inspection report, the HDPE liner in Cell 4A is torn in many locations (Photos 16 & 17). The torn HDPE liner renders Cell 4A unusable for the storage of liquids or mill tailings. Mr. Price indicated that Cell 4-A is not used and that Cell 4-A would have to be completely relined prior to the operation and storing of any mill tailings or liquids.

2. Spillway Gates, Operation and Standby Power. Not applicable.

3. Power Plants. Not applicable.

4. Reservoir Condition. The liquid level in Cell 1-I was at approximately elevation 5,611 feet on July 25, 2000, (Photo 1) versus the maximum allowable pool elevation of 5,615.4 feet. Cell 2 is filled with mill tailings with a small pond and no longer receives mill tailings or liquids. Cell 3 is filled with mill tailings on the eastern half, northern portion, and western portion of the cell (Figure 2). Random fill cover has been placed over the mill tailings on the eastern portion of Cell 3 (Figure 2 and Photos 8 & 17). The liquids were at approximately elevation of 5,601 feet on July 25, 2000, (Photo 3). The maximum allowable pool elevation is 5,603.0 feet. Cell 4A is not being used due to the torn liner. The cell floor is covered by crystals (Photos 16 & 17).

5. Instrumentation and Monitoring.

a. Survey Monitoring Points. On Dikes 3, 4A-W and 4A-S vertical and horizontal movements are monitored with survey monitoring points. Survey monitoring points are located on the downstream shoulder of the crest of the dikes. On Dike 4A-S additional survey monitoring points are located at midslope and at the toe berm. Review of the survey completed on May 29, 2000, indicates that there has been little change from the previous inspection report period. Most of the Dike 3 monitoring points are below the design crest elevation of 5,608 feet with a maximum difference of 0.54 feet at monitoring point No. 325. Inspection revealed that the monitoring points are located slightly downstream of the crest shoulder and below the crest.

Dike 4A-W and 4A-S shows monitoring points that are below the design elevation of 5,598 feet by as much as 1.14 feet at monitor point #401. As with Dike 3 the monitoring points are located slightly downstream and below the crest. The survey indicates horizontal movements to be small with a maximum of 0.22 feet at midslope of Dike 4A-S. The horizontal movement is essentially unchanged from the 0.25 feet reported for the previous report period. The survey data indicates vertical and horizontal movements are within ranges expected for embankments of this type, height, and age.

b. Leak Detection System. A leak detection system underlays the cell liner. The system consists of a crushed sandstone layer beneath the liner over a clay liner that overlies the subgrade and a collection system. The leakage was below the action level of 1.0 gpm.

6. Licensee's Inspection Program. License Condition 26 requires "the licensee to conduct a tailings retention system and liner inspection program according to Section 5.5.7 and Appendix D, Section 3.0, of the renewal application." The document referred to is the "White Mesa Procedures Manual, Mill Tailings Management," Section 3.1, Revision Four, February 1991. Section 3.1 identifies daily, weekly, monthly, quarterly, and yearly inspection frequency of the tailings management system. Section 3.1 was reviewed and appears adequate. Records of the inspections are filed at the mill. Mr. Palmer indicated that the licensee is conducting the inspections at the required frequencies. Review of inspection reports in the "Annual Technical Evaluation of White Mesa Mill Tailings Management System," June 2000, verified that the inspections are being conducted as required.

7. Emergency Action Plans. The dikes are classified as having low downstream hazard potentials due to the low risk for loss of life and property damage downstream of the project. An emergency action plan is not required. An emergency response for dam failure is contained in Section 6.2 in Materials License SUA-

1358 Renewal, Book 1 (6-6,6-7). The documents appear to be adequate for the low downstream hazard potential of the project.

8. Status of Consultant's Safety Inspection Report. An annual technical evaluation of the tailings retention system is conducted in accordance with USNRC Regulatory Guide 3.11.1. The technical evaluation of system performance, inspection observations, and yearly inspection is conducted by an individual registered professional engineer with experience or training in geotechnical aspects of retention structures. The latest "Annual Technical Evaluation of White Mesa Mill Tailings Management System," dated June 2000, was prepared by Curtis O. Sealy of Southwest Resource Engineering. The report was reviewed and found to be adequate.

9. Status of Previous Operation Inspection.

Maintenance items identified during the previous inspection were completed and were as follows:

a. A low spot on the south west corner of Cell 4A was observed. The low spot concentrates crest runoff and is starting to erode an area of the regraded slope.

b. Shrubs located on Dike 3, 4A-E, 4A-S, and 4A-W are starting to become numerous and at certain locations obscure the view of the slope. The brush should be periodically removed.

10. Records. Project design, construction, inspection, instrumentation, maintenance, and operations reports and documents are maintained at the project site.

C. Environmental Requirements.

An environmental and public use inspection is not required because the project is closed to the public.

D. Public Safety.

The project site is closed to the public. Access to the project facilities is limited and controlled by gates and fences. Signs that identify the presence of hazardous and toxic materials are posted. The public safety plan appears to be adequate.

E. Project Compliance.

1. Unauthorized Project Modifications or Uses. No structural modifications were observed on the Dikes.

2. License Compliance. Pertaining to the safe operation and safety of the dikes, the dikes appear to be in compliance with the license.

F. Specific Findings and Necessary Follow-Up Actions

1. Inspection revealed that the bushes along the western portion of Dike 3 and 4A-E have been removed. Woody bushes were observed along the northern portion of the DS slope of Dike 4A-W and western portion of Dike 4A-S (Photos 11 & 12). IUC were instructed to continue with their maintenance program of removing woody bushes from the dike slopes.

2. The upstream side of Dike I-1 had some evidence of beaching/wave erosion of the soil liner cover material. The beaching/wave erosion did not expose the liner. The licensee was informed to monitor and repair the beaching/wave erosion before the liner is exposed.

Three exhibits and 17 photos.

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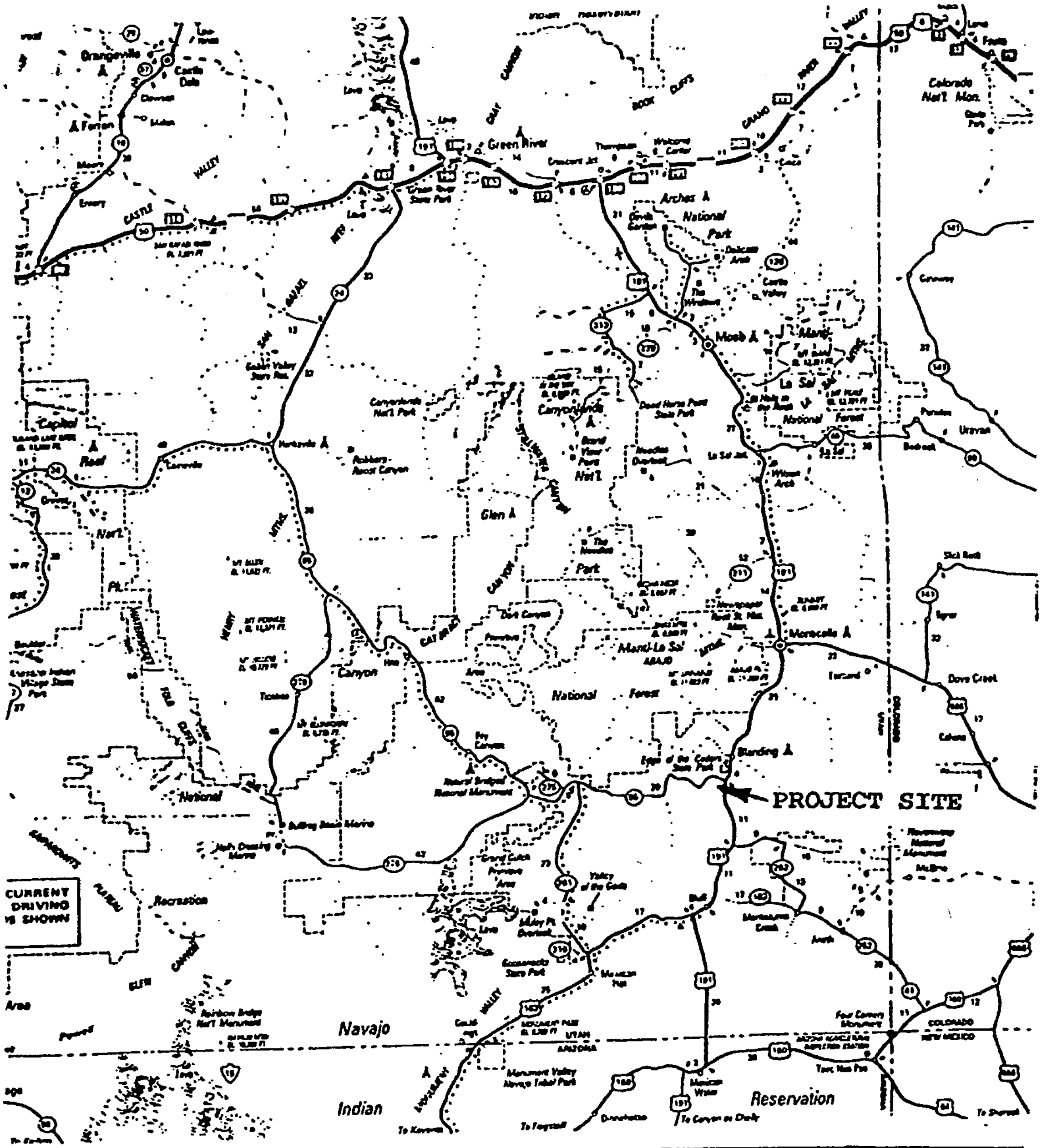
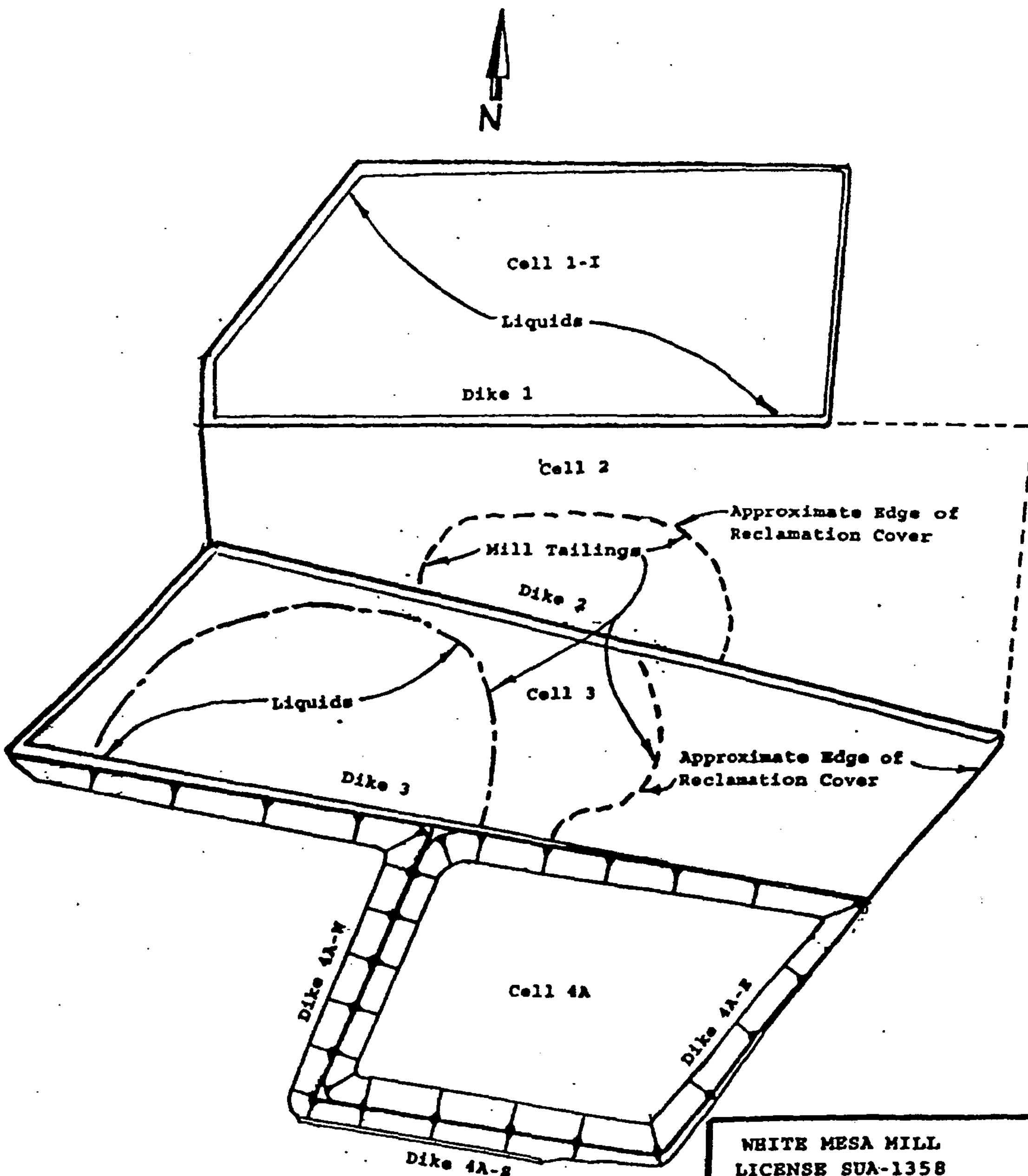


WHITE MESA MILL
LICENSE SUA-1358

PROJECT LOCATION

Figure 1

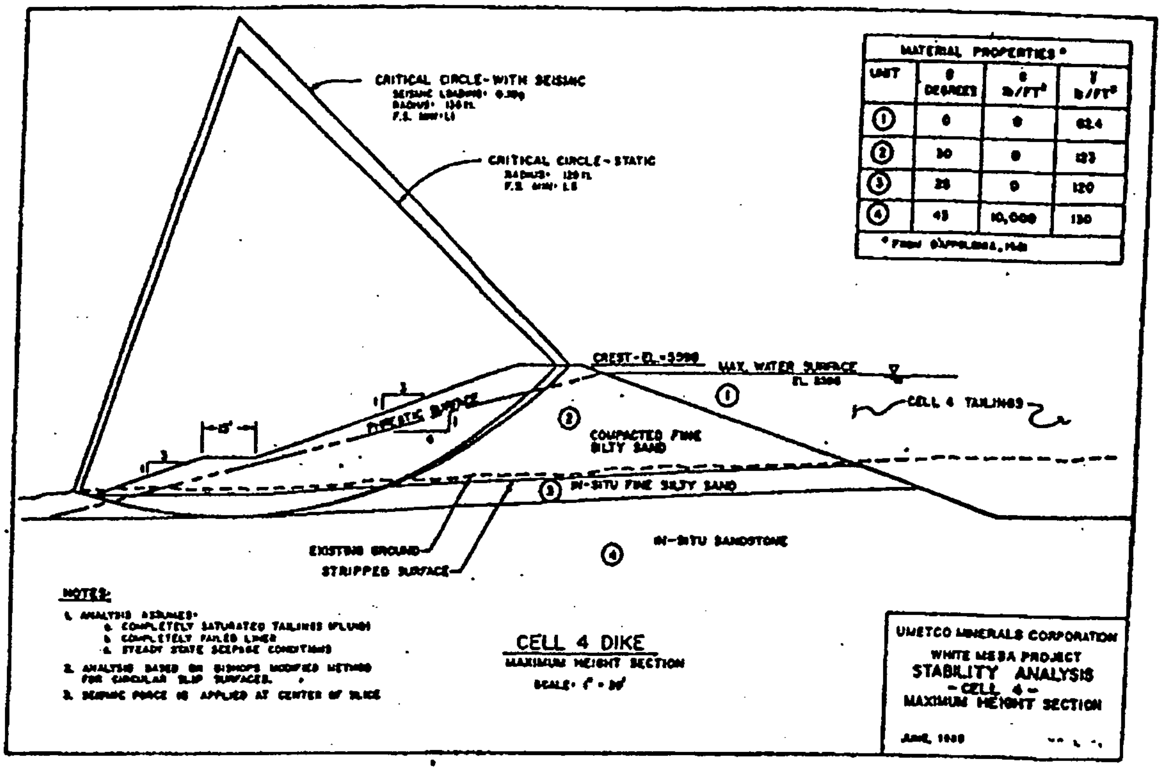


(#) PHOTO LOCATION

WHITE MESA MILL
LICENSE SUA-1358

PROJECT LAYOUT
AND
PHOTO LOCATION

Figure 2



WHITE MESA MILL
LICENSE SUA-1358

TYPICAL DIKE SECTION

Figure 3

Photo 1. Crest of Dike 1 looking west. Note the 4 feet thick random fill cover material, on the left, filling in Cell 2 and buttressing Dike I-1.

Photo 2. Crest of Dike 2 looking east from the west end of the dike. Note the random fill cover filling Cell 2 and buttressing Dike 2 (left side) and the mill tailings in Cell 3 (right side).

Photo 3. Crest of Dike 3 looking west.

Photo 4. Crest of Dike 4A-E looking south.

Photo 5. Crest of Dike 4A-S looking west.

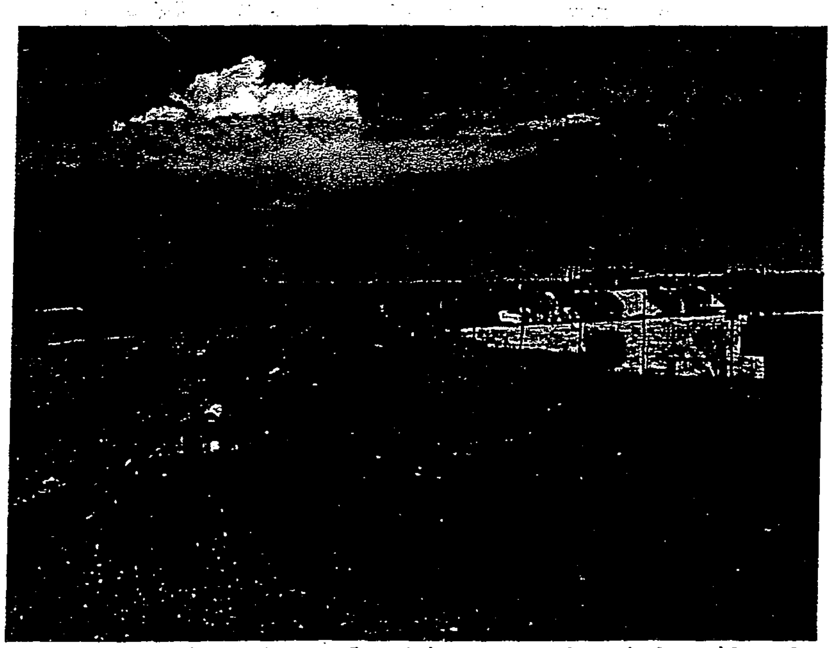


Photo 6. Crest of Dike 4A-W looking north with Dike 3 on the left center of the photo.

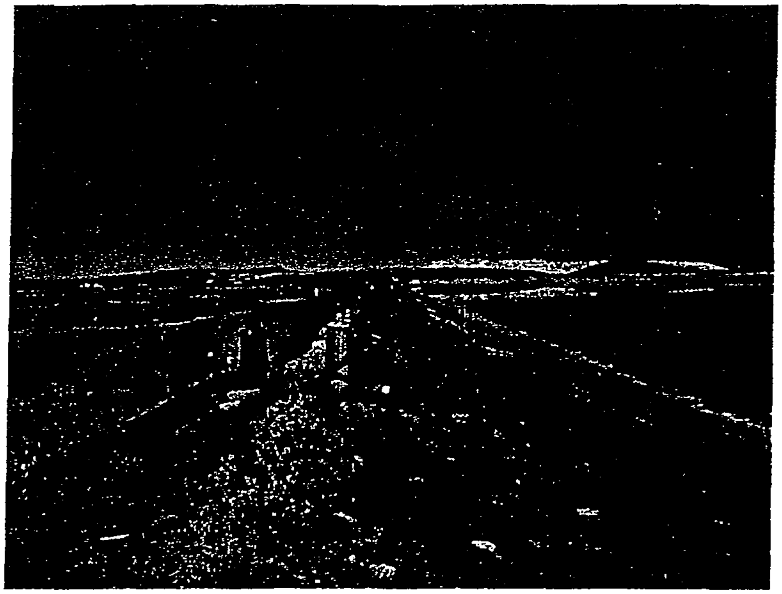


Photo 7. Dike 1 US slope.

Photo 8. US slope of Dike 2 note the 4 feet thick random fill soil covering Cell 2, arrow.

Photo 9. DS slope of Dike 3 looking west.

Photo 10. DS slope & toe of Dike 4A-E.

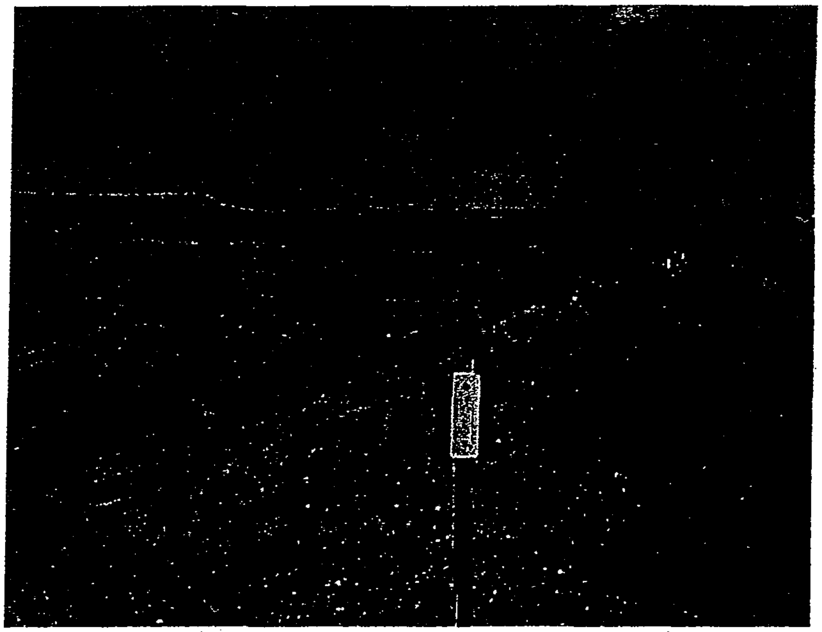


Photo 11. DS slope & toe of Dike 4A-S, note the woody bushes starting to grow on the slope.

Photo 12. DS slope of Dike 4A-W, note the woody bushes growing on the slope.

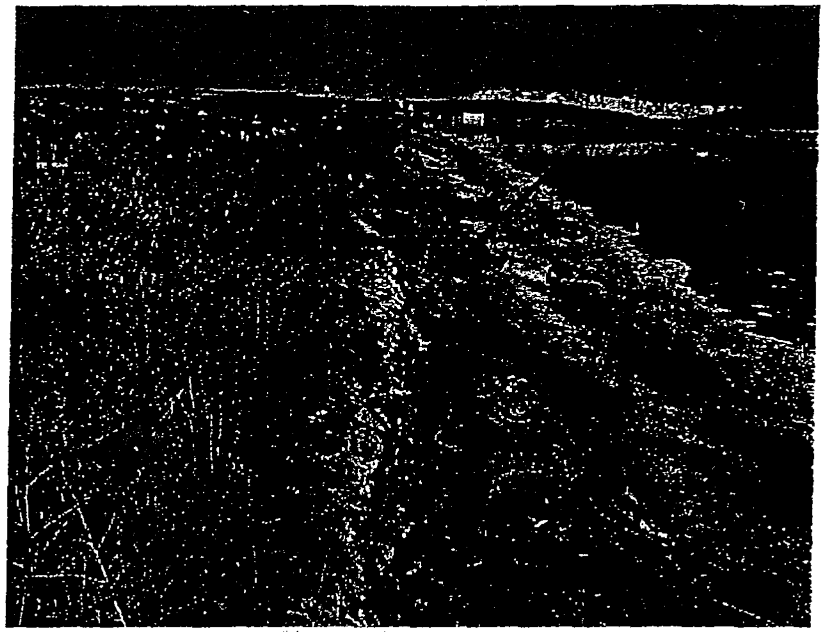


Photo 13. Looking west on the upstream slope of Dike 1, note the beaching/wave erosion on the slope, arrow

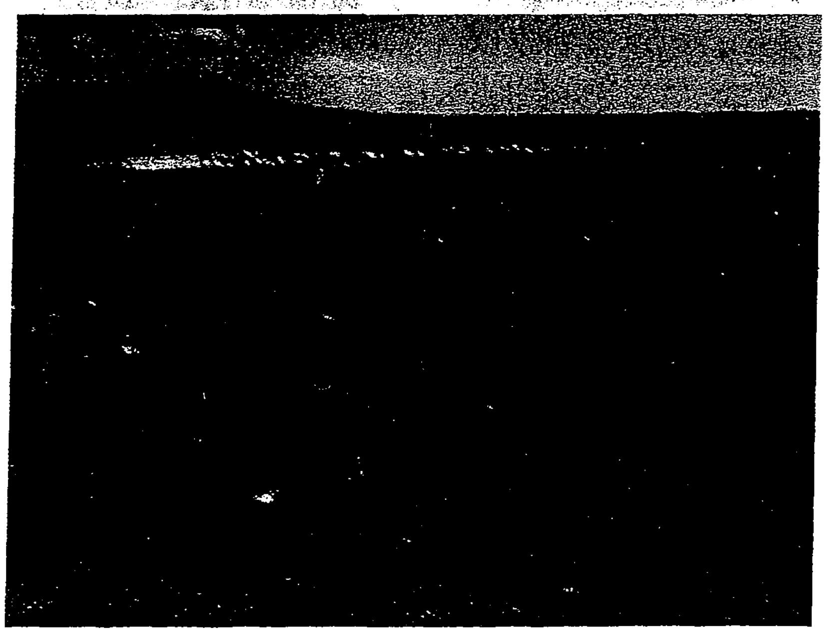


Photo 14. Contact between Dikes 3 and 4A-W.

Photo 15. Spillway (car location) with Cell 2 on the right.

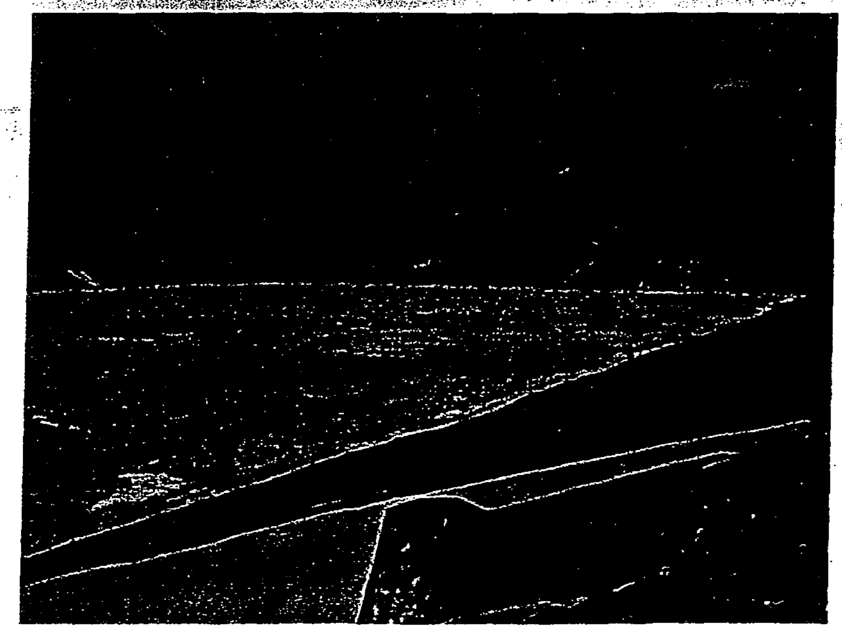


Photo 16. Cell 4A from Dike 3 looking SW with torn cell lining on Dikes 4A-S, 4A-W, and 3.

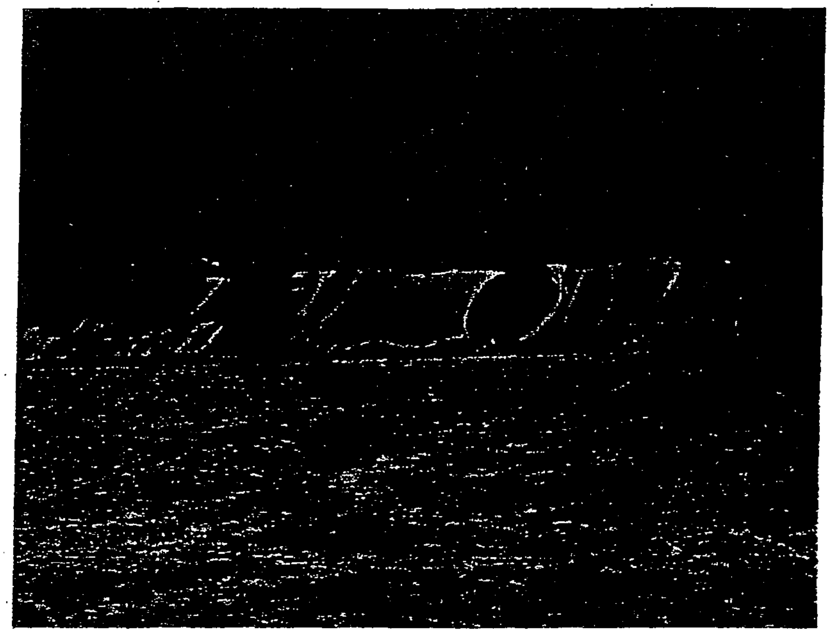


Photo 17. Cell 4A looking at DS face of Dike 3 with torn lining, note the 4 feet thick random fill soil covering on the eastern portion of Cell 3, arrow.

NRC Inspection Report 40-8681/00-01
Dated September 6, 2000
and Notice of Violation

NRC Inspection of July 27, 2000

and
Corrective Action/Responses to Notice of Violation,
October 13, 2000 through January 15, 2001

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

September 6, 2000

David C. Frydenland, Vice-President and
General Counsel
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-8681/00-01 AND NOTICE OF VIOLATION

Dear Mr. Frydenland:

On July 27, 2000, the NRC completed an inspection at your White Mesa Mill near Blanding, Utah. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. The preliminary inspection findings were presented to you and members of your staff at the conclusion of the onsite inspection. A telephonic briefing was held with Mr. Hochstein and members of your staff on August 22, 2000, following the completion of additional in-office inspection. The enclosed report presents the results of that inspection.

Based on information developed during the inspection, the NRC has determined violations of NRC requirements occurred. Three violations are cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the enclosed inspection report. The first violation involved the failure to follow established standard operating procedures (SOPs) for performing functional checks of radiation detection instruments in accordance with License Condition 9.6. The second violation involved a failure to implement the Performance-Based License condition, a violation of License Condition 9.4. Specifically, your staff changed a radiation survey procedure that is described in the license application, but failed to maintain records required by the license, of the basis for determining the change was in compliance with the requirements referred to in the license. The third violation was for failure to perform unrestricted release surveys of certain vanadium product drums prior to shipment as specified by your license. Additionally, the inspection found that some vanadium product drums exhibited elevated levels of radioactivity. This finding is the subject of an Unresolved Item in this report. An Unresolved Item is a matter about which the NRC needs additional information in order to ascertain whether the issue in question is an acceptable item, a deviation, a nonconformance, or a violation. The issues which appear to be unresolved center on jurisdiction of the NRC over the radioactivity in your vanadium product and any safety controls which may be needed for this material. With respect to these issues, we are in receipt of your letter dated August 25, 2000, which describes your position on the subject. Until these matters are resolved, we understand that you committed to make no shipments of contaminated vanadium product currently in storage. If your understanding of this commitment is different than stated above, please contact us immediately.

A fourth violation concerning the release of contaminated intermodal containers is being treated as a Non-Cited Violation (NCV), consistent with Section VI.A(8) of the Enforcement Policy. This NCV is described in the subject inspection report. If you contest the violation or the significance of this NCV, you should provide a response with 30 days of the date of this inspection report, with the basis of your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements. For your consideration and convenience, NRC Information Notice 96-28, "SUGGESTED GUIDANCE RELATING TO DEVELOPMENT AND IMPLEMENTATION OF CORRECTIVE ACTION," is enclosed.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Mr. Louis C. Carson II at (817) 860-8220 or Dr. D. Blair Spitzberg at (817) 860-8191.

Sincerely,

Dwight D. Chamberlain

Dwight D. Chamberlain, Director
Division of Nuclear Materials Safety

Docket No.: 40-8681
License No.: SUA-1358

Enclosures:
1. Notice of Violation
2. NRC Inspection Report 40-8681/00-01

cc w/enclosures:
Mr. Ron Hochstein, President
International Uranium (USA) Corp.
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

Ms. Michelle Rehmann
International Uranium (USA) Corp.
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

Mr. William Deal, Mill Manager
International Uranium (USA) Corp.
6425 South Highway 191
P.O. Box 809
Blanding, Utah 84511

Mr. William J. Sinclair, Director
State of Utah
Department of Environmental Quality
Division of Radiation Control
168 North 1950 West
Salt Lake City, Utah 84115-4850

Mr. Pat Mackin, Assistant Director
Systems Engineering & Integration
Center for Nuclear Waste Regulatory Analyses
6220 Culebra Road
San Antonio, Texas 78238-5166

ENCLOSURE 1

NOTICE OF VIOLATION

International Uranium (USA) Corporation
San Juan County, Utah

Docket No.: 40-8681
License No.: SUA-1358

During an NRC inspection conducted on July 24-27, 2000, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violations are listed below:

A. License Condition 9.6 states, in part, that standard operating procedures (SOPs) shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. Additionally, written procedures shall be established for non-operational activities to include instrument calibrations.

Section 3.1.2.3.2 of the licensee's procedure "Checks" required that instrument checks are made for each detector using an appropriate calibrated source. Comparison of the results with those obtained at the calibration is utilized to determine field performance. If deviations exceeding 10 percent are noted, recalibration of the detector is required.

Contrary to the above, alpha detector functional check results for June and July 2000, were not compared to the results of the instruments' calibration to determine the field performance of the alpha detectors.

This is a Severity Level IV violation (Supplement VI).

B. License Condition 9.4(A&B) states, in part, that the licensee may, subject to the conditions specified in this condition, make changes in procedures presented in the application. The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations, made by the safety, environmental, and review panel (SERP) that provide the basis for determining if changes are in compliance with the requirements referred to in Part B of this condition.

The January 1991 License Application, Section 2.7, "Product Shipment Surveys," states, in part, that product shipment from the facility will be monitored by the radiation protection department prior to shipment release. Product shipment includes uranium and vanadium. Section 2.7 of the license application requires that all barrels are fixed alpha and gamma scanned; inspected for leaks, holes, and cleanliness; and the inspection is documented.

In December 1998, the licensee determined that the procedure in License Application Section 2.7 "Product Shipment Surveys," did not apply to vanadium product shipments and therefore, the licensee stopped performing fixed alpha and gamma scan surveys and inspections on all vanadium product barrels as specified in Section 2.7 of the license application. Contrary to the above, records were not maintained of this change with a written safety and environmental evaluation that provided the basis for determining that the change was in compliance with the requirements referred to in License Condition 9.4(B).

This is a Severity Level IV violation (Supplement VI).

C. License Condition 9.10 requires those releases of equipment or packages from the restricted area shall be in accordance with "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated May 1987, or suitable alternative procedures approved by the NRC prior to any such release.

Section 2.7.5.(3) and (4) of the SOP "Procedures - Uranium & Vanadium Concentration Shipments" required, in part, the licensee to perform removable alpha contamination (smear/swipe) survey on any barrel that exceeds 1,000 disintegrations per minute per 100 square centimeters (dpm/100cm^2) fixed alpha contamination.

Contrary to the above, on March 17 and April 14, 2000, three barrels containing vanadium product were released from the site restricted area with measured fixed contamination that exceeded 1,000 dpm/100cm^2. The licensee measurements however were not capable of determining the fraction of this radioactivity that was alpha contamination. Therefore, the licensee did not perform surveys for removable alpha contamination as required. Specifically, the three barrels had fixed contamination levels of 1,200, 1,600, and 2,000 dpm/100cm^2, respectively.

This is a Severity Level IV violation (Supplement VI).

Pursuant to the provisions of 10 CFR 2.201, International Uranium (USA) Corporation, is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 6th day of September 2000

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	40-8681
License No.	SUA-1358
Report No.	40-8681/00-01
Licensee:	International Uranium (USA) Corp.
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	July 24-27, 2000
Inspector(s):	Louis C. Carson II, Health Physicist Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety Judith L. Walker, Inspector-In-Training Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Accompanied by:	R. William VonTill, Geotechnical Engineer Uranium Recovery Section Fuel Cycle Safety and Safeguards Phillip Ting, Branch Chief Fuel Cycle Licensing Branch Fuel Cycle Safety and Safeguards
Approved by:	D. Blair Spitzberg, Ph.D., Chief Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Attachment:	Supplementary Information

EXECUTIVE SUMMARY

White Mesa Mill
NRC Inspection Report 40-8681/99-01

This inspection included a review of site status, management organization and controls, site operations, radioactive waste management, radiation protection and environmental protection programs.

Management Organization and Controls

- The licensee had maintained an organization structure that agreed with the requirements of the license (Section 2.0).
- With one exception that is discussed in Section 3.2(f) of this report, the licensee had adequately implemented the performance-based conditions of the license (Section 2.0).
- The licensee's review and use of site procedures were adequate with two exceptions that are discussed in Sections 3.2 (c) and (f) of this report (Section 2.0).

Radiation Protection

- The radiation protection program areas that were reviewed and found to be acceptable were facility posting and access control, personnel air sample analyses, and as low as reasonably achievable (ALARA) program reviews (Section 3.0).
- Violations were identified in the radiation safety area for failure to follow procedures for compliance with instrument functional checks, radioactive material and contamination controls, and material and equipment free release surveys. Three cited violations and one non-cited violation were identified in these areas. An Unresolved Item was identified concerning the controls for vanadium product (Section 3.0).

Radioactive Waste Management and Environmental Protection

- Operational activities were being conducted safely and in accordance with the conditions of the license as well as NRC regulations (Section 4.0).
- A review of the licensee's onsite control of the alternate feed material demonstrated the licensee was maintaining control of the material in an orderly, controlled fashion (Section 4.0).
- The licensee was noted to be collecting environmental monitoring samples as required by the license and as reported in the 1999 semi-annual effluent reports. All sample results were less than the associated effluent release limits specified in 10 CFR Part 20 during 1999. No adverse trends were identified (Section 4.0).

Followup

- One open item remained open regarding a shipment of soil containing hazardous waste that had to be reclaimed and shipped (Section 5).

Report Details

1 Site Status

The NRC issued Source Material License SUA-1358 to Energy Fuels Nuclear during August 1979. Ownership of the site was eventually transferred to Umetco Minerals, back to Energy Fuels Nuclear, and finally to International Uranium (USA) Corporation (IUC). IUC assumed ownership of the White Mesa Mill on May 10, 1997. The NRC approved the transfer via Amendment 2 of the revised License SUA-1358. This amendment was issued to IUC on May 9, 1997.

The mill was actively receiving alternate feed material during the inspection. Alternate feed material is material other than natural uranium ore. The licensee is authorized to receive and process alternate feed materials from certain out-of-state entities by License Conditions 10.6 through 10.13.

The licensee is also receiving and processing bulk uranium ore from active mines through private contractors. Since the previous inspection, the licensee had processed vanadium from Colorado Plateau Ore and reprocessed old vanadium that had been stored at the site since 1988. The licensee had shipped 30 lots of vanadium product since the last inspection. Additionally, the licensee as authorized by License Condition 10.5 was disposing of 11e.(2) byproduct material waste.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organization structure was reviewed to ensure the licensee had maintained effective organization and management controls in place to ensure compliance with NRC requirements. Also, the utilization and implementation of the licensee's performance-based license (PBL) was reviewed.

2.2 Observations and Findings

a. Management Organization

The organization structure requirements are provided in License Condition 9.3, which references the NRC-approved license renewal application dated January 30, 1997. The licensee had made no changes to the organization structure since the previous inspection. The licensee's organization structure was found to be in agreement with the intent of License Condition 9.3.

b. Performance-Based License Review

License Condition 9.4 states that the licensee may, under certain conditions and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the performance-based license provisions was reviewed to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site. The NRC granted the licensee a performance-based license during March 1997.

Making changes pursuant to License Condition 9.4 are required to be reviewed by a safety and environmental review panel (SERP). Proposed changes and the deliberations are required to be documented pursuant to License Condition 9.4(D). On July 7, 2000, the licensee submitted its annual SERP report to the NRC pursuant to License Condition 9.4(D). During the licensee's SERP period (July 1, 1999 - June 30, 2000), the licensee held six SERP meetings. The licensee has held three SERP meetings since the previous inspection. The inspectors reviewed the meeting minutes from SERP No. 00/01 and 02 dated July 21 and 24, 2000, and found them to be adequate. However, the licensee held a SERP meeting in December 1999, that resulted in a change to a procedure that is in the license application, and the SERP's decision was not documented in accordance with License Condition 9.4. This matter is further discussed in Section 3.2(f) of this report.

Additionally, License Condition 9.4 states that the licensee's SERP shall function in accordance with the SOP submitted to the NRC on June 10, 1997. The inspector reviewed SOP No. PBL-1, "Safety and Environmental Review Panel," Revision 2, dated June 7, 1997, which implemented the PBL process. The inspectors did not identify any changes in the SOP as approved by the NRC.

Based on review of the 1999 and the July 2000 SERP minutes, the inspectors determined that the SERP met the requirements of License Condition 9.4, with the exception that is discussed in Section 3.2(f) of this report.

c. Site Procedures

In accordance with License Condition 9.6, SOPs are required to be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. The inspectors reviewed the health physics manual, SOPs for plant process operations, and the emergency response plan. The inspectors noted continual improvements in the quality of the licensee's procedures since 1994. The radiation safety officer (RSO) had been updating, reviewing, and approving procedures as required by License Condition 9.4. However, the inspectors identified an example where an established radiation protection SOP was not consistent with the procedure described in the license application. Additionally the inspectors identified an example where radiation protection staff was not following the established procedure. The specific examples of these inconsistencies are further discussed in Sections 3.2 (c) and (f) of this report.

2.3 Conclusions

The licensee had maintained an organization structure that agreed with the requirements of the license. With one exception, the licensee had correctly implemented the performance-based conditions of the license. The licensee's review and use of site procedures were adequate with two exceptions that are discussed in Sections 3.2 (c) and (f) of this report.

3 Radiation Protection (83822)

3.1 Inspection Scope

Portions of the licensee's radiation protection program were reviewed to verify compliance with the conditions of the license as well as the requirements of 10 CFR Part 20.

3.2 Observations and Findings

a. Site Tour

A facility tour was performed to observe activities in progress. Site perimeter postings, required by License Condition 9.9 were in place at the appropriate entrances to the mill. During the inspectors' site tour, radiation levels were measured using an NRC microRoentgen (μR) meter. The background radiation level offsite was 10-15 μR/hr. Surveys taken in various locations throughout the mill and around the ore pad showed the following radiation levels:

- Sag Mill - 200 μR/hr
- Ash Lot No. 133 - 500 μR/hr
- Main Grizzly - 800 μR/hr
- Pulp storage tank area - 200 μR/hr
- Truck Wash/Decon Pad - 700 μR/hr
- Ore pad near fenceline - 300 μR/hr
- Truck checkout Point - 50 μR/hr
- Cell 2, 11e.(2) area - 60 μR/hr

The inspectors' radiation measurements were consistent with the licensee's routine survey results. No "Radiation Areas" as defined by 10CFR20.1003 were identified within the process facility. The inspectors identified that the vanadium storage area had elevated radiation levels of 300-400 μR/hr. It was determined that this area was part of the site restricted area and was adequately posted as required by License Condition 9.9. No health or safety concern was identified during the tour.

b. As low As Reasonably Achievable Program Review

In accordance with License Condition 11.6, an annual as low as reasonably achievable (ALARA) audit of the radiation safety program is required to be performed in accordance with Regulatory Guide 8.31. The most current ALARA audit was conducted in 1999 and was found to have been adequate. Portions of the radiation safety officer's daily, weekly and monthly inspection reports were reviewed. These reports were required by Section 3.6 of the ALARA Program section of the license application. The reports provided useful information such as in-plant radiological sampling and survey results. No significant health or safety issue was identified.

On June 14 and 16, 2000, the licensee conducted ALARA Meetings. The inspectors reviewed the ALARA committee meeting minutes. The licensee's ALARA meeting covered several topics including the investigation of intermodal container management, vanadium circuit operations, reviewing and establishing SOPs, and assuring compliance with regulatory requirements. The inspector determined that the ALARA meeting minutes were adequate.

c. Instrument Calibrations

(1) Requirements

License Condition 9.6 states, in part, that standard operating procedures shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. Additionally, written procedures shall be established for non-operational activities to include instrument calibrations. An up-to-date copy of each written procedure shall be kept in the mill area to which it applies.

All written procedures for both operational and non-operational activities shall be reviewed and approved in writing by the radiation safety officer (RSO) before implementation and whenever a change in the procedure is proposed to ensure that proper radiation protection principles are being applied. The inspectors found that the licensee used several procedures for calibrating and conducting efficiency checks on instruments.

Section 3.0 of the license application from January 1991 addresses the site's required radiation protection procedures for instrument calibrations. Section 3.0 of the license application had been duplicated as the established calibration SOP in the January 1991, Radiation Protection Manual, Section 3, Appendix D. In December 1998, Pages 29-31 of the health physics manual was drafted as the licensee's latest written SOP for calibrating and performing efficiency checks of alpha radiation detection instruments. The inspectors noted that the 1991 procedure identified the specific brands and models of radiation instruments used at the site. The 1998 SOP did not identify specific instrument brands; it was generically written for performing calibrations and efficiency checks on instrument types like alpha meters. The licensee also used the vendor manual to operate the instruments to provide guidance during calibrations and efficiency checks. The RSO explained that they were continuing to revise instrument calibration procedures.

(2) Instrument Functional Checks

Section 3.1.2.3.2 of the licensee's procedure "Checks" required the following:

> "Checks are made for each detector using an appropriate calibrated source. Mounting a source a fixed repeatable distance from the detector, a reading is made. Comparison of the results with those obtained at the calibration is utilized to determine field performance. If deviations exceeding 10 percent are noted, recalibration of the detector is required."

The inspectors reviewed the June and July 2000 alpha instrument efficiency check records. It was determined that the licensee did not compare the results of the instrument efficiency checks to the results of the instrument calibration. Therefore, the licensee had not been conducting alpha detector checks in accordance with the established procedure. This was identified as a violation of License Condition 9.6 for failure to follow established procedures for instrument calibrations (40-8681/0002-01).

Additionally, the inspectors noted that the alpha detectors were calibrated with plutonium-239, but efficiency checked with a thorium-232 check source. The inspector observed the RSO perform a conventional efficiency check on an alpha detector. The inspectors noted that the apparent efficiency of the alpha detector using thorium-232 was 7-8 percent. The inspectors compared the 7-8 percent efficiency to the revised plutonium-239 calibration efficiency of 15-17 percent. The inspectors determined that the different instrument responses to thorium and plutonium illustrated the importance of assuring that the calibration efficiency check source was equivalent to calibration source.

In summary, the licensee had not been conducting alpha instrument functional checks in accordance with the approved SOP, which was a violation of License Condition 9.6.

d. Air Samples Analyses

License Condition 11.4 requires that on an annual basis, the licensee collects, during mill operations, 8 hours of air samples in routinely and frequently occupied areas of the mill. In addition, with each change in mill feed material, the licensee must analyze mill feed or production product for natural uranium, thorium-230, radium-226, and lead-210. The inspectors reviewed air sample results from January 1999 to March 2000. The RSO had collected annual 8-hour air samples for the Ashland-2 alternate feed material and for materials that were in storage that contained both uranium and vanadium. The RSO found that airborne thorium-230 concentrations were significantly higher from the Ashland-2 material than other feedstock such as the Colorado Plateau Ore. The RSO determined that operators who worked with the Ashland-2 material had to be assigned an additional 100 millirem dose for 1999 based on the 8-hour air sample results. The inspectors concluded that the licensee had met the requirements of License Condition 11.4.

e. Contaminated Vanadium

During site tours the inspectors conducted radiation surveys using an NRC calibrated microRoentgen meter. The inspectors noted that the offsite background levels measured 10-15 μR/hr. However, the inspectors found a fenced area of the owner controlled property that measured 300-400 μR/hr at the fence. The inspectors noted that blue 55-gallon drums were stored behind the fenced area. Based on the inspectors' inquiry about the contents of the barrels, the licensee revealed that the drums contained vanadium product that was contaminated with radioactive material. Vanadium is a constituent of some ores (Colorado Plateau Ore) and is present in the uranium recovery process raffinate as a dissolved solid. The licensee's vanadium process involves processing the uranium recovery raffinate through a solvent extraction process in order to precipitate and recover vanadium as a commercial product. This vanadium recovery process was designed to remove all radioactive material from the vanadium product. The RSO had notified IUC management that the vanadium was radioactively contaminated by a letter dated May 5, 2000. Although not required, the licensee did not inform the NRC of this situation. The inspectors surveyed the barrels containing vanadium and the contact radiation readings measured by the inspector were as follows:

- Lot 45 Drum No. 39 - 210 μR/hr
- Lot 45 Drum No. 22 - 200 μR/hr
- Lot 44 Drum No. 45 - 100 μR/hr
- Lot 49 Drum No. 41 -1,600 μR/hr
- Lot 51 Drum No. 61 - 700 μR/hr
- Lot 51 Drum No. 34 - 700 μR/hr
- Lot 52 Drum No. 9 -1,000 μR/hr
- Lot 52 Drum No. 8 -1,000 μR/hr

The licensee's energy compensated Geiger-Mueller detector measured 1,500 μR/hr on contact at Drum No. 41. The inspectors' review of the licensee's May 5, 2000, letter from the RSO to the IUC president revealed the following:

- Each vanadium lot consisted of 66 barrels.
- Lots 34-52 were ready for shipment when a buyer was found.
- Lots 34-52 had total uranium concentrations between 32-850 picocuries/gram (pCi/g) and total thorium concentrations between 232-1462 pCi/g.

The licensee's course of action regarding the contaminated vanadium product was to blend the higher contaminated lots of vanadium with the lower contaminated lots. This strategy was in order to get the amount of source material in each lot below the 0.05 percent by weight "Unimportant Quantities" limit from 10CFR40.13. According to the licensee, they had not determined a root cause for the vanadium product lots being contaminated. However, they believed the problem was due to a possible failure in the process circuit and that they had reprocessed contaminated vanadium that had been stored since 1988. The inspectors noted however that Section 3.9 of the July 1991 license application "Byproduct Vanadium Recovery," states that the vanadium is not radioactive. In addition, Section 3.2.2.2 of the White Mesa Environmental Statement Report, "Byproduct Vanadium Recovery" states that less than 0.005 percent U_3O_8 will be contained in the vanadium product.

The inspectors noted that radioactive material labels had not been placed on the vanadium barrels that were in the storage area. Additionally, the inspectors noted that Lots 1-33 had been shipped as non-radioactive material. The inspectors noted that the licensee's vanadium shipping records routinely included a non-radiological analyses of the constituents that were in the vanadium product. However, the licensee did not routinely perform radioisotopic analyses on the vanadium product, and they had no requirement to conduct such analyses. The licensee provided vanadium shipment records from the previous shipments that occurred in 1988. The radiation survey records for these releases of the product measured 300-1100 dpm/100cm^2 fixed contamination and 0.1 millirem/hour.

The inspectors determined that this matter would be considered an Unresolved Item (URI) pending further review by the NRC. An Unresolved Item is a matter about which the NRC needs additional information in order to ascertain whether the issue in question is an acceptable item, a deviation, a nonconformance, or a violation (40-8681/0001-02). Meanwhile, the IUC president committed that White Mesa would not release and ship the contaminated vanadium product that was in storage until this URI is resolved.

The inspectors also found the licensee had decided that Section 2.7 of license application "Product Shipment Surveys" and SOP 2.7.5, "Procedures - Uranium & Vanadium Concentrates Shipments," were no longer applicable to vanadium product shipments. The inspectors questioned whether this change degraded licensee safety commitments as specified in the license application Section 2.7. License Condition 9.4 allows the licensee, without prior NRC approval, to make changes in procedures presented in the application if there is no degradation in the essential safety or environmental commitments. The licensee's SERP did not document the reason for the change. This aspect is further detailed in Section 3.2.f(2) of this report. However, the licensee's decision to drop vanadium product surveys as a license requirement is considered part of the URI pending resolution of the question of jurisdiction over the contaminated vanadium product.

f. Release Surveys for Equipment and Packages

(1) Release Survey Requirements

License Condition 9.10 requires that releases of equipment or packages from the restricted area shall be in accordance with "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated May 1987, or suitable alternative procedures approved by the NRC prior to any such release.

Section 2.7 of the January 1991 license application "Product Shipment Surveys," states, in part, that product shipments from the facility will be monitored by the radiation protection department prior to shipment release. Section 2.7 of the license application requires that all barrels are fixed alpha and gamma scanned; inspected for leaks, holes, and cleanliness; and the inspection is documented. Additionally, Section 2.7.4 provides detailed procedural steps to be followed when surveying the product drums for release.

(2) Reduction in Product Drum Surveys

In December 1998, the licensee determined that the procedure in License Application Section 2.7 "Product Shipment Surveys," did not apply to vanadium product shipments and therefore, the licensee stopped performing fixed alpha and gamma scan surveys and inspections on all barrels as specified in Section 2.7 of the license application. Additionally, the licensee's SERP did not maintain a record of this change with a written safety and environmental evaluation that provided the basis for determining that the change was in compliance with the requirements referred to in License Condition 9.4(B). The inspectors' review of vanadium shipment records of Lots 1-33 from March-June 2000 confirmed that the licensee was no longer conducting radiological surveys in accordance with the instructions in Section 2.7 of the license application.

Further discussions with the RSO and corporate management revealed that it was decided in either a December 1998 ALARA or SERP meeting that the survey requirements for product shipments did not apply to vanadium product shipments and therefore, these surveys were no longer performed. At the time of this inspection, the licensee could not provide the inspectors with the December 1998 ALARA Committee or SERP minutes.

License Condition 9.4 states, in part, that the licensee may, subject to the conditions specified in this condition make changes in procedures presented in the application. The licensee shall file an application for an amendment to the license, unless the following conditions are satisfied: There is no degradation in the essential safety or environmental commitments in the license application. The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations, made by the safety, environmental, and review panel. These records shall include written safety and environmental evaluations made by the SERP that provide the basis for determining that changes are in compliance with the requirements referred to in Part B of this condition.

In summary, in December 1998 the licensee changed the requirements of Section 2.7 of the license application for conducting radiological surveys on vanadium product shipments. However, the licensee did not maintain records of the safety evaluation made by the SERP for determining that the change was in compliance with the performance-based license. This was a violation of License Condition 9.4 (40-8681/0002-03).

(3) Contaminated Drums of Vanadium Released Offsite

The licensee's equipment and material release limits are found in the White Mesa "Equipment Release/Radiological Survey Procedure," which incorporates the "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of Licenses for Byproduct, Source, or Special Nuclear Material," (Guidelines) dated May 1987. Table 1 of the Guidelines "Acceptable Surface Contamination Levels" for natural uranium contamination has a release limit of 5,000 dpm/100cm^2 average fixed contamination and 1000 dpm/100cm^2 removable contamination. The Guidelines specifies release limits for thorium-230 and radium-226 which are 100 dpm/100cm^2 average fixed contamination and 20 dpm/100cm^2 removable contamination. Natural uranium, thorium-230, and radium-226 are part of the White Mesa site's radiological profile. Additionally, the Guidelines states, in part, that the average and maximum radiation levels associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 millirad/hour at 1 centimeter for beta radiation and 1.0 millirad/hour at 1 centimeter for gamma radiation.

The inspectors reviewed release survey records of vanadium product that had been released out of the restricted area since March 2000. The inspectors reviewed vanadium shipment records associated with 33 lots. One lot normally consisted of 66 barrels (drums) that weighed on average 550 pounds. The inspectors' review of the other vanadium lots that were shipped revealed that some barrels were released with measured contamination levels of more than 1,000 dpm/100cm^2. However, the RSO stated that the barrels had been washed off before leaving the site in accordance with the SOP. The inspectors examined the shipping records associated with Lot Nos. 7 and 9 that were shipped on March 17 and April 14, 2000, respectively. Records indicated that barrel Nos. 32 and 44 in Lot No. 7 had measured radiation readings of 0.16 and 0.2 millirem/hour, respectively. Likewise, the licensee's records indicated that Barrels 32 and 44 had total contamination levels of 1,600 and 2,000 dpm/100cm^2. Records indicated that barrel No. 37 in Lot No. 9 had measured radiation reading of 0.12 millirem/hour. Likewise, the licensee's records indicated that Barrel No. 37 had total contamination level of 1,200. Additionally, there were four other barrels that measured fixed contamination at 1,000 dpm/100cm^2.

Sections B(1, 3, and 5) of the SOP "Determination of External Contamination of Product Drums," dated December 1998, required, in part, that product drums must be swiped with filter paper discs to determine if they are externally contaminated. The filter swipe must be counted via standard gross alpha counting techniques. The results of the contamination surveys for each drum must be logged onto the drum contamination report. The inspectors further noted that the drum contamination reports stated that if total alpha contamination is greater than or equal to 1000 dpm/100cm^2, a removable smear is required.

Section 2.7.5.(3) and (4) of the SOP "Procedures - Uranium & Vanadium Concentration Shipments" required, in part, that the licensee to perform removable alpha contamination (smear/swipe) surveys on any barrel that exceeds 1,000 disintegrations per minute per 100 square centimeters (dpm/100cm^2) fixed alpha contamination.

However, on March 17 and April 14, 2000, three barrels containing vanadium product were released from the site restricted area that exceeded 1,000 dpm/100cm^2 fixed contamination, and the licensee did not conduct fixed or removable alpha contamination (smear/swipe) surveys on the barrels. The three barrels surveyed had contamination levels of 1,200, 1,600, and 2,000 dpm/100cm^2. However, the licensee had not determined if the contamination was from alpha radioactivity The inspectors determined that the licensee's failure to conduct required fixed or removable alpha contamination release surveys on the barrels from Lots 7 and 9 was a violation of License Condition 9.10 (40-8681/0002-04).

g. Intermodal Container Releases

During the period from January 2 to April 18, 2000, the licensee had determined that 17 intermodal containers had been released from the White Mesa facility with external radiation contamination in excess of Department of Transportation (DOT) limits. The licensee reported this finding to the NRC on March 1, 2000. The licensee conducted an extensive investigation of the circumstances surrounding the release of the contaminated containers. The licensee had implemented short and long term corrective actions associated with this matter. The inspectors reviewed the following licensee investigation reports and corrective actions concerning the inadvertent intermodal container releases:

- Investigation Report of Intermodal Container Management at the International Uranium Corporation White Mesa Mill, May 26, 2000.
- SERP No. 00/01-02: Meeting Minutes, July 21 and 24, 2000.
- ALARA Committee Meeting Minutes, June 14 and 16, 2000.
- SOP: "Intermodal Container Acceptance, Handling, and Release," July 27, 2000.

The licensee found that out of approximately 6,000 intermodal containers released from the site, 17 were found to have been contaminated with radioactive material from the White Mesa site in excess of the DOT shipping limit of 22,000 dpm/100cm^2. A review the survey data revealed that contaminated containers measured between 2,315-37,791 dpm/100cm^2. The inspectors determined that these contamination levels did not represent a significant safety potential to members of the public because the containers were empty and in transit during most of the time they were in the public domain. The licensee determined that the cause of the inadvertent releases were as follows:

- Failure to adhere to the general SOP for equipment releases and failure to establish an SOP that was specific to intermodal container releases.
- Wet radioactive material from within the site restricted area splattered on the underside of the container and would not be decontaminated.
- The amount of traffic accessing the restricted area had increased the probability of releasing contaminated containers.

The licensee's corrective actions included the following:

- On July 24, 2000, the licensee implemented a new SOP "Intermodal Container Acceptance, Handling, and Release."
- Truck routes on the site were modified. Trucks that transport feed material to White Mesa have limited site access, if any, to the restricted area. Most trucks have access to the owner controlled area where the trailer or intermodal container of material is disconnected and transferred to the licensee's truck. The licensee's staff now unloads the contents of the container at the ore pad.
- The licensee instituted new intermodal trailer/container washing and decontamination procedures.

Inspectors observed the licensee's implementation of the new intermodal container SOP. Licensee personnel were observed satisfactorily conducting contamination surveys on both the intermodal containers and licensee vehicles that were exiting the restricted area.

In a letter dated June 22, 2000, the licensee stated that during a telephone call with the NRC project manager regarding the intermodal container issue, that they concluded that they failed to implement their SOP for releasing intermodal containers for restricted use.

Failure to implement the SOP for releasing intermodal containers for restricted use was a violation of License Conditions 9.6 and 9.10. The inspectors determined that the licensee had satisfactorily implemented corrective actions, and the contamination levels that were detected on the containers had a low safety consequence to members of the public. This matter was considered non-repetitive, licensee-identified and corrected. Therefore, this violation is being treated as a non-cited violation, consistent with Section VI.A(8) of the NRC Enforcement Policy (NCV: 40-8681/0001-05).

3.3 Conclusions

The radiation protection program areas that were reviewed and found to be acceptable were facility posting, personnel air sample analyses, and ALARA program reviews.

Violations were identified in the radiation safety area for failure to follow procedures for instrument calibrations and functional checks, radioactive material and contamination controls, and material and equipment free release surveys. Three cited violations and one non-cited violation were identified in these areas. An Unresolved Item was identified concerning controls for vanadium product.

4 Radioactive Waste Management (88035) and Environmental Monitoring (88045)

4.1 Inspection Scope

The environmental, effluent and groundwater monitoring programs were reviewed to assess the effectiveness of the licensee's programs and to evaluate the effects, if any, of site activities on the local environment.

4.2 Observations and Findings

a. Site Operations

The licensee was not processing alternate feed material or uranium ore during this inspection. Conventional uranium ore operations occurred from April-October 1999. From November-December 1999, the licensee had processed Colorado Plateau Ore that contained both uranium and vanadium, and the licensee also reprocessed vanadium that had been storage since 1989.

In accordance with License Conditions 10.6 and 10.7, IUC is authorized to process alternate feed material from Allied Signal. This material, referred to as "CaF" (calcium fluoride), had been stockpiled for future processing.

In accordance with License Conditions 10.10, 10.11, 10.12, and 10.13, the licensee was receiving bulk alternate feed materials in soil form from the Ashland Formerly Utilized Sites Remedial Action Program near Tonowanda, New York, and drummed calcined byproduct materials from Cameco Corporation's Blind River and Port Hope facilities in Ontario, Canada.

License Condition 10.5 authorizes the licensee to dispose of 11e.(2) byproduct material generated at licensed in-situ leach facilities subject to several conditions, including a 5000 cubic yard limit from a single source.

The inspectors specifically reviewed the licensee's implementation of License Condition Nos 10.5, 10.10, 10.11, 10.12, and 10.13 in the areas of airborne contamination, radiation safety, and vehicle scanning. The inspectors found that the licensee had been receiving and processing the alternate feed material and disposing of the 11e.(2) materials in accordance with the detail of the applicable license amendment request commitments.

b. Environmental and Effluent Monitoring Programs

Environmental monitoring program requirements are identified in License Condition 11.2, which specifies that the licensee implement the effluent and environmental monitoring programs specified in Section 5.5 of the renewal application. During the inspection, the inspectors reviewed the semi-annual effluent report for the second half of 1999. The first half of 2000 had not been issued, however, the raw data was reviewed for consistency.

The licensee's environmental monitoring program consisted of continuous air, groundwater, surface water, and vegetation, as well as ambient gamma exposure rate measurements. The licensee collected the required samples at the five sampling stations, including a nearest resident and a background location.

c. Environmental Air Sampling

Particulate air sampling was performed at four stations using continuous high volume samplers. The background sampling station (BHV-3) was taken down due to vandalism. The sample filters were exchanged weekly and analyzed quarterly for natural uranium, radium-226, thorium-230, and lead-210 concentrations. All sample results for July 1999-December 1999 were 6.4 percent or less of the concentrations specified in 10 CFR Part 20, Appendix B. No adverse trends were identified.

d. Environmental Exposure Rates

Ambient gamma radiation levels were continuously measured at the five sample stations with thermoluminescent dosimeters (TLDs). The TLDs were exchanged and analyzed on a quarterly basis. The sample results varied from 9.7 μR/hr at the background station to 11.1 μR/hr at an onsite sample station (East Tailings Area) for 1999. Ambient gamma exposure rates were found to be below the limits established in 10 CFR 20.1301.

A review of TLD data revealed that each TLD location was less than 12 μR/hr. The average dose rate offsite was determined to be 10-15 μR/hr by surveys, which was comparable to the readings at each TLD location. The licensee reported each TLD location as background corrected.

e. Vegetation

Vegetation samples were collected at three locations around the mill during early spring, late spring, and fall. The samples were analyzed for radium-226 and lead-210 concentrations. Sample results for the second half of 1999 were comparable to those taken in the first half of 1999, with no observable adverse trends.

f. Surface Water Sampling

In accordance with Section 5.5 of the license application, surface water samples are required to be obtained from two locations. Water samples (or sediment samples if the streams are dry) are to be obtained annually from Westwater Creek and quarterly from Cottonwood Creek. The samples were analyzed for their natural uranium, radium-226, and thorium-230 concentrations, as well as their quantity of total dissolved solids. The natural uranium concentration was 2.2 percent of the concentration specified in Appendix B to 10 CFR Part 20.

g. Groundwater Detection Monitoring Program

License Condition 11.3(A) requires the licensee to implement a groundwater detection monitoring program. The licensee's internal procedure entitled "Groundwater Monitoring Plan and Standard Operating Procedures," revised May 1999, was reviewed along with records since the last inspection. Staff involved in groundwater sampling were interviewed. It was determined that the licensee was following proper procedures in this area.

h. Tailings Cell Leak Detection Program

License Condition 11.3(B-E) requires the licensee to implement a monitoring program of the leak detection systems for the disposal cells. The licensee's procedures for tailings management, training and quality assurance were reviewed. The inspector toured the cell area with mill staff responsible for leak detection system field monitoring and observed demonstrations of field protocol. Based on observations of mill staff and the review of records, it was determined that the licensee was properly implementing License Condition 11.3.

i. Radioactive Waste Receipts and Disposal Inspections

The licensee is required to submit an annual summary to the NRC of wastes disposed of from offsite generators in accordance with Condition 10.5.D. The licensee's most current annual summary dated February 17, 2000, was reviewed. During 1999, the licensee received 57 shipments of 11e.(2) byproduct waste for disposal from three individual waste generators. Seven shipments of 11e.(2) waste had been received from offsite generators in 2000. Shipments of 11e.(2) waste were found to have been conducted within the limits of the license.

A review of the licensee's four disposal cells was conducted. Cells 1 and 3 were actively being used for process solution evaporation and recycling, with Cell 3 also used for disposal of tailings generated onsite and wastes generated offsite (as authorized in License Condition 10.5). Cell 2 was being used for disposal of solid wastes generated onsite, and was covered as the cell was filled. Any liquid recovered from Cell 2 operations was transferred to Cell 3. Since Cell 4 was not in service during the inspection, receiving only precipitation. Cell 4 had multiple tears and channels in the liner system, the licensee stated that Cell 4 would not be used until the liner is replaced. No abnormal conditions, such as leaks or berm failures were observed at any of the other cells during the site tour.

4.4 Conclusions

Operational activities were being conducted safely and in accordance with the conditions of the license as well as NRC regulations. A review of the licensee's onsite control of the alternate feed material demonstrated the licensee was maintaining control of the radioactive waste shipments in an orderly, controlled fashion. The licensee was noted to be collecting all environmental monitoring samples required by the license at the intervals specified in the license, as reported in the 1999 semi-annual effluent reports. All sample results were less than the associated effluent release limits specified in 10 CFR Part 20 during 1999. No adverse trends were identified.

5 Followup (92701)

5.1 (Open) IFI 40-8681/9903: Receipt of Hazardous Waste Material at the White Mesa Mill

On October 26, 1999, the licensee inadvertently received and accepted a shipment of potentially hazardous waste material from the Massachusetts Highway Department Central Artery Tunnel project. On the basis of a single analyzed sample, the material contained lead, a hazardous waste. The result of the sample showed a lead concentration of 5.75 milligrams per liter (mg/l) which was above the criteria of 5.0 mg/l for classifying the material as hazardous waste. The lead contaminant most likely originated from automotive exhaust particles that had settled into the soil prior to excavation.

The waste material was erroneously shipped to the site primarily because of a duplication in shipping container numbers. Several programmatic weaknesses helped contribute to the problem including poor control of shipping manifests and use of generic versus specific ore receipt inspection procedures. The licensee's random sampling program would not have identified the wastes because the hazardous constituent (lead) was not one of the constituents that the licensee tested for incoming material. Finally, the shipment of the material was determined not to be under the jurisdiction of the NRC.

An NRC Inspection Followup Item (IFI) was opened to ensure the licensee resolves the mixed waste concerns, disposes of the waste material, and implements corrective actions to prevent recurrence of the incident. The inspectors observed that the licensee had completely excavated the hazardous material and stored the hazardous material in an intermodal container. The licensee was expecting the intermodal container to be shipped in August 2000. This matter will remain open until the waste material is removed from the site. On July 24, 2000, the licensee established a new SOP "Intermodal Container Acceptance, Handling, and Release," to preclude the recurrence of this type of situation. The inspectors noted that the licensee had improved the process for verifying shipment manifests.

6 Exit Meeting Summary

The inspectors presented the preliminary inspection results to the representatives of the licensee at the conclusion of the inspection on July 27, 2000. A telephonic exit briefing was held on August 22, 2000, to discuss the results of the inspection as presented in this report. Licensee representatives acknowledged the findings as presented. The licensee did not identify any information reviewed by the inspector as propriety information.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Hochstein, President
R. Berg, Radiation Safety Officer
W. Deal, Mill Manager
M. Rehmann, Environmental Manager

INSPECTION PROCEDURES USED

83822	Radiation Protection
88005	Management Organization and Controls
88035	Radioactive Waste Management
88045	Environmental Monitoring
92701	Followup

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

40-8681/0001-01	VIO	Failure to follow procedures for alpha detector functional checks (License Condition 9.6).
40-8681/0001-02	URI	NRC determination on whether radioactively contaminated vanadium is a byproduct material or is it an Unimportant Quantity pursuant to10 CFR 40.13.
40-8681/0001-03	VIO	Failure to follow the PBL and utilized the SERP to change the procedure in the license application for uranium and vanadium product surveys (License Condition 9.4).
40-8681/0001-04	VIO	Failure to conduct free release surveys on vanadium product shipments as required by the license (License Condition 9.10).
40-8681/0001-05	NCV	Failure to follow procedures for surveying equipment such as intermodal containers for unrestricted release. (License Condition 9.6)

Closed

none

Discussed

40-8681/9903	IFI	Receipt of hazardous was at the White Mesa Site

LIST OF ACRONYMS USED

ALARA	as low as reasonably achievable
CaF	calcium fluoride
CFR	Code of Federal Regulations
cpm	counts per minute
DOT	Department of Transportation
dpm	disintegrations per minute
IN	Information Notice
IUC	International Uranium Corporation
mg/l	milligrams per liter
μR/hr	microRoentgen/hour
PBL	Performance Based License
pCi/g	picocuries/gram
PDR	Public Document Room
RSO	Radiation Safety Officer
SERP	Safety and Environmental Review Panel
SOP	Standard Operating Procedure
TLD	thermoluminescent dosimeters
URI	Unresolved Item

MEMORANDUM

TO: David C. Frydenlund
Ron F. Hochstein
Ronald E. Berg
William N. Deal

FROM: Michelle R. Rehmann

DATE: October 16, 2000

SUBJECT: Follow-up Actions Relative to NOV Response of October 13, 2000

The purpose of this memo is to summarize follow-up actions to which IUC committed in the NOV response of October 13, 2000. For ease of reference, the violation, corrective steps (taken and planned) and dates when final corrective action will be completed are listed below for each of the three cited violations. Please keep me advised on any plans to produce any of the response items listed below so that the responses can be coordinated and tracked, and so that we can ensure that all are completed in the timeframes to which the company has committed to perform.

VIOLATION A

"...alpha detector functional check results for June and July 2000, were not compared to the results of the instruments' calibration to determine the field performance of the alpha detectors."

1. Corrective steps that have been taken and results achieved

(a) The SERP has commenced review of the revised draft SOP.
(b) SERP has directed that Mill Radiation Safety Staff is to continue to make use of the manufacturer's manual as guidance for inputting the efficiency factor for the instrument in question pending final review and approval of the updated SOP by the SERP.
(c) IUC has notified Ludlum Instruments to calibrate all radiation detection instruments used by the Mill for alpha detection to a Th-230 source, and to provide both 2-pi and 4-pi calibration.

2. Corrective steps that will be taken to avoid further violations

(a) IUC will implement the SOP detailed above
(b) IUC will review the SOP as new instruments are added to ensure that the functional check steps are detailed in the SOP.
(c) IUC has notified Ludlum Instruments to calibrate all radiation detection to a Th-230 source, and to provide both 2-pi and 4-pi calibration.

3. Date when full compliance will be achieved

(a) Complete modification of the SOP above on or before December 15, 2000.
(b) The calibration modification defined above was completed on September 1, 2000.

VIOLATION B

"...records were not maintained of this change with a written safety and environmental evaluation that provided the basis for determining that the change was in compliance with the requirements referred to in License Condition 9.4(B)."

1. Corrective steps that have been taken and results achieved

(a) Immediate corrective step, all product shipments will be surveyed as per the January 1991 License Application, Section 2.7, "Product Shipment Surveys," Surveys apply to both uranium and vanadium, although IUC has committed that no shipments of vanadium are planned until the issues identified in the Notice are resolved.

2. Corrective steps that will be taken to avoid further violations

(a) Long-term corrective step, SOP will be subjected to final SERP review and approval.
(b) IUC will address the root cause of this violation on the programmatic level. Corrective actions for this violation will include all of the following:

i. Reinforce in personnel the requirement to follow <u>all</u> existing approved SOPs, and to change SOPs <u>only</u> after proper SERP review and approval

ii. Update the document control process to ensure that only approved SOPs are available for use

iii. Evaluate and update internal responsibilities for auditing and responding to audits; and for reporting, tracking, and implementing SOPs and audit recommendations

iv. Conduct regularly scheduled ALARA meetings and/or audits for the purpose of evaluating detailed review of sets of SOPs (i.e., Operations, Health Physics and Radiation Safety, Environmental), thereby identifying SOPs that may contain outdated material or that require change or other forms of revisions on a more pro-active basis

v. Update administrative process to address programmatic issues

3. Date when full compliance will be achieved

IUC will perform all items identified under (2) above on or before January 15, 2001.

VIOLATION C

"...on March 17 and April 14, 2000, three barrels containing vanadium product were released from the site restricted area with measured fixed contamination that exceeded 1,000 dpm/100cm^2. The licensee measurements however were not capable of determining the fraction of this radioactivity that was alpha contamination as required."

1. Corrective steps that have been taken and results achieved

(a) IUC will ensure that proper measurements, capable of determining the fraction of radioactivity due to alpha contamination, are performed as per the existing SOP, pending the proper implementation of any revised SOP.

2. Corrective steps that will be taken to avoid further violations

(a) Scanning for alpha contamination will be performed in strict accordance with the existing SOP.

(b) All product shipments will be surveyed for alpha surface contamination in the future (after the barrels are sufficiently dried to perform the scan).

(c) Mill Staff will consider the feasibility of modifying the SOP to allow for alternative surveys of wet barrels to determine alpha activity.

(d) Any such modification would be subject to the SERP process.

3. Date when full compliance will be achieved

(a) Effective October 13, 2000, IUC will perform scans as per the existing SOP. Staff have been advised of this requirement, and agree to perform in full compliance henceforth.

(b) SOP revisions, if made, will be completed on or before January 15, 2001.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

December 1, 2000

David Frydenlund Vice-President and
General Counsel
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: RESPONSE AND ERRATUM TO NRC INSPECTION REPORT 40-8681/00-01

Dear Mr. Frydenlund:

Thank you for your letter of October 13, 2000, in response to our July 27, 2000, letter and Notice of Violation (Notice). We have reviewed your reply and find it responsive to the concerns raised in our Notice. We will review the implementation of your corrective actions during a future inspection to determine that full compliance has been achieved and will be maintained.

In your letter, you requested that we correct our inspection report reference to the "unrestricted release" of intermodal containers. We had mistakenly typed "unrestricted release" when referencing the open items on the last page of the report. However, the NRC had correctly identified in the text of the inspection report that License Conditions 9.6 and 10.6 applied to "restricted release" procedures for intermodal containers. Therefore, consider this letter as an erratum to the July 27, 2000, inspection report.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Should you have any questions concerning this letter, please contact Mr. Louis C. Carson II at (817) 860-8221or Dr. D. Blair Spitzberg at (817) 860-8191.

Sincerely,

Dwight D. Chamberlain

Dwight D. Chamberlain, Director
Divisions of Nuclear Materials Safety

Docket No.: 40-8681
License No.: SUA-1358

cc w/copy of licensee's letter dated 10/13/00:
Ms. Michelle Rehmann
International Uranium (USA) Corp.
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

Mr. William Deal, Mill Manager
International Uranium (USA) Corp.
6425 South Highway 191
P.O. Box 809
Blanding, Utah 84511

Mr. William J. Sinclair, Director
State of Utah
Department of Environmental Quality
Division of Radiation Control
168 North 1950 West
Salt Lake City, Utah 84115-4850

Mr. Pat Mackin, Assistant Director
Systems Engineering & Integration
Center for Nuclear Waste Regulatory Analyses
6220 Culebra Road
San Antonio, Texas 78238-5166

IUC INTERNATIONAL URANIUM (USA) CORPORATION

6425 S. Hwy. 191 • P.O. Box 809 • Blanding, UT 84511 • 435-678-2221 (phone) • 435-678-2224 (fax)

October 13, 2000

RECEIVED
OCT 17 2000
DNMS

VIA FACSIMILE TO (817) 860-8188
AND FEDERAL EXPRESS
Mr. Dwight D. Chamberlain, Director
U.S. Nuclear Regulatory Commission
Region IV
Division of Nuclear Materials Safety
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-8064

Reference: RESPONSE TO NOTICE OF VIOLATION
NRC Inspection Report 40-8681/00-01 and Notice of Violation
White Mesa Uranium Mill
Source Material License No. SUA-1358
Docket No. 40-8681

Dear Mr. Chamberlain:

On July 27, 2000, the NRC completed an inspection at International Uranium (USA) Corporation's (IUSA's) White Mesa Mill near Blanding, Utah. On September 6, 2000, the NRC forwarded the results of the inspection, including the referenced Notice Of Violation (Notice), to IUSA. Pursuant to the provisions of 10 CFR 2.201, IUSA is submitting the following written statement and explanations in response to the three violations cited in the Notice, to the Director of NRC Region IV, and to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555. In accordance with IUSA's discussion with NRC on October 5, 2000, the time for submittal of this response was extended to October 13, 2000.

It should be noted that IUSA has followed the instructions specified in the Notice in preparing these responses to the three cited violations, by including the following for each violation: (1) the reason for the violation; (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. In addition, IUSA has referred to the Suggested Guidance Relating to Development and Implementation of Corrective Actions (NRC Information Notice 96-28, May 1, 1996) to ensure that prompt, comprehensive corrective actions necessary to address each noncompliant condition and to prevent recurrence of each violation and the occurrence of similar violations have been undertaken.

GENERAL COMMENT

The Violations involved one of three possible root causes, namely: (1) Procedure being followed by Mill Staff that did not contain sufficiently specific language; (2) Mill Staff following revised procedures that had not been properly approved prior to implementation; or (3) Failure of Mill Staff to follow a procedure. To the extent that a procedure has not been properly approved prior to implementation, IUC's SERP will carefully evaluate such proposed revised procedure to ensure that it does not involve any degradation to the essential health and safety at the Mill and meets all of the other criteria for approval by the SERP, and can, if approved by the SERP, then be properly implemented.

The fact that the Mill staff may have followed a revised procedure that had not been properly implemented indicates a potential programmatic weakness in the Mill's documentary control process and other internal administrative processes that lead to confusion as to which procedures should have been followed by Mill staff. Such a programmatic weakness, along with the other contributors to these violations, are of significant concern to IUC. All will be given the appropriate high level of attention, in the manner detailed below.

VIOLATION A

In the Notice, the NRC describes Violation A as follows:

> "License Condition 9.6 states, in part, that standard operating procedures (SOPs) shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. Additionally, written procedures shall be established for non-operational activities to include instrument calibrations.
>
> Section 3.1.2.3.2 of the licensee's procedure "Checks" required that instrument checks are made for each detector using an appropriate calibrated source. Comparison of the results with those obtained at the calibration is utilized to determine field performance. If deviations exceeding 10 percent are noted, recalibration of the detector is required.
>
> Contrary to the above, alpha detector functional check results for June and July 2000, were not compared to the results of the instruments' calibration to determine the field performance of the alpha detectors.
>
> This is a Severity Level IV violation (Supplement VI)."

1. Reason for the violation

Review of circumstances that led to the violation

It should be noted that alpha detector functional checks for June and July, 2000, were in fact compared to the results of the instrument's calibration to determine the field performance of the alpha detectors, using procedures for modern equipment that were not detailed in the Mill's 1991 License Application. This violation resulted from having a section that had not been updated to current instruments, in an established standard operating procedure (SOP) (section 3.1.2.3.3 of the 1991 License Application). As a result, although an SOP existed that required this functional check, the SOP did not contain specific language directing the reader of the SOP to the manufacturer's manual for setting the instrument based on the comparison of the functional check to the calibration.

Root cause analysis

The SOP contained text requiring that instrument checks be made for each detector using an appropriate calibrated source. The Mill records indicate that such checks are made each time an instrument is used, and additional checks are made and documented on a monthly basis, as well. However, for the particular alpha instrument in question (Eberline Alpha Scintillator Instrument ESP-1 with AC-3 Alpha Detector), application of the efficiency factor, after it has been derived by performing the instrument check (using an appropriate calibrated source), for setting the instrument to take field measurements, is not explicitly described in the text of the SOP. Rather, the Mill Radiation Safety Staff have referred to the manufacturer's manual to make the appropriate use of the instrument, including inputting the efficiency factor for the day.

It is also noted that the Inspector questioned the efficacy of utilizing a Thorium-230 (Th-230) source for the efficiency check, given that the instrument in question had been calibrated by the manufacturer to a Plutonium-239 (Pu-239) source. As detailed in Attachment 1 to this response, Memorandum dated September 28, 2000 from Ludlum Measurements, Inc., the Th-230 check source used by the Mill Staff is appropriate and provides sufficient accuracy for the check. Nevertheless, as detailed below, the Mill Radiation Safety Staff has indicated that the off-site laboratory calibration methodology will be changed to use of a Th-230 source to prevent any further concern regarding use of differing sources for calibration of the same instrument.

2. Corrective steps that have been taken and results achieved

The SERP has commenced review of the revised draft SOP and has directed that Mill Radiation Safety Staff is to continue to make use of the manufacturer's manual as guidance for inputting the efficiency factor for the instrument in question pending final review and approval of the updated SOP by the SERP. IUC has notified Ludlum Instruments, the calibration laboratory for the instrument in question, that the Ludlum

Service Department is to calibrate all radiation detection instruments used by the Mill for alpha detection to a Th-230 source, and to provide both 2-pi and 4-pi calibration.

3. Corrective steps that will be taken to avoid further violations

Given that this Inspector recommended that the SOP should state explicitly the steps that will be used for inputting the efficiency factor after performing the function check, IUC will implement the SOP detailed under (2) above, and will review it as new instruments are added to ensure that the functional check steps are detailed in the SOP.

Additionally, in response to the Inspector's concern regarding utilization of two different sources for calibration vs. function checks, IUC has notified Ludlum Instruments, the calibration laboratory for the instrument in question, that the Ludlum Service Department is to calibrate all radiation detection instruments used by the Mill for alpha detection to a Th-230 source, and to provide both 2-pi and 4-pi calibration.

4. Date when full compliance will be achieved

IUC will complete modification of the SOP as defined under (3) above on or before December 15, 2000. The calibration modification defined under (3) above was completed on September 1, 2000.

VIOLATION B

In the Notice, the NRC describes Violation B as follows:

> "License Condition 9.4(A&B) states, in part, that the licensee may, subject to the conditions specified in this condition, make changes in procedures presented in the application. The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations, made by the safety, environmental, and review panel (SERP) that provide the basis for determining if changes are in compliance with the requirements referred to in Part B of this condition.
>
> The January 1991 License Application, Section 2.7, "Product Shipment Surveys," states, in part, that product shipment from the facility will be monitored by the radiation protection department prior to shipment release. Product shipment includes uranium and vanadium. Section 2.7 of the license application requires that all barrels are fixed alpha and gamma scanned; inspected for leaks, holes, and cleanliness; and the inspection is documented.
>
> In December 1998, the licensee determined that the procedure in License Application Section 2.7 "Product Shipment Surveys," did not apply to vanadium product shipments and therefore, the licensee stopped

performing fixed alpha and gamma scan surveys and inspections on all vanadium product barrels as specified in Section 2.7 of the license application. Contrary to the above, records were not maintained of this change with a written safety and environmental evaluation that provided the basis for determining that the change was in compliance with the requirements referred to in License Condition 9.4(B).

This is a Severity Level IV violation (Supplement VI)."

1. Reason for the violation

Review of circumstances that led to the violation

This violation, failure to maintain records of a procedure change with a written safety and environmental review panel (SERP) evaluation that provided the basis for determining that the change was in compliance with the requirements referred to in License Condition 9.4(B), resulted from an interpretation and usage of an SOP that had not been subjected to full review and approval by the SERP.

Root cause analysis

Although Mill Radiation Safety Staff interpreted the draft SOP to not require surveys on all vanadium product barrels, Staff did perform surveys on all drums; however, the surveys performed were not as comprehensive as required in the 1991 License Application SOP.

IUC undertook a major revision and update of all of the Mill SOPs in 1998. A large number of the Mill's established SOPs were reviewed and updated. In a systematic manner, a large number of these SOPs were reviewed by the SERP, revised as warranted, and ultimately approved. However, not all SOPs were revised and available during this particular SERP review and approval period, and this resulted in the Mill having on-site, in some cases, two or more versions of SOPs addressing the same topic – the SOP specified in the license application and certain draft revised SOPs. Furthermore, although management, through the ALARA audit process, had identified and reported on the need for review and approval of such draft revised SOPs, proper follow-up and response did not occur in this case.

This is regarded as a programmatic issue for the following reasons: First, Mill Staff had inadvertently implemented its interpretation of a draft SOP absent finalization and formal approval of the draft SOP; and second, in its ALARA review process, management had identified the need to complete the formal review process for this and other proposed revised SOPs, but full response to the issue was not implemented. It appears that this may be due, in part, to weaknesses in the Mill's document control procedures, as well as to ill-defined responsibilities relating to the implementation and tracking of ALARA Committee recommendations.

2. Corrective steps that have been taken and results achieved

As an immediate corrective step, any product shipments that may be necessary will be surveyed as per the January 1991 License Application, Section 2.7, "Product Shipment Surveys," which requires, in part, that product shipments from the Mill be monitored by the Radiation Protection Department prior to shipment release. Such surveys will apply to both uranium and vanadium, although IUC has committed that no shipments of vanadium are planned until the issues identified in the Notice are resolved.

3. Corrective steps that will be taken to avoid further violations

As a long-term corrective step to avoid further violations, the SOP will be subjected to final SERP review and approval. In addition, IUC will address the root cause of this violation on the programmatic level. Corrective actions for this violation will include all of the following:

i. Reinforce in personnel the requirement to follow all existing approved SOPs, and to change SOPs only after proper SERP review and approval

ii. Update the document control process to ensure that only approved SOPs are available for use

iii. Evaluate and update internal responsibilities for auditing and responding to audits; and for reporting, tracking, and implementing SOPs and audit recommendations

iv. Conduct regularly scheduled ALARA meetings and/or audits for the purpose of evaluating detailed review of sets of SOPs (i.e., Operations, Health Physics and Radiation Safety, Environmental), thereby identifying SOPs that may contain outdated material or that require change or other forms of revisions on a more pro-active basis

v. Update administrative process to address programmatic issues

4. Date when full compliance will be achieved

IUC will perform all items identified under (3) above on or before January 15, 2001.

VIOLATION C

In the Notice, the NRC describes Violation C as follows:

> "License Condition 9.10 requires those releases of equipment or packages from the restricted area shall be in accordance with "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of License for Byproduct, Source, or

Special Nuclear Material," dated May 1987, or suitable alternative procedures approved by the NRC prior to any such release.

Section 2.7.5.(3) and (4) of the SOP "Procedures – Uranium & Vanadium Concentration Shipments" required, in part, the licensee to perform removable alpha contamination (smear/swipe) survey on any barrel that exceeds 1,000 disintegrations per minute per 100 square centimeters (dpm/100cm^2) fixed alpha contamination.

Contrary to the above, on March 17 and April 14, 2000, three barrels containing vanadium product were released from the site restricted area with measured fixed contamination that exceeded 1,000 dpm/100cm^2. The licensee measurements however were not capable of determining the fraction of this radioactivity that was alpha contamination as required. Specifically, the three barrels had fixed contamination levels of 1,200, 1,600, and 2,000 dpm/100cm^2 respectively.

This is a Severity Level IV violation (Supplement VI)."

1. Reason for the violation

Review of circumstances that led to the violation

The draft SOP "Procedures – Uranium & Vanadium Concentration Shipments", which requires, in part, that the licensee perform a removable alpha contamination (smear/swipe) survey on any barrel that exceeds 1,000 disintegrations per minute per 100 square centimeters (dpm/100cm^2) fixed alpha contamination, was not properly implemented, due to extenuating circumstances in existence at the time the shipments were being surveyed for release from the Mill property. Mill Staff were unable to follow the SOP, because, as noted on the forms for these drums, the drums were wet at the time of the surveys. However, in the Radiation Safety Staff's technical view (see Attachment 2), the surveys of the drums were sufficient to infer that total alpha would be at an acceptable level, had it been possible to take alpha swipes. Therefore, the technicians performing the surveys released these three drums, even though the readings exceeded 1,000 dpm/cm^2. This resulted in a failure to perform the alpha swipes on three barrels that had total alpha beta and gamma in excess of the 1,000 dpm standard.

Root cause analysis

Alternative methods of measurement considered by the Mill Radiation Safety Staff to be equally protective were utilized on a small percentage of the barrels prior to shipment. Although such a deviation may have seemed reasonable, particularly if the barrels were damp on the exterior, the SOP does not explicitly state any provision for such an alternative approach. This is, therefore, an unauthorized deviation from the SOP.

2. Corrective steps that have been taken and results achieved

IUC will ensure that proper measurements, capable of determining the fraction of radioactivity due to alpha contamination, are performed as per the existing SOP, pending the proper implementation of any revised SOP.

3. Corrective steps that will be taken to avoid further violations

Scanning for alpha contamination will be performed in strict accordance with the existing SOP. All product shipments will be surveyed for alpha surface contamination in the future. This will be done after the barrels are sufficiently dried to perform the scan. In addition, Mill Staff will consider the feasibility of modifying the SOP to allow for alternative surveys of wet barrels to determine alpha activity. Any such modification would be subject to the SERP process.

4. Date when full compliance will be achieved

IUC has committed, effective the date of this letter, to perform scans as per the existing SOP. Staff have been advised of this requirement, and agree to perform in full compliance henceforth. SOP revisions, if made, will be completed on or before January 15, 2001.

NONCITED VIOLATION

IUC notes that the noncited violation contained in the Notice for "Failure to follow procedures for surveying equipment such as intermodal containers for unrestricted release (License Condition 9.6) in fact applies to IMCs which were being released for restricted release. We believe that this reference should be corrected.

Should you have any questions regarding these responses, please contact me at 303.389.4130.

Sincerely yours,

David C. Frydenlund
Vice President and General Counsel

cc: William J. Sinclair, UDEQ
Pat Mackin, NRC
Ron F. Hochstein
William N. Deal
Ron E. Berg
Michelle R. Rehmann

ATTACHMENT 1

Ludlum Measurements, Inc.

Memorandum of September 28, 2000

LUDLUM MEASUREMENTS, INC.
501 OAK STREET / P.O. BOX 810
SWEETWATER, TEXAS 79556
800-622-0828 (USA) 915-235-5494
FAX: 915-235-4672 E-Mail: ludlum@camalott.com

DESIGNER AND
MANUFACTURER
OF
Scientific and Industrial Instruments

September 28, 2000

To: Whom It May Concern
From: Rhonda Harris, RSO
Rhonda Harris
Re: LMI Efficiencies for Alpha Sources

Normally, efficiencies for detectors calibrated at Ludlum Measurements, Inc. (LMI) are reported as 2 pi efficiencies, based upon the 2 pi emission rate. Even 4 pi efficiencies, published in our catalog, are also based upon the 2 pi emission rate, because these are "nominal" 4 pi efficiencies and do not represent 4 pi geometry. To calculate a "nominal" 4 pi efficiency, we first multiply the calibration source 2 pi emission rate by 2 to obtain a nominal 4 pi activity. We then divide the source count by this nominal 4 pi activity to obtain the 4 pi efficiency. In this way, corrections inherently incorporated into the emission rate (such as backscattering correction) are included in the calculated efficiency.

Please note, however, that for alpha radiation sources this correction factor is very small, and, in our experience, most source manufacturers apply a correction factor of only 1.5%. We adopt the philosophy of NCRP Report No. 112*, which states:

> *"Scatter effects of alpha particles are negligible, and corrections for such scatter are not required for calibration of alpha particle detectors."*

We generally ignore backscattering for alpha sources, but if one wants to calculate for this effect, the 4 pi disintegration rate may be determined by multiplying the 2 pi emission rate by 2 and then dividing the product by 1.015. We find that for calculating efficiency, there is usually very little difference between this calculation and one in which the correction factor is ignored.

Other effects that normally deserve consideration for alpha sources, such as attenuation in the source covering and attenuation in air between the detector window and the source, have been minimized for LMI calibrations. The first condition does not apply in the case of LMI alpha sources, as they have no coverings. In the latter, we minimize the effects of attenuation in air by placing the source as close as possible to the detector window.

Lastly, regarding the interchangeability of one alpha source for another, we also subscribe to the philosophy of NCRP Report No. 112, which states:

> *"Ideally, calibrations should be conducted with sources of the same radionuclide(s) as anticipated in the field. In cases where this is not possible or practical, radionuclides should be selected with discrete alpha particle energies or maximum beta energies close to those expected."*

Thus, we justify using Th-230 for Pu-239 (or vice versa) because the former has a primary alpha energy of 4.69 MeV and the latter 5.16 MeV. In our view, these are close enough to be interchangeable.

We trust that this letter adequately addresses the issues of concern regarding alpha efficiencies. If you have additional questions or need more information, please do not hesitate to call.

*Ref: NCRP Report No. 112, *Calibration of Survey Instruments Used in Radiation Protection for the Assessment of Ionizing Radiation Fields and Radioactive Surface Contamination*, National Council on Radiation Protection and Measurements, 1991.

Ludlum Measurements, Inc. — Scientific and Industrial Instruments
POST OFFICE BOX 810 PH. 915-235-5494
501 OAK STREET FAX NO. 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CERTIFICATE OF CALIBRATION

CUSTOMER: INTERNATIONAL URANIUM CORP — ORDER NO. 248689 / 248282

Mfg. Eberline — Model ESP-1 — Serial No. 02299

Mfg. Eberline — Model AC-3 — Serial No. EN 012402

Cal. Date 14-Jun-00 — Cal Due Date 14-Dec-00 — Cal. Interval 6 Months — Meterface cpm

Check mark ☑ applies to applicable instr. and/or detector IAW mfg. spec. T. 74 °F RH 46 % Alt 700.8 mm Hg

☐ New Instrument Instrument Received ☐ Within Toler. +-10% ☐ 10-20% ☐ Out of Tol. ☐ Requiring Repair ☐ Other-See comments

☑ Mechanical ck. ☐ Meter Zeroed ☐ Background Subtract ☐ Input Sens. Linearity
☐ F/S Resp. ck ☑ Reset ck. ☐ Window Operation ☐ Geotropism
☑ Audio ck. ☐ Alarm Setting ck. ☐ Batt. ck. (Min. Volt) ____ VDC

☐ Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. ☐ Calibrated in accordance with LMI SOP 14.9 rev 12/19/89.

Instrument Volt Set 1000 V Input Sens. 10 mV Det. Oper. 1000 V at 10 mV Threshold Dial Ratio ____ = ____ mV

☑ HV Readout (2 points) Ref./Inst. 498 / 500 V Ref./Inst. 2050 / 2000 V

COMMENTS:

Eff. for Pu-239 s/n 8743, 25300dpm, read = 4290 in one minute = 17% 4pi

Gamma Calibrator: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
	800 kcpm	8.10 x05	8.10 x05
	200 kcpm	2.00 x05	2.00 x05
	80 kcpm	8.00 x04	8.00 x04
	20 kcpm	2.00 x04	2.00 x04
	8 kcpm	8.00 x03	8.00 x03
	2 kcpm	2.00 x03	2.00 x03
	800 cpm	8.00 x02	8.00 x02
	200 cpm	2.00 x02	2.00 x02

*Uncertainty within ± 10% C.F. within ± 20% — Range(s) Calibrated Electronically

Digital Readout REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	Log Scale REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400 kcpm	4.00 x05	4.00 x05			
40 kcpm	4.00 x04	4.00 x04			
4 kcpm	4.00 x03	4.00 x03			
400 cpm	4.00 x02	4.00 x02			
40 cpm	4.00 x01	4.00 x01			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N ☐ 1162 ☐ G112 ☐ M565 ☐ 5105 ☐ T1008 ☐ T879 ☐ E552 ☐ E551 ☐ Neutron Am-241 Be S/N T-304

☑ Alpha S/N Pu-239 12800cpm ☐ Beta S/N ____ ☐ Other ____

☑ m 500 S/N 134709 ☐ Oscilloscope S/N ____ ☑ Multimeter S/N 57390613

Calibrated By: Conrad Talanda — Date 14 Jun 00

Reviewed By: Rhonda Harris — Date 15 Jun 00

FORM C22A 12/29/1999 ☐ Passed Dielectric (Hi-Pot) and Continuity Test

ATTACHMENT 2

Ron E. Berg Memorandum

Of October 13, 2000

MEMORANDUM:

TO : Dave Frydenlund

FROM : Ron Berg *RB*

DATE : October 13, 2000

SUBJECT : Surface contamination level

The root cause for failure to perform this survey was during the time of preparation and loading of these product lots, the individual drums were wet. As a result of inclement weather conditions the most practical survey was made on the surfaces of each drum using a Ludlem Modle 3 instrument with a Modle 44-9 detector. This measurement identified surface contamination levels for beta and photon emitting gamma radioisotopes only; surface alpha contamination levels were indeterminate.

However, typical beta/gamma to alpha ratios for uranium material from the Mill site range between eight to ten beta/gamma to one alpha therefore it was assumed that the alpha surface contamination was below the 1000 dpm/100cm2 removable criterion.

xc: Ron Hochstein
    Michelle R. Rehmann
    Central File

INTERNATIONAL URANIUM (USA) CORPORATION

Independence Plaza, Suite 950 • 1050 Seventeenth Street • Denver, CO 80265 • 303 628 7798 (main) • 303 389 4126 (fax)

FACSIMILE TRANSMITTAL

TO:	Dwight Chamberlain	FAX NO:	(817) 860-8188
	U.S. Nuclear Regulatory Commission	PHONE NO:	
FROM:	Dave C. Frydenlund	DATE:	October 13, 2000
		PAGE 1 OF:	15
		IF ALL PAGES ARE NOT RECEIVED, PLEASE CALL:	Sharon Carroll
		PHONE NO:	(303) 389 - 4135

Please find attached a copy of IUSA's response to the Notice of Violation NRC Inspection Report 40-8681/00-01. Complete original copies will be couriered to yourself, Region IV and the Document Control Desk in Washington on Monday, October 16, 2000 from our Denver office.

MEMORANDUM

TO: Lele/Mill/SERP and Lele/Mill/Inspections/NOV

cc: William N. Deal
Ron E. Berg

FROM: Ronald F. Hochstein
David C. Frydenlund
Michelle R. Rehmann

DATE: January 15, 2001

SUBJECT: Completion of Corrective Actions on Violations A, B and C from the July 2000 Inspection

---

On July 27, 2000, the NRC completed an inspection at International Uranium (USA) Corporation's (IUSA's) White Mesa Mill near Blanding, Utah. On September 6, 2000, the NRC forwarded the results of the inspection, including the referenced Notice Of Violation (Notice), to IUSA. On October 13, 2000, pursuant to the provisions of 10 CFR 2.201, IUSA submitted a written statement and explanations in response to the three violations cited in the Notice, to the Director of NRC Region IV, and to the U.S. Nuclear Regulatory Commission (the "Response Letter"). On December 1, 2000, the NRC acknowledged receipt of IUSA's response letter and provided an erratum on the point of the use by NRC of the term "unrestricted release" when referencing an open item on the last page of the NRC's Notice, when the term should have been "restricted release".

The following describes IUSA's completion of corrective actions in accordance with the commitments and schedules contained in the Response Letter. For ease of reference, relevant sections from the Response Letter are paraphrased below, with each section revised to detail corrective actions completed.

RELEVANT SECTIONS FROM THE RESPONSE LETTER

VIOLATION A

In the Notice, the NRC describes Violation A as follows:

> "License Condition 9.6 states, in part, that standard operating procedures (SOPs) shall be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. Additionally, written procedures shall be established for non-operational activities to include instrument calibrations.

> Section 3.1.2.3.2 of the licensee's procedure "Checks" required that instrument checks are made for each detector using an appropriate calibrated source. Comparison of the results with those obtained at the calibration is utilized to determine field performance. If deviations exceeding 10 percent are noted, recalibration of the detector is required.
>
> Contrary to the above, alpha detector functional check results for June and July 2000, were not compared to the results of the instruments' calibration to determine the field performance of the alpha detectors.
>
> This is a Severity Level IV violation (Supplement VI)."

1. Reason for the violation

Review of circumstances that led to the violation

It should be noted that alpha detector functional checks for June and July, 2000, were in fact compared to the results of the instrument's calibration to determine the field performance of the alpha detectors, using procedures for modern equipment that were not detailed in the Mill's 1991 License Application. This violation resulted from having a section that had not been updated to current instruments, in an established standard operating procedure (SOP) (section 3.1.2.3.3 of the 1991 License Application). As a result, although an SOP existed that required this functional check, the SOP did not contain specific language directing the reader of the SOP to the manufacturer's manual for setting the instrument based on the comparison of the functional check to the calibration.

Root cause analysis

The SOP contained text requiring that instrument checks be made for each detector using an appropriate calibrated source. The Mill records indicate that such checks are made each time an instrument is used, and additional checks are made and documented on a monthly basis, as well. However, for the particular alpha instrument in question (Eberline Alpha Scintillator Instrument ESP-1 with AC-3 Alpha Detector), application of the efficiency factor, after it has been derived by performing the instrument check (using an appropriate calibrated source), for setting the instrument to take field measurements, is not explicitly described in the text of the SOP. Rather, the Mill Radiation Safety Staff have referred to the manufacturer's manual to make the appropriate use of the instrument, including inputting the efficiency factor for the day.

It is also noted that the Inspector questioned the efficacy of utilizing a Thorium-230 (Th-230) source for the efficiency check, given that the instrument in question had been calibrated by the manufacturer to a Plutonium-239 (Pu-239) source. As detailed in Attachment 1 to this response, Memorandum dated September 28, 2000 from Ludlum Measurements, Inc., the Th-230 check source used by the Mill Staff is appropriate and provides sufficient accuracy for the check. Nevertheless, as detailed below, the Mill Radiation Safety Staff has indicated that the off-site laboratory calibration methodology will be changed to use of a Th-230 source to prevent any further concern regarding use of differing sources for calibration of the same instrument.

2. Corrective steps that have been taken and results achieved

Initially, the SERP reviewed a revised draft SOP and directed that Mill Radiation Safety Staff continue to make use of the manufacturer's manual as guidance for inputting the efficiency factor for the instrument in question pending final review and approval of the updated SOP by the SERP. Concurrently, IUC notified Ludlum Instruments, the calibration laboratory for the instrument in question, that the Ludlum Service Department is to calibrate all radiation detection instruments used by the Mill for alpha detection to a Th-230 source, and to provide both 2-pi and 4-pi calibration.

3. Corrective steps that will be taken to avoid further violations

Given that this Inspector recommended that the SOP should state explicitly the steps that will be used for inputting the efficiency factor after performing the function check, IUC has implemented the SOP detailed under (2) above, and has instituted a schedule for SOP reviews. This will mean that this SOP will be reviewed as new instruments are added, to ensure that the functional check steps are detailed in the SOP.

Additionally, in response to the Inspector's concern regarding utilization of two different sources for calibration vs. function checks, IUC notified Ludlum Instruments, the calibration laboratory for the instrument in question, that the Ludlum Service Department is to calibrate all radiation detection instruments used by the Mill for alpha detection to a Th-230 source, and to provide both 2-pi and 4-pi calibration.

4. Date when full compliance will be achieved

IUC met commitments for correcting this violation as set forth in the Response Letter, by (completing modification of the SOP as defined under (3) above on December 15, 2000; and completing the calibration modification defined under (3) above on September 1, 2000.

VIOLATION B

In the Notice, the NRC describes Violation B as follows:

> "License Condition 9.4(A&B) states, in part, that the licensee may, subject to the conditions specified in this condition, make changes in procedures presented in the application. The licensee shall maintain records of any changes made pursuant to this condition until license termination. These records shall include written safety and environmental evaluations, made

by the safety, environmental, and review panel (SERP) that provide the basis for determining if changes are in compliance with the requirements referred to in Part B of this condition.

The January 1991 License Application, Section 2.7, "Product Shipment Surveys," states, in part, that product shipment from the facility will be monitored by the radiation protection department prior to shipment release. Product shipment includes uranium and vanadium. Section 2.7 of the license application requires that all barrels are fixed alpha and gamma scanned; inspected for leaks, holes, and cleanliness; and the inspection is documented.

In December 1998, the licensee determined that the procedure in License Application Section 2.7 "Product Shipment Surveys," did not apply to vanadium product shipments and therefore, the licensee stopped performing fixed alpha and gamma scan surveys and inspections on all vanadium product barrels as specified in Section 2.7 of the license application. Contrary to the above, records were not maintained of this change with a written safety and environmental evaluation that provided the basis for determining that the change was in compliance with the requirements referred to in License Condition 9.4(B).

This is a Severity Level IV violation (Supplement VI)."

1. Reason for the violation

Review of circumstances that led to the violation

This violation, failure to maintain records of a procedure change with a written safety and environmental review panel (SERP) evaluation that provided the basis for determining that the change was in compliance with the requirements referred to in License Condition 9.4(B), resulted from an interpretation and usage of an SOP that had not been subjected to full review and approval by the SERP.

Root cause analysis

Although Mill Radiation Safety Staff interpreted the draft SOP to not require surveys on all vanadium product barrels, Staff did perform surveys on all drums; however, the surveys performed were not as comprehensive as required in the 1991 License Application SOP.

IUC undertook a major revision and update of all of the Mill SOPs in 1998. In a systematic manner, a large number of these SOPs were reviewed by the SERP, revised as warranted, and ultimately approved. However, not all SOPs were revised and available during this particular SERP review and approval period, and this resulted in the Mill having on-site, in some cases, two or more versions of SOPs addressing the same topic – the SOP specified in the license application and certain draft revised SOPs. Furthermore, although management, through the ALARA audit process, had identified and reported on the need for review and approval of such draft revised SOPs, proper follow-up and response did not occur in this case.

This is regarded as a programmatic issue for the following reasons: First, Mill Staff had inadvertently implemented its interpretation of a draft SOP absent finalization and formal approval of the draft SOP; and second, in its ALARA review process, management had identified the need to complete the formal review process for this and other proposed revised SOPs, but full response to the issue was not implemented. It appears that this may be due, in part, to weaknesses in the Mill's document control procedures, as well as to ill-defined responsibilities relating to the implementation and tracking of ALARA Committee recommendations.

2. Corrective steps that have been taken and results achieved

As an immediate corrective step, any product shipments that may be necessary will be surveyed as per the January 1991 License Application, Section 2.7, "Product Shipment Surveys," which requires, in part, that product shipments from the Mill be monitored by the Radiation Protection Department prior to shipment release. Such surveys will apply to both uranium and vanadium, although IUC has committed that no shipments of vanadium blackflake are planned until the issues identified in the Notice are resolved.

3. Corrective steps that will be taken to avoid further violations

As a long-term corrective step to avoid further violations, the SOP will be subjected to final SERP review and approval. In addition, IUC has addressed the root cause of this violation on the programmatic level. Corrective actions for this violation have included all of the following:

i. Reinforce in personnel the requirement to follow <u>all</u> existing approved SOPs, and to change SOPs <u>only</u> after proper SERP review and approval

Prior to January 15, 2001, the President of IUC met with key management personnel at the Mill to reinforce this requirement, and also distributed a memorandum addressed to all Mill personnel explicitly stating this requirement. The memorandum was the subject of staff-level training sessions during weekly safety meetings, and has been posted on staff bulletin boards.

ii. Update the document control process to ensure that only approved SOPs are available for use

In accordance with the commitments and schedule set forth in the Response Letter, the document control process has been reviewed and updated effective January 15, 2001. Key elements of the updated process include:

a. A central document control list, including SOP names, numbers, revision numbers, revision dates; and locations of controlled copies;
b. Controlled access to the master hard copy and electronic copy; and
c. Administrative controls for the review and update process.

iii. Evaluate and update internal responsibilities for auditing and responding to audits; and for reporting, tracking, and implementing SOPs and audit recommendations

Effective January 15, 2001, the ALARA Committee has determined that it will meet within 30-60 days following the annual ALARA audits to discuss the audit findings and plan follow-up, priorities, and schedule. The ALARA Committee further determined that, following the ALARA Committee's review, the annual ALARA Report will be prepared for transmittal to the NRC.

iv. Conduct regularly scheduled ALARA meetings and/or audits for the purpose of evaluating detailed review of sets of SOPs (i.e., Operations, Health Physics and Radiation Safety, Environmental), thereby identifying SOPs that may contain outdated material or that require change or other forms of revisions on a more pro-active basis

The ALARA Committee has determined that, effective January 15, 2001, quarterly ALARA Committee meetings will be held to discuss SOPs, thereby identifying SOPs that may contain outdated material or that require change of other forms of revisions. The ALARA Committee meeting agendas typically will include, but not be limited to:

a. ALARA Audit results and recommendations;
b. Status of ALARA Audit follow-up actions;
c. Inspection recommendations;
d. Scheduled SOP reviews for the period;
e. Unscheduled reviews of SOPs during the period;
f. Training needs;
g. New regulatory requirements;
h. New license amendments; and
i. Status of SERP reviews.

v. Update administrative process to address programmatic issues

The actions in response to items (i) – (iv) above are based upon a root cause analysis by the IUSA President/Director of Operations, Vice President and General Counsel, and Environmental Manager. In particular, IUSA found that the program for responding to ALARA audits was insufficient to ensure response to an identified need for SERP review of a procedure in this, or potentially other cases. This was viewed as a programmatic issue for the following reasons: First, Mill staff had inadvertently implemented its interpretation of a draft SOP absent finalization and formal approval of the SOP; and second, in its ALARA review process, management had identified the need to complete the formal review process for this and other proposed revised SOPs, but full response to the issue was not implemented. The foregoing upgrades to responsibilities relating to document control, requirements to following existing procedures, and to the implementation and tracking of ALARA Committee recommendations are expected to resolve these programmatic issues. Following January 15, 2001 implementation of these actions, the ALARA Committee will continue to track the effectiveness of these corrective actions.

4. Date when full compliance will be achieved

As detailed above, IUSA completed these corrective actions in accordance with the commitments and schedule contained in the Response Letter, on January 15, 2001.

VIOLATION C

In the Notice, the NRC describes Violation C as follows:

> "License Condition 9.10 requires those releases of equipment or packages from the restricted area shall be in accordance with "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of License for Byproduct, Source, or Special Nuclear Material," dated May 1987, or suitable alternative procedures approved by the NRC prior to any such release.
>
> Section 2.7.5.(3) and (4) of the SOP "Procedures – Uranium & Vanadium Concentration Shipments" required, in part, the licensee to perform removable alpha contamination (smear/swipe) survey on any barrel that exceeds 1,000 disintegrations per minute per 100 square centimeters (dpm/100cm^2) fixed alpha contamination.
>
> Contrary to the above, on March 17 and April 14, 2000, three barrels containing vanadium product were released from the site restricted area with measured fixed contamination that exceeded 1,000 dpm/100cm^2. The licensee measurements however were not capable of determining the fraction of this radioactivity that was alpha contamination as required.

Specifically, the three barrels had fixed contamination levels of 1,200, 1,600, and 2,000 dpm/100cm^2 respectively.

This is a Severity Level IV violation (Supplement VI)."

1. Reason for the violation

Review of circumstances that led to the violation

The draft SOP "Procedures – Uranium & Vanadium Concentration Shipments", which requires, in part, that the licensee perform a removable alpha contamination (smear/swipe) survey on any barrel that exceeds 1,000 disintegrations per minute per 100 square centimeters (dpm/100cm^2) fixed alpha contamination, was not properly implemented, due to extenuating circumstances in existence at the time the shipments were being surveyed for release from the Mill property. Mill Staff were unable to follow the SOP, because, as noted on the forms for these drums, the drums were wet at the time of the surveys. However, in the Radiation Safety Staff's technical view (see Attachment 2), the surveys of the drums were sufficient to infer that total alpha would be at an acceptable level, had it been possible to take alpha swipes. Therefore, the technicians performing the surveys released these three drums, even though the readings exceeded 1,000 dpm/cm^2. This resulted in a failure to perform the alpha swipes on three barrels that had total alpha, beta, and gamma in excess of the 1,000 dpm standard.

Root cause analysis

Alternative methods of measurement considered by the Mill Radiation Safety Staff to be equally protective were utilized on a small percentage of the barrels prior to shipment. Although such a deviation may have seemed reasonable, particularly if the barrels were damp on the exterior, the SOP does not explicitly state any provision for such an alternative approach. This is, therefore, an unauthorized deviation from the SOP.

2. Corrective steps that have been taken and results achieved

IUC has ensured that proper measurements, capable of determining the fraction of radioactivity due to alpha contamination, were performed as per the existing SOP. The revised SOP has been completed and implemented.

3. Corrective steps that will be taken to avoid further violations

Scanning for alpha contamination will be performed in strict accordance with the existing SOP. All product shipments will be surveyed for alpha surface contamination in the future. This will be done after the barrels are sufficiently dried to perform the scan. In addition, Mill Staff will consider the feasibility of modifying the SOP to allow for alternative surveys of wet barrels to determine alpha activity. Any such modification would be subject to the SERP process.

4. Date when full compliance will be achieved

IUC committed, effective October 13, 2000, to perform scans as per the existing SOP. Staff have been advised of this requirement, and agree to perform in full compliance henceforth. SOP revisions underwent final SERP approval on January 15, 2001.

MRR

NRC Inspection Report 40-8681/01-01
Dated April 27, 2001

No notices of violation issued

NRC Inspection of April 4, 2001

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

April 27, 2001

David C. Frydenland, Vice-President and
General Counsel
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-8681/01-01

Dear Mr. Frydenland:

On April 4, 2001, the NRC completed an inspection at your White Mesa Mill near Blanding, Utah. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and your license conditions. The inspection included an examination of selected procedures and representative records, observations of activities, and interviews with personnel. This inspection consisted of a review of site status, site operations, radioactive waste management, environmental monitoring, and followup of previously identified NRC inspection findings. The preliminary inspection results were provided to members of your staff at the conclusion of the onsite inspection. The enclosed report presents the results of that inspection.

No violations or deviations were identified during this inspection; therefore, no response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Mr. Louis C. Carson II at (817) 860-8234 or the undersigned at (817) 860-8191.

Sincerely,

D. Blair Spitzberg, Ph.D., Chief
Fuel Cycle and Decommissioning Branch

Docket No.: 40-8681
License No.: SUA-1358

Enclosure:
NRC Inspection Report 40-8681/00-01

cc w/enclosure:
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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	40-8681
License No.	SUA-1358
Report No.	40-8681/01-01
Licensee:	International Uranium (USA) Corp.
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	April 3-4, 2001
Inspector:	Louis C. Carson II, Health Physicist Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Approved by:	D. Blair Spitzberg, Ph.D., Chief Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Attachment:	Supplementary Information

EXECUTIVE SUMMARY

White Mesa Mill
NRC Inspection Report 40-8681/01-01

This inspection included a review of site status, management organization and controls, site operations, radioactive waste management, radiation protection and environmental protection programs. Also, a followup review was performed of previously identified NRC inspection findings. Overall, the licensee was conducting operations in compliance with license and regulatory requirements.

Management Organization and Controls

- The licensee had maintained an organization structure that agreed with the requirements of the license (Section 2.0).

- The licensee had adequately implemented the As Low As is Reasonably Achievable (ALARA) committee, the Safety Environmental Review Panel (SERP), and performance-based license conditions (Section 2.0).

- The licensee's review and use of site procedures met requirements (Section 2.0).

Radiation Protection

- The radiation protection and ALARA programs were found to be adequate. Personnel exposures for year 2000 were below limits, and bioassay results were acceptable (Section 3.0).

Operations, Radioactive Waste Management, and Environmental Protection

- Operational activities were being conducted safely and in accordance with the conditions of the license as well as NRC regulations (Section 4.0).

- A review of the licensee's onsite control of the alternate feed material demonstrated that the licensee was maintaining control of the material in an orderly, controlled fashion (Section 4.0).

- The licensee was noted to have collected environmental monitoring samples as required by the license and as reported in the year 2000 semiannual effluent reports. Sample results were less than the associated effluent release limits specified in 10 CFR Part 20 during year 2000. No adverse trends were identified (Section 4.0).

Followup

- Five open items were closed which included four violations and one inspection followup item (Section 5).

Report Details

1 Site Status

The NRC issued Source Material License SUA-1358 to Energy Fuels Nuclear during August 1979. Ownership of the site was eventually transferred to Umetco Minerals, back to Energy Fuels Nuclear, and finally to International Uranium (USA) Corporation (IUC). IUC assumed ownership of the White Mesa Mill on May 10,1997. The NRC approved the transfer via Amendment 2 of the revised License and issued to IUC on May 9, 1997.

The mill was actively receiving alternate feed material during the inspection. Alternate feed material is material other than natural uranium ore. The licensee is authorized to receive and process alternate feed materials from certain out-of-state entities by License Conditions 10.6 through 10.16. The licensee had not received and processed ore for uranium or vanadium since the previous inspection. The licensee as authorized by License Condition 10.5 was disposing of 11e.(2) byproduct material waste.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organization structure was reviewed to ensure the licensee had maintained effective organization and management controls to ensure compliance with NRC requirements. Also, reviewed was the utilization and implementation of the licensee's performance-based license (PBL).

2.2 Observations and Findings

a. Management Organization

The organizational structure requirements are provided in License Condition 9.3, which references the NRC-approved license renewal application dated January 30, 1997. No changes had been made to the organization structure since the previous inspection. The licensee's organizational structure was found to be in agreement with the intent of License Condition 9.3.

b. Performance-Based License Review

License Condition 9.4 states, that the licensee may, under certain conditions and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the performance-based license provisions was reviewed to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site. The NRC granted the licensee a performance-based license in March 1997.

Making changes pursuant to License Condition 9.4 are required to be reviewed by a safety and environmental review panel (SERP). Proposed changes and the deliberations are required to be documented pursuant to License Condition 9.4(D).

Since the previous inspection, the licensee had held eight SERP meetings. Some of the SERP reviews involved changes to the following procedures: instrument calibration and functional checks, environmental monitoring, alternate feed material receipt, and release of intermodal containers. The SERP meeting minutes and changes were found to be acceptable. The SERP changes since July 2000 met the requirements of License Condition 9.4.

c. Site Procedures

In accordance with License Condition 9.6, standard operating procedures (SOPs) are required to be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. The inspector reviewed the health physics manual, SOPs for plant process operations, and the emergency response plan. The inspector noted improvements in the quality of the licensee's procedures since the last inspection. The radiation safety officer (RSO) had reviewed and approved updates to procedures as required by License Condition 9.4. Additionally, the inspector observed the licensee's performance of SOPs associated with the receipt of alternate feed material and release of intermodal containers. The license was observed to have been following the established SOPs as required by License Condition 9.6.

2.3 Conclusions

The licensee had maintained an organization structure that agreed with the requirements of the license and had correctly implemented the performance-based conditions of the license. The licensee's review and use of site procedures met requirements.

3 Radiation Protection (83822)

3.1 Inspection Scope

Portions of the licensee's radiation protection program were reviewed to verify compliance with the conditions of the license as well as the requirements of 10 CFR Part 20.

3.2 Observations and Findings

a. Site Tour

A facility tour was performed to observe activities in progress. Site perimeter postings, required by License Condition 9.9 were in place at the appropriate entrances to the mill. During the inspector's site tour, radiation levels were measured using an NRC microRoentgen (μR) meter (Serial Number 15544, calibration due date November 29, 2001). The background radiation level offsite was 10-15 μR/hr. Surveys taken in various locations throughout the mill and around the ore pad showed the following radiation levels:

- Central Mill - 200 μR/hr
- Main Grizzly - 800 μR/hr
- Truck Wash/Decon Pad - 200-600 μR/hr
- Ore Pad Area - 300 - 1,000 μR/hr
- Truck Checkpoint - 70 μR/hr

The inspector's radiation measurements were consistent with the licensee's routine survey results. No "radiation areas" as defined by 10 CFR 20.1003 were identified within the process facility. It was determined that the site restricted area was posted as required by License Condition 9.9. No health or safety concern was identified during the tour.

b. As low As Reasonably Achievable Program Review

In accordance with License Condition 11.6, an annual As Low As is Reasonably Achievable (ALARA) audit of the radiation safety program is required to be performed in accordance with Regulatory Guide 8.31. The most current ALARA audit was conducted December 5-6, 2000, and was found to have been adequate. This ALARA audit was also required by Section 3.6 of the ALARA Program section of the license application. The report provided useful information pertaining to the implementation of the radiological program. No significant health or safety issue was identified.

Since the last inspection, the licensee had conducted routine ALARA committee meetings. The inspector reviewed the ALARA committee meeting minutes and the ALARA Action Tracking List. The tracking list contained 38 action items that the ALARA committee had prioritized for improving the White Mesa radiation protection program. The inspector determined that the ALARA audit and program were adequate.

c. Personnel Radiation Exposure and Bioassay Results

The inspector reviewed the Annual Report of Dose to Employee - 2000 letters dated March 15, 2000, that the licensee had issued pursuant to 10 CFR 19.13. The highest worker total effective dose equivalent (TEDE) recorded was 566 millirem of which 449 millirem was committed effective dose equivalent (CEDE). All other worker's TEDE were less than 10 percent of the 5,000 millirem annual limit specified in 10 CFR 20.1201.

The licensee's bioassay results for year 2000 were reviewed. The licensee had implemented the bioassay program as specified by NRC Regulatory Guide 8.22, "Bioassay at Uranium Mills." Employee urinalysis results were required to be investigated if bioassay samples exceeded the action level of 15 micrograms/ liter uranium. No bioassay results had exceeded the action level during the period. The licensee's bioassay program was adequate.

3.3 Conclusions

The radiation protection and ALARA programs were found to be adequate. Personnel exposures for year 2000 were below limits, and bioassay results were acceptable.

4 Operations Review (88020), Radioactive Waste Management (88035), and Environmental Monitoring (88045)

4.1 Inspection Scope

The environmental, effluent, radioactive material storage and waste, and groundwater monitoring programs were reviewed to assess the effectiveness of the licensee's programs and to evaluate the effects, if any, of site activities on the local environment.

4.2 Observations and Findings

a. Alternate Feed Material Operations

During year 2000, the licensee had not processed alternate feed material or uranium ore. Conventional uranium ore operations last occurred in November-December 1999. The licensee plans to process alternate feed material in June 2001.

License Conditions 10.6 and 10.7, authorizes the licensee to process alternate feed material from Allied Signal. This material, referred to as "CaF" (calcium fluoride), had been stockpiled for future processing. In accordance with License Conditions 10.10, 10.11, 10.12, 10.14, 10.15 and 10.16, the licensee was authorized to receive bulk alternate feed materials in soil form from the following sites: (1) Ashland and Line Formerly Utilized Sites Remedial Action Programs (FUSRAP) near Tonowanda, New York and Saint Louis, Missouri; (2) drummed calcined byproduct materials from Cameco Corporation's Blind River, Port Hope facilities in Ontario, Canada; (3) W.R. Grace material from Chattanooga, Tennessee; and (4) Heritage Minerals in Lakehurst, New Jersey. During year 2000, the licensee only stockpiled alternate feed material. Since the last inspection, the licensee had been authorized to receive alternate feed material from the Linde, W.R. Grace, and Heritage sites. However, the licensee was only stockpiling Linde material.

The inspector noted that License Condition 10.14 for Linde alternate feed material, required the licensee to certify that the Linde material did not contain hazardous waste material, and determine if the White Mesa tailings impoundment had adequate capacity to store the waste generated from the Linde material. The inspector verified that the licensee had conducted a tailings capacity evaluation on September 25, 2000, for tailings Cells 1, 2, and 3. The evaluation included projecting waste generated from USX 11e.2 material, Ashland I, Molycorp, Heritage, and Linde. The licensee had also received an alternate feed material report from the Linde site which certified that hazardous waste constituents met specifications. The inspector determined that the licensee had met the requirements of License Condition 10.14.

The licensee's onsite control of the alternate feed material demonstrated that the licensee was maintaining control of the radioactive waste shipments in an orderly, controlled fashion. The inspector concluded that the licensee had been receiving alternate feed material in accordance with the detail of the applicable license conditions.

b. Environmental and Effluent Monitoring Programs

Environmental monitoring program requirements are identified in License Condition 11.2, which specifies that the licensee implement the effluent and environmental monitoring programs specified in Section 5.5 of the renewal application. During the inspection, the inspector reviewed the semiannual effluent reports for year 2000.

The licensee's environmental monitoring program consisted of continuous air, groundwater, surface water, and vegetation, as well as ambient gamma exposure rate measurements. The licensee had collected the required samples at the sampling stations, including a nearest resident and a background location.

c. Environmental Air Sampling

Particulate air sampling was performed at four stations using continuous high volume samplers. The sample filters were exchanged weekly and analyzed quarterly for natural uranium, radium-226, thorium-230, and lead-210 concentrations. All sample results for year 2000 were less than 2 percent of the concentrations specified in 10 CFR Part 20, Appendix B. No adverse trends were identified.

d. Environmental Exposure Rates

Ambient gamma radiation levels were continuously measured at the five sample stations with thermoluminescent dosimeters (TLDs). The TLDs were exchanged and analyzed on a quarterly basis. The environmental TLD results for year 2000 were approximately 10 μR/hr, which was consistent with the background station TLDs located at an onsite sample station (East Tailings Area). Ambient gamma exposure rates were determined to be below the limits established in 10 CFR 20.1301(a)(2).

e. Vegetation

Vegetation samples were collected at three locations around the mill during early spring, late spring, and fall. The samples were analyzed for radium-226 and lead-210 concentrations. Sample results for year 2000 were comparable to those taken in 1999, with no observable adverse trends.

f. Surface Water Sampling

In accordance with Section 5.5 of the license application, surface water samples are required to be obtained from two locations. Water samples were obtained from Westwater Creek and quarterly from Cottonwood Creek. The samples were analyzed for their natural uranium, radium-226, thorium-230 concentrations, and total dissolved solids. Surface water sample results for year 2000 were comparable to those taken in 1999, with no observable adverse trends.

g. Tailings Cell Leak Detection Program

License Condition 11.3(B-E) requires the licensee to implement a monitoring program of the leak detection systems for the disposal cells. The licensee's procedures for tailings management, training and quality assurance were reviewed. The inspector toured the cell area with mill staff responsible for the leak detection system and field monitoring.

The licensee notified the NRC that the 1-gallon per minute (gpm) flow rate specified in License Condition (LC) 11.3(D) has been exceeded for Cell 4A, and that it may have been exceeded since January 2001. The licensee noted that they were fulfilling the requirement in License Condition 11.3(D)(3) to report this exceedence to the NRC within 48 hours. Mill staff had not reported this exceedence until recently due to equipment problems. The licensee had initiated corrective action by pumping the leak detection sump. During this inspection, the licensee was investigating this matter in order to issue a written report to the NRC in 30 days as specified in LC 11.3(D)(3). The inspector determined that the licensee was properly implementing License Condition 11.3.

i. 11e.(2) Radioactive Waste Receipts and Disposal Operations

License Condition 10.5 authorizes the licensee to dispose of 11e.(2) byproduct material from licensed in-situ leach facilities subject to several conditions, including a 5000 cubic yard limit from a single source.

The licensee's most current annual 11e.(2) summary for year 2000 was reviewed. During 2000, the licensee received 11e.(2) byproduct waste for disposal from one waste generator. Shipments of 11e.(2) waste were found to have been conducted within the 5000 cubic yard limit of License Condition 10.5.

A field inspection of the licensee's disposal cells was conducted. Cells 1 and 3 were actively being used for process solution evaporation and recycling. Cell 3 was also used for disposal of White Mesa's tailings and wastes from offsite, as authorized in License Condition 10.5. Cell 2 was being used for disposal of White Mesa waste and had been covered as the cell was filled. Liquid recovered from Cell 2 operations was being transferred to Cell 3. No abnormal conditions, such as leaks or berm failures were observed at any of the other cells during the site tour.

4.4 Conclusions

Operational activities were being conducted safely and in accordance with the conditions of the license as well as NRC regulations. A review of the licensee's onsite control of the alternate feed material demonstrated the licensee was maintaining control of the radioactive waste shipments in an orderly, controlled fashion. The licensee was noted to have collected environmental monitoring samples required by the license at the intervals specified in the license, as reported in the 2000 semiannual effluent reports.

Sample results were less than the associated effluent release limits specified in 10 CFR Part 20 during year 2000. No adverse trends were identified.

5 Followup (92701)

5.1 (Closed) IFI 40-8681/9903-01: Receipt of Hazardous Waste Material at the White Mesa Mill

On October 26, 1999, the licensee inadvertently received and accepted a shipment of potentially hazardous waste material from the Massachusetts Highway Department Central Artery Tunnel project. The waste material sample result showed a lead concentration of 5.75 milligrams per liter (mg/l) which was above the criteria of 5.0 mg/l for classifying the material as hazardous waste.

The waste material had been erroneously shipped to the site because of a duplication in shipping container numbers. Several programmatic weaknesses contributed to the problem including poor control of shipping manifests and use of generic versus specific ore receipt inspection procedures. The licensee's random sampling program would not have identified the wastes because the hazardous constituent (lead) was not one of the constituents that the licensee tested for incoming material. Finally, the shipment of the material was determined not to be under the jurisdiction of the NRC.

An NRC Inspection Followup Item (IFI) was opened to ensure the licensee resolves the mixed waste concerns, disposes of the waste material, and implements corrective actions to prevent recurrence of the incident. The inspector observed that the licensee had completely excavated the hazardous material and stored the hazardous material in an intermodal container. The licensee was expecting the intermodal container to be shipped in August 2000. This matter was to remain open until the waste material was removed from the site. The licensee had established a new SOP "Intermodal Container Acceptance, Handling, and Release," to preclude the recurrence of this type of situation.

During this inspection, the inspector verified that the container of hazardous material had been shipped off the White Mesa site. This matter is closed.

5.2 (Closed) VIO 40-8681/0001-01: Failure to follow procedures for alpha detector functional checks

License Condition 9.6 required that SOPs be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. Additionally, written procedures were to be established for non-operational activities to include instrument calibrations. Section 3.1.2.3.2 of the licensee's SOP "Checks," required that instrument checks were made for each detector using an appropriate calibrated source. A comparison of the results with those obtained at the calibration was to be conducted to determine field performance. If deviations exceeding 10 percent were noted, a recalibration of the detector was required. However, alpha detector functional check results for June and July 2000 were not compared to the results of the instruments' calibration to determine the field performance of the alpha detectors.

During this inspection, the inspector verified that the licensee had implemented corrective actions as stated in the violation response letter to the NRC dated October 13, 2000. The licensee's corrective actions included retraining radiation protection staff, revising the SOP concerning functional checks, and providing new instructions to the instrument calibration vendor. This matter is closed.

5.3 (Closed) VIO 40-8681/0001-03: Failure to follow the Performance Based License and use the Safety and Environmental Review Panel to change the procedure in the license application for uranium and vanadium product surveys

License Condition 9.4 subjected the licensee to specific conditions regarding changes to procedures presented in the application. The licensee must maintain records of any changes made pursuant to this condition until license termination. These records include written safety and environmental evaluations made by the SERP that provide the basis for determining if changes are in compliance with the requirements referred to in Part B of this condition. License application Section 2.7, required that product be monitored by the radiation protection department before released and shipped from the site. Product shipments included uranium and vanadium. Section 2.7 of the license application required that all barrels be fixed alpha and gamma scanned; inspected for leaks and cleanliness; and all the results documented. In December 1998, the licensee determined that the procedure in license application Section 2.7, "Product Shipment Surveys," did not apply to vanadium product shipments. Therefore, the licensee stopped performing fixed alpha and gamma scan surveys and inspections on all vanadium product barrels. Records of this change and a written safety and environmental evaluation that provided the basis for determining that the change met the requirements in License Condition 9.4(B) were not maintained.

During this inspection, the inspector verified that the licensee had implemented corrective actions as stated in the violation response letter to the NRC dated October 13, 2000. The inspector noted that the licensee increased the level of administrative rigor associated with conducting SERP and ALARA meetings, especially, pertaining to potential changes to the license application. This matter is closed.

5.4 (Closed) VIO 40-8681/0001-04: Failure to conduct free release surveys on vanadium product shipments as required by the license

License Condition 9.10 required that releases of equipment or packages from the restricted area be in accordance with "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use of Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated May 1987, or suitable alternative procedures approved by the NRC prior to any such release. Section 2.7.5.(3) of the SOP "Procedures - Uranium & Vanadium Concentration Shipments," required the licensee to perform removable alpha contamination (smear/swipe) surveys on any barrel that exceeds 1,000 disintegrations per minute per 100 square centimeters (dpm/100cm^2) fixed alpha contamination. However, on March 17 and April 14, 2000, three barrels containing vanadium product were released from the site restricted area with measured fixed contamination that exceeded 1,000 dpm/100cm^2. The licensee measurements were not capable of determining the fraction of this radioactivity that was alpha contamination. Therefore, the licensee did not perform surveys for removable alpha contamination as required. Specifically, the three barrels had fixed contamination levels of 1,200, 1,600, and 2,000 dpm/100cm^2, respectively.

During this inspection, the inspector verified that the licensee had implemented corrective actions as stated in the violation response letter to the NRC dated October 13, 2000. This matter is closed.

5.5 (Closed) NCV 40-8681/0001-05: Failure to follow procedures for surveying equipment such as intermodal containers for unrestricted release

On June 22, 2000, the licensee reported to the NRC that they had failed to implement their SOP for releasing intermodal containers offsite. Failure to implement the SOP for releasing intermodal containers for restricted use was a violation of License Conditions 9.6 and 9.10. The inspector determined that the licensee had satisfactorily implemented corrective actions, and the contamination levels that were detected on the containers had a low safety consequence to members of the public. This matter was considered non-repetitive, licensee-identified and corrected. Therefore, the violation was treated as a non-cited violation, consistent with Section VI.A(8) of the NRC Enforcement Policy.

During this inspection, the inspector observed the decontamination and release surveys of intermodal containers. The inspector noted that the licensee's program for releasing intermodal containers was extensive. Due to the licensee's implementation of its corrective actions, this matter is closed.

6 Exit Meeting Summary

The inspector presented the inspection results to representatives of the licensee at the conclusion of the inspection on April 4, 2001. The licensee did not identify any information reviewed by the inspector as propriety information.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Berg, Radiation Safety Officer
W. Deal, Mill Manager
M. Rehmann, Environmental Manager

INSPECTION PROCEDURES USED

83822	Radiation Protection
88005	Management Organization and Controls
88035	Radioactive Waste Management
88045	Environmental Monitoring
92701	Followup

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

40-8681/9903-01	IFI	Receipt of hazardous was at the White Mesa Site
40-8681/0001-01	VIO	Failure to follow procedures for alpha detector functional checks (License Condition 9.6).
40-8681/0001-03	VIO	Failure to follow the PBL and utilized the SERP to change the procedure in the license application for uranium and vanadium product surveys (License Condition 9.4).
40-8681/0001-04	VIO	Failure to conduct free release surveys on vanadium product shipments as required by the license (License Condition 9.10).
40-8681/0001-05	NCV	Failure to follow procedures for surveying equipment such as intermodal containers for unrestricted release. (License Condition 9.6)

Discussed

None

LIST OF ACRONYMS USED

ALARA	as low as reasonably achievable
CaF	calcium fluoride
CFR	Code of Federal Regulations
cpm	counts per minute
DOT	Department of Transportation
dpm	disintegrations per minute
IN	Information Notice
IUC	International Uranium Corporation
mg/l	milligrams per liter
μR/hr	microRoentgen/hour
PBL	Performance Based License
pCi/g	picocuries/gram
PDR	Public Document Room
RSO	Radiation Safety Officer
SERP	Safety and Environmental Review Panel
SOP	Standard Operating Procedure
TLD	thermoluminescent dosimeter

NRC Inspection Report 40-8681/01-02
Dated October 16, 2001

No notices of violation issued

NRC Inspection of September 19, 2001

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

October 16, 2001

David C. Frydenland, Vice-President and
General Counsel
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-8681/01-02

Dear Mr. Frydenland:

On September 19, 2001, the NRC completed an inspection at your White Mesa Mill near Blanding, Utah. This inspection consisted of a review of site status, management organization and controls, radiation protection, site operations, radioactive waste management, and environmental protection. The inspection results were provided to members of your staff at the conclusion of the inspection. The enclosed report presents the results of that inspection.

No violations or deviations were identified during this inspection; therefore, no response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response, if any, will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Mr. Louis C. Carson II at (817) 860-8221 or the undersigned at (817) 860-8186.

Sincerely,

Charles L. Cain

Charles L. Cain, Chief
Nuclear Materials Licensing Branch
Division of Nuclear Materials Safety

Docket No.: 40-8681
License No.: SUA-1358

Enclosure: NRC Inspection Report 40-8681/01-02

cc w/enclosure:

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ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	40-8681
License No.	SUA-1358
Report No.	40-8681/01-02
Licensee:	International Uranium (USA) Corp.
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	September 18-19, 2001
Inspector:	Louis C. Carson II, Health Physicist Nuclear Materials Licensing Branch
Accompanied By:	Jack E. Whitten, Senior Health Physicist Nuclear Materials Licensing Branch
Approved By:	Charles L. Cain, Chief Nuclear Materials Licensing Branch
Attachment:	Supplementary Information

EXECUTIVE SUMMARY

White Mesa Mill
NRC Inspection Report 40-8681/01-02

This inspection included a review of site status, management organization and controls, radiation protection, site operations, radioactive waste management, and environmental protection programs. Overall, the licensee was conducting operations in compliance with license and regulatory requirements.

Management Organization and Controls

- The licensee had maintained an organizational structure that agreed with the requirements of the license (Section 2.0).
- The licensee had adequately implemented the Safety Environmental Review Panel and performance-based license conditions (Section 2.0).
- The licensee's review and use of site procedures met requirements (Section 2.0).

Radiation Protection

- The radiation protection and "As Low As is Reasonably Achievable" programs were found to be adequate. Personnel exposures during year 2001 have been below limits, and bioassay results were acceptable (Section 3.0).

Operations, Radioactive Waste Management, and Environmental Protection

- Operational activities were being conducted safely and in accordance with the license and NRC regulations (Section 4.0).
- A review of the licensee's handling of the alternate feed material and 11e.(2) byproduct material demonstrated that they were maintaining control of radioactive material shipments in an orderly, controlled fashion (Section 4.0).
- The licensee was noted to have collected environmental monitoring samples as required by the license and as reported in the January - June 2001 semiannual effluent report. Sample results were less than the associated effluent release limits specified in 10 CFR Part 20. No adverse trends were identified (Section 4.0).

Report Details

1 Site Status

The NRC issued Source Material License No. SUA-1358 to Energy Fuels Nuclear during August 1979. Ownership of the site was eventually transferred to Umetco Minerals, back to Energy Fuels Nuclear, and finally to International Uranium (USA) Corporation (IUC). IUC assumed ownership of the White Mesa Mill on May 10,1997, with NRC's approval of License Amendment No. 2.

The mill was actively receiving alternate feed material during this inspection. Alternate feed material is material other than natural uranium ore. The licensee is authorized to receive and process alternate feed materials from certain out-of-state entities by License Conditions 10.6 through 10.16. The licensee had not received and processed ore for uranium or vanadium since the previous inspection. The licensee as authorized by License Condition 10.5 was disposing of 11e.(2) byproduct material waste on site.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organization structure was reviewed to ensure that the licensee had maintained effective organization and management controls and maintained compliance with NRC requirements. Also reviewed was the utilization and implementation of the licensee's performance-based license (PBL) and selected procedures.

2.2 Observations and Findings

a. Management Organization

The organizational structure requirements are provided in License Condition 9.3, which references the NRC-approved license renewal application dated January 30, 1997. No changes had been made to the organization structure since the previous inspection. However, the licensee had assigned another individual to the position of mill manager. The licensee's organizational structure was found to be in agreement with the intent of License Condition 9.3.

b. Performance-Based License Review

License Condition 9.4 states that the licensee may, under certain conditions and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the PBL provisions was reviewed to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site. The NRC granted the licensee a PBL in March 1997.

Pursuant to License Condition 9.4 the licensee is authorized to make certain changes to the licensed program as long as they are reviewed by a safety and environmental review panel (SERP). Proposed changes and SERP deliberations are required to be documented pursuant to License Condition 9.4(D).

Since the previous inspection, the licensee had held two SERP meetings. The SERP reviews involved changes to the "Heritage Alternate Feed Management" procedure. The SERP meeting minutes and changes were found to be acceptable. The NRC inspector found that the SERP changes met the requirements of License Condition 9.4.

c. Site Procedures

In accordance with License Condition 9.6, standard operating procedures (SOPs) are required to be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. The inspector reviewed the health physics manual, SOPs for plant process operations, and the emergency response plan. Because of the potential for personnel being exposed to thorium during the handling of ore from the Heritage site, the licensee established an SOP, "Heritage Alternate Feed Management," for that activity. Based on the licensee's SERP and ALARA committee minutes, the inspector determined that the radiation safety officer (RSO) had reviewed and approved the procedure as required by License Condition 9.6.

The inspector observed the licensee's execution of the SOP during the receipt of alternate feed material and release of intermodal containers. The license was observed to have been following the established SOP as required by License Conditions 9.4 and 9.6.

2.3 Conclusions

The licensee had maintained an organization structure that agreed with the requirements of the license and had correctly implemented SERP and PBL license conditions. The licensee's review and use of site procedures met requirements.

3 Radiation Protection (83822)

3.1 Inspection Scope

Portions of the licensee's radiation protection program were reviewed to verify compliance with the license as well as the requirements of 10 CFR Part 20.

3.2 Observations and Findings

a. Site Tour

The inspector toured the facility to observe activities in progress. Site perimeter postings, required by License Condition 9.9, were in place at the appropriate entrances to the mill. The inspector measured radiation levels using an NRC microRoentgen (μR) meter (Serial Number 15544, calibration due date November 29, 2001). Radiation surveys taken by the inspector at various locations throughout the mill and around the ore pad were consistent with radiation levels from the previous inspection. The inspector's radiation measurements were found to be consistent with the licensee's routine survey results. No "radiation areas" as defined by 10 CFR 20.1003 were identified within the process facility. It was determined that the site restricted area was posted as required by License Condition 9.9. No health or safety concern was identified during the tour.

b. As low As Is Reasonably Achievable Program

Since the last inspection, the licensee had conducted routine "As low As is Reasonably Achievable" (ALARA) committee meetings. The inspector reviewed the third quarter ALARA committee meeting minutes and the third quarter ALARA Action Tracking List. The tracking list contained 29 action items that the ALARA committee had prioritized for improving the White Mesa radiation protection program. The inspector determined that the ALARA program was adequate.

c. The Heritage Ore Radiation Work Permit

The inspector reviewed activities, since the previous inspection, that required the licensee to issue a radiation work permit (RWP) due to a significant potential for workers to be exposed to radioactive material. The only licensed activity that required the issuance of an RWP was the handling of the Heritage ore during the period July 31 - August 4, 2001. RWP-370 was issued by the RSO to work in conjunction with the SOP, "Heritage Alternate Feed Management." The inspector reviewed the RWP and the SOP for the Heritage activity. The RSO explained that personnel conducting the Heritage operation received training on the RWP and the SOP. The inspector reviewed the training records of the workers who signed onto RWP-370 and determined that they were adequately trained. RWP-370 required personnel to don protective equipment such as full-face respirators, coveralls, and rubber gloves.

The inspector reviewed the results of airborne radioactivity samples that were collected during the Heritage work. With the exception of one air sample that was collected during a windstorm, the airborne concentrations were less than the licensee's action level of 25 percent of the derived air concentration level for the Heritage ore. The licensee had collected breathing zone measurements and analyzed them for radon, uranium, and thorium. Overall, the workers' total effective dose equivalent results were less than 1 percent of the 5,000 millirem annual limit specified in 10 CFR 20.1201.

d. External Radiation Exposures and Bioassay Results

The inspector reviewed the deep dose equivalent (DDE) radiation exposures during calendar year 2001. According to dosimeter results though July 2001, there were only four workers with DDEs of at least 100 millrem (102, 103, 110, and 152 millirem). The inspector noted that the radiation safety officer was continuing to track the radiation exposures of all radiation workers. The RSO gave the inspector a report that showed that the licensee actively used ALARA assessments to ensure that workers' dosimeters were being worn and stored properly. Additionally, the RSO showed the inspector that they varied the work assignments of individuals at the ore pad and scalehouse to assure that worker exposures were ALARA.

The inspector reviewed the licensee's bioassay results since the previous inspection. The licensee had implemented the bioassay program as specified by NRC Regulatory Guide 8.22, "Bioassay at Uranium Mills." Employee urinalysis results were required to be investigated if bioassay samples exceeded the action level of 15 micrograms per liter uranium. No bioassay results had exceeded the action level during the period. The licensee's bioassay program was found to be adequate.

3.3 Conclusions

The radiation protection and ALARA programs were found to be adequate. Personnel exposures during year 2001 were below limits, and bioassay results were acceptable.

4 Operations Review (88020), Radioactive Waste Management (88035), and Environmental Monitoring (88045)

4.1 Inspection Scope

The environmental monitoring, effluent monitoring, radioactive material storage, and waste management programs were reviewed to assess the effectiveness of the licensee's programs and to evaluate the effects, if any, of site activities on the local environment.

4.2 Observations and Findings

a. Alternate Feed Material Operations

So far during calendar year 2001, the licensee had not processed alternate feed material or uranium ore.

License Conditions 10.6 and 10.7 authorize the licensee to process alternate feed material from Allied Signal. In accordance with License Conditions 10.10, 10.11, 10.12, 10.14, 10.15 and 10.16, the licensee was authorized to receive bulk alternate feed materials in soil form from the following sites: (1) Ashland and Linde Formerly Utilized Sites Remedial Action Program (FUSRAP) sites near Tonowanda, New York, and Saint Louis, Missouri; (2) drummed calcined byproduct materials from Cameco Corporation's Blind River and Port Hope facilities in Ontario, Canada; (3) W.R. Grace material from Chattanooga, Tennessee; and (4) Heritage Minerals in Lakehurst, New Jersey. So far during year 2001, the licensee only stockpiled alternate feed material. Since the last inspection, the licensee received and stockpiled ore from the Cameco, Ashland, Linde, and Heritage sites.

The inspector observed the licensee's process for the release of intermodal containers. The licensee conducted contamination surveys on intermodal containers before being released and transported from the White Mesa facility. The licensee was required to assure that external radiation contamination on the containers was not in excess of Department of Transportation (DOT) limits per 49 CFR 173.428. The inspector observed radiation protection personnel affix "Empty" labels on containers leaving the site. The labels stated that the package conformed to the limitations of 49 CFR 173.428 for radioactive material. Specifically, the DOT's external radiation contamination limit was 22 disintegrations per minute per square centimeters (dpm/cm^2) loose beta-gamma contamination. The inspector observed the licensee use a beta-gamma detector for the surveys and noted the level of sensitivity that the detector exhibited during the conduct of the surveys. The inspector reviewed container release survey records and determined that the licensee was meeting the DOT's contamination limit. The inspector concluded that the licensee was continuing to release and ship empty alternate feed material containers in accordance with applicable license conditions, NRC regulations, and DOT requirements.

b. Environmental and Effluent Monitoring Programs

The environmental monitoring program requirements are identified in License Condition 11.2. The licensee must implement the effluent and environmental monitoring programs specified in Section 5.5 of the renewal application. The inspector reviewed the semiannual effluent report for the first half of calendar year 2001.

The licensee's environmental monitoring program consisted of continuous air, groundwater, surface water, and vegetation, as well as ambient gamma exposure rate measurements. The licensee had collected and analyzed the required samples at the sampling stations, including one at the nearest resident and at a background location.

(1) Environmental Air Sampling

Particulate air sampling was performed at four stations using continuous high volume samplers. The sample filters were exchanged weekly and analyzed quarterly for natural uranium, radium-226, thorium-230, and lead-210 concentrations. All sample results were less than 2 percent of the concentrations specified in 10 CFR Part 20, Appendix B. No adverse trends were identified.

(2) Environmental Exposure Rates

Ambient gamma radiation levels were continuously measured at the four sample stations with thermoluminescent dosimeters (TLDs). The TLDs were exchanged and analyzed on a quarterly basis. The environmental TLD results were approximately 6 μR/hr, which was consistent with the background station TLD located at an onsite sample station (East Tailings Area). Ambient gamma exposure rates were determined to be below the limits established in 10 CFR 20.1301(a)(2).

(3) Vegetation

Vegetation samples were collected at three locations around the mill during spring 2001. The samples were analyzed for radium-226 and lead-210 concentrations. Sample results were comparable to those taken in 2000, with no observable adverse trends.

(4) Surface Water Sampling

In accordance with Section 5.5 of the license application, surface water samples are required to be obtained from two locations. Water samples were obtained from Westwater Creek and quarterly from Cottonwood Creek. The samples were analyzed for natural uranium, radium-226, thorium-230 concentrations, and total dissolved solids. Surface water sample results were comparable to those taken in 2000, with no observable adverse trends.

c. Tailings Cell Leak Detection Program

License Condition 11.3(B-E) requires the licensee to implement a monitoring program of the leak detection systems for the disposal cells. The inspector toured the four cell areas with mill staff responsible for the leak detection system and field monitoring. During year 2001, the licensee had reported to the NRC that the 1-gallon per minute (gpm) flow rate specified in License Condition 11.3(D) was still being exceeded for Cell 4A. Cell 4A had been built for disposal of byproduct waste material; however, byproduct had not been placed into the cell. During this inspection, the inspector observed that the licensee had initiated corrective actions in Cell 4A that included dissolving crystalized vanadium material and keeping the water level in Cell 4A very low. The licensee stated that they planned to replace the damaged polyvinyl liner in Cell 4A.

The inspector conducted a tour of the licensee's disposal cells. Cells 1 and 3 were actively being used for waste water recirculation and evaporation processing. Cell 4A water was being pumped into Cell 3. Liquid recovered from Cell 2 operations was being transferred to Cell 3. No abnormal conditions, such as leaks or berm failures, were observed at any of the other cells during the site tour.

The inspector concluded that the licensee was properly implementing License Condition 11.3 regarding disposal cell management.

d. 11e.(2) Radioactive Waste Receipts and Disposal Operations

License Condition 10.5 authorizes the licensee to dispose of 11e.(2) byproduct material from licensed in-situ leach facilities subject to several conditions, including a 5000 cubic yard limit from a single source. Disposal Cell 3 was being used for disposal of offsite 11(e).2 byproduct waste, as authorized in License Condition 10.5(C). Cell 2 was being used for disposal of White Mesa waste.

The inspector reviewed the licensee's most current 11e.(2) summary for year 2001. So far in 2001, the licensee had received 11e.(2) byproduct waste for disposal from two waste generators. The inspector reviewed nine waste shipping manifest records and the licensee waste receipt process. The inspector determined that the licensee's 11e.(2) byproduct waste receipt inspection process was adequate.

Shipments of 11e.(2) waste were found to have been conducted within the 5000 cubic yard limit of License Condition 10.5.

4.3 Conclusions

Operational activities were being conducted safely and in accordance with the license and NRC regulations. A review of the licensee's handling of the alternate feed material and 11e.(2) byproduct material demonstrated that they were maintaining control of radioactive material shipments in an orderly, controlled fashion. The licensee was noted to have collected environmental monitoring samples as required by the license and as reported in the January - June 2001 semiannual effluent report. Sample results were less than the associated effluent release limits specified in 10 CFR Part 20. No adverse trends were identified.

5 Exit Meeting Summary

The inspector presented the inspection results to representatives of the licensee at the conclusion of the inspection on September 19, 2001. The licensee did not identify any information reviewed by the inspector as propriety information.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Berg, Radiation Safety Officer
R. Bartlett, Mill Manager
M. Rehmann, Environmental Manager

INSPECTION PROCEDURES USED

83822	Radiation Protection
88005	Management Organization and Controls
88035	Radioactive Waste Management
88045	Environmental Monitoring

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ALARA	as low as reasonably achievable
CaF	calcium fluoride
CFR	Code of Federal Regulations
DOT	Department of Transportation
dpm	disintegrations per minute
IUC	International Uranium Corporation
mg/l	milligrams per liter
μR/hr	microRoentgen/hour
PBL	Performance Based License
PDR	Public Document Room
RSO	Radiation Safety Officer
SERP	Safety and Environmental Review Panel
SOP	Standard Operating Procedure
TLD	thermoluminescent dosimeter

NRC Dam Safety Audit Report
Dated October 15, 2002

No notices of violation issued

Audit of July 23, 2002

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

October 15, 2002

cc to: RFH MRR
DCF
REB
TKM
DT
HRR
cf Lile/Mill/NRC/
Annual Dam Safety
Audit

Ms. Michelle Rehmann, Environmental Manager
International Uranium (IUSA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: RESULTS OF DAM SAFETY AUDIT (JULY 2002) RELATED TO THE TAILINGS MANAGEMENT SYSTEM FOR WHITE MESA MILL, BLANDING, UTAH

Dear Ms. Rehmann:

On July 23, 2002, an audit was conducted at the dams retaining cells I-1, 2, 3, and 4A at the White Mesa facility in Blanding, Utah. The NRC staff has received and evaluated the final report from its technical assistance contractor, the Federal Energy Regulatory Commission (FERC), related to this audit. The conclusion of the audit was that there were no conditions observed that would indicate any immediate concerns regarding the integrity of the dams. Two minor maintenance issues were noted including vehicle tire rutting at two locations on the crest of Dike 4A and an erosion hole on the crest of Dike 4A-S.

An original copy of the FERC report, dated September 9, 2002, which includes color photographs taken of various areas that were inspected during the audit, has been provided as an Enclosure. As noted in the FERC report, representatives of IUC accompanied the Office of Nuclear Material Safety and Safeguards and FERC personnel during this audit and participated in the discussions. No other written inspection report related to this audit was generated.

The FERC report also states that it was informed by IUC personnel that the two minor maintenance concerns were repaired on July 24, 2002. These areas will be observed during the next NRC scheduled inspection. It is understood that periodic dam inspections will be performed at routine intervals by IUC personnel. Information from such inspections and evaluations, as well as any actions you have taken relative to the dams, may be reviewed during the next periodic inspection.

"NON-PUBLIC"
OPERATION REPORT
(ELECTRONICALLY SUBMITTED)
FEDERAL ENERGY REGULATORY COMMISSION

San Francisco Regional Office

For the Period July 26, 2000 **to** July 23, 2002

Licensee International Uranium Corporation

Project No. NRC Docket No. 40-8681, License No. SUA-1358

Project Name White Mesa Mill

Location Unnamed Drainage on White Mesa, San Juan, Utah
(Waterway or reservation) (County) (State)

License Issued April 28, 1981 **Expires** August 31, 2009 **Type** Major

Inspected By David Ricketts **Date** July 23, 2002

Parts of Project Inspected Cells I-1, 2, 3, &4A and Dikes 1, 2, 3, & 4A-E, 4A-S, & 4A-W

Weather Clear and Hot

Accompanied By Mr. Dan Rom (NRC) and Mr. David Turk (White Mesa Mill)

Summary

White Mesa Mill is located just south of Blanding, Utah (Figure 1). The plant is currently operational. The dikes which create the four containment cells (I-1, 2, 3, and 4A), were the subject of this inspection. With regard to structural integrity, all of the dikes appeared to be in good condition. There were no signs of seepage, deformation, cracks, unusual erosion, excessive animal burrowing, or any other adverse conditions that would suggest potentially unsafe conditions. Other than some minor maintenance issues, which include vehicle tire rutting at two locations on the crest of Dike 4A, and an erosion hole on the crest of Dike 4A-S, all of the embankments appeared to be structurally sound and well maintained.

The project pertinent data sheet is found on pages 2 and 3. Figures 1 through 3 show, respectively, the project location, site layout, and a typical embankment cross section. Photographs taken during the inspection are included at the end of the report.

Submitted 09/09/02

David Ricketts, P.E.
Civil Engineer

Enclosure

Crest Elevation: 5608 feet
Upstream Slope: 1V:3H
Downstream Slope: 1V:3H
Completion Date: September 2, 1982

Spillway: Type: None
Outlet works: Type: None
Cell: Gross Capacity: 2,091,717 tons
Liquid Volume: 775 acre feet

Cell 4A

Dike 4A-E, 4A-S, 4A-W:
Type: Random Fill
Height[2]: 36 feet
Gross Head: 34.4 feet
Crest Length: 3,100 feet
Crest Width: 18 feet
Crest Elevation: 5598 feet
Upstream Slope: 1V:3H
Downstream Slope: 1V:3H, w/ toe berm on 4A-S
Completion Date: December 21, 1989

Spillway: Type: None
Outlet works: Type: None
Cell: Gross Capacity: 1,855,000 tons
Liquid Volume: 1150 acre feet

2/ Dimensions obtained from General Reclamation Plan, dated 6/21/88 coefficient of 0.10g representing the seismic loading condition. The dikes meet the minimum requirement for seismic stability.

Cell freeboard requirements are defined in License Condition 51. NRC memorandum for Docket File No. 40-8681, Subject: Amendment No. 20 to Source Material License SUA-1358; Request to Construct Cell 4A at the White Mesa Mill, Blanding, Utah, March 1, 1990, summarizes the staff evaluation for the cell design. The memorandum discusses and defines the required maximum operating elevations and freeboard requirements for each cell to provide adequate volume to store the probable maximum flood. The cells operating pool and freeboard have been adequately defined to contain the PMF.

The following paragraphs describe the current condition of each cell and observations made during the inspection with the primary emphasis on structural stability of the dikes. Much of the interior of Cells 2 and 3 have been filled with mill tailings (Figure 2). Because of their heights, Dikes 3, 4A-W, 4A-S, and 4A-E are of most concern.

a. Cell 1-I. Cell 1-I (Photos 1 and 2), which was completed on June 29, 1981, is used as a disposal pond for liquid solutions used in the solvent extraction circuit and small volumes of other liquid waste from the extraction process. This cell is essentially a below natural ground containment. The dikes surrounding the cell have a design crest elevation 5,618.2 feet and a total length of 2,540 feet. In order to satisfy the freeboard requirement of 2.8 feet, the maximum allowable water surface in cell 1-I is 5,615.4 feet. The most recent pond elevation data provided during the inspection indicated a pond elevation of 5,610.29 feet on July 18, 2002. Based on the data provided during the inspection, the pond has fluctuated only minimally in the last 5 months, varying between elevation 5,610.1 feet and 5,611.30 feet. The landside area to the north, east, and west side of the cell is essentially the same elevation as the crest of the dike. On the south side, the elevation of the Cell 2 tailings and temporary cover is well above the water level in Cell 1-I. Therefore, there is little potential for embankment failure of the dike surrounding this cell.

b. Cell 2. Cell No. 2 was completed on May 4, 1980. The dike surrounding the cell has a design elevation of 5,615 feet with crest length of 3,130 feet. All except for a small area within the cell (Photos 3), which is filled with mill tailings, the cell has been filled with mill tailings and a temporary cover. Based on information provided in the May 2002 Annual Technical Evaluation, the remaining capacity of this cell is estimated to be between 20,000 and 25,000 cubic yards. The cell no longer receives tailings or liquid effluent from the mill. Similar to Cell 1, there is essentially no risk of embankment failure since there is virtually no possibility for any significant head differential between the interior of the cell and the north, east, and west ends of the cell (Photo 4). Most of downstream area along Dike 2 is buttressed by the fill in Cell 3, which provides stability

2. **Spillway Gates and Standby Power.** Not applicable. There are no spillway gates associated with the project.

3. **Power Plant.** Not applicable. There are no power plants at the project.

4. **Reservoirs.** The maximum operating levels of the cells is prescribed in License Condition 51. The table below indicates the levels allowed by the license and the levels a few days prior to the inspection. Based on the data provided by the licensee, it appears the operation of the ponds has been within the prescribed maximum pond elevations.

Cell No.	Pond Elevation (ft.) (7/18/02)	Maximum Allowed Pond Elevation (ft.) (Freeboard)
Cell 1	5610.29	5615.4 (2.8)
Cell 2	No pond	N/A
Cell 3	5596.0	5601.1 (6.9) (Rev. amendment 16)
Cell 4A	Not Used	5596.4 (1.6)

5. **Instrumentation.**

a. **Survey Monument Points.** Survey monuments were installed along the crest of Dikes 3, 4A-W, and 4A-S. The last annual survey was completed on May 11, 2002 by Fisher and Sons Surveying of Blanding, Utah and provided to International Uranium Corporation in a May 13, 2002 letter. Review of the data indicates that there has been little to no change in the crest elevations or lateral movement of the crest of the dikes in the last few years.

b. **Leak Detection System.** A leak detection system underlays the cell liner. The system consists of a crushed sandstone layer beneath the liner over a clay liner that overlies the subgrade and a collection system. The licensee continues to monitor the system.

6. **Licensee's Inspection Program.** The licensee conducts daily, weekly, monthly, quarterly and yearly inspections as required by the "White Mesa Procedures Manual, Mill Tailings Management," Section 3.1, Revision 4, February 1991. A visual inspection of the dikes is conducted daily. Quarterly, a more detailed inspection is conducted which includes a visual inspection of the toe and crest of each dike. The licensee's inspection program appears to be appropriate.

7. **Emergency Action Plan (EAP).** The dikes are classified as having low downstream hazard potentials due to the low risk for loss of life and property damage downstream of the project. An emergency action plan is not required. An emergency response for dam failure is contained in Section 6.2 in Materials License SUA-1358 Renewal, Book 1 (6-

F. <u>FINDINGS AND FOLLOW-UP ACTIONS</u>. During the exit briefing, the licensee was informed that overall the cell dikes appeared to be in good condition and the only required follow-up actions included the following:

1. Repair the rutting on the crest surface at the east and west ends of Dike 4A-S.
2. Repair the erosional hole on the crest surface at the east end of Dike 4A-S.

As stated in paragraph B-1d, according to Mr. Turk, the above items were repaired on July 24, 2002, the day after the inspection.

3 Figures and 12 Photographs

SFRO/Ricketts/lcd
L\Ricketts\2002\NRCWhiteMesa.wpd

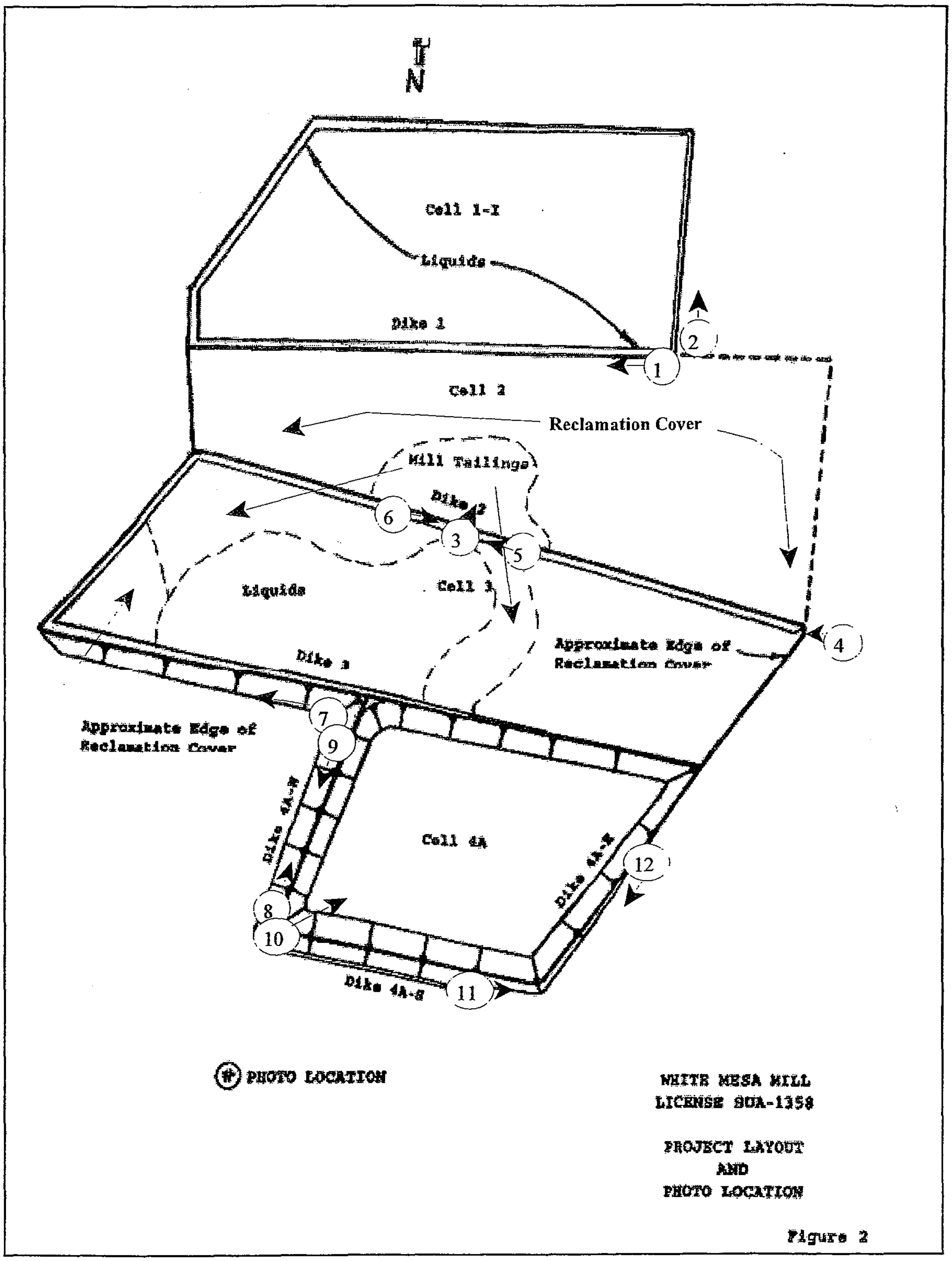

Figure 2. White Mesa Mill. Project Layout and Photo Locations

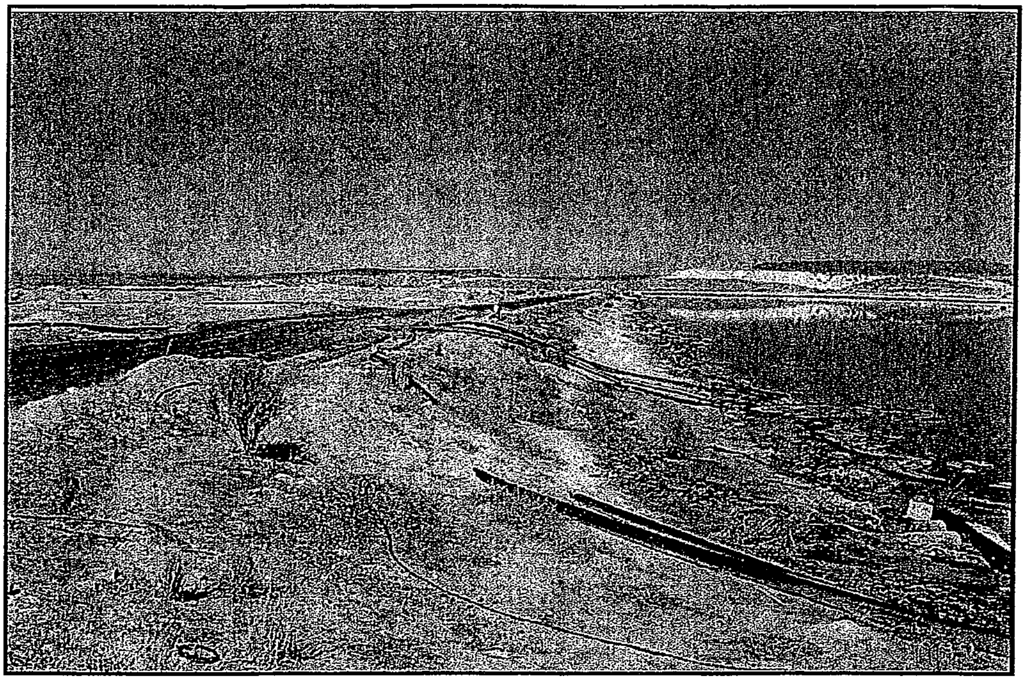

Photo 1. Looking west along Dike 1. Cell 1 is on the right side of the photograph.

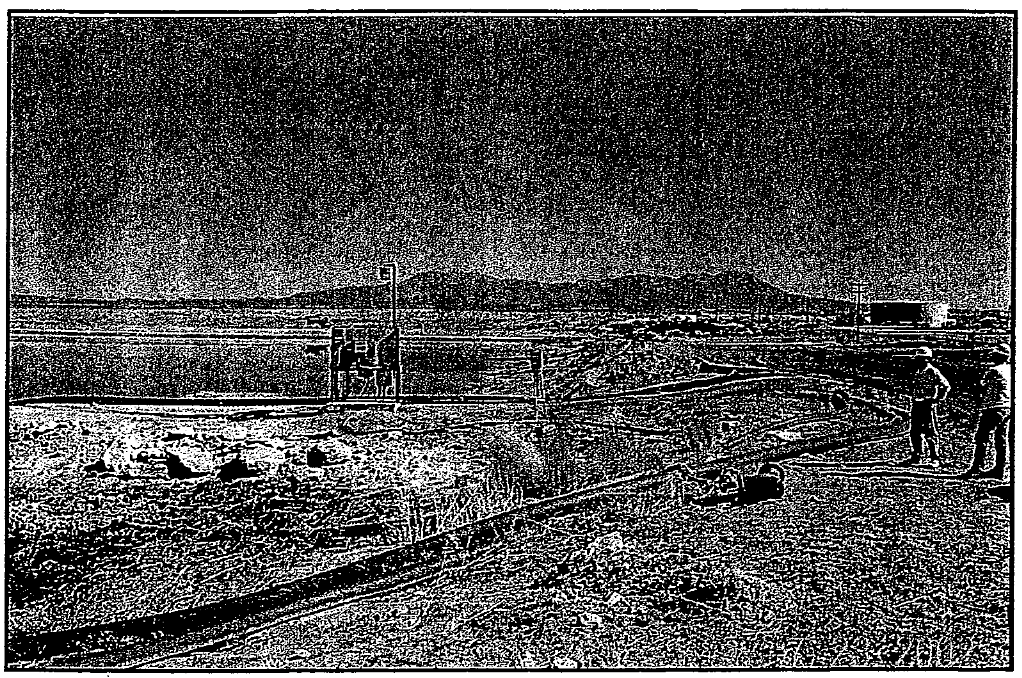

Photo 2. Looking north along the east side of Cell 1-I. Note that the ground elevation is approximately the same as the dike elevation.

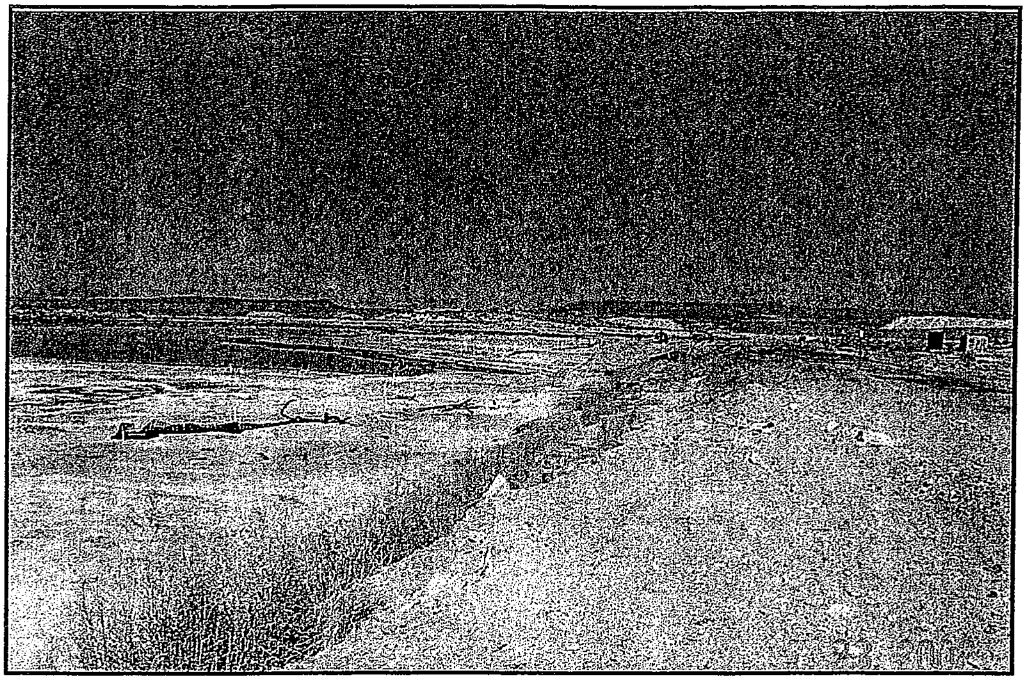

Photo 5. Looking west near center of Dike 2. Liquids in Cell No. 3 on the left. The spillway section between Cell Nos. 2 and 3 is in the right center of the photograph.

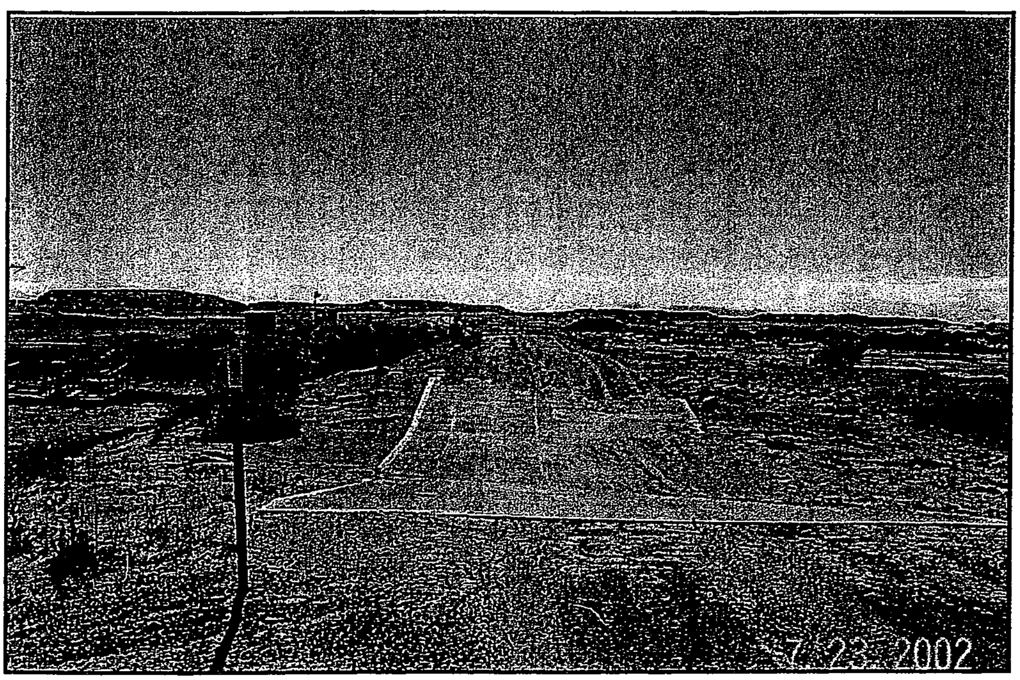

Photo 6. The concrete spillway section located near center of Dike 2 appears to be in good condition. Cell No. 2 is on the left in photo and Cell No. 3 is on the right.

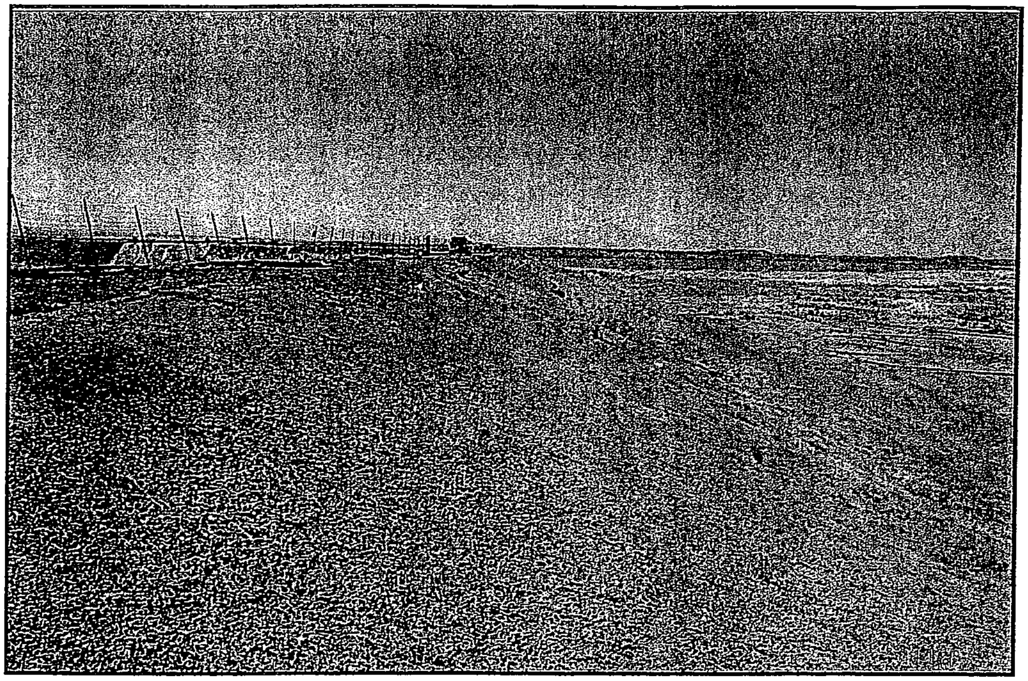

Photo 9. Looking south along the downstream slope of Dike 4A-W. Note the uniform slope, minimal vegetation, and lack of significant erosion.

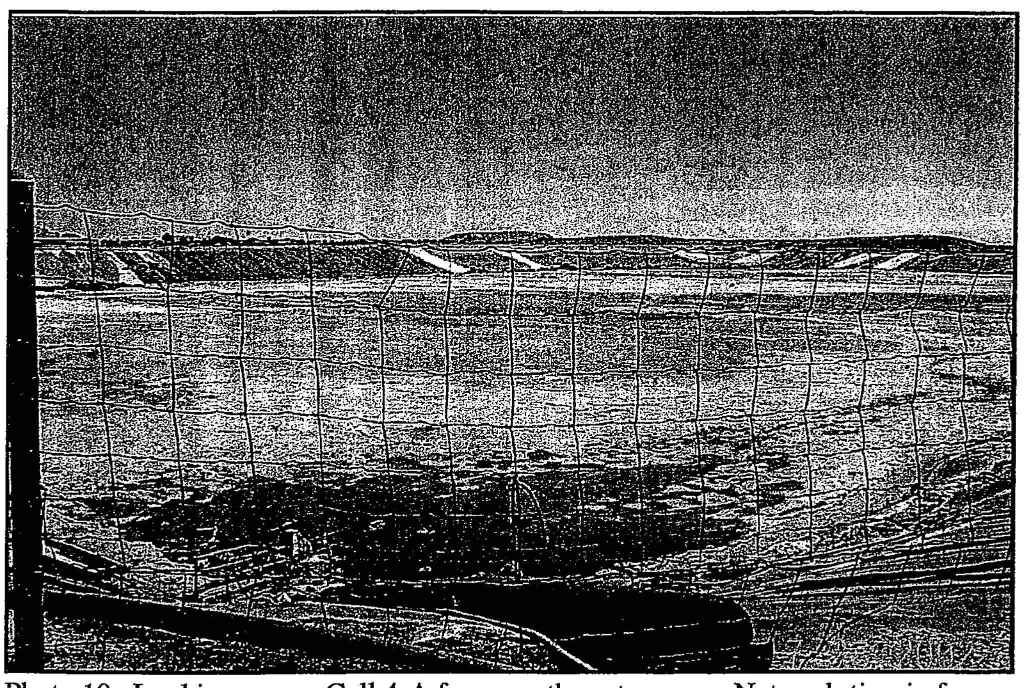

Photo 10. Looking across Cell 4-A from southwest corner. Note solution in foreground which is pumped back to Cell No. 3 as crystals are dissolved. Also, note damaged HDPE liner around the interior of the cell.

NRC Inspection Report 40-8681/02-02
Dated September 9, 2002

No notices of violation issued

NRC Inspection of August 22, 2002

Cf: WM/NRC Inspects '02 -

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-8064

September 9, 2002

David C. Frydenland, Vice-President and
General Counsel
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-8681/02-02

Dear Mr. Frydenland:

On August 22, 2002, the NRC completed an inspection at your White Mesa Mill near Blanding, Utah. This inspection consisted of a review of site status, management organization and controls, radiation protection, site operations, and occupational safety. The inspection results were provided to members of your staff at the conclusion of the inspection. The enclosed report presents the results of that inspection.

No violations or deviations were identified during this inspection; therefore, no response to this letter is required.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Mr. Louis C. Carson II at (817) 860-8221 or Charles L. Cain at (817) 860-8186.

Sincerely,

Dwight D. Chamberlain

Dwight D. Chamberlain, Director
Division of Nuclear Materials Safety

Docket No.: 40-8681
License No.: SUA-1358

Enclosure:
NRC Inspection Report
40-8681/02-02

COPY

SEP 12 2002

cc w/enclosure:
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San Antonio, Texas 78238-5166

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	40-8681
License No.	SUA-1358
Report No.	40-8681/02-02
Licensee:	International Uranium (USA) Corp.
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	August 20-22, 2002
Inspector:	Louis C. Carson II, Senior Health Physicist Nuclear Materials Licensing Branch
Approved By:	Charles L. Cain, Chief Nuclear Materials Licensing Branch
Attachment:	Supplementary Inspection Information

EXECUTIVE SUMMARY

White Mesa Mill
NRC Inspection Report 40-8681/02-02

This inspection included a review of site status, management organization and controls, radiation protection, site operations, and occupational safety. Overall, the licensee was conducting operations in compliance with license and regulatory requirements.

Management Organization and Controls

- The licensee had maintained an organization structure that agreed with the requirements of the license (Section 2.0).
- The licensee had adequately implemented the safety environmental review panel and performance-based license conditions (Section 2.0).
- The licensee's review and use of site procedures met requirements (Section 2.0).

Operations Review

- Operational activities were being conducted safely and in accordance with the license and NRC regulations (Section 3.0).
- Observations of the licensee's alternate feed material operations revealed that the material was handled in an orderly and controlled fashion (Section 3.0).
- The licensee plans to submit to the NRC a report of changes to the process flow diagram and license application in the next annual SERP summary (Section 3.0).

Radiation Protection

- The radiation protection program was found to be adequate. Personnel exposures in year 2002 were well below limits, and bioassay results were acceptable (Section 4.0).

Occupational Safety

- The inspector identified several occupational health and safety issues regarding anhydrous ammonia (NH_3) activities. The licensee took corrective actions on some issues and continued with evaluation of others identified by the inspector. The inspector also discussed these issues with the Mine Safety and Health Administration Office, Salt Lake City, Utah (Section 5.0).

What comments from UT

Report Details

1 Site Status

The NRC issued Source Material License SUA-1358 to Energy Fuels Nuclear during August 1979. International Uranium Corporation (IUC) assumed ownership of the White Mesa Mill on May 10,1997, with the NRC's approval of License Amendment 2.

The licensee had not received and processed natural ore for uranium or vanadium since December 1999. The mill had restarted processing alternate feed material in June 2002. The licensee is authorized to receive and process alternate feed materials from certain out-of-state entities by License Conditions 10.6 through 10.17. There were no yellowcake drying operations in progress during the inspection.

As authorized by License Condition 10.5, the licensee was disposing of 11e.(2) byproduct material waste on site.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organization structure was reviewed to ensure that the licensee had maintained effective organization and management controls to maintain compliance with NRC requirements. Also reviewed was the utilization and implementation of the licensee's performance-based license (PBL) and selected procedures.

2.2 Observations and Findings

a. Management Organization

The organization structure requirements are provided in License Condition 9.3 as described in the NRC-approved license renewal application dated January 30, 1997. No changes had been made to the organization structure since the previous inspection. There were 53 workers employed at the mill at the time of this inspection. The licensee's organization structure was found to be in agreement with the intent of License Condition 9.3.

b. Performance-Based License Review

License Condition 9.4 states that the licensee may, under certain conditions and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the PBL provisions was reviewed to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site. The NRC granted the licensee a PBL in March 1997.

Pursuant to License Condition 9.4, the licensee is authorized to make certain changes to the licensed program as long as they are reviewed by the safety and environmental review panel (SERP). Proposed changes and SERP deliberations are required to be documented pursuant to License Condition 9.4(D).

The inspector reviewed three SERP meeting packages that the licensee had completed since the previous inspection. SERP meetings Nos. 02/03-02, 02/03-03, and 02/03-04 involved reviews of changes to three standard operating procedures (SOPs). The SERP meeting minutes and changes were reviewed and found to be acceptable. The inspector found that the SERP changes met the requirements of License Condition 9.4.

c. Site Procedures

In accordance with License Condition 9.6, SOPs are required to be established and followed for all operational process activities involving radioactive materials that are handled, processed, or stored. The inspector reviewed SOPs for plant process operations and surveys for the release of intermodal containers. Based on reviews of the licensee's SOPs and SERP minutes, the inspector determined that the radiation safety officer (RSO) had reviewed and approved procedures as required by License Condition 9.6.

The inspector observed the licensee's implementation of SOPs for plant process operations and surveys for the release of intermodal containers. The licensee was observed to have been following the established SOPs as required by License Conditions 9.4 and 9.6.

2.3 Conclusions

The licensee had maintained an organization structure that agreed with the requirements of the license and had correctly implemented SERP and PBL license conditions. The licensee's review and use of site procedures met requirements.

3 Operations Review (88020)

3.1 Inspection Scope

The objective of this portion of the inspection was to verify that site operations were being conducted in accordance with applicable regulations and the conditions of the license, and to ensure that operational controls were adequate to protect the health and safety of the workers and the members of the general public.

3.2 Observations and Findings

a. Alternate Feed Material Operations

Until June 13, 2002, the licensee had not processed alternate feed material or uranium ore since year 2000. License Conditions 10.6 through 10.17 authorizes the licensee to receive and process alternate feed material from 11 providers. Some of the sites that the licensee was authorized to receive alternate feed materials from included: (1) Honeywell Corporation, formerly Allied Signal Incorporated, in Metropolis, Illinois; (2) Ashland and Linde Formerly Utilized Sites Remedial Action Program (FUSRAP) sites near Tonowanda, New York, and Saint Louis, Missouri; (3) drummed calcined byproduct materials from Cameco Corporation's Blind River and Port Hope facilities in Ontario, Canada; (4) W.R. Grace material from Chattanooga, Tennessee; (5) Heritage Minerals in Lakehurst, New Jersey, and (6) Molycorp in Mountain Pass, California.

Since the previous inspection, the licensee had been preparing the facility by testing and installing equipment to process alternate feed material from the Ashland and Linde sites. During this inspection, the inspector observed the licensee processing alternate feed material from the Ashland site. The inspector observed the licensee utilizing two water spray processes for dust suppression during alternate feed material loading into the feed screens (debris leach and trommel operation). According to the licensee, for every 1,000 pounds of material fed into the screening operation, approximately 600 pounds make it to the acid leaching and decantation wash circuit. Since June 13, 2002, the licensee had processed 40,000 tons of Ashland-1 feed material.

The licensee had transferred uranium bearing liquid from the leaching and wash circuit to the solvent extraction (SX) facility.

b. Mill Process Flow Circuit

License Condition 9.3 requires, in part, that the licensee conduct operations in accordance with statements, representations, and conditions contained in the license renewal application dated August 23, 1991, as revised by submittals dated December 31, 1996, and January 30, 1997, except where superseded by license conditions.

On March 14, 1997, the NRC approved the license renewal for the White Mesa site. The White Mesa Uranium Mill's basic process is illustrated in a generalized flow diagram, Plate 3.1-3, in the renewal application. The licensee's basic flow diagram includes ore crushing and grinding, pre-leach, thickening, acid leaching, decant washing, SX, stripping, precipitation, and drying as part of the process circuits.

Currently, the licensee's alternate feed material process to recover uranium involves the following four stage process:

1. Debris leach and trommel stage: The transfer of alternate feed material from the ore storage pad and loading into a 6-inch mesh grizzly screen, conveyor belt, and rotating trommel system. During this process, large debris and foreign materials are removed, and the feed material becomes a slurry.

2. Acid leaching and decantation wash circuit stage: These process operations are conducted in the central process facility. Sulfuric acid is added to the slurried feed

material, and a uranium pregnant leach solution is produced containing about 1 milligram per liter of yellowcake (U_3O_8).

3. Eluex system stage: The Eluex system involves the use of two separate process circuits to increase the concentration of U_3O_8 in the process solution. The two processes are SX and ion exchange (IX). The SX process uses kerosene and ammonia compounds to separate U_3O_8 from other materials. The IX process uses resin to attract U_3O_8 by ion adsorption.

4. Yellowcake drying stage: This stage of the process dries the concentrated U_3O_8 for packaging for yellowcake shipment.

During the NRC inspection in April 2002, the inspector observed that the licensee was installing an IX circuit as permanent equipment in the SX facility. The inspector inquired as to whether such a change to the process circuit had been reviewed by the SERP to determine if this permanent IX circuit change required a NRC license amendment request and whether changes to the process flow diagram were required. The inspector confirmed that IX processing had been conducted during 1999. The licensee had been operating the current IX system since June 17, 2002. On July 24, 2002, the license held SERP No. 02/03-01 concerning whether the process flow diagrams should be changed. The licensee concluded that the flow diagram should not be changed.

The inspector noted that the IX circuit and the Eluex system were not described in the license application. Additionally, the process flow diagram, Plate 3.3-1, had not been updated to reflect the site's current configuration and operation. The licensee provided the inspector with the SERP review and a NRC license amendment approval from 1998 for Cabot alternate feed material. In these documents the use of IX processing at White Mesa was reviewed by the NRC as part of the licensee's new design to enhance processing alternate feed material. Once the licensee implemented the new IX process design, the licensee was required to change the license application, process flow diagram, and SOPs to conform to License Conditions 9.3 and 9.4.

NOTE PLANNED SUBMITTAL

The inspector concluded that License Condition 9.4 allowed the licensee to make changes to the process circuit under the SERP process. Licensee management stated that the IX operational changes and updates were planned to be submitted to the NRC in the next annual SERP summary.

3.3 Conclusions

Operational activities were being conducted safely and in accordance with the license and NRC regulations. Observations of the licensee's alternate feed material operations revealed that the material was handled in an orderly and controlled fashion. Based on the IX circuit operations, the licensee planned to submit to the NRC a report of changes to the process flow diagram and license application in the next annual SERP summary.

4 Radiation Protection (83822)

4.1 Inspection Scope

Portions of the licensee's radiation protection program were reviewed to verify compliance with the license as well as the requirements of 10 CFR Part 20.

4.2 Observations and Findings

a. Site Tour

The inspector toured the facility to observe activities in progress at various locations throughout the mill and around the ore pad. Licensee radiation measurements were found to be consistent with previous radiation survey results. No "radiation areas" as defined by 10 CFR 20.1003 were identified within the process facility. Site perimeter postings required by License Condition 9.9 were in place at the appropriate entrances to the mill. No radiological health or safety concern was identified during the tour.

b. Internal and External Radiation Exposures and Bioassay Results

The inspector reviewed the deep dose equivalent (DDE) radiation exposures since the previous inspection. The RSO had issued dosimeters and reviewed the DDE results of each radiation worker's dosimeter. The inspector observed that all radiation workers were wearing dosimeters in the restricted area.

The highest worker total effective dose equivalent (TEDE) recorded was less than 3 millirems based on air sampling analyses. So far in 2002, all workers' TEDEs were less than 10 percent of the 5,000 millirem annual limit specified in 10 CFR 20.1201.

The inspector reviewed the licensee's bioassay results for year 2002. The licensee had implemented the bioassay program as specified by NRC Regulatory Guide 8.22, "Bioassay at Uranium Mills." Employee urinalysis results were required to be investigated if bioassay samples exceeded the action level of 15 micrograms per liter uranium. No bioassay results had exceeded the action level so far during year 2002. The inspector observed the licensee preparing bioassays for processing. The licensee's bioassay program was found to be adequate.

The inspector reviewed the licensee's program for explaining risk of radiation exposure to potentially pregnant employees. So far in 2002, three women employees had been given training in accordance with 10 CFR 19.12, "Instruction to Workers," 10 CFR 20.2108, "Dose Equivalent to an Embryo/Fetus," and Regulatory Guide 8.13, "Instruction Concerning Prenatal Radiation Exposure." The inspector determined that the licensee's program was adequate.

The inspector reviewed the licensee's program for determining if a new employee in year 2002 had received a previous occupational dose during the current year.

10 CFR 20.2104 "Determination of Prior Occupational Dose," requires that the licensee obtain prior dose records of new employee who may receive exposures in excess of 10 percent of the occupational limit of 5 rem. During initial site training, the licensee asked new employees to identify whether they had received radiation exposures during the year. Four new employees were identified with occupational radiation doses from other facilities during 2002. The licensee had a standard letter to send to former employers of the new employees. Some occupational exposure information had been received by telephone inquiries. The licensee had received occupational exposure information for two of the new employees. The inspector concluded that the licensee's program met the requirements to 10 CFR 20.2104.

4.3 Conclusions

The radiation protection program was found to be adequate. Personnel exposures during year 2002, were well below limits, and bioassay results were acceptable.

5 OSHA Interface Activities (93001)

5.1 Inspection Scope

The objective of this portion of the inspection was to verify that site activities were being conducted in accordance with applicable regulations, occupational safety standards, and license conditions. Additionally, this portion of the inspection was to ensure that industrial safety at White Mesa was adequate to protect the health and safety of the workers and the members of the general public.

5.2 Observations and Findings

Site Safety and Operations

During the facility tour, the inspector observed licensee practices related to worker occupational and industrial safety which are under the regulatory jurisdiction of the Mine Safety and Health Administration (MSHA). MSHA has a memorandum of understanding (MOU) with the Occupational Safety and Health Administration (OSHA) regarding OSHA requirements at MSHA facilities. The NRC has MOUs with both MSHA and OSHA regarding NRC licensed facilities.

The licensee's industrial safety program includes extensive training for site workers. Each worker received and was trained on the "White Mesa Mill Safety Manual," hazard recognition at White Mesa, MSHA training, emergency response, and the safety work permit (SWP). The inspector noted that the safety manual contained useful information on White Mesa site hazards and safety requirements.

?, BACK END LOADERS

The inspector observed worker safety in the following areas:

- Heavy equipment operations during feed material processing
- Dust control
- Chemical safety

During alternate feed material loading, operation workers appeared to be attentive to the movement of heavy equipment such as dump trucks, back end loaders, and trommel screen operations. When the trucks and loaders moved in the reverse direction, the appropriate hazard warning initiated. Workers wore appropriate safety gear. During the daily lubrication of the trommel screen, the circuit boxes were locked. Dust control methods were apparent. To suppress dust, the licensee operated a spray mister system at the screen where the alternate feed was initially loaded. All around the ore pad where the alternate feed material was stored, the licensee used tanker trucks to spray the roadways and control dusting.

During the site tour, the inspector noticed a strong odor in the air from ammonia at a distance of at least 75 yards from the source. Discussions with the licensee revealed that the maintenance department had started an anhydrous ammonia (NH_3) venting operation from one of its two NH_3 tanks. One of the NH_3 tanks had a leaking flange that needed to be replaced. Several MSHA/OSHA health and safety concerns were identified during the inspector's tours related to the NH_3 venting operations. The following safety observations were made:

- The licensee had started the NH_3 venting and draining operation without warning all the workers onsite.

- The licensee had not set up a safety parameter around the venting area to keep workers away.

- At times the concentration of NH_3 in the general area of the tanks was strong enough to make your eyes burn and water instantly. However, the licensee's measured concentration of NH_3 around the venting operation was 5 parts per million. The worker threshold valve limit for NH_3 is 25 parts per million.

- The eye wash and safety shower at the NH_3 tank was not operational.

- When the workers went to repair the safety shower, the licensee did not stop the NH_3 venting operation, and the workers were not provided respiratory protection equipment.

- Rubber hoses that were being used to transfer NH_3 into a container did not have isolation valves at the discharge of the hoses.

The inspector reviewed the SWP that was issued on August 20, 2002, for the NH_3 venting and transfer operation. The inspector noted that several safety checks and precautions as listed on the SWP were not checked as required. For example, reviewing the material safety data sheet, establishing a qualified safety watch, conducting atmosphere toxicity checks, having respiratory equipment available, and assuring that the shower and eye wash was functional were not checked on the SWP.

The inspector reported the observations listed above and several other observations regarding NH_3 operations to the onsite safety officer and management. The licensee took corrective actions on some issues and continued with evaluation of others identified by the inspector. The inspector also discussed these observations with the MSHA Office, Salt Lake City, Utah.

5.3 Conclusions

The inspector identified several occupational health and safety issues regarding NH_3 activities. The licensee took corrective actions on some issues and continued with evaluation of others identified by the inspector. The inspector also discussed the NH_3 safety concerns with the MSHA Office, Salt Lake City, Utah.

6 Exit Meeting Summary

The inspector presented the inspection results to representatives of the licensee at the conclusion of the inspection on August 22, 2002. The licensee did not identify any information reviewed by the inspector as propriety information.

Conclusions for discussion with MSHA NOT MENTIONS

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Bartlett, Maintenance Manager
R. Berg, Radiation Safety Officer
D. Frydenlund, Vice President and General Counsel
R. Hochstein, President
K. Miyoshi, Mill Manager
M. Rehmann, Environmental Manager

Utah Department of Environmental Quality-Division of Radiation Controls

G. Galloway, Environmental Scientist
J. Hultquist, Environmental Scientist
B. Imai, Environmental Scientist

INSPECTION PROCEDURES USED

83822	Radiation Protection
88005	Management Organization and Controls
88020	Operations Review
93001	OSHA Interface Activities

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
DDE	deep dose equivalent
FUSRAP	Formerly Utilized Sites Remedial Action Program
IUC	International Uranium Corporation
IX	ion exchange
MOU	Memorandum of Understanding
MSHA	Mine Safety and Health Administration
OSHA	Occupational Safety and Health Administration
NH_3	anhydrous ammonia
PBL	Performance Based License
PDR	Public Document Room
RSO	radiation safety officer
SERP	Safety and Environmental Review Panel
SOP	standard operating procedure
SWP	safety work permit
SX	solvent extraction
TEDE	total effective dose equivalent
U_3O_8	yellowcake

NRC Inspection Report 40-8681/03-01
Dated August 25, 2003
and Notice of Violation

NRC Inspection of June 26, 2003

and
Corrective Action/Responses to Notice of Violation,
October 1, 2003

Central Files

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

August 25, 2003

David C. Frydenland, Vice-President and
General Counsel
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 40-08681/03-001 AND NOTICE OF VIOLATION

Dear Mr. Frydenland:

On June 26, 2003, the NRC completed an onsite inspection at your White Mesa Mill near Blanding, Utah. The inspection consisted of selective examinations of procedures and representative records, interviews with personnel, and observations of activities in progress. The preliminary inspection findings were presented to you and members of your staff at the conclusion of the onsite inspection. A final telephonic briefing was held with Mr. Ron Hochstein and members of your staff on July 8, 2003, following the completion of additional in-office inspection. The enclosed report presents the results of that inspection.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation was evaluated in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy), NUREG-1600. The current Enforcement Policy is included on the NRC's Web site at www.nrc.gov; select **What We Do, Enforcement**, then **Enforcement Policy**. This violation is cited in the enclosed Notice of Violation (Notice), and the circumstances surrounding it are described in detail in the enclosed inspection report. This violation involved the failure to conduct 11e.(2) disposal operations in accordance with License Condition 10.5.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. For your consideration and convenience, NRC Information Notice 96-28, "SUGGESTED GUIDANCE RELATING TO DEVELOPMENT AND IMPLEMENTATION OF CORRECTIVE ACTION," is enclosed. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

If you contest the violation or the significance of this violation, you should provide a response within 30 days of the date of this inspection report, with the basis of your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011.

Should you have any questions concerning this inspection, please contact Mr. Louis C. Carson II at (817) 860-8221 or Mr. Jack E. Whitten at (817) 860-8197.

Sincerely,

Elmo E. Collins

Elmo E. Collins, Director
Division of Nuclear Materials Safety

Docket No.: 040-08681
License No.: SUA-1358

Enclosures:
1. Notice of Violation
2. NRC Inspection Report
   040-08681/03-001
3. NRC Information Notice 96-28

cc w/enclosures:
Mr. Ron Hochstein, President
International Uranium (USA) Corp.
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

Mr. Ken Miyoshi, Mill Manager
International Uranium (USA) Corp.
6425 South Highway 191
P.O. Box 809
Blanding, Utah 84511

Mr. Craig W. Jones, Acting Director
State of Utah
Department of Environmental Quality
Division of Radiation Control
168 North 1950 West
Salt Lake City, Utah 84115-4850

Mr. Pat Mackin, Assistant Director
Systems Engineering & Integration
Center for Nuclear Waste Regulatory Analyses
6220 Culebra Road
San Antonio, Texas 78238-5166

ENCLOSURE 1

NOTICE OF VIOLATION

International Uranium (USA) Corporation
San Juan County, Utah

Docket No.: 040-08681
License No.: SUA-1358

During an NRC inspection conducted on June 24-26, 2003, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violation is identified below:

> License Condition 10.5 requires, in part, that in accordance with the submittal dated May 20, 1993, the licensee is authorized to dispose of [11.e(2)] byproduct material generated at licensed in-situ leach facilities, subject to specific conditions. License Condition 10.5(D) requires, in part, that all disposal activities shall be documented. The documentation shall include descriptions of the waste and the disposal locations, as well as all actions required by this condition.
>
> The May 20, 1993, submittal, Section 11(a) waste disposal procedure, requires the licensee, as part of a complete set of waste disposal records, to provide a plat of the waste disposal site for each waste shipment.
>
> Contrary to the above, the documentation and records for waste disposal shipments from calendar year 2002 to June 17, 2003, did not include descriptions of each waste disposal location or a plat of each disposal site.
>
> This is a Severity Level IV violation (Supplement IV).

Pursuant to the provisions of 10 CFR 2.201, International Uranium (USA) Corporation, is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555, with a copy to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 611 Ryan Plaza Drive, Suite 400, Arlington, Texas 76011, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation or severity level, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information).

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 25th day of August 2003

ENCLOSURE 2

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.:	040-08681
License No.:	SUA-1358
Report No.:	040-08681/03-001
Licensee:	International Uranium (USA) Corporation
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	June 22-24 and July 8, 2003
Inspectors:	Louis C. Carson II, Health Physicist Nuclear Materials Licensing Branch
	Merritt N. Baker, Fuel Cycle Inspector Special Projects Inspection Branch Fuel Cycle Safety and Safeguards (FCSS)
Accompanied by:	R. William VonTill, Geotechnical Engineer Uranium Processing Section, FCSS
	Ron C. Linton, Hydrologist Uranium Processing Section, FCSS
	Diana B. Diaz-Toro, Process Engineer Fuel Cycle Facilities Branch, FCSS
	William Brock, Health Physicist Office of State and Tribal Programs Nuclear Materials Safety and Safeguards
Approved by:	Jack E. Whitten, Acting Chief Nuclear Materials Licensing Branch, DNMS
Attachment:	Supplementary Information

EXECUTIVE SUMMARY

White Mesa Mill
NRC Inspection Report 040-08681/03-001

This inspection included a review of site status, management organization and controls, site operations, radiation protection, radioactive waste management, environmental protection programs, and chemical process safety.

Management Organization and Controls

- The licensee had maintained an organization structure that agreed with the requirements of the license (Section 2.0).
- The licensee had adequately implemented the performance-based conditions of the license (Section 2.0).
- The licensee had adequately reviewed and properly used site procedures with one exception. This exception is discussed in this report (Section 2.0).

Operations Review

- Operational activities were being conducted safely and in accordance with the license and NRC regulations (Section 3.0).
- Inspection of the licensee's alternate feed material operations revealed that the material was handled in an orderly and controlled fashion (Section 3.0).

Radiation Protection

- The radiation protection program areas reviewed and found to be acceptable were facility posting and access control, personnel air sample analyses, release surveys, and the as low as is reasonably achievable (ALARA) program reviews (Section 4.0).

Radioactive Waste Management and Environmental Protection

- Environmental activities were being conducted safely and in accordance with the license and NRC regulations (Section 5.0).
- The licensee had collected environmental monitoring samples as required by the license and as reported in its calendar year (CY) 2002 semi-annual effluent reports. All sample results were less than the effluent release limits specified in 10 CFR Part 20 during 2002. No adverse trends were identified by the inspectors (Section 5.0).
- The licensee had failed since CY 2002 to maintain records that documented the specific location of each 11e.(2) shipment buried in Tailing Cell No. 3. This failure to maintain records was identified as a violation of License Condition 10.5(D) (Section 5.0).

<u>Process Safety Information, Hazard Identification and Assessment, and OSHA Interface Activities</u>

- Adequate chemical safety was demonstrated by the licensee during the inspection for activities involving licensed materials (Section 6.0).

Report Details

1 Site Status

The NRC issued Source Material License SUA-1358 to Energy Fuels Nuclear during August 1979. Ownership and control of the site was eventually transferred to Umetco Minerals, then back to Energy Fuels Nuclear, and finally to International Uranium (USA) Corporation (IUC). IUC assumed ownership of the White Mesa Mill on May 10, 1997, based on the NRC's approval of the transfer of ownership to IUC via Amendment 2 of revised License SUA-1358.

The mill has actively received and processed alternate feed material since the previous inspection. Alternate feed material by definition is material considered to be non-conventional uranium ore. The licensee is authorized by License Conditions 10.6 through 10.18 to receive and process alternate feed materials from certain out-of-state entities.

The inspectors noted that the licensee has not received or processed conventional uranium ore from active mines since 1999. As authorized by License Condition 10.5, the licensee was disposing of 11e.(2) byproduct material waste.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organization structure was reviewed to ensure the licensee had maintained effective organization and management controls in place to ensure compliance with NRC requirements. Also, the utilization and implementation by the licensee of its performance-based license was reviewed by the inspectors.

2.2 Observations and Findings

a. Management Organization

The required organization structure is provided in License Condition 9.3, which references the NRC-approved license renewal application dated January 30, 1997. No changes have been made to the licensee's organization structure since the previous inspection. The current organization structure was found by the inspectors to be in agreement with the intent of License Condition 9.3. However, the inspectors noted that White Mesa's staff had decreased from 65 to 15 employees at the termination of the recent alternate feed material campaign that ended in late May 2003. The licensee's current staff was determined by the inspectors to be adequate based on current limited facility operations.

b. Performance-Based License Review

License Condition 9.4 states, in part, that the licensee may under certain conditions and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the performance-based license provisions was reviewed by the inspectors to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site. The NRC granted the licensee a performance-based license during March 1997.

Changes made pursuant to the provisions of License Condition 9.4 are required to be reviewed by a Safety and Environmental Review Panel (SERP). Any proposed changes, and the deliberations made in support of these changes, are required to be documented pursuant to License Condition 9.4(D). On June 26, 2002, the licensee submitted its annual SERP report to the NRC pursuant to the provisions of License Condition 9.4(D). During the licensee's SERP period (July 1, 2001 - June 30, 2002), the licensee held five SERP meetings. During the licensee's current SERP period (July 1, 2002 - June 30, 2003), the licensee held six SERP meetings. The inspectors reviewed the meeting minutes from the SERPs conducted during CY 2003 and found them to be adequate. Specifically, the inspectors reviewed two SERP packages that the licensee had completed since the previous inspection. SERP meetings Nos. 02/03-01 and 02/03-06 involved changes to the facility process flow diagram and the Molycorp material operations described in the license, respectively. The SERP packages and changes made by the licensee were reviewed by the inspectors and found to be acceptable. The inspectors determined that the SERP changes met the requirements of License Condition 9.4.

c. As low As Reasonably Achievable Program Review

License Condition 11.6 requires that the licensee perform an annual as low as is reasonably achievable (ALARA) audit of the radiation safety program in accordance with Regulatory Guide 8.31. The inspectors reviewed the following aspects of the licensee's ALARA program:

- CY 2002 ALARA report to the NRC
- October and November 2002 IUC Corporate ALARA Audit
- CY 2002 Quarterly ALARA Committee Meeting Minutes

The CY 2002 ALARA audit was submitted to the NRC on March 29, 2002. The inspectors reviewed this ALARA audit and found it to be adequate. Portions of the radiation safety officer's (RSO's) daily, weekly and monthly ALARA inspection reports were also reviewed. These periodic ALARA reports required by Section 3.6 of the license application were found to be adequate. The RSO's ALARA inspection reports provided useful information such as in-plant radiological sampling and survey results. The inspectors identified no significant health or safety issues. Since the last NRC inspection, the licensee had made no ALARA significant recommendations to reduce personnel exposures to radioactive materials. The CY 2002 ALARA report provided to the NRC stated that recommendations and issues from the Corporate ALARA Audit were forwarded to the ALARA committee for their consideration. The CY 2002 IUC Corporate Audit contained 13 recommendations.

On November 19, 2002, and March 24, 2003, the licensee conducted ALARA committee meetings and the inspectors reviewed the content of these ALARA committee meeting minutes. The licensee's November 2002 ALARA committee meeting covered several of the recommendations and issues that were addressed in the CY 2002 Corporate ALARA Audit. However, the March 2003 ALARA committee meeting minutes did not specifically address the recommendations from the CY 2002 Corporate ALARA Audit and the ALARA report provided to the NRC for review. The inspectors determined that both the ALARA program and minutes to the ALARA meetings were adequate.

d. Site Procedures

In accordance with License Condition 9.6 the licensee is to establish and follow standard operating procedures (SOPs) for all operational process activities involving radioactive materials that are handled, processed, or stored. During this inspection, the inspectors reviewed the health physics manual, SOPs for plant process operations, and the emergency response plan. The inspectors noted a continual improvement by the licensee in the quality of the SOP review process. The RSO and staff had updated the SOPs, reviewed the SOPs on a quarterly basis, and approved procedures as required by the provisions of License Condition 9.6. However, the inspectors did identify one example where an SOP was not established, reviewed, or maintained by the licensee. The licensee's 11e.(2) disposal operations procedure was established when the facility was under the ownership and control of UMETCO in the early 1990s. This SOP had not been updated or reviewed by the RSO since the site was owned and operated by UMETCO. During this inspection, the inspectors determined that the licensee had implemented a radiation work permit (RWP) program in accordance with the license application. However, the inspectors discovered that the licensee had not established a written procedure for implementing RWPs. This finding seemed inconsistent with the intent of License Condition 9.6 which requires the licensee to establish written SOPs. Licensee management agreed that they would continue to review all site activities to assure the adequacy of procedures.

2.3 Conclusions

Since the last inspection, the licensee had maintained an organization structure that agreed with the requirements of the license. The licensee had correctly implemented the performance-based conditions of the license. The licensee's review and use of site procedures were adequate with one exception noted in Section 2.2.

3 Operations Review (88020)

3.1 Inspection Scope

The objective of this portion of the inspection was to verify that site operations were being conducted in accordance with applicable regulations and license conditions, and to ensure that operational controls were adequate to protect the health and safety of workers and members of the general public. There are three operations authorized by the IUC White Mesa license: (1) conventional uranium ore processing, (2) non-conventional ore processing of alternate feed material, and (3) commercial 11e.(2) byproduct waste disposal. However, the licensee has not processed conventional ore since 1999. Disposal of 11e.(2) byproduct waste is addressed in Section 5.0 of this inspection report.

3.2 Observations and Findings

Alternate Feed Material Operations

License Conditions 10.6 through 10.18 authorizes the licensee to receive and process source material in the form of alternate feed material from 13 specific providers. Sites where the licensee was authorized to receive alternate feed materials included: (1) Honeywell Corporation, formerly Allied Signal Incorporated, in Metropolis, Illinois; (2) Ashland and Linde (Formerly Utilized Sites Remedial Action Program (FUSRAP)) near Tonowanda, New York, and St. Louis, Missouri; (3) Cameco Corporation's Blind River and Port Hope facilities in Ontario, Canada (drummed calcined byproduct materials); (4) W.R. Grace in Chattanooga, Tennessee; (5) Heritage Minerals in Lakehurst, New Jersey, (6) Molycorp in Mountain Pass, California, and (7) Maywood Site, Maywood, New Jersey

From the period June 13, 2002, to May 30, 2003, the licensee processed 272,465 tons of alternate feed material for its source material content, which included the following quantities: (a) 172,830 tons from Ashland-1 site, (b) 11,550 tons from Molycorp site, (c) 78,389 tons from Linde site, (d) 5,775 ton of various feed materials, and (e) 3,921 tons from Heritage site.

The licensee has determined that for every 1,000 pounds of alternate feed material fed into the screening operation, approximately 600 pounds make it to the acid leaching and decantation wash circuit. During this inspection, the inspectors noted that the licensee had transferred uranium bearing liquid from the leaching and wash circuit to the solvent extraction (SX) facility. The inspectors also noted that the licensee's alternate feed material processing had resulted in the production of several tons of U_3O_8 slurry in the thickener tank. This U_3O_8 slurry in the thickener tank was being readied for yellowcake drying operations.

As of this inspection, the only alternate feed material remaining unprocessed was total of 20,417 tons; 15,000 tons of Linde feed material and 5,417 tons (35,700 drums) of Cameco material.

3.3 Conclusions

The inspectors determined that operational activities were being conducted safely and in accordance with the license and NRC regulations. Observations made by the inspectors of the licensee's alternate feed material operations revealed that the material was handled in an orderly and controlled fashion.

4 Radiation Protection (83822)

4.1 Inspection Scope

Specific parts of the licensee's radiation protection program were reviewed to verify compliance with license conditions and the requirements of 10 CFR Part 20. The inspectors specifically reviewed the licensee's implementation of License Condition Nos. 10.5, 10.12, 10.14, 10.16, and 10.17. Additionally, the inspectors reviewed the areas of airborne contamination, radiation safety, and release surveys.

4.2 Observations and Findings

a. Site Tour

During this inspection, a facility tour was performed by the inspectors to observe licensed activities in progress. Site perimeter postings required by License Condition 9.9 were in place at all entrances to the mill. During the inspectors' site tour, radiation levels were measured using an NRC microRoentgen (μR) meter, serial number 15540 with a calibration due date of March 2, 2004. The background radiation level measured offsite ranged between 10-15 μR/hr. Radiation surveys were conducted in various locations throughout the mill and around the ore pad revealed the following measurements:

Facility	μR/hr
• Sag Mill	200-400
• Main Grizzly	800
• Trommel Grizzly	310 -1,600
• Pulp storage tank area	200
• Truck Wash/Decon Pad	200
• Ore pad near fenceline	300-1,600
• Truck checkout Point	100
• Cell 2, 11e.(2) area	60
• White Mesa Fenceline	200-900
• Molycorp Area	300-1,500

The inspectors' radiation measurements were consistent with the licensee's routine radiation survey results. No "Radiation Areas" as defined by 10 CFR 20.1003 were identified within the process facility. Overall, the inspectors detected some elevated radiation levels in several areas around the site, but none that would meet the threshold of a radiation area. The RSO stated that site radiation levels were higher than usual because alternate feed material had shielded ambient radiation levels that were associated with conventional uranium ore that was embedded in the surface soils. The site restricted area was found to be adequately posted as required by License Condition 9.9. No health or safety concern was identified by the inspectors during the tour of the site.

b. Internal and External Radiation Exposures and Bioassay Results

The inspectors reviewed the deep dose equivalent (DDE) radiation exposures to site personnel since the previous inspection. Since the last inspection, the RSO had issued dosimeters and reviewed the reported DDE results of each radiation worker. During the site tours, the inspectors observed that site radiation workers wearing dosimeters in restricted areas.

The highest worker total effective dose equivalent (TEDE) recorded by the licensee was less than 5 millirems. This recorded dose was based on air sampling analyses. To date in CY 2003, all workers' TEDEs were less than 10 percent of the 5,000 millirem annual limit specified in 10 CFR 20.1201.

The inspectors reviewed the licensee's bioassay results for CY 2002 and 2003. The inspectors determined that the licensee had implemented the bioassay program as specified by NRC Regulatory Guide 8.22, "Bioassay at Uranium Mills." An employee's bioassay result, using urinalysis, that exceeds 15 micrograms per liter uranium was required to be investigated. Reviews of bioassay records indicated that no bioassay result had exceeded the action level in CY 2003. The inspectors determined that the licensee's bioassay program was adequate.

c. Instrument Calibrations

Section 3.0 of the license application and radiation protection manual requires, in part, that all radiation monitoring, sampling, and detection equipment be recalibrated after each repair, as recommended by the manufacturer, or at least annually. A review of the instrument calibration records by the inspectors indicated that the licensee had maintained the instrument calibrations up-to-date, and that calibrated equipment was available at the site for immediate use.

d. Air Samples Analyses

License Condition 11.4 requires, in part, that on an annual basis the licensee collect, during mill operations, a set of air samples covering 8 hours of sampling in routinely and frequently occupied areas of the mill. Additionally, with each change in mill feed material or at least annually, the licensee must analyze mill feed or production product for natural uranium, thorium-230, radium-226, and lead-210. The inspectors reviewed breathing zone and area air sample results from CY 2002 and 2003. Since the last inspection the RSO had collected annual 8-hour continuous air samples from 30 mill locations including alternate feed materials being processed and in storage. With one exception, all the results of air samples collected during CY 2002 were less than 10 percent of any derived air concentration (DAC) specified in 10 CFR Part 20. The inspectors noted that one worker was exposed to uranium particulates from Molycorp feed material which was equivalent to 14 percent of a DAC. The inspectors concluded that the licensee had met the requirements of License Condition 11.4.

e. The Molycorp Ore Radiation Work Permits

The inspectors reviewed RWPs issued by the RSO since the last inspection. RWPs were issued for activities that presented a significant potential for workers to be exposed to radioactive material. Since the last inspection, the licensee issued six RWPs for the handling of alternate feed materials. RWPs reviewed in detail by the inspectors included RWPs 377 and 378. These RWPS were written by the licensee specifically for activities involving the Molycorp ore. The inspectors reviewed licensee memoranda on the results on implementing the Molycorp RWPs. The RSO explained that personnel conducting the Molycorp operation received specific training on the RWPs. The inspectors reviewed the training records of the workers who signed or were included in RWPs and determined that they were adequately trained. Directions provided in the RWPs required personnel to don protective equipment such as full-face respirators, coveralls, and rubber gloves. In accordance with License Condition 10.17, specific for receiving and processing Molycorp ore, the licensee had analyzed air samples for lead concentrations. These air sample analyses demonstrated that lead concentrations were minimal.

As part of its radiation safety program, the licensee had collected breathing zone measurements and analyzed them for radon, uranium, and thorium. The inspectors reviewed the results of airborne radioactivity samples that were collected during the Molycorp work. With a few exceptions, the inspectors determined that air samples collected had airborne concentrations of less than 10 percent of a DAC. The licensee had established an action level of 25 percent of a DAC for Molycorp ore. Overall, the inspectors concluded that the workers' total effective dose equivalent results were less than 1 percent of the 5,000 millirem annual limit specified in 10 CFR 20.1201.

f. Release Surveys for Equipment, Packages, and Personnel

License Condition 9.10 requires, in part, that equipment or packages released from the restricted area shall be in accordance with the "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material," dated May 1987, or suitable alternative procedures approved by the NRC prior to any such release.

The inspectors observed the licensee's process for releasing intermodal containers. The licensee conducted contamination surveys on each intermodal container before the container was released from the controlled area and transported from the White Mesa facility. The licensee was required to assure that the amount of external radiation contamination on each intermodal containers was not in excess of Department of Transportation (DOT) limits specified in 49 CFR 173.428. DOT's external radiation contamination limit for the intermodal container is 22 disintegrations per minute per square centimeter squared (dpm/cm^2) loose beta-gamma contamination. The inspectors reviewed container release survey records for intermodal containers released since the last inspection and determined that the licensee was meeting DOT's established contamination limit. The inspectors concluded that the licensee was continuing to release empty alternate feed material intermodal containers in accordance with applicable license conditions, NRC regulations, and DOT requirements.

Worker contamination monitoring procedures require that before leaving any restricted area, all workers will either shower or monitor themselves for radioactive contamination. During the site tours the inspectors observed the alpha meters used by employees for self-scanning. The inspectors confirmed that survey meters were properly calibrated, had been operationally checked daily, and were fully functional. Monitoring records reviewed by the inspectors indicated that no individual had left the site with contamination above the licensee's action level of 650 dpm/100 cm^2.

4.3 Conclusions

The radiation protection program areas that were reviewed by the inspectors and found to be acceptable were facility posting, personnel air sample analyses, release surveys, and the ALARA program reviews.

5 Radioactive Waste Management (88035) and Environmental Monitoring (88045)

5.1 Inspection Scope

The environmental, effluent and groundwater monitoring programs were reviewed by the inspectors to assess the effectiveness of the licensee's programs and to evaluate the effects, if any, of site activities on the local environment.

5.2 Observations and Findings

a. Radioactive Waste Receipts and Disposal Inspections

License Condition 10.5 authorizes, in part, that White Mesa dispose of [11.e(2)] byproduct material generated at licensed in-situ leach facilities in accordance with the licensee's submittal dated May 20, 1993. The licensee is required to submit an annual summary to the NRC of waste disposed of from offsite generators in accordance with License Condition 10.5(D). The inspectors reviewed the licensee's CY 2001 and 2002 annual 11e.(2) byproduct summaries dated March 31, 2002, and March 31, 2003, respectively. The inspectors determined that during CY 2001 and CY 2002, the licensee received shipments of 11e.(2) byproduct waste for disposal from three individual waste generators. The licensee received several shipments of 11e.(2) waste from offsite generators in CY 2003. The inspectors determined that the volume of 11e.(2) waste received was within the limits of the license. However, during the inspection the inspectors discovered that the licensee had not received, processed, or disposed of the 11e.(2) materials in accordance with commitments in the license.

License Condition 10.5(D) requires, in part, that all disposal activities be documented to include a description of the waste and the disposal location. The licensee's submittal dated May 20, 1993, contained the waste disposal procedure that the licensee is required to follow. Section 6 of this procedure requires the licensee to select a location in NRC-approved Cell No. 3 for 11e.(2) waste disposals. The waste material's disposal location is required to be noted on the shipping manifest and waste disposal plat. Both documents are required to be entered into the site's permanent records. Section 11(a) of this procedure also requires the licensee, as part of a complete set of waste disposal records, to provide a plat of the waste disposal site for each waste shipment buried in Cell No. 3.

The inspectors reviewed 11e.(2) byproduct waste disposal records beginning CY 2002 and continuing through June 17, 2003. The inspectors determined that the licensee's waste disposal records for this time period did not include a description of each waste disposal location and a plat of each disposal site. For burials occurring in the above time frame, the licensee did not know the specific location where each 11e.(2) shipment had been placed in disposal Cell No. 3.

Representatives of the licensee, when questioned about the location of burials, explained that they buried 11e.(2) waste from outside generators in same section of Cell No. 3. The licensee also took photographs of each shipment's contents before burial in Cell No. 3. The licensee, when questioned about the change in procedure, was not certain when they stopped documenting the specific disposal location of each shipment and stopped providing plats of each waste disposal location. The inspectors determined that this change in procedure was not in accordance with the license. The inspectors were concerned that if a waste generator were to notify the licensee that a problem existed with a particular waste shipment, the licensee would not be able to identify the specific location where the 11e.(2) waste was buried in Cell No. 3. The licensee's failure to maintain records documenting the specific location of each 11e.(2) shipment buried in disposal Cell No. 3 beginning in CY 2002 was a violation of License Condition 10.5(D) (40-8681/0301-01).

b. Environmental and Effluent Monitoring Programs

License Condition 11.2 requires, in part, that the licensee implement an effluent and environmental monitoring program as specified in Section 5.5 of the renewal application. The inspectors reviewed the semi-annual effluent report for the second half of CY 2002. At the time of this inspection, the licensee had not issued the first half of CY 2003 semi-annual effluent report; however, the raw data provided by the licensee was reviewed for consistency. The licensee's environmental monitoring program consisted of taking samples of air continuously, groundwater, surface water, and vegetation, as well as making ambient gamma exposure rate measurements. The licensee had collected the required samples at the five sampling stations, including a nearest resident and a background location.

Internal procedures for taking environmental samples were evaluated by the inspectors. An assessment was made of the licensee's performance in following procedures for surface water sampling, soil sampling, and vegetation sampling. The inspectors concluded that the licensee was adequately following their environmental monitoring procedures and that these procedures were up-to-date.

c. Environmental Air Sampling

The licensee collected environmental air samples at four stations using continuous high volume samplers. The sample filters in the high volume samplers were exchanged weekly. These sample filters were analyzed quarterly for natural uranium, radium-226, thorium-230, and lead-210 concentrations. All environmental sample results for CY 2002 were less than the concentrations specified in 10 CFR Part 20, Appendix B. The inspectors identified no adverse trends.

Discussions with White Mesa staff and review of records indicated that the licensee used two water sprays for dust suppression during alternate feed material operations. The licensee also routinely used tanker trucks to spray water on the alternate feed material piles and ore pad roads during unloading and loading operations. The inspectors verified that the piles of feed material that were located nearest to the public highway for the last 3 years no longer existed. The inspector observed that the only piles of alternate feed material onsite was approximately 15,000 tons of material from the Linde site.

The inspectors reviewed radioactive and non-radioactive air particulate data collected and analyzed during CY 2002. The inspectors review of this data indicated that the volume of dust collected on sample filters was especially high from April to August 2002. However, the inspector noted that the concentration of radioactive material had not increased in proportion to the volume of dust collected. Based on this finding, the inspectors concluded that the dust blowing from the White Mesa site was not alternate feed or radioactive material when compared to previous years of environmental air sample results.

d. Environmental Exposure Rates

Ambient gamma radiation levels were continuously measured at the five sample stations using thermoluminescent dosimeters (TLDs). The TLDs were exchanged and analyzed on a quarterly basis. Sample results of the TLDs varied in CY2002 from 12.6 μR/hr at the background station to 20 μR/hr at an onsite sample station (East Tailings Area). Ambient gamma exposure rates were found to be below the limits established in 10 CFR 20.1301. The licensee determined the average dose rate offsite to range between 10-15 μR/hr by using direct radiation measurement surveys and was comparable to the readings at each TLD location. The licensee reported each TLD location as being background corrected.

e. Vegetation

Vegetation samples were collected at three locations by the licensee around the mill during early spring, late spring, and fall. The samples collected by the licensee were analyzed for radium-226 and lead-210 concentrations. Sample results for the second half of CY 2002 were comparable to those taken in the first half of CY 2002. The inspectors noted no observable adverse trends.

f. Groundwater Detection Monitoring Program

License Condition 11.3(A) requires, in part, that the licensee implement a groundwater detection monitoring program. The licensee's internal procedure entitled "Groundwater Monitoring Plan and Standard Operating Procedures," was reviewed along with monitoring records maintained by the licensee since the last inspection. The inspectors focused on the licensee's performance when following and implementing the groundwater sampling procedure. Inspectors interviewed and observed staff who were involved in groundwater sampling. A technician's water sampling technique was evaluated. The inspectors determined that the licensee was adequately following their procedures on groundwater sampling and monitoring.

5.3 Conclusions

Environmental activities were being conducted safely and in accordance with the license and NRC regulations. The inspectors determined that the licensee was collecting environmental monitoring samples as required by the license. The licensee had collected environmental samples at the intervals specified in the license, and as reported in the CY 2002 semi-annual effluent reports. All environmental monitoring sample results were less than the effluent release limits specified in 10 CFR Part 20 during CY 2002. The inspectors noted no adverse trends. The inspectors concluded that the licensee's failure since CY 2002 to maintain records documenting the specific location of each 11e.(2) shipment buried in Tailing Cell No. 3 was a violation of License Condition 10.5(D).

6 Process Safety Information (88056), Hazard Identification and Assessment (88057) Management of Change (88065), OSHA Interface Activities (93001)

6.1 Inspection Scope

The objective of this portion of the inspection was to verify that site activities were being conducted in accordance with applicable regulations, occupational safety standards, and license conditions. Additionally, this portion of the inspection was to ensure that chemical safety at White Mesa was adequate to protect the health and safety of the workers and the members of the general public.

6.2 Observations and Findings

Site Safety and Operations

During the facility tour, the inspectors observed licensee practices related to worker occupational and industrial safety activities under the regulatory jurisdiction of the Mine Safety and Health Administration (MSHA). MSHA has a memorandum of understanding (MOU) with the Occupational Safety and Health Administration (OSHA) regarding OSHA requirements at MSHA facilities. The NRC has MOUs with both MSHA and OSHA regarding NRC licensed facilities.

The NRC conducted a routine, scheduled, and announced inspection of chemical safety programs at the White Mesa Uranium Mill in Blanding, Utah, on June 24, 2003. The purpose of the inspection was to determine whether activities involving licensed materials were conducted safely and in accordance with regulatory requirements. The inspectors determined by interviews with licensee personnel that process safety information was available, material safety data sheets were located in the control room, and the emergency response plan was adequate. The inspectors verified by interviews with licensee personnel that the following programs were in place and functioning:

- Operators and mechanics training
- Contractor worker training
- Pre-startup safety reviews
- Hot work permits
- Compliance audits

The inspectors verified that written operating procedures were available for the following licensed processes. Additionally, the inspectors confirmed that the licensee had subjected the following procedures to an annual review and that the procedures were updated as required:

- Yellowcake precipitation
- Uranium Solvent Exchange
- Counter-current decantation
- Pre-Leach and Leach
- Ore receiving and grinding

Licensee personnel, when interviewed by the inspectors, were unable to demonstrate a management of change program. Drawings showing the as-found plant condition were not available. The inspectors verified that the external material condition of anhydrous ammonia, sulfuric acid, and propane bulk storage tanks, pumps, and piping was satisfactory. The inspectors examined copies of the most recent pressure test documents for the anhydrous ammonia tanks. The inspectors examined round sheets maintained by the licensee when conducting daily mill inspections.

During interviews, licensee personnel described an adequate program for investigation of unusual incidents. The inspectors reviewed a copy of the "UMETCO Corporation Safety Manual" (1988), which included, but was not limited to: Accident Notification and Investigation; Safe Work Permits; Inspections and Audits; Hazardous Materials Identification. Later in the inspection, the licensee produced a copy of the "1991 Safety and Health Program," which the licensee stated included the current incident investigation procedure.

6.3 Conclusions

Based on this inspection, the inspectors determined that adequate chemical safety was demonstrated by the licensee for activities involving licensed materials.

7 Exit Meeting Summary

The inspectors presented the preliminary inspection results to the licensee representatives of the licensee at the conclusion of the onsite inspection on June 26, 2003. A telephonic exit briefing was held on July 8, 2003, to discuss the results of the inspection as described in this report. Representatives of the licensee acknowledged the findings as presented. During the inspection, the licensee did not identify any information reviewed by the inspectors as propriety information.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Bartlett, Maintenance Manager
R. Berg, Radiation Safety Officer
D. Frydenlund, Vice President and General Counsel
R. Hochstein, President
K. Miyoshi, Mill Manager

Utah Department of Environmental Quality-Division of Radiation Controls

B. Hamos, Environmental Scientist

INSPECTION PROCEDURES USED

83822	Radiation Protection
88005	Management Organization and Controls
88020	Operations Review
88035	Radioactive Waste Management
88045	Environmental Monitoring
88056	Process Safety Information
88057	Hazard Identification and Assessment
88063	Management of Change
93001	OSHA Interface Activities

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

40-8681/0301-01	VIO	Failure to document or provide a plat of the locations of 11e.(2) shipments that were place into the disposal cell (License Condition 10.5).

Closed

none

Discussed

none

LIST OF ACRONYMS USED

ALARA	as low as reasonably achievable
CFR	Code of Federal Regulations
CY	calendar year
DAC	derived air concentration
DOT	Department of Transportation
DDE	deep dose equivalent
dpm/cm^2	disintegrations per minute/centimeter squared
FUSRAP	Formerly Utilized Sites Remedial Action Program
IN	Information Notice
IUC	International Uranium Corporation
mg/l	milligrams per liter
$\mu R/hr$	microRoentgen/hour
MOU	memorandum of understanding
MSHA	Mine Safety and Health Administration
OSHA	Occupational Safety and Health Administration
PDR	Public Document Room
RWP	radiation work permit
RSO	radiation safety officer
SERP	Safety and Environmental Review Panel
SOP	standard operating procedure
SX	solvent extraction
TEDE	total effective dose equivalent
TLD	thermoluminescent dosimeters
URI	Unresolved Item
U_3O_8	yellowcake

IUC INTERNATIONAL URANIUM (USA) CORPORATION

Independence Plaza, Suite 950 • 1050 Seventeenth Street • Denver, CO 80265 • 303 628 7798 (main) • 303 389 4125 (fax)

October 1, 2003

Via Facsimile & Federal Express

U.S. Nuclear Regulatory Commission
Washington, D.C. 20555
Attention: Document Control Desk

And

Mr. Thomas P. Gwynn
Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza, Suite 400
Arlington, TX 76011-4005

Re: REPLY TO NOTICE OF VIOLATION
NRC Inspection Report 40-08681/03-001 and Notice of Violation
White Mesa Uranium Mill
Source Material License No. SUA-1358
Docket No. 40-8681

Dear Sirs:

On July 8, 2003, the Nuclear Regulatory Commission ("NRC") completed an inspection of International Uranium (USA) Corporation's ("IUSA's") White Mesa Mill near Blanding, Utah. On August 25, 2003, the NRC forwarded the results of the inspection, including the referenced Notice of Violation (the "Notice") to IUSA. In accordance with IUSA's discussion with NRC on September 22, 2003, the time for submittal of a response to the Notice was extended from September 24, 2003 to October 1, 2003. Pursuant to the provisions of 10 CFR 2.201, IUSA is submitting the following written statement and explanation in response to the Notice.

As required by the Notice, this submission includes the following information: (1) the reason for the violation; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and, (4) the date when full compliance will be achieved. In addition, IUSA has referred to the Suggested Guidance Relating to Development and Implementation of Corrective Action (NRC Information Notice 96-28, May 1, 1996) to ensure that prompt, comprehensive corrective actions necessary to address the became the operator. Umetco operated the Mill from 1984 until 1994. In 1994, EFN once again became operator. EFN operated the Mill from 1994 until 1997, when the current operator, IUSA, took over.

The renewal application for the Mill's current license was prepared in 1991 by Umetco, and contained a number of procedures. The license amendment application for the disposal of 11e.(2) byproduct material that is referred to in the Notice was prepared and submitted by Umetco in 1993. An operating procedure was attached to that license amendment application, and it is that procedure that was the active procedure for the disposal of 11e.(2) byproduct material at the time of the recent inspection. All of the procedures in the 1991 renewal application, together with the procedure attached to the 1993 license amendment application and any other procedures attached to or incorporated by reference into any other license amendment application, should have been included as SOPs in the Mill's document control system by the then operator of the Mill at the time the procedures were adopted.

In 1998, IUSA undertook a major revision and update of the Mill's SOPs. All of the SOPs in the Mill's document control system were reviewed by the SERP in a systematic manner, revised as warranted, and ultimately approved. However, in this process, IUSA did not systematically review all submissions to NRC by previous operators, in order to determine whether or not all operating procedures attached to or incorporated by reference into all such submissions were properly included as SOPs in the Mill's document control system.

Due to the changes in Mill operators it may also be possible that there are other procedures that relate to the Mill's license that are attached to or incorporated by reference into the 1991 license renewal application or other submissions by previous operators and that have also inadvertently not been included as SOPs in the Mill's document control system.

The failure of IUSA and past Mill operators to ensure that all procedures attached to or incorporated by reference into submissions to NRC are properly included as SOPs in the Mill's document control system, is considered by IUSA to be the root cause of this violation. This is regarded as a programmatic issue relating to the incorporation of procedures as SOPs into the Mill's document control system.

Corrective Steps That Have Been Taken and Results Achieved

As an immediate corrective step, Mill management has surveyed the locations of the 11e.(2) byproduct disposal shipments in Cell 3 using a hand held GPS (Global Positioning System) device. Using these co-ordinates, a plat, which illustrates the disposal locations for the period of January 1, 2002 to June 17, 2003, has been prepared and is in the Mill files for review by NRC. Mill management has also reviewed the original procedure prepared by Umetco in 1993, and has presented to the Mill's SERP for approval a revised, updated procedure for 11e.(2) byproduct disposal. In a meeting held on September 15, 2003 the SERP reviewed the updated procedure relative to the requirements contained in License Condition 10.5 and the 1993 license amendment application, and approved the procedure for implementation and incorporation as an

NRC Inspection Report 40-8681/04-001
Dated March 10, 2004

No notices of violation issued

NRC Inspection of February 19, 2004

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

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TKM
3/15/04

March 10, 2004

David C. Frydenland, Vice-President and
General Counsel
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, Colorado 80265

SUBJECT: NRC INSPECTION REPORT 040-08681/04-001

Dear Mr. Frydenland:

On February 19, 2004, the NRC completed an inspection at your White Mesa Mill near Blanding, Utah. This inspection consisted of a review of site status, management organization and controls, radiation protection, and site operations. The inspection results were provided to members of your staff at the conclusion of the inspection. The enclosed report presents the results of that inspection.

No violations or deviations were identified during this inspection; therefore, no response to this letter is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Should you have any questions concerning this inspection, please contact Mr. Louis C. Carson II at (817) 860-8221 or Jack E. Whitten at (817) 860-8197.

Sincerely,

Jack E. Whitten, Chief
Nuclear Materials Licensing Branch

Docket No.: 040-08681
License No.: SUA-1358

Enclosure:
NRC Inspection Report
040-08681/04-001

cc w/enclosure:
Mr. Ron Hochstein, President
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Denver, CO 80265

Mr. Kenneth T. Miyoshi, Mill Manager
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6425 South Highway 191
P.O. Box 809
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Mr. Dane Finerfrock, Director
State of Utah
Department of Environmental Quality
Division of Radiation Control
168 North 1950 West
Salt Lake City, Utah 84115-4850

ENCLOSURE

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.	040-08681
License No.	SUA-1358
Report No.	040-08681/04-001
Licensee:	International Uranium (USA) Corp.
Facility:	White Mesa Mill
Location:	San Juan County, Utah
Dates:	February 18-19, 2004
Inspector:	Louis C. Carson II, Health Physicist Nuclear Materials Licensing Branch
Accompanied by:	R. William VonTill, Senior Project Manager Fuel Cycle Safety and Safeguards (FCSS) Uranium Processing Section
Approved By:	Jack E. Whitten, Chief Nuclear Materials Licensing Branch
Attachment:	Supplemental Inspection Information

EXECUTIVE SUMMARY

White Mesa Mill
NRC Inspection Report 040-08681/04-001

This inspection included a review of site status, management organization and controls, radiation protection, and site operations. Overall, the licensee was conducting operations in compliance with license and regulatory requirements.

Management Organization and Controls

- The licensee had maintained an organization structure that agreed with the requirements of the license (Section 2.0).
- The licensee had adequately implemented the performance-based conditions of the license (Section 2.0).
- The licensee had adequately reviewed and properly used site procedures (Section 2.0).

Operations Review

- Operational activities were being conducted safely by the licensee in accordance with the license and NRC regulations (Section 3.0).
- Inspection of the licensee's alternate feed material operations revealed that the material was handled in an orderly and controlled fashion (Section 3.0).

Radiation Protection

- The radiation protection program areas reviewed by the inspectors and found to be acceptable were facility postings, personnel exposures, and radiation surveys (Section 4.0).

Radioactive Waste Management and Environmental Protection

- Environmental, groundwater, and radioactive waste activities were being conducted safely by the licensee and in accordance with the license and NRC regulations (Section 5.0).

Report Details

1 Site Status

The NRC issued Source Material License SUA-1358 to Energy Fuels Nuclear during August 1979. International Uranium Corporation (IUC) assumed ownership of the White Mesa Mill on May 10,1997, with the NRC's approval of License Amendment 2.

The licensee had not received and processed any natural ore containing uranium or vanadium since December 1999. The licensee is authorized by License Conditions 10.6 through 10.17 to receive and process alternate feed materials from certain out-of-state entities. The mill processed alternate feed material during calendar years (CY) 2002 and 2003. There were no yellowcake drying operations in progress during the inspection. License Condition 10.5 authorizes the licensee to dispose of 11e.(2) byproduct material waste on site. However, 11e.(2) disposal operations had not taken place since the last inspection.

2 Management Organization and Controls (88005)

2.1 Inspection Scope

The organization structure was reviewed to ensure that the licensee had maintained effective organization and management controls necessary to maintain compliance with NRC requirements. Also reviewed was the utilization and implementation of the licensee's performance-based license (PBL) and selected procedures.

2.2 Observations and Findings

a. Management Organization

The licensee's required organization structure is described in License Condition 9.3, which references the NRC-approved license renewal application dated January 30, 1997. No changes have been made to the licensee's organization structure since the previous inspection. The current organization structure was found by the inspectors to be in agreement with the intent of License Condition 9.3. At the time of this inspection, White Mesa's staff included 15 employees. The inspectors determined that the licensee's staffing level was adequate based on current limited facility operations.

b. Performance-Based License Review

License Condition 9.4 states, in part, that the licensee may, under certain conditions and without prior NRC approval, make changes in the facility or processes, make changes to procedures, or conduct tests and experiments not presented in the license application. The licensee's implementation of the PBL provisions was reviewed to ensure that any changes made by the licensee did not negatively impact the licensing basis of the site. The NRC granted the licensee a PBL in March 1997.

Pursuant to License Condition 9.4, the licensee is authorized to make certain changes to the licensed program as long as they are reviewed by the safety and environmental review panel (SERP). Proposed changes and SERP deliberations are required to be documented in accordance with the provisions of License Condition 9.4(D). On August 26, 2003, the licensee submitted its annual SERP report to the NRC. During the licensee's current SERP period (July 1, 2002 - June 30, 2003), the licensee held eight SERP meetings. The inspectors reviewed the meeting summaries from the SERPs conducted during the period and found them to be adequate.

c. Site Procedures

In accordance with License Condition 9.6, the licensee is required to establish and follow standard operating procedures (SOPs) for all operational process activities involving radioactive materials that are handled, processed, or stored under the provision of the NRC license. Based on reviews of the licensee's SOPs and SERP minutes, the inspectors determined that the radiation safety officer (RSO) had reviewed and approved procedures as required by the provisions of License Condition 9.6. During this inspection, the inspectors reviewed the health physics manual, SOPs for plant process operations, and the emergency response plan. The RSO and staff had updated the SOPs, reviewed the SOPs on a quarterly basis, and approved procedures as required by the provisions of License Condition 9.6. The inspectors noted improvement by the licensee in the quality of the SOP review process. However, the inspectors did identify one example where an established SOP was not adequately maintained by the licensee. The Respiratory Protection Program SOP had not been updated to reflect that the licensee had started using a new powered air-purifying full-face respirator in July 2003. However, the inspectors noted that new respirator was appropriately addressed under the radiation work permit program.

2.3 Conclusions

The licensee had maintained an organization structure that agreed with the requirements of the license and had correctly implemented the provisions of the SERP and PBL license conditions. The licensee's review and use of site procedures met requirements.

3 Operations Review (88020)

3.1 Inspection Scope

The objective of this portion of the inspection was to verify that site operations were being conducted in accordance with applicable regulations and license conditions, and to ensure that operational controls were adequate to protect the health and safety of workers and members of the general public. There are three operations authorized by the IUC White Mesa license: (1) conventional uranium ore processing, (2) non-conventional ore processing of alternate feed material, and (3) commercial 11e.(2) byproduct waste disposal. However, the licensee has not processed conventional ore since 1999.

3.2 Observations and Findings

Alternate Feed Material Operations

The first licensed operation involving processing of either alternate feed or uranium ore material occurred on June 13, 2002, the licensee had not processed alternate feed material or uranium ore since CY2000. License Conditions 10.6 through 10.17 authorizes the licensee to receive and process alternate feed material from 11e.(2) providers. Some of the sites identified on the license that the IUC White Mesa was authorized to receive alternate feed materials includ: (1) Honeywell Corporation, formerly Allied Signal Incorporated, Metropolis, Illinois; (2) Ashland and Linde Formerly Utilized Sites Remedial Action Program (FUSRAP) sites near Tonowanda, New York, and Saint Louis, Missouri; (3) drummed calcined byproduct materials from Cameco Corporation's Blind River and Port Hope facilities, Ontario, Canada; (4) W.R. Grace material from Chattanooga, Tennessee; (5) Heritage Minerals, Lakehurst, New Jersey, and (6) Molycorp, Mountain Pass, California.

The licensee had not processed any alternate feed material since May 2003. As of this inspection, the only alternate feed material remaining unprocessed consisted of a total of 45,221 tons; 39,036 tons of Linde feed material and 6,185 tons (42,740 drums) of Cameco material. The license does not plan to resume alternate feed material processing until this summer.

3.3 Conclusions

Operational activities were being conducted safely and in accordance with the license and NRC regulations. Observations of the licensee's alternate feed material operations revealed that the material was handled in an orderly and controlled fashion.

4 Radiation Protection (83822)

4.1 Inspection Scope

Portions of the licensee's radiation protection program were reviewed to verify compliance with the license as well as the requirements of 10 CFR Part 20.

4.2 Observations and Findings

a. Site Tour

The inspectors toured the facility to observe activities in progress at various locations throughout the mill and around the ore pad. Licensee radiation measurements were found to be consistent with the licensee's previously recorded radiation survey results. During the inspectors' site tour, radiation levels were measured using an NRC microRoentgen (μR) meter, Serial Number 15540 with a calibration due date of March 2, 2004. The background radiation level measured offsite ranged between 10-15 μR/hr. Radiation surveys were conducted in various locations throughout the mill and around the ore pad. No "radiation areas" as defined by 10 CFR 20.1003 were identified within the process facility. Site perimeter postings required by License Condition 9.9 were in place at the appropriate entrances to the mill. No radiological health or safety concern was identified during the tour.

b. Internal and External Radiation Exposures and Bioassay Results

The inspectors reviewed the deep dose equivalent (DDE) radiation exposures since the previous inspection. The RSO had issued dosimeters and reviewed the DDE results of each radiation worker's dosimeter. The inspectors observed that all radiation workers were wearing dosimeters in the restricted area.

The highest worker total effective dose equivalent (TEDE) recorded for CY 2003 was 280 millirems based on combined dosimeter and air sampling analyses. During CY 2003, all workers' TEDEs were less than 10 percent of the 5,000 millirem annual limit specified in 10 CFR 20.1201.

The inspectors reviewed the licensee's bioassay results for CY 2003. The licensee had implemented the bioassay program specified in NRC Regulatory Guide 8.22, "Bioassay at Uranium Mills." Employee urinalysis results were required to be investigated if bioassay samples exceeded the action level of 15 micrograms per liter uranium. No bioassay results had exceeded the action level during CY 2003. The inspectors observed the licensee preparing bioassays for processing. The licensee's bioassay program was found to be adequate.

4.3 Conclusions

The radiation protection program was found to be adequate. Personnel exposures during CY 2003, were well below limits, and bioassay results were acceptable.

5 Radioactive Waste Management (88035) and Environmental Monitoring (88045)

5.1 Inspection Scope

The environmental, effluent and groundwater monitoring programs were reviewed by the inspectors to assess the effectiveness of the licensee's programs and to evaluate the affects, if any, of site activities on the local environment.

5.2 Observations and Findings

a. Groundwater Detection Monitoring Program

License Condition 11.3(A) requires, in part, that the licensee implement a groundwater detection monitoring program. The licensee's internal procedure entitled "Groundwater Monitoring Plan and Standard Operating Procedures," was reviewed along with monitoring records maintained by the licensee since the last inspection. The inspectors focused on the licensee's performance when following and implementing the groundwater sampling procedure. Inspectors reviewed the implementation of the licensee's procedures and results from groundwater, springs, and surface water sampling. The inspectors observed licensee staff performing leak detection of cell 4A. In addition, the inspectors observed corrective action activities related to an effort to remediate chloroform in the groundwater. The inspectors determined that the licensee had adequately followed their procedures on groundwater sampling and monitoring.

b. <u>11e.(2) Radioactive Waste Receipts and Disposal Operations</u>

License Condition 10.5 authorizes the licensee to dispose of 11e.(2) byproduct material from licensed in-situ leach facilities subject to several conditions, including a 5000 cubic yard limit from a single source. During the site tour, the inspectors noted that Disposal Cell 3 was being used for disposal of offsite 11(e).2 byproduct waste, as authorized in License Condition 10.5(C). Disposal Cell 2 was being used for disposal of White Mesa waste. During the site tour, the inspectors did not observe any problems with the 11(e).2 disposal area.

The inspectors determined that the licensee had not received 11e.(2) byproduct waste shipments since the last inspection.

5.3 <u>Conclusions</u>

Environmental, groundwater, and radioactive waste activities were being conducted safely and in accordance with the license and NRC regulations

6 Exit Meeting Summary

The inspectors presented the inspection results to representatives of the licensee at the conclusion of the inspection on February 19, 2004. The licensee did not identify any information reviewed by the inspectors as propriety information.

ATTACHMENT

PARTIAL LIST OF PERSONS CONTACTED

Licensee

R. Bartlett, Maintenance Manager
R. Berg, Radiation Safety Officer
D. Frydenlund, Vice President and General Counsel
R. Hochstein, President
K. Miyoshi, Mill Manager

Utah Department of Environmental Quality-Division of Radiation Controls

B. Hamos, Environmental Scientist
B. Imai, Environmental Scientist

INSPECTION PROCEDURES USED

83822	Radiation Protection
88005	Management Organization and Controls
88020	Operations Review
88035	Radioactive Waste Management
88045	Environmental Monitoring

ITEMS OPENED, CLOSED AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

CFR	Code of Federal Regulations
CY	calendar year
DDE	deep dose equivalent
FUSRAP	Formerly Utilized Sites Remedial Action Program
IUC	International Uranium Corporation
μR/hr	microRoentgen/hour
PBL	Performance-Based License
PDR	Public Document Room
SERP	safety and environmental, review panel
SOP	standard operating procedure
TEDE	total effective dose equivalent

DWQ Notice of Violation and Groundwater Corrective Action Order Dated August 23, 1999

Resulting from May 1999 Split Sampling Event

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF RADIATION CONTROL

Michael O. Leavitt
Governor
Dianne R. Nielson, Ph.D.
Executive Director
William J. Sinclair
Director

168 North 1950 West
P.O. Box 144850
Salt Lake City, Utah 84114-4850
(801) 536-4250
(801) 533-4097 Fax
(801) 536-4414 T.D.D.
www.deq.state.ut.us Web

RECEIVED
AUG 26 1999
By________

August 23, 1999

CERTIFIED MAIL
RETURN RECEIPT REQUIRED

Mr. David Frydenlund
Vice President and General Counsel
International Uranium Corporation (USA)
Independence Plaza, Suite 950
1050 17th Street
Denver, CO 80265

Re: White Mesa Uranium Mill: Notice of Violation and Groundwater Corrective Action Order, Docket No. UGW20-01.

Dear Mr. Frydenlund:

Transmitted herewith is a Notice of Violation (NOV) and Order, Docket No. UGW20-01 from the Utah Water Quality Board regarding groundwater contamination recently discovered on the White Mesa uranium mill site near Blanding, Utah. This Order is based on results of groundwater monitoring conducted in conjunction with the International Uranium Corporation (IUC) during May, 1999. Due to the elevated contaminant concentrations found in these groundwater samples, we find it necessary to proceed with a formal enforcement action in order to pursue a satisfactory resolution of this matter.

In addition to the chloroform discovered in IUC monitoring well MW-4, four (4) other pollutants have been identified in the wells sampled which appear to be in excess of State health based groundwater standards, including: gross alpha [MW-2, MW-3, MW-4, MW-12, MW-14, MW-15, MW-17, MW-18, and MW-19], nitrate + nitrite (N) [MW-4], manganese [MW-1, MW-3, MW-4, MW-11, MW-14, MW-15, MW-17, and MW-18], selenium [MW-15], and total uranium [MW-3, MW-4, MW-14, MW-15, MW-17, MW-18, and MW-19]. Three (3) other potential indicators of groundwater pollution were also found in concentrations below State health based groundwater standards, ammonia, iron, and tetrahydrofuran. We request that you include all of these contaminants in the Groundwater Contaminant Investigation mandated by the attached order.

We urge you to direct your immediate attention to this matter. If you have any questions on this NOV and Order, please contact Loren Morton at (801) 536-4250.

Sincerely,

William J. Sinclair

WJS/LBM:lm
attachment

cc: Dianne Nielson, DEQ (w/attach.)
Don Ostler, DWQ (w/attach.)
Loren Morton, DRC (w/attach.)
David Cunningham, SE District Health Dept. (w/attach.)
Dave Arrioti, DEQ, SE District (w/attach.)
Fred Nelson, Utah Asst. Attorney General (w/attach.)
Terry Brown, EPA Region VIII (w/attach.)
Milt Lammering, EPA Region VIII (w/attach.)
John Surmeier, NRC Washington, D.C. (w/attach.)
Bill von Till, NRC - Washington, D.C. (w/attach.)
Charles Hackney, NRC Region IV

F:\...IUC\gwcao.nov
File: International Uranium Corporation, Groundwater Corrective Action Order

UTAH WATER QUALITY BOARD

IN THE MATTER OF	:	**DOCKET NUMBER UGW20-01**
International Uranium Corporation	:	**NOTICE OF VIOLATION**
White Mesa Uranium Mill	:	**AND ORDER**

STATUTORY AUTHORITY

THE UTAH WATER QUALITY BOARD (hereinafter **"BOARD"**) issues this Notice of Violation and Order under the *Utah Water Quality Act,* including Sections *19-5-105, 19-5-106, 19-5-111* and *19-5-115, Utah Code Annotated,* and in accordance with the *Utah Administrative Procedures Act,* Sections *63-46b-1,* et seq.

FACTS

1. International Uranium (USA) Corporation (hereinafter **IUC**) operates a uranium mill facility and tailings disposal ponds on White Mesa located near Blanding, Utah in Sections 28 and 33, Township 37 South, Range 22 East, SLBM.

2. Utah Code Annotated (UCA) 19-5-102(10) states: ""Pollution" means any man-made or man-induced alteration of the chemical, physical, biological, or radiological integrity of any waters of the state, unless the alteration is necessary for the public health and safety."

3. UCA 19-5-102(18) defines "Waters of the state" as: "... all streams, lakes, ponds, marshes, watercourses, waterways, wells, springs, irrigation systems, drainage systems, and all other bodies or accumulations of water, surface and underground, natural or artificial, public or private, which are contained within, flow through, or border upon this state or any portion of the state ..."

4. Utah Code Annotated (UCA) 19-5-107(1)(a) states: "Except as provided in this chapter or rules made under it, it is unlawful for any person to discharge a pollutant into waters of the state or to cause pollution which constitutes a menace to public health and welfare, or is harmful to wildlife, fish or aquatic life, or impairs domestic, agricultural, industrial, recreational, or other beneficial uses of water, or to place or cause to be placed any wastes in a location where there is probable cause to believe it will cause pollution."

5. In accordance with Utah Administrative Code (UAC) R317-6-6.15(C)(1): "The Executive Secretary may require a person that is subject to R317-6-6.15 to submit for the Executive Secretary's approval a Contamination Investigation and Corrective Action Plan, and may require implementation of an approved Corrective Action Plan..."

FINDINGS

1. On May 11 and 12, 1999 the Utah Department of Environmental Quality (hereafter **DEQ**) in conjunction with **IUC** collected split groundwater quality samples from monitoring wells at the White Mesa uranium mill facility.

2. Laboratory analyses by DEQ of the groundwater quality samples described in FINDINGS 1 above indicate that at least one pollutant in the uppermost aquifer at the White Mesa mill facility exceeds groundwater standards established by the Executive Secretary, as provided in Table 1, below:

Table 1. Summary of May, 1999 DEQ Groundwater Sampling at White Mesa Mill

Contaminant	Sample Date	IUC Monitoring Well	Detected Concentration (mg/l)	Groundwater Quality Standard (mg/l)
Organic Contaminant				
Chloroform	5/11/99	MW-4	4.7	0.10 (1)

Footnote:
1) Ad-hoc Groundwater Quality Standard established by the Executive Secretary pursuant to UAC R317-6-6.15(E)(3) and (F)(2).

3. Laboratory analyses by **IUC** of groundwater samples described in FINDINGS 1 above have confirmed both the presence of chloroform in **IUC** well MW-4 and exceedance of the respective groundwater quality standard.

4. Based on FINDINGS 1, 2, and 3 above, the Executive Secretary has concluded that groundwater in the shallow aquifer at the White Mesa mill has been polluted by one or more sources of pollution at the facility and as such **IUC** is subject to UAC R317-6-6.15.

VIOLATION

IUC is in violation of:

1. UCA 19-5-107(1) for discharging pollutants to waters of the State, causing groundwater pollution which constitutes a menace to public health and the environment and impairs beneficial uses of water, and for placing wastes in a location where there is probable cause to believe it will cause groundwater pollution.

ORDER

IUC is hereby ordered to:

1. Submit within thirty (30) days of receipt of this Order a plan and timetable for conducting a Groundwater Contaminant Investigation and submittal of a report for Executive Secretary approval, pursuant to the provisions of UAC R317-6-6.15(D).

2. Submit within 30 days of Executive Secretary notification a plan and timetable for submittal, implementation, and completion of a Groundwater Corrective Action Plan, pursuant to the provisions of UAC R317-6-6.15(D).

NOTICE

Any appeal of the Notice of Violation and Order will be pursuant to *Section R317-1-8 of UAC* and *Sections 63-46b-6 through 63-46b-15 of the UCA*. If **IUC** contests any portion of the Notice of Violation and Order, it must do so in writing and request a hearing before the Board within thirty (30) days of the receipt of this Notice. If no response and request for hearing is received, the Notice of Violation and Order shall be considered final.

UCA 19-5-115 provides that violators of the *Act* or a related permit, rule, or order may be subject to a civil penalty of up to $10,000 per day of violation. Under certain circumstances of willfulness or gross negligence, violators may be fined up to $25,000 per day.

Signed this 23rd day of August, 1999.

Utah Water Quality Board

Don A. Ostler

Don A. Ostler, P.E.
Executive Secretary

DAO/LBM:lm

F:\...\IUC\gwcao.nov
File: IUC Groundwater Corrective Action Order

DWQ Review of Ground Water Quality Quarterly
Monitoring Report
Dated December 7, 2004

No notices of violation issued

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

OLENE S. WALKER
Governor

GAYLE F. McKEACHNIE
Lieutenant Governor

CC RFH HAN

December 7, 2004

Mr. Daniel B. Shrum
Compliance and Permitting Manager
Envirocare of Utah, Inc.
605 North 5600 West
Salt Lake City, UT 84116

SUBJECT: BAT 2nd Quarter April-June 2004 Monitoring Report, Ground Water Quality Discharge Permit No. UGW450005

Dear Mr. Shrum,

On October 25, 2004 a review was conducted for the BAT 2nd Quarter April-June 2004 Monitoring Report at your facility by Dean Henderson, representatives of The Utah Department of Environmental Quality Division of Radiation Control (DRC). The review addressed the BAT daily inspection for the facility (Groundwater Inspection Module 7B).

The review was an examination of the daily BAT inspection activities conducted at your facility as they relate to compliance with the Water Quality Discharge Permit No. UGW450005 (Permit). The inspection consisted of a review of the daily BAT reports.

After DRC review of the BAT 2nd Quarter April-June 2004 Monitoring Report it appears that all BAT monitoring was conducted in compliance with the Permit. If you have any questions regarding this letter, please call Dean Henderson at 536-0046. Thank you for your cooperation.

Sincerely,

D Finerfrock

Dane L. Finerfrock, Director

DLF/DH:dh

F:/Henderson/Envirocare/2nd BAT/BAT 2nd 2004.doc
File: BAT Quarterly Monitoring Reports

DRC Dam Safety Inspection Report
Dated May 25, 2005

No notices of violation issued

DRC Inspection of March 22, 2005

And
DRC Response letter of September 12, 2005

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

CF
RFH
HRR
TKm
REB
DCf

May 27, 2005

David C. Frydenlund
International Uranium (IUSA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

Subject: 1st Quarter, 2005, UDRC Annual International Uranium (IUSA) Corporation Inspection Module – Dam Safety Visual Inspection

Dear Mr. Frydenlund,

The purpose of this letter is to transmit UDRC findings made during a March 22, 2005 inspection of the International Uranium (IUSA) Corporation uranium mill near Blanding, Utah. This inspection focused on a dam safety visual inspection (UDRC Engineering Inspection Module 82). During the inspection UDRC staff, Christine Hiaring and Johnathan Cook, met with Mr. Ron Berg and you. Mr. Berg and you accompanied the UDRC staff during the mill tour. Mr. Berg accompanied the UDRC staff during the dam safety visual inspection. The embankments of Tailings Cells 1, 2, 3, and 4A were inspected for:

- Foundation or abutment movement, settlement, cracks, erosions, sluffs, sloughs, and leakages.
- Seepage, piping, and subsurface erosion.
- Muddy water boils in the area of the embankments, abutments, etc.
- Significant vegetation on embankment slopes.
- Sinkholes or localized subsidence in the foundation, or adjacent to, embankments, or other pertinent structures.
- Two-foot minimum freeboard above water level.
- Adequate embankment drainage and diversion channel capacity.
- Significant damage to, or changes in, structures, foundations, reservoir levels, groundwater conditions, and adjacent terrain as a result of seismic events.

Dam Safety Visual Inspection Observations

1. Devegetation of Embankments - The dikes appeared to be structurally sound. There was some minor vegetation noted on the south embankment of Cell 3. Because of the wet winter southern Utah has experienced, the embankment is too soft for heavy equipment to devegetated the slope.

2. Minor Erosion on the Embankments - There was some minor rutting and erosion noted on the west and south embankments of Cell 4A. The rutting and erosion has been caused by devegetation that occurred prior to the latest series of winter storms to move through southern Utah. The embankments are currently too soft for heavy equipment to repair them. The rutting and erosion at this point was not sufficient enough to pose a significant risk to the stability of the embankments.

3. Minor Rutting on the Embankments - Additionally, it was noticed that there was tire rutting on the access road between Cell 2 and Cell 3. The tire rutting can also be attributed to the wet winter southern Utah has experienced.

IUSA indicated that they have plans to correct these problems as soon as the embankment surfaces are sufficiently dry. The repair work of the rutting and minor erosion will be reviewed upon the next site visit to the IUSA facility.

Additional Observations

1. Dosimeters - During the dam safety visual inspection, it was noticed that the IUSA personnel are wearing their radiation dosimeters on the back strap of their hardhats. According to UAC R313-15-503 *"Location of Individual Monitoring Devices"* states that each licensee shall ensure that individual monitoring devices shall be worn at the unshielded location of the whole body likely to receive the highest exposure. The back of the hardhat constitutes a shielded location and is not the location of the whole body likely to receive the highest exposure.

   Additionally, it is recommended that the dosimeter that IUSA uses, the Landauer Luxel+, that to receive the most accurate reading it must be worn on the front and center of the body (the location shown by the icon). To wear the dosimeter in other locations can cause the reading to be off by as much as –50% and +100%.

IUSA needs to provide written justification for the placement of the dosimeters on the back strap of the hardhat or immediately correct the deviation. This item will be reviewed upon the next site visit to the IUSA facility

MODULE 82
IUSA – WHITE MESA
DAM SAFETY VISUAL INSPECTION GUIDANCE

License Condition 10.3 – Freeboard limits for Cells 1-I, 3, and 4A, shall be set periodically in accordance with the procedures set out in Section 3.0 to Appendix E of the previously approved NRC license application, including the October 13, 1999 revisions made to the January 10, 1990 Drainage Report. The freeboard limit for Cell 3 shall be recalculated annually in accordance with the procedures set in the October 13, 1999 revision to the Drainage Report.

October 13, 1999 Letter – The effect of the modification to the procedure for calculating the required freeboard for Cell 3 is to more realistically account for the addition of tailings sand in the year ahead, based on the actual operating projection for the mill. The procedure is to estimate the next 12-months mill throughput, plus a 1.5 safety factor.

The calculation procedure is as follows:

(1) Estimated Dry Tons * 1.5 = Max Mill Throughput

(2) (Eq, 1) / 39,146 dry tons per acre [A] = Reduced Pool Area

(3) Current Pool Area [B] – (Eq. 2) = Remaining Pool Area (after 1 year's production)

(4) 123.4 acre-feet [C] / (Eq. 3) = Required Freeboard to Contain the PMP Flood

(5) (Eq. 4) + 0.78 feet [D] = Maximum Required Freeboard

(6) 5608.0 feet [E] – (Eq. 5) = The Calculated Maximum Water Level in Cell 3

(7) Is (Eq. 6) < 5603.0 feet [F]?

[A] 39,146 dry tons per acre = the quantity of mill throughput required to reduce the poll area by 1 acre (derived from aerial photographs)
[B] Determined from an aerial photograph.
[C] PMP Flood Volume = 123.4 acre-feet.
[D] 0.78 feet = the wave run-up factor
[E] 5608.0 = the dike crest height of Cell 3.
[F] The Maximum Allowable Pool Height is 5603.0 feet. If Equation (6) results in a number higher than 5603.0 feet, then 5603.0 feet must be used. If Equation (6) results in a number lower than 5603.0 feet, then the result of Equation (6) is used.

This procedure will be used yearly to recalculate the Cell 3 freeboard. If, during any such year, the actual volume of mill production approaches the Estimated Dry Tons, then the Cell 3 freeboard will be re-evaluated based on the revised mill production estimates for the next twelve month period.

If you have any questions or comments, please contact John Cook at (801) 536-4250.

Dane Finerfrock
Executive Secretary

DF/JPC: jc

F:\FACILITIES\IUC - WHITE MESA\Inspections\2005-03-22 First Quarter\2005-05-27 Letter -Surety Questions-final.doc
File: IUC.02.05

3. U.S. Army Corp of Engineers EP 1110-2-13 – Dam Safety Preparedness
4. U.S. Army Corp of Engineers ER 1110-2-1156 – Safety of Dams – Policy and Procedures
   a. Evidence of distress in dams, levees, and other water control structures shall be immediately reported:

      First: To the Licensee Dam Safety Officer.
      Second: Division of Dam Safety.
      Third: Initiate enforcement action.

      Typical evidence of distress to report are:

      i) Sluffs, settlement or sides in embankments such as earth or rock-fill dams, levees, and bridge abutments or slopes, spillway slopes or channels, and lock and dam abutments.
      ii) Evidence of piping or muddy water boils in the area of a structure such as embankments, abutments, dam monoliths, lock walls, or cofferdams. Larger trees, scrubs, green vegetation during the fall, and hydrophyllic plants can also be signs that water piping is taking place.
      iii) Any significant increases in seepage quantities through or under embankments or abutments.
      iv) Any significant change in pore-water pressure in either embankments or their foundations or abutments.
      v) Unusual vertical or horizontal movement or cracking of embankments or abutments.
      vi) Sinkholes or localized subsidence in the foundation of, or adjacent to, embankments or other pertinent structures critical to the safe operation of the project.
      vii) Significant damage to any structure (e.g. barge damage to bridge piers or lock walls or ice flow damage to intake towers and access bridge piers).
      viii) Significant damage to, or changes in, structures, foundations, reservoir levels, groundwater conditions, and adjacent terrain as a result of seismic events.
   b. The first inspection is carried out prior to impoundment of the pool for new earth and rock-fill dams.
   c. The second inspection is made at a reasonable stage of normal operating pool.
   d. Subsequent inspections are made at 1-year intervals for the next three years.
   e. After three years, inspections are made at 2-year intervals for the next four years.
   f. After the first seven years of operation, the period can be extended to 5-year intervals if warranted by the results of the previous inspections.
   g. For projects on a 5-year inspection cycle, an "Intermediate Inspection" of all or some of the features may be scheduled, if warranted. Selection shall be based on consequences of failure, age, degree of routine observation, a natural event (earthquake), performance record, and history of remedial measures.

Freeboard Calculation Analysis

The UDRC received a letter dated February 22, 2005 from IUSA stating that since no natural ores or alternate feeds were processed last year, the previously submitted calculations will be carried over to this year. The Cell 3 freeboard elevation for October 2004 – September 2005 is 5601.60 feet.

FREEBOARD CALCULATION ERRORS Yes___ No _X_ (Amended Agreement for Uranium Recovery Regulation, January 2003, XII. Inspection Program (Criteria 29 and 35)).

Dam Safety Visual Inspection

Dam Safety Visual Inspection is to be performed, at a minimum, as part of the UMILL's comprehensive annual inspection. The inspection can take place more frequently, if determined to be necessary. The full comprehensive dam safety inspection will be performed, as required by their Risk Assessment program, by the Utah Department of Natural Resources, Division of Water Rights, Dam Safety Section. A Division of Radiation Control Representative should be present at the time of the Dam Safety Section's comprehensive inspection.

SAFETY CONCERNS Yes ___ No_X_ (Amended Agreement for Uranium Recovery Regulation, January 2003, XII. Inspection Program (Criteria 29 and 35))

Guidance for Dam Safety Inspection

1. Utah State Division of Radiation Control - Inspection Guidance
   a. All routine materials inspections should be performed on an unannounced basis.
2. NRC Regulatory Guide 3.11 - Design, Construction, and Inspection of Embankment Retention Systems for Uranium Mills
   a. Whether the dam and its foundation are behaving as anticipated in the design, whether there are any unusual movements, settlements, cracks, erosions, sloughs, or leakages, and whether the waste and borrow materials being placed in the dam have the characteristics assumed in the design;
   b. Whether the tailing pond levels are rising as anticipated and whether the rate of dam construction is sufficiently rapid to keep the crest above rising pond (2-foot of freeboard required); and
   c. Whether embankment drainage is adequate, whether the capacity of diversion channels is adequate to pass experienced and anticipated runoffs, whether embankment soil is becoming saturated by seepage, whether piping or subsurface erosion is occurring in the tailing dam, and whether there is any unusual release of radioactive material.
   d. A checklist similar to that used for water retention dams may be used to help the inspector in performing visual inspections.

Intermediate/Informal Visual Inspection Form
Operation Report
Division of Radiation Control

For the Period July 23, 2002 to March 22, 2005

Licensee International Uranium (IUSA) Corporation

License No. UT1900479

Project Name White Mesa Mill

Location Unnamed Drainage on White Mesa, San Juan County
(Waterway or reservation) **(County)**

License Issued February 18, 2005 **Expires** March 31, 2007

Inspected By Johnathan Cook **Date** March 22, 2005

Parts of Project Inspected Cells I-1, 2, 3, and 4A. Dikes 1, 2, 3, and 4A-E, 4A-S, and 4A-W

Weather Sunny, Partly Cloudy, Temp: 50's, Currently dry, significant rain yesterday.

Accompanied By Ron Berg & Dave Frydenlund (IUSA), Christine Hiaring (UDRC)

Summary

The White Mesa Mill is located just south of Blanding, Utah. The plant is currently in standby mode. The dikes which create the four containment cells (I-1, 2, 3, and 4A), were the subject of this inspection. With regard to structural integrity, all of the dikes appeared to be structurally sound. There was some minor vegetation, rutting, and erosion noted during the inspection. These are all primarily due to the heavy rain and snow that has been received between January and March. These items can be resolved as soon as the embankments dry enough for heavy equipment to operate on them.

Photographs taken during the inspection are included at the end of the report.

Submitted: March 22, 2005

Johnathan P. Cook, P.E.
Environmental Engineer

h. "Informal Inspections" can be made for the purpose to identify and report abnormal conditions and evidence of distress in accordance with training instructions and guidance.
i. Accompany the inspection team on the inspection and provide the support required for the inspection.

Intermediate and Informal Inspection Requirements

The attached form should be followed when performing an Intermediate or Informal Inspection.

Cell 2

Dike:	Type:	Random Fill
	Height:	34 feet
	Gross Head:	30 feet
	Crest Length:	3,130 feet
	Crest Width	18 feet
	Crest Elevation:	5,615 feet
	Upstream Slope:	3H:1V
	Downstream Slope:	3H:1V
	Completion Date:	May 4, 1980
Spillway:	Type:	Concrete lined trapezoidal channel Invert Width = 18 feet Depth = 2.2 feet
Outlet Works:	Type:	None
Reservoir:	Gross Capacity: (liquids & sedimentation)	2,419,707 tons
Embankment Retention System:	Foundation or abutment movement, settlement, cracks, erosions, sluffs, sloughs, or leakages?	No.
	Seepage, piping, or subsurface erosion?	No.
	Muddy water boils in the area of the embankments, abutments, etc.?	No.
	Significant vegetation on embankment slopes?	N/A. This cell is almost completely filled with tailings. Very little solution impounded in Cell 2.
	Sinkholes or localized subsidence in the foundation, or adjacent to, embankments, or other pertinent structures?	No.
	Tailings pond levels rising or lowering at anticipated rate?	N/A
	Two-foot minimum freeboard above water level?	N/A
	Adequate embankment drainage? Diversion channel capacity adequate?	Yes.
	Unusual release of radioactive material?	No.
	Significant damage to, or changes in, structures, foundations, reservoir levels, groundwater conditions, and adjacent terrain as a result of seismic events?	No..

Pertinent Data

Cell I-1

Dike:	Type:	Random Fill
	Height:	8 feet
	Gross Head:	5 feet
	Crest Length:	2,540 feet
	Crest Width	18 feet
	Crest Elevation:	5,618.2 feet
	Upstream Slope:	3H:1V
	Downstream Slope:	3H:1V
	Completion Date:	June 29, 1981
Spillway:	Type:	None
Outlet Works:	Type:	None
Reservoir:	Gross Capacity: (liquids & sedimentation)	116 acre-feet (liquids plus sediment)
	Elevation	5,614.4 feet
Embankment Retention System:	Foundation or abutment movement, settlement, cracks, erosions, sluffs, sloughs, or leakages?	No
	Seepage, piping, or subsurface erosion?	No
	Muddy water boils in the area of the embankments, abutments, etc.?	No
	Significant vegetation on embankment slopes?	No
	Sinkholes or localized subsidence in the foundation, or adjacent to, embankments, or other pertinent structures?	No
	Two-foot minimum freeboard above water level?	Yes
	Adequate embankment drainage? Diversion channel capacity adequate?	Yes
	Unusual release of radioactive material?	No
	Significant damage to, or changes in, structures, foundations, reservoir levels, groundwater conditions, and adjacent terrain as a result of seismic events?	No

MODULE 82
IUSA – WHITE MESA
DAM SAFETY VISUAL INSPECTION GUIDANCE

Cell 4A

Dike:	Type:	Random Fill
4A-E	Height[2]:	36 feet
4A-S	Gross Head:	34.4 feet
4A-W	Crest Length[2]:	3,100 feet
	Crest Width	18 feet
	Crest Elevation:	5,598 feet
	Upstream Slope:	3H:1V
	Downstream Slope:	3H:1V, w/ toe of berm on 4A-S
	Completion Date:	December 21, 1989
Spillway:	Type:	None
Outlet Works:	Type:	None
Reservoir:	Gross Capacity: (liquids & sedimentation)	1,855,000 tons
	Liquid Volume	1,150 acre feet
Embankment Retention System:	Foundation or abutment movement, settlement, cracks, erosions, sluffs, sloughs, or leakages?	Some erosion has taken place where devetation has been performed. Embankment slopes will be repaired when they are sufficiently dry for heavy equipment to operate on.
	Seepage, piping, or subsurface erosion?	No.
	Muddy water boils in the area of the embankments, abutments, etc.?	No.
	Significant vegetation on embankment slopes?	Some devegetation has been performed on the 4A-S and 4A-W dikes. No observed vegetation on 4A-E.
	Sinkholes or localized subsidence in the foundation, or adjacent to, embankments, or other pertinent structures?	No.
	Tailings pond levels rising or lowering at anticipated rate?	N/A. Cell 4A is dry.
	Two-foot minimum freeboard above water level?	N/A. Cell 4A is dry.
	Adequate embankment drainage? Diversion channel capacity adequate?	Yes.
	Unusual release of radioactive material?	N/A. Cell 4A is dry.
	Significant damage to, or changes in, structures, foundations, reservoir levels, groundwater conditions, and adjacent terrain as a result of seismic events?	No.

Cell 3

Dike:	Type:	Random Fill
	Height[2]:	38 feet
	Gross Head:	33 feet
	Crest Length[2]:	3,390 feet
	Crest Width	18 feet
	Crest Elevation:	5,608 feet
	Upstream Slope:	3H:1V
	Downstream Slope:	3H:1V
	Completion Date:	September 2, 1982
Spillway:	Type:	None
Outlet Works:	Type:	None
Reservoir:	Gross Capacity: (liquids & sedimentation)	2,091,717 tons
	Liquid Volume	775 acre feet
Embankment Retention System:	Foundation or abutment movement, settlement, cracks, erosions, sluffs, sloughs, or leakages?	No.
	Seepage, piping, or subsurface erosion?	No.
	Muddy water boils in the area of the embankments, abutments, etc.?	No.
	Significant vegetation on embankment slopes?	Vegetation growing on the south outside embankment of Cell 3, west of Cell 4A. The embankment slopes are currently too wet from this winter's precipitation for vegetation removal to take place.
	Sinkholes or localized subsidence in the foundation, or adjacent to, embankments, or other pertinent structures?	No.
	Tailings pond levels rising or lowering at anticipated rate?	Yes.
	Two-foot minimum freeboard above water level?	Yes.
	Adequate embankment drainage? Diversion channel capacity adequate?	Yes.
	Unusual release of radioactive material?	No.
	Significant damage to, or changes in, structures, foundations, reservoir levels, groundwater conditions, and adjacent terrain as a result of seismic events?	No.

determined, by the June 1998 report, to be *nil* based upon the low MCE loading and resistance to these soils to liquefaction. Seismic stability of the dikes was evaluated using the pseudo-static method with a seismic coefficient of 0.10g representing the seismic loading condition. The dikes meet the minimum requirement for seismic stability.

The following paragraphs describe the current condition of each cell and observations made during the inspection with the primary emphasis on structural stability of the dikes. Much of the interior of Cells 2 and 3 have been filled with mill tailings. Cell 4 is in the process of being emptied of residual salts and the HDPE liner disposed of in Cells 2 and 3. Because of their heights, Dikes 3, 4A-W, 4A-S, and 4A-E are of most concern.

a. Cell I-1

Cell I-1 is used as a disposal pond for liquid solutions used in the solvent extraction circuit and small volumes of other liquid waste from the extraction process. This cell is essentially a below natural ground containment. In order to satisfy the freeboard requirement of 2.8 feet, the maximum allowable water surface in cell 1-I is 5,615.4 feet. The areas to the north, east, and west side of the cell is essentially the same elevation as the crest of the dike. On the south side, the elevation of the Cell 2 tailings and temporary cover is well above the water level in Cell I-1. Therefore, there is little potential for embankment failure of the dike surrounding this cell.

b. Cell 2

All except for a small area within Cell 2, which is filled with mill tailings, the cell has been filled with mill tailings and a temporary cover. Based upon information provided in the June 2003-2004 Annual Technical Evaluation, the remaining capacity of this cell is estimated to be 5,000 cubic yards. Similar to Cell 1-I, there is essentially no risk of embankment failure since there is virtually no difference between the interior of the cell and the north, east, and west ends of the cell. Most of the downstream area long Dike 2 is buttressed by the fill in Cell 3, which provides stability to the dike. Overall, the dikes surrounding this cell appear to be in good condition with no indications of deformation or cracking. The crest road surface is relatively has some rutting. This is primarily due to the inspection truck driving on it during the extremely wet months of December through March. The rutting will be re-graded when the crest road becomes sufficiently dry.

Dam Safety Inspection Outline for Field Notes – Guidance

A. DOWNSTREAM HAZARD POTENTIAL.

The project has a low downstream hazard potential, as determined by the Utah Department of Natural Resources, Division of Dam Safety. The largest cell capacity, Cell 4A, is 1150 ac-ft. By a visual inspection, there are no developments or recreational facilities downstream of the project. In the unlikely event there was a failure of any of the cells, water release would likely spread out in the relatively flat downstream Correl Canyon channel. A review of the USGS 7.5 minute quadrangle (Blanding South) confirms that there are no structures or recreational areas for at least 20 miles downstream. Therefore, failure of any of the dikes would not result in inundation of any structures or recreational facilities, and it would be unlikely that there would be loss of life.

B. SAFETY OF THE PROJECT.

1. Dams, Dikes, and Appurtenant Structures.

The mill tailings management facilities consist of four cells: I-1, 2, 3, and 4A. The cells were constructed by excavating below grade in the pond area and constructing dikes. Dike design and construction are generally similar for all four cells. The dikes were constructed of random fill materials consisting of sandy clays and silts. Sandy clays and silts, classified primarily as clay (CL) and silt (ML) under the USCS, were obtained from the excavation of each cell. The dike foundation typically consists of sandy clays and silts varying in thickness from 2 to 12 feet overlying bedrock. The bedrock consists predominantly of sandstones of the Dakota Sandstone Formation. The dike side slopes are 3H:1V and the crest widths are 18 feet. Cells I-1, 2, and 3 are lined with 30-mil PVC and Cell 4A is lined with 40-mil HDPE. The stability analyses performed assumed a complete liner failure and the development of a steady state seepage condition. A leak detection system is located beneath each of the cell liners. The system consists of a clay liner over the subgrade, a drain layer over the clay liner, and a collection system.

The section on Seismic Risk Assessment, "Reclamation Plan, White Mesa Project, Blanding, Utah, " dated June 1998, describes the maximum credible earthquake to be a magnitude 6.4 occurring on a mapped suspected Quaternary fault located 25 miles north of the site. The MCE produces an estimated peak horizontal acceleration of 0.07g at the project site. The seismic risk assessment adequately assesses and defines the MCE and peak site horizontal motion.

Liquefaction potential of the predominantly clay (CL) and silt (ML) fine grained foundation and embankment materials under the postulated MCE loading was

3. Licensee's Inspection Program.

   The licensee conducts daily, weekly, monthly, quarterly and yearly inspections as required by the "White Mesa Procedures Manual, Mill Tailings Management," Section 3.1, Revision 4, February 1991. These inspections are reported in the Annual Technical Evaluation Report (NRC Regulatory Guide 3.11.1 requirement).

4. Status of Previous Operations Inspection.

   The following items and their status were identified during the NRC's July 23, 2002 Operation Inspection:

   a. Repair the rutting on the crest surface at the east and west ends of Dike 4A-S
   b. Repair the erosional hole on the crest surface at the east end of Dike 4A-S

   These items were reported to have been corrected within days of the July 23, 2002 inspection.

C. PROJECT COMPLIANCE.

1. Unauthorized Project Modifications or Use.

   There were no modifications noted.

2. License Compliance.

   The licensee appears to be in compliance with the license with regard to safe operation and inspection of the dike facilities.

3. Other Maters.

   None

D. FINDINGS AND FOLLOW-UP ACTIONS.

During the exit briefing, the licensee was informed that overall the cell dikes appeared to be in good condition and the only required follow-up actions included the following:

Enclosures list:
12 Photographs

c. Cell 3

A concrete spillway section was built between Cells 2 and 3 to prevent the uncontrolled release from Cell No. 2. The concrete spillway appeared to be structurally sound with no indications of cracks or displacement. According to the June 2003-2004 Annual Technical Evaluation, approximately 40% of the cell has been covered with random fill. Mill tailings and liquids, make up the remainder of the cell. The southwest half of Dike 3 is approximately 38 feet high. With the relatively high head differential between the elevation of the liquids and the toe of the dike, this dike is currently considered the more critical dike. Based on observations made during the inspection, this reach appeared to be in good condition. The downstream slope is in good condition, however there is some vegetation growing on it. The slope can be devegetated when the surface becomes dry enough. Also, there were no signs of seepage, cracks, and excessive erosion. Tailings fill within the eastern half of Cell 3 precludes any risk of instability on the interior of the cell.

d. Cell 4A

Cell 4A is has been used as a waste area for processed materials and an evaporation pond for solutions. Operations are currently underway to remove the liner, debris, and salts from Cell 4A and transfer them to Cells 2 and 3 for disposal.

In its current condition, with exposed and torn HDPE lining, this cell cannot be used to store tailings or waste solutions. If the cell is to be used in the future, the licensee would need to developed a plan to rehabilitate the cell for use. Dikes 4A-W, 4A-S, and 4A-E appear to be in good condition. There were no signs of slope instability, seepage, cracks, or prairie dog activity on any of the dikes. The west and south downslopes had been devegetated. There is a minor amount of erosion on these slopes because of the devegetation. The erosion will be repaired when the surface becomes dry enough to handle heavy equipment.

2. <u>Instrumentation.</u>

a. <u>Leak Detection System.</u>

A leak detection system underlies the cell liner. The system consists of a crushed sandstone layer beneath the liner over a clay liner that overlies the subgrade and a collection system. The licensee continues to monitor the system.

Figure 3: March 22, 2005: Cell 2 viewed from the north embankment. Temporary radon barrier has been placed over the majority of the cell.

Figure 4: March 22, 2005: Cell 2 viewed from the south embankment. Temporary radon barrier has been placed over the majority of the cell.

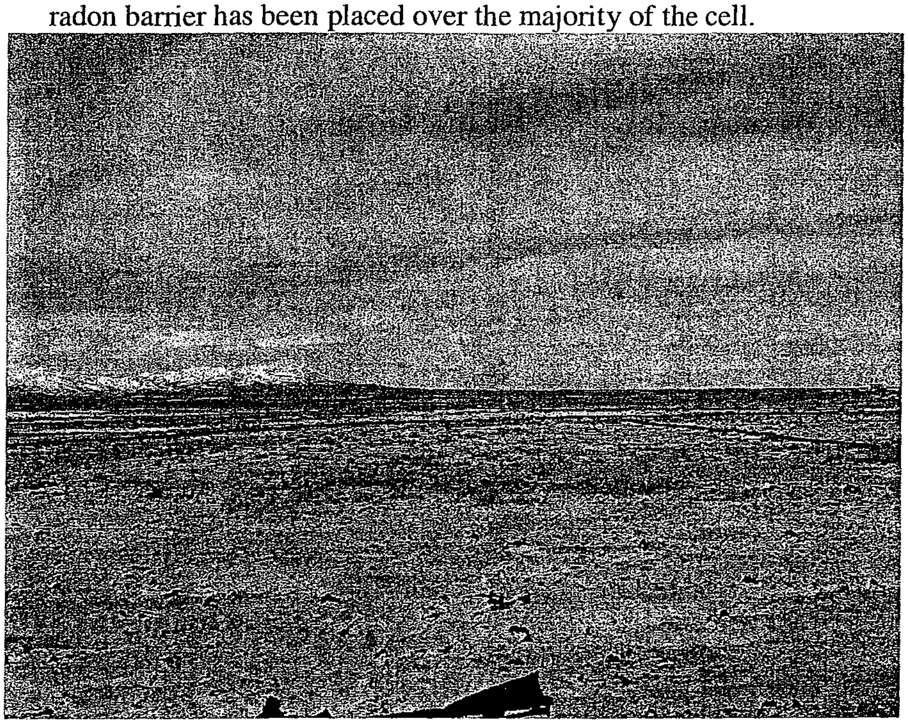


Figure 1: 03/22/05: View of Cell 1 from the north embankment. The band of red is the freeboard of the cell.

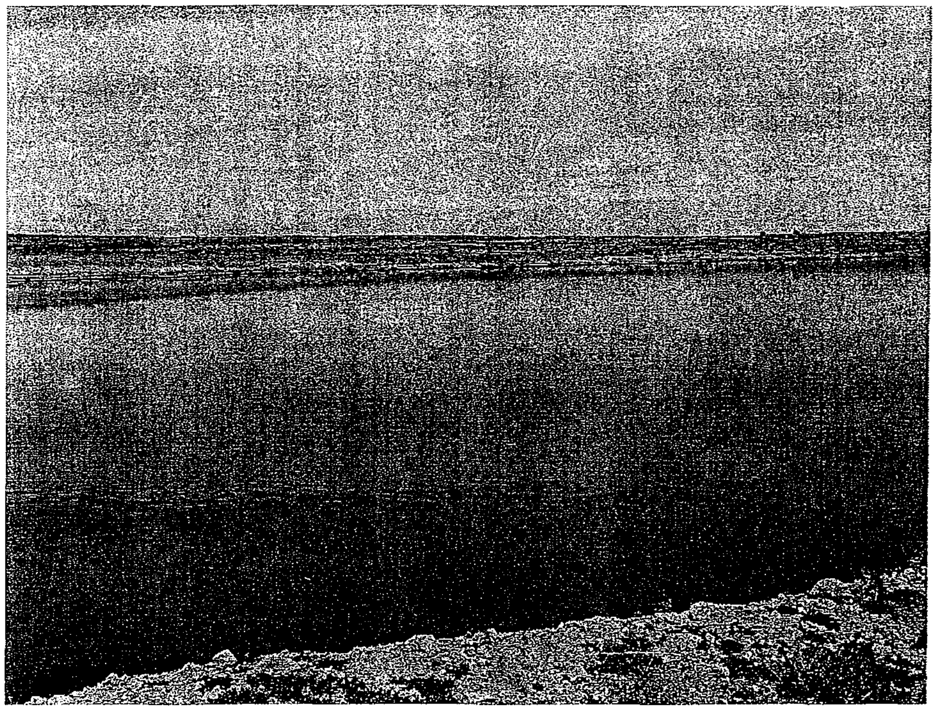


Figure 2: 03/22/05: View of Cell 1 from the south embankment. The band of red is the freeboard of the cell.

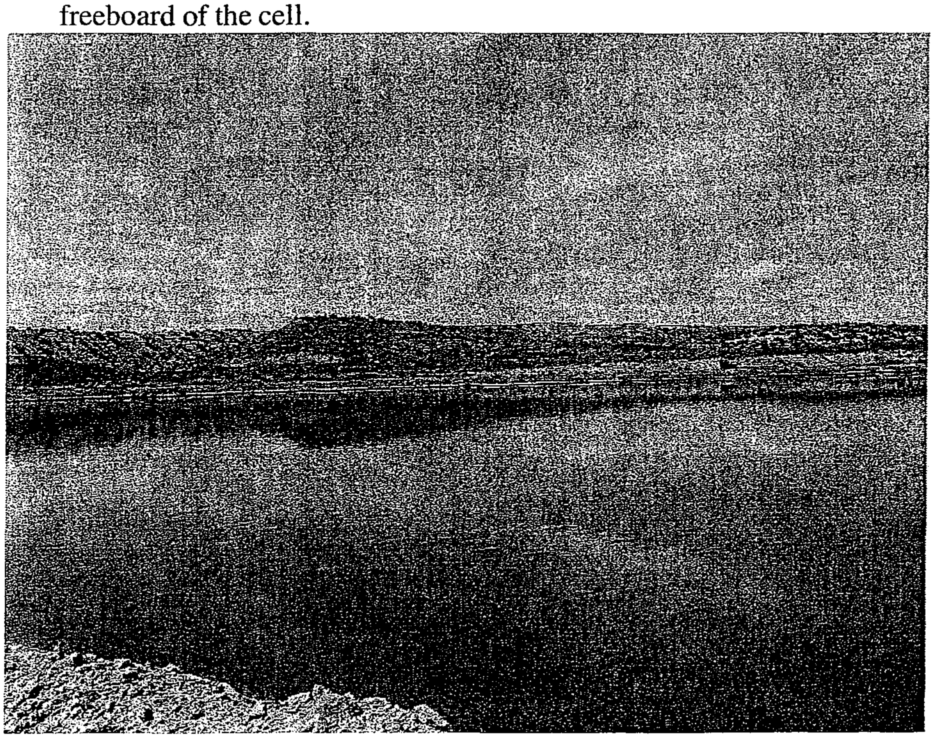


Figure 7: March 22, 2005: Cell 3 salt crust over tailings sands and pool viewed from north embankment. The salt crust is the white/gray in the foreground.

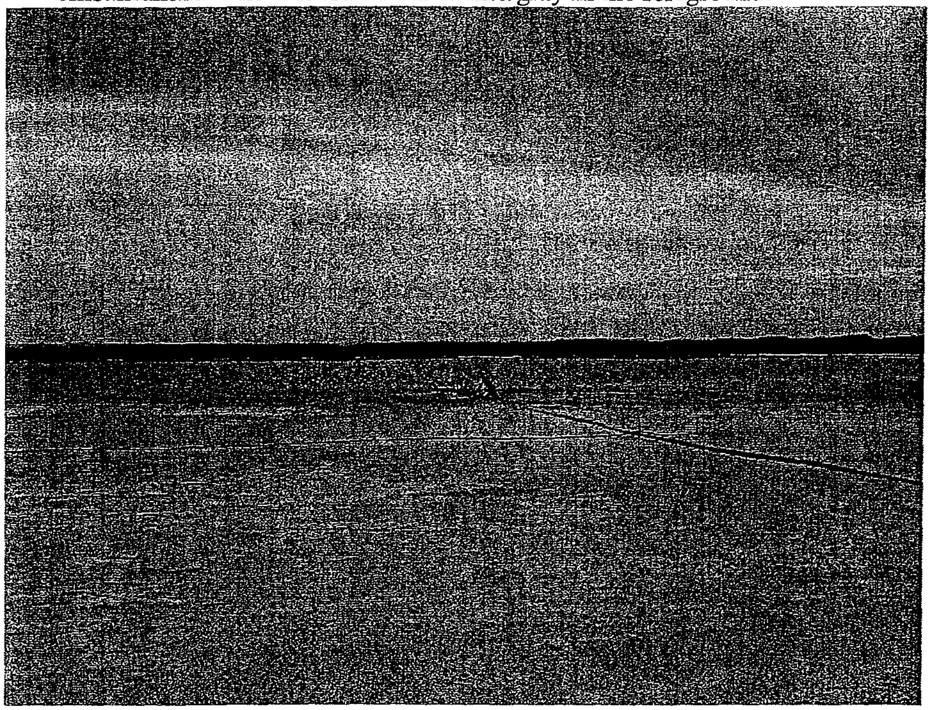


Figure 8: March 22, 2005: Same as Figure 7.

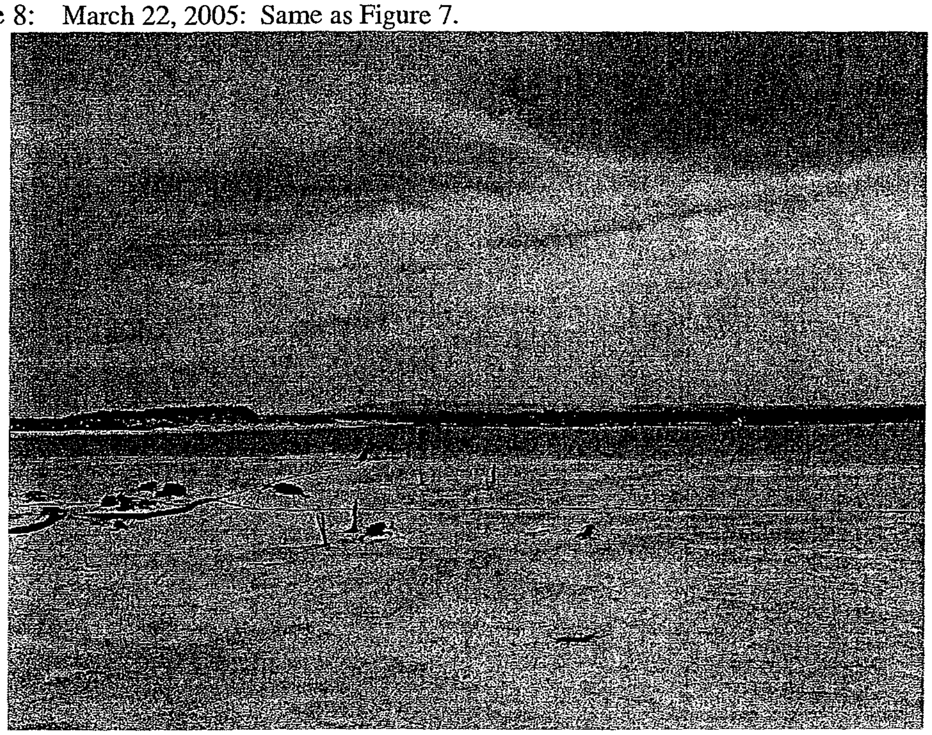


Figure 5: March 22, 2005: Open area of Cell 2 viewed from the south embankment. This portion of the cell is used for facility trash disposal.

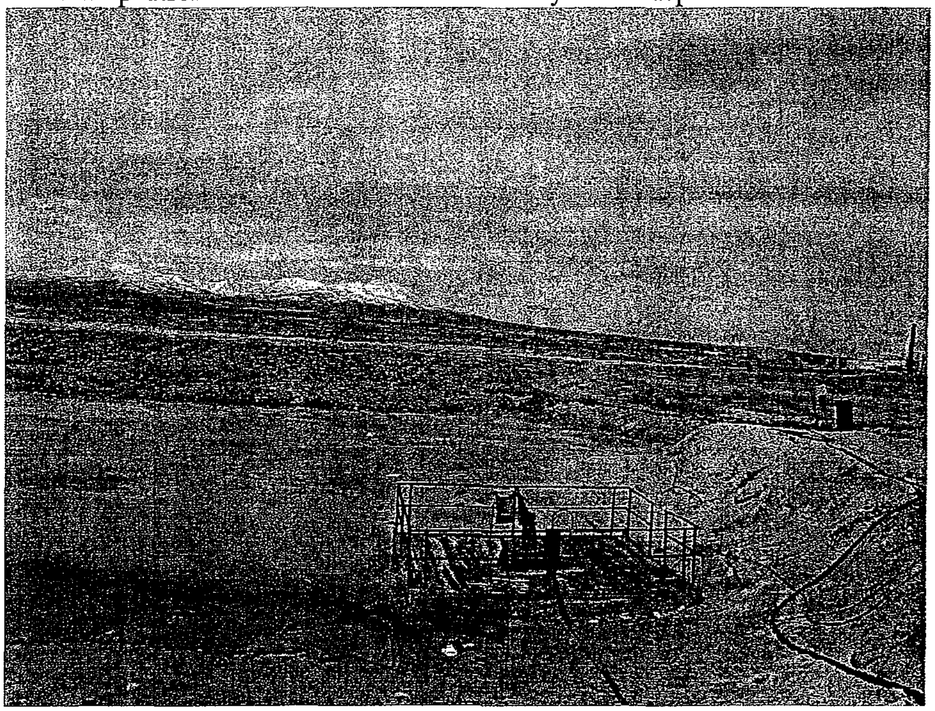


Figure 6: March 22, 2005: Same as Figure 5.

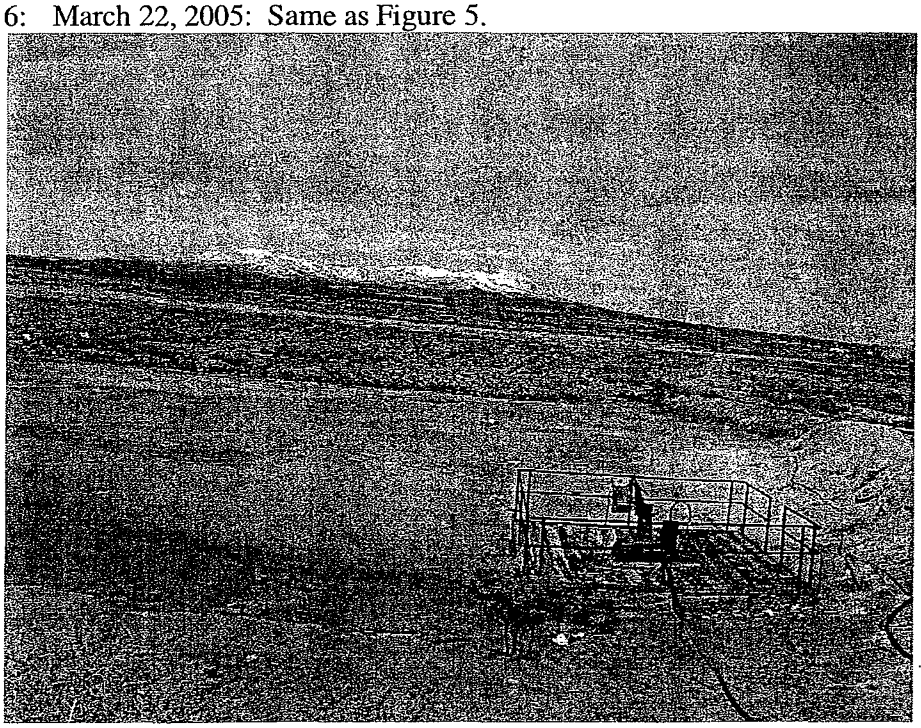


Figure 11: March 22, 2005: Same as Figure 10. On the left and right of the embankment, the liner can be seen to be ripped.

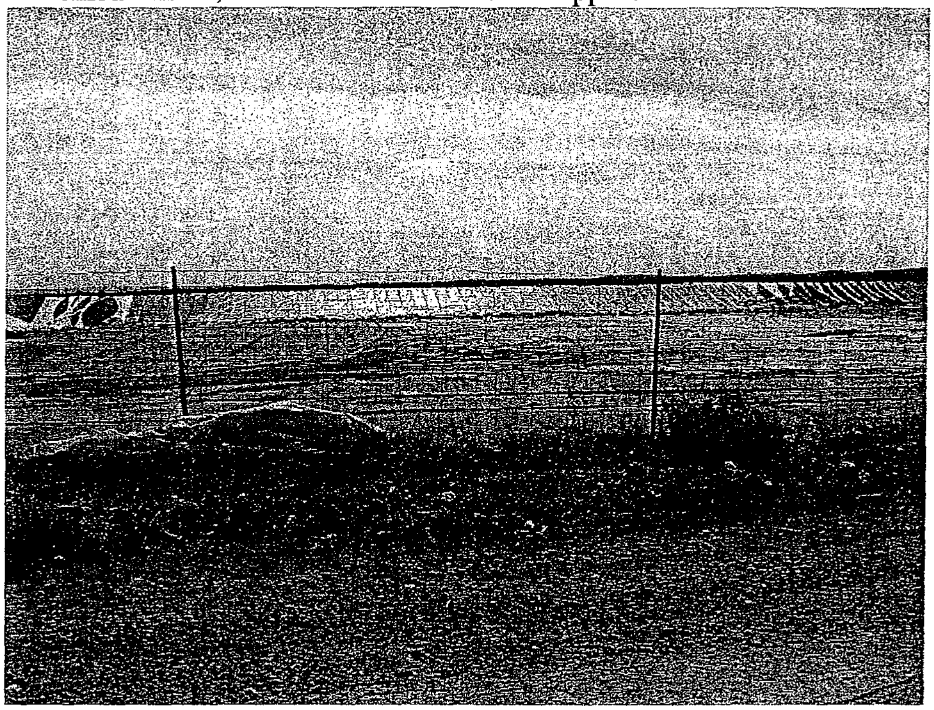


Figure 12: March 22, 2005: Cell 4A downslope embankment viewed from the south. Sage brush and short grass can be seen growing in the foreground.

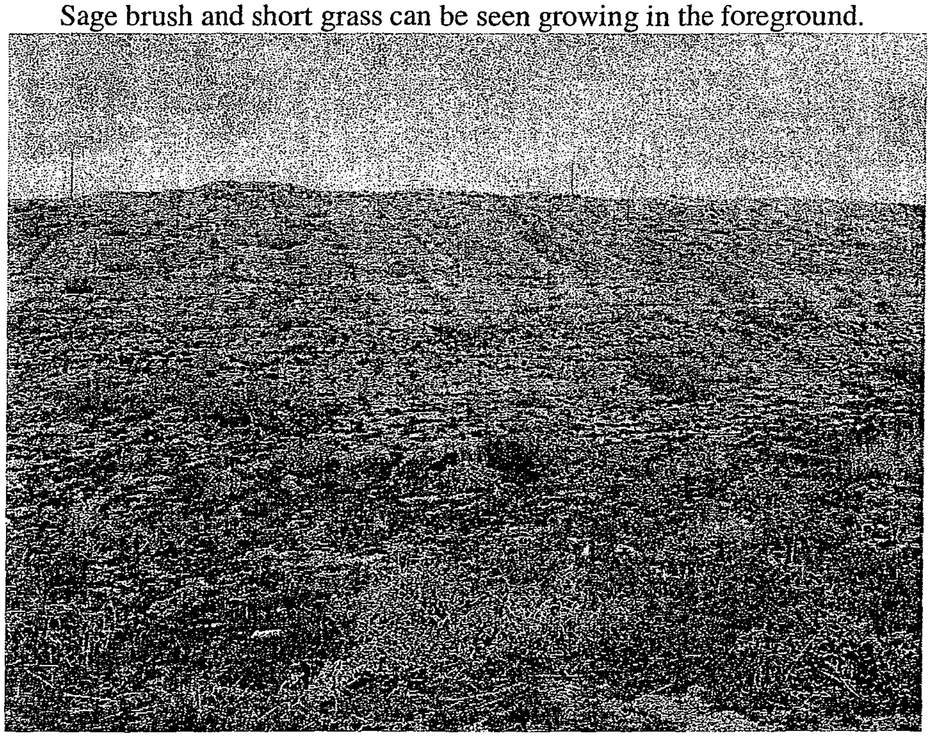
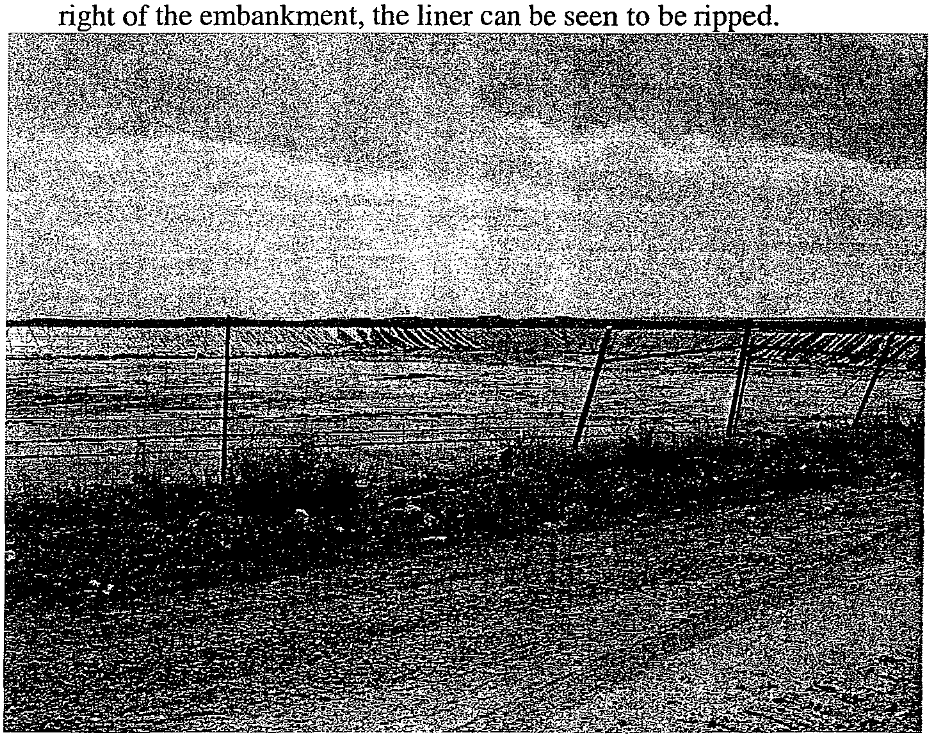


Figure 9: March 22, 2005: Cell 3 downslope embankment viewed from the east. Sage brush and short grasses are growing on the slope.

Figure 10: March 22, 2005: Cell 4A viewed from north embankment. In the center and right of the embankment, the liner can be seen to be ripped.



It is IUC's belief that the nature of operations at the White Mesa Uranium Mill exposes workers to radiation from all angles, not only to the front. It is IUCs belief that the location of dosimetry should not matter as long as it is worn.

DRC response:
If IUC has such documentation regarding radiation from all angles to the workers at the Mill, the DRC requests copies of the surveys. The DRC has also considered the various work activities performed at the Mill and has concluded that only an employee whose work activities were confined to the storage yard may fall into the situation described by IUC. All other work activities, such as facility maintenance, lab activities, health physics surveys, etc., would be performed facing the task.

It is the IUC belief that historically the Total Effective Dose Equivalent (TEDE) received by Mill workers is low when compared to regulatory limits.

DRC Response:
The DRC can agree with IUC's belief that the Total Effective Dose Equivalent (TEDE) is low compared to regulatory limits.
The personal monitoring data collected from the OSL dosimetry is the permanent legal record of exposure to radiation for each employee. While this record provides the employee information regarding any occupational exposure, it also provides information to the employer should questions arise.

On page 3, IUC reiterates their belief statement that the Nuclear Regulatory Commission (NRC) had "previously inspected and found this practice to be acceptable".

DRC Response:
The DRC has been unable to locate any documentation to substantiate this statement. Please submit to the DRC documentation of the NRC inspection and their concurrence.

The study proposed by IUC requires several workers at the White Mesa Uranium Mill to wear duel dosimetry for a two month period. One OSL dosimeter would continue to be clipped to the tightening strap located on the back of the hardhat and the second OSL dosimeter would be added to the front torso of the same worker. The proposed participants included a shift foreman, a maintenance, worker, an operations worker, a Radiation Technician, and a laboratory worker. At the end of this 2-month period, the results would be evaluated to determine if there was a "significant difference" between the first and second dosimeters.

DRC Response:
The DRC has no issue with the proposed study. However, the DRC has the following comments on the proposal. The DRC would recommend that for a true comparison, the second dosimeter be added during normal quarterly exchange and worn for that entire quarter. The list of employees proposed by IUC for the study seems adequate, conversely IUC may want to consider including mill workers who have historically received the highest recorded doses. If the purpose of the study is to determine whether there is a "significant difference" in exposure readings from two badges worn by the same person, DRC would recommend that

CF, RFH, MHR, TLCm REB DCP

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

RECEIVED
SEP 19 2005
BY:

September 12, 2005

David Frydenlund, Vice President and General Council
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 17th Street
Denver, CO 80265

Re: Results of Technical Evaluation and Request for further Information and Documentation Regarding International Uranium (USA) Corporation's Correspondence, dated June 30, 2005 - License # UT 1900479

Dear Mr. Frydenlund:

On June 30, 2005, the International Uranium (USA) Corporation (IUC) transmitted a letter to the Utah Division of Radiation Control (DRC), in which the IUC provided written comments regarding the proper wearing of personal monitoring devices by employees at the White Mesa Uranium Mill. An evaluation has been completed by the DRC to determine if the IUC provided adequate justification and documentation regarding Radiation Safety and met the requirements in UAC R313-15-503.

For ease of reference, the statements made by IUC in the June 30, 2005 correspondence, has been summarized below in italics; followed by the DRCs response.

Wearing the personal monitoring devices [i.e. Optically Stimulated Luminescence (OSL) Dosimeters] on the backstrap of the hardhat was implemented at the White Mesa Uranium Mill to minimize their loss and/or damage.

DRC response:
The DRC does not consider this adequate justification for not adhering to the rule. Based on literature search, other facilities conducting similar hazardous activities have been able to mitigate the loss and/or damage.

IUC develop a defensible quantitative numerical value instead of using the term "significant difference".

If, as the IUC stated in their correspondence, the NRC inspected and granted approval to deviate from 10 CFR 20; the DRC requests copies of this documentation. However until such documentation has been received, it is the determination of the DRC that IUC has not provided sufficient justification to demonstrate compliance with R313-15-503.

In summary, please provide the additional information requested in this letter, if available and a revised comparison study.

If you have any questions or comments, please contact me at (801) 536-4250

Sincerely,

John Hultquist
LLW/Uranium Mills Section Manager

JH/cmh

DRC Review of Semi-annual Effluent Monitoring Report
Dated November 18, 2005

No notices of violation issued

and
Response letter dated April 14, 2006

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

CF, RFH, DCF, HWH
ICM REK

NOV 22 2005

November 18, 2005

David C. Frydenlund, Vice President and General Council
International Uranium (USA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

Subject: Radioactive Materials License UT 1900479: Review of the July 1 through December 31, 2004, Semi-Annual Environmental Monitoring Effluent Report for the White Mesa Uranium Mill, International Uranium (USA) Corporation

Dear Mr. Frydenlund:

On March 1, 2005, International Uranium (USA) Corporation (IUSA) transmitted the July 1 through December 31, 2004, Semi-Annual Environmental Monitoring Effluent Report for the White Mesa Uranium Mill to the Division of Radiation Control (DRC) for review. Except for the Groundwater Monitoring which was reviewed separately; this letter presents the results of this review with respect to past data and license requirements.

Gas Stack Effluent Monitoring
The system was in standby during this reporting period and no effluent gas stack sampling occurred.

Air Particulate Sampling
All air particulate sampling results for the reporting period were less than the concentrations specified in the radioactive materials license and 10 CFR Part 20, Appendix B and no adverse trends were identified.

Direct Radiation
Ambient gamma exposure rates were below the 10 CFR 20.1301 limits required by the license.

Environmental Radon
Section 2.1 of the effluent report states that instead of direct measurement of the radon-222 flux at the facility boundaries using TLDs, "computational methods" are used to demonstrate compliance with the requirements of 10 CFR 20.1302 (b) (1). This could not be verified since the effluent monitoring report did not include this data. Mill personnel confirmed that the effluent monitoring report did not contain this data since the data is part of the National Emission Standards for Hazardous Air Pollutants (NESHAPs) report.

The DRC requests the licensee provide the "computational methods" that are used to demonstrate compliance. In addition, the DRC requests that future Semi-Annual Effluent Monitoring reports include the data, data calculations, and a discussion of the results.

Soil Monitoring
Sample results for the reporting period were comparable to those taken in prior years and indicated no adverse trends.

Vegetation Monitoring
Sample results for the reporting period were comparable to those taken in prior years and indicated no adverse trends.

Surface Water Monitoring
The analytical results from surface water samples collected in Cottonwood Creek during this reporting period remained consistent with prior sampling events.

The Westwater Creek remained dry during 2004, therefore no samples were required by the License.

Groundwater Monitoring
As stated previously, the groundwater monitoring reports are transmitted separately in accordance with the Groundwater Discharge Permit UGW370004.

Conclusions
Based upon DRC review of the White Mesa Mill, Blanding Utah, Semi-Annual Effluent Monitoring Report for the period of July 1, 2004 through December 31, 2004, the DRC concludes that the environmental activities presented in the report are in accordance with license requirements. The DRC has determined that the licensee had collected the required environmental monitoring samples as specified in the license. The environmental monitoring sample results included in the report were lower than the effluent release limits specified in the license, and no adverse trends were apparent when compared to past data.

In addition, the DRC would propose a change to the environmental effluent monitoring requirements. Based upon review of the many years of the analytical results of the vegetative sampling and the difficulty in obtaining sufficient vegetative material for samples, especially during drought conditions, the DRC would propose that IUC entertain the replacement of vegetation sampling with the addition of two new air-monitoring stations. As identified on the facility diagram attached to this letter, the two proposed locations are downwind from the mill in the prevailing wind direction. These two locations would identify and quantify any airborne particulates from the tailing ponds or from the ore storage pad.

Finally, the DRC requests the licensee submit the "computational methods" used and how compliance is demonstrated with these calculations, and a response to our proposal regarding the two air monitoring stations. Also, the DRC requests future Semi-Annual Effluent Monitoring reports include the computational method, data calculations, and a discussion of the results. If you have any questions or comments, please contact me at (801) 536-4250.

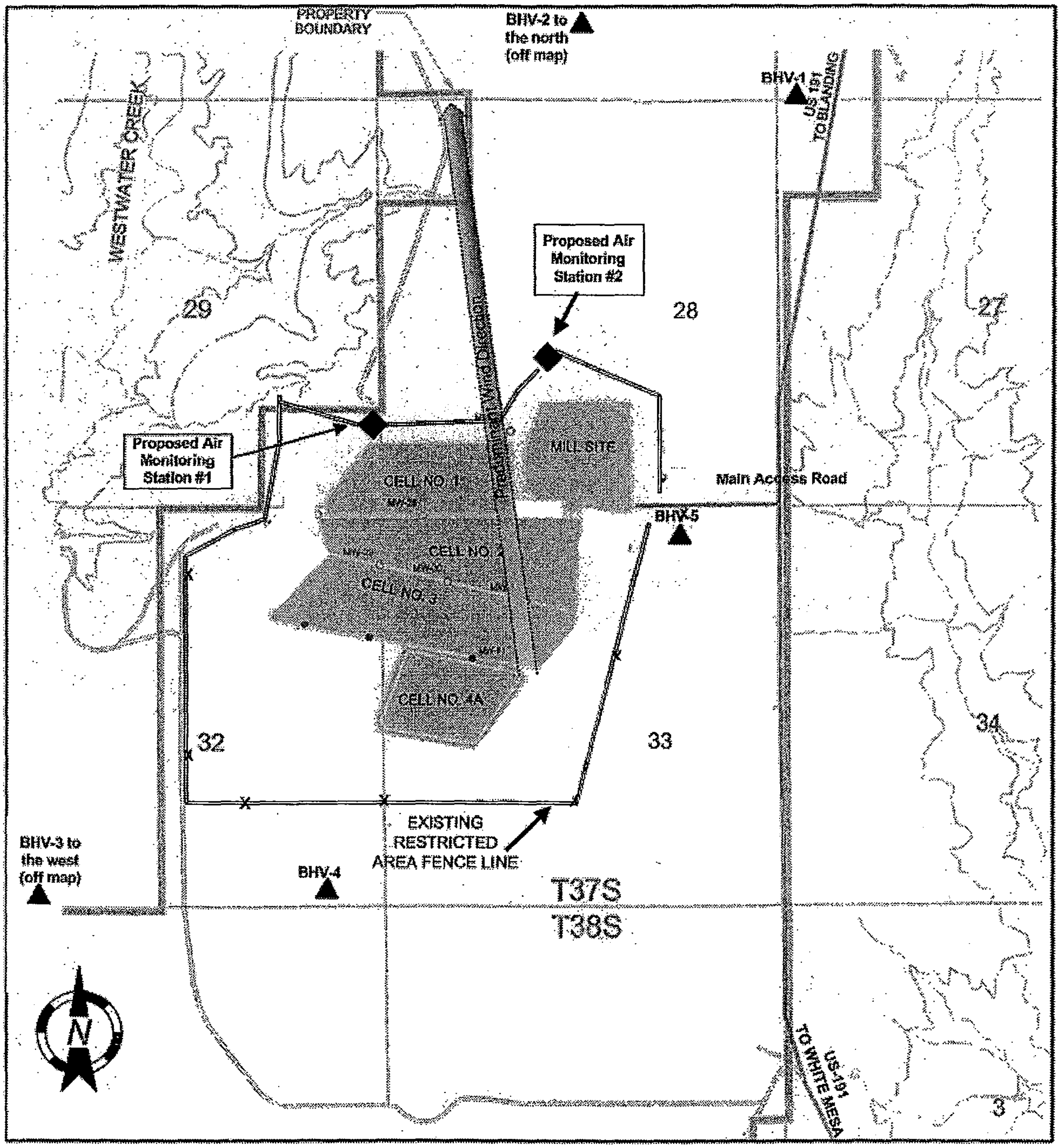
Sincerely,

John Hultquist
LLW/Uranium Mills Section Manager

JH/CMH/ch

Attachment

CC: Ronald E. Berg, International Uranium (USA) Corporation



Legend

Restricted Area Fence

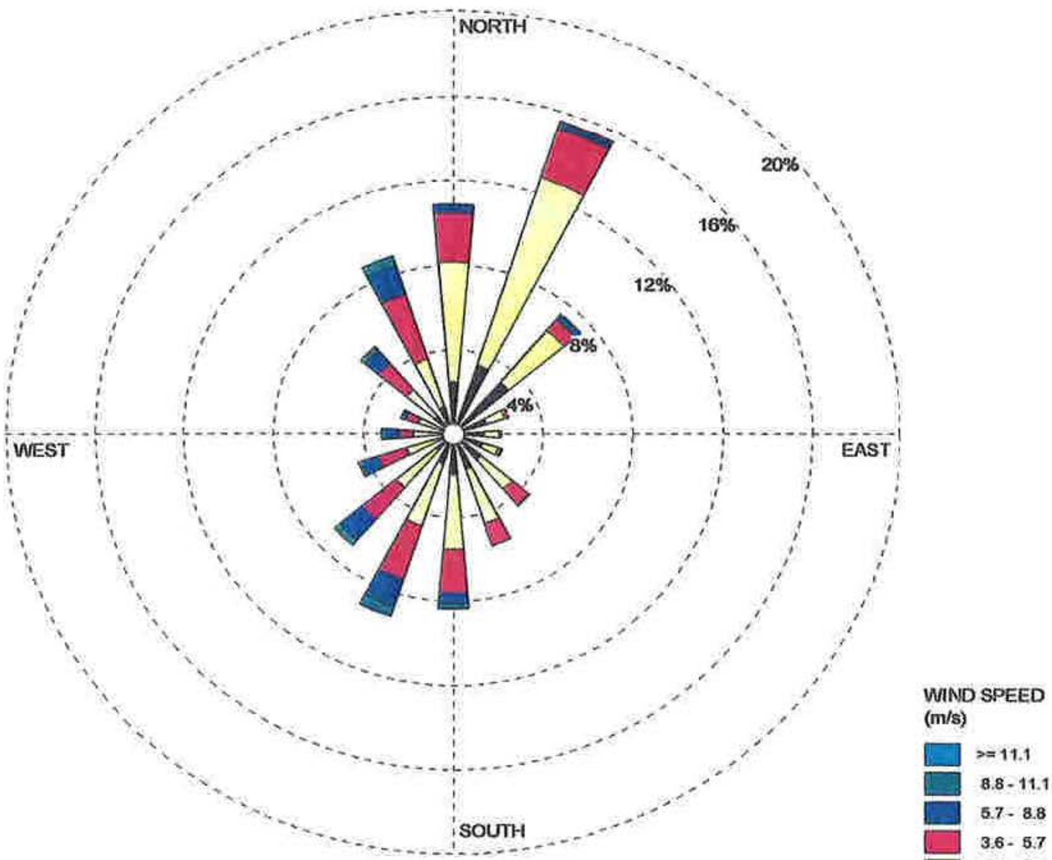
Current Air Monitoring Stations

Proposed Air Monitoring Stations

Attachment 1 - Proposed Air Sampling Station Locations

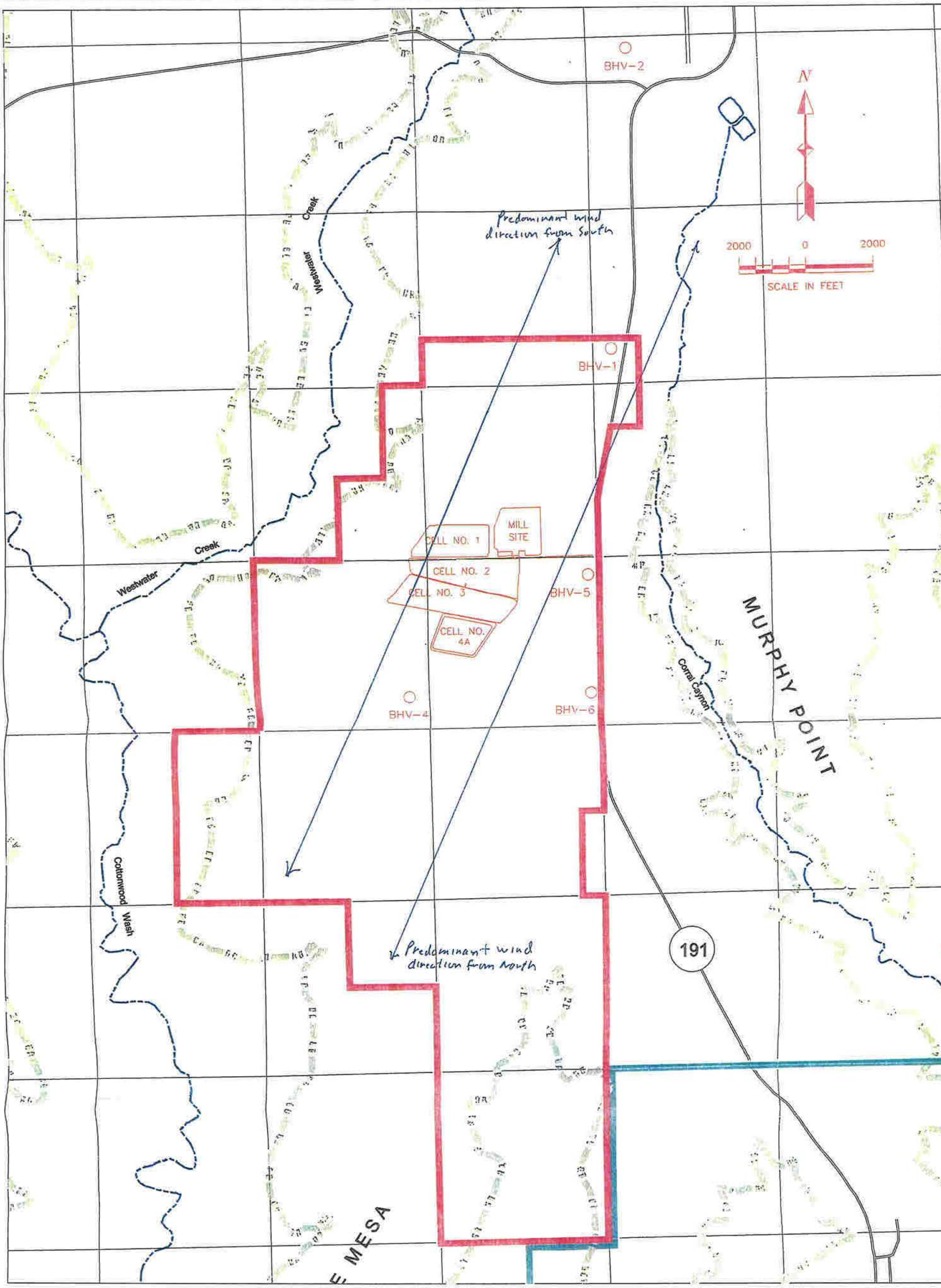
White Mesa Mill
Blanding, Utah

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	2005 Jan 1 - Dec 31 00:00 - 23:00	International Uranium Corporation	
		MODELER: McVehil-Monnett Associates	FIGURE 4-1
	CALM WINDS: 0.47%	TOTAL COUNT: 7178 hrs.	
	AVG. WIND SPEED: 3.37 m/s	DATE: 2/21/2006	PROJECT NO.: 1868-05

WRPLOT View - Lakes Environmental Software



Property Boundary

Reservation Boundary

Canyon Rim

Air Monitor Stations

International Uranium (USA) Corporation			
Project	WHITE MESA MILL		
REVISIONS	County:	State: UT	
Date / By	Location:		
	Figure 3.3 - 2 NRC Air Monitoring Stations		
	Scale: AS SHOWN	Date: March 2003	figure 3.3-2.dwg
	Author: HRR	Drafted By:	

Denver Central Files

IUC

INTERNATIONAL URANIUM (USA) CORPORATION

April 14, 2006

VIA US MAIL

Mr. John Hultquist
LLW/Uranium Mills Section Manager
Division of Radiation Control
State of Utah Department of Environmental Quality
168 North 1950 West
P.O. Box 144850
Salt Lake City, UT 84114-4850

Re: Radioactive Materials License UT 1900479: Review of the July 1 through December 31, 2004, Semi-Annual Environmental Monitoring Effluent Report for the White Mesa Uranium Mill, International Uranium (USA) Corporation

Dear Mr. Hultquist:

This letter is in response to your November 18, 2005 letter, in which you provided the results of your review of the July 1 through December 31, 2004, Semi-Annual Environmental Monitoring Effluent Report for International Uranium (USA) Corporation's ("IUSA's") White Mesa Uranium Mill (the "Mill").

In your letter, you asked us to address the following two issues:

Environmental Radon

You have asked us to provide the "computational methods" that are used to demonstrate compliance with the requirements of R313-15-302 (2) (a) (10 CFR 20.1302 (b) (1)), and have requested that future Semi-Annual Effluent Monitoring reports include the data, data calculations and a discussion of the results.

As indicated in your letter and in the Mill's Semi-Annual Effluent Reports, radon 222 is not directly measured at the Mill's boundary. IUSA demonstrates compliance with the limits and requirements of R313-15-301 by calculation, authorized by the United States Nuclear Regulatory Commission, and contemplated by 10 CFR 20.1302 (b) (1) (R313-15-302 (2) (a)).

This calculation is performed by use of the MILDOS code for estimating environmental radiation doses for uranium recovery operations (Strenge and Bender 1981). The MILDOS code was applied in 1991 in support of the Mill's 1997 license renewal and more recently in 2003 by use of the updated MILDOS AREA code (Argonne 1998). The analysis under both the MILDOS and MILDOS AREA codes assumed the Mill to be

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1050 Seventeenth St., Suite 950
Denver, Colorado, USA 80265

info@intluranium.com
www.intluranium.com

processing high grade Arizona Strip ores at full capacity, and calculated the concentrations of radioactive dust and radon at individual receptor locations around the Mill. Specifically, the modeling under these codes assumed the following conditions:

- 730,000 tons of ore per year
- Average grade of 0.53% U3O8
- Operating 24 hrs/day for 340 days per year
- Yellowcake production of 4,380 tons of U3O8 per year (8.8 million lbs/yr).

Based on these conditions, the MILDOS and MILDOS AREA codes calculated the *combined* total effective dose equivalent *from both air particulate and radon* at the current nearest residence (approximately 1.2 miles north of the Mill), i.e., the individual member of the public likely to receive the highest dose from Mill operations, to be below the ALARA goal of 10 mrem/yr *for air particulate alone* as set out in R313-15-101(4).

Mill operations are constantly monitored to ensure that operating conditions do not exceed the conditions assumed in the above calculations. If conditions are within those assumed above, radon has been calculated to be within regulatory limits. If conditions exceed those assumed above, then further evaluation will be performed in order to ensure that doses to the public continue to be within regulatory limits. It should be noted that Mill operations to date have never exceeded the licensed conditions assumed above. During 2004 and 2005, Mill operations did not come close to approaching these assumed conditions.

Disclosure to the foregoing effect was included in the Semi-Annual Effluent Report for the period July 1 – December 31, 2005, which was sent to the Executive Secretary on March 3, 2006.

Proposed Change to Effluent Monitoring Requirements

In your letter, you have noted that, based upon a review of the many years of analytical results of vegetative sampling, it is difficult to obtain sufficient vegetative material for samples, especially during drought conditions, and you have proposed that IUSA entertain the replacement of vegetation sampling with the addition of two new air-monitoring stations.

We agree that it is very difficult if not impossible to make any meaningful comparisons of vegetation sampling results, due to the different quality and quantity of samples that can be obtained from period to period. By necessity, these samples typically are comprised of varying proportions of different types of vegetation. This fact, along with the fact that results to date have shown no upward trend in contamination, leads to the conclusion that continued vegetation sampling provides little if any benefit. We agree that the Mill's license should be amended to eliminate the need for vegetation sampling.

However, we do not believe that the removal of the requirement to conduct vegetation sampling should be conditional upon adding two new air particulate monitoring stations, as you have proposed. In your Attachment 1 *Proposed Air Sampling Station Locations* (a copy of which is enclosed with this letter), you propose two locations for new air particulate monitoring stations, which you suggest would be located downwind from the mill in the prevailing wind direction. However, as you can see from the enclosed wind rose, which has been copied out of the *Semi-Annual Meteorological Monitoring Report, July Through December 2005 And Annual Meteorological Summary Report For 2005 For International Uranium Blanding, Utah*, prepared by McVehil-Monnett Associates, Inc. (February 2006), a copy of which is maintained at the Mill for inspection, the prevailing wind direction is not southeast to northwest, as you have suggested. Rather, the predominant wind direction is from the northeast to the southwest, followed by north to south and northwest to southeast, which is in line with existing air particulate monitoring stations BHV-4 and BHV-6. The predominant wind direction from the south is from the southwest to the northeast, which is in line with BHV-1, located near the Mill's property boundary, about 0.50 miles short of the nearest residence. Winds from the southeast to the northwest, which you have suggested is the prevailing wind direction, are among the lightest at the site.

We also enclose a map showing the current locations of the Mill's air particulate (BHV) stations, with the predominant winds from the north (northeast to southwest) and from the south (southwest to northeast) indicated thereon. The map includes BHV-6, which is not indicated on your Attachment 1. BHV-6 was added in July 1999 at the request of the White Mesa Ute community to provide added air particulate monitoring to the southeast of the Mill site, in line with the White Mesa Ute community which is over 3 miles away in that direction.

Since the existing air particulate monitoring stations are in the path of the prevailing winds, IUSA does not believe there is a need to add any additional monitoring stations. However, as mentioned above, IUSA does agree that there is no useful purpose in continuing with vegetation sampling at the site, and proposes that that requirement be deleted from the Mill's radioactive materials license.

If you have any questions or require any further information, please give me a call.

Yours truly,

David C. Frydenlund
Vice President and General Counsel

cc: Ron F. Hochstein
Harold R. Roberts
David Turk

DRC Reclamation and Decommissioning Inspection
Report and Closeout Letter
Dated November 28, 2005

DRC Inspection of September 20, 2005

No notices of violation issued

CF HRK RFH DCF Tlcn RES

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

DEC 5 2005

November 28, 2005

CERTIFIED MAIL
(RETURN RECEIPT REQUESTED)

David C. Frydenlund
International Uranium (IUSA) Corporation
Independence Plaza, Suite 950
1050 Seventeenth Street
Denver, CO 80265

Subject: 3rd Quarter 2005 International Uranium (USA) Corporation Engineering Inspection Module 72 – Reclamation and Decommissioning: **Closeout Letter**

Dear Mr. Frydenlund,

The purpose of this letter is to transmit UDRC findings made during the September 20, 2005 inspection of the International Uranium (USA) Corporation (IUSA) White Mesa facility. The basis of the inspection was Engineering Inspection Module 72 – Reclamation and Decommissioning. The primary focus of this inspection was the Cell 4A cleanup construction that had taken place since the last inspection on March 22, 2005. DRC staff, John Hultquist and John Cook, were at the facility from 12:30 p.m. to 3:30 p.m. DRC staff met with Messrs. David Frydenlund, Ron Berg and Harold Roberts. Messrs. Frydenlund, Berg, and Roberts all accompanied DRC staff throughout the Cell 4A inspection. Items in the Module 72 that were relevant to this inspection were:

- Cell 4A evaporation to dryness
- Cell 4A crystals, liner, and contaminated soils transported to Cell 3 for disposal
- Contaminated material detection by gamma survey

Conclusions

At the time of the inspection, it was apparent that:

1. Cell 4A had been evaporated to dryness and that the raffinate crystals, synthetic liner, and some contaminated soils have been transported to Cell 3 for disposal.
2. Final gamma soil surveys for contamination have not yet taken place. Some preliminary soil surveys have taken place and there are some known areas that will need additional clean-up before new liner can be constructed. The preliminary and final gamma survey must be submitted to the UDRC for approval.

Additionally, the DRC staff discussed the settlement and movement monitoring stands that have been installed on the tailings cells. DRC staff requested a drawing showing the existing and proposed locations of the monitoring stands. Please provide this information within 45 days of receipt of this letter.

The progress on cell cleanup up to the time of the inspection appeared to be compliant with the requirements of the Reclamation and Decommissioning plan. Although the Cell 4A material appears to be bulky in nature, the DRC recommends that stockpiles of material be spread into Cell 3 to reduce the likelihood of wind dispersion. Final approval for the Cell 4A cleanup will be given upon review of the final radiological survey results.

If you have any questions or comments, please contact John Cook at (801) 536-4250.

D. Finerfrock

Dane Finerfrock
Executive Secretary

DF/JPC: jc

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File: IUC.02.05

MODULE 72
IUSA – WHITE MESA 11e.(2)
RECLAMATION & DECOMMISSIONING

Soil Cover Design

A six-foot thick soil cover for the uranium tailings in Cell 2 and Cell 3 has be designed. The Cover consists of:

- Top layer: 3-inch thick (top of cell) to 8-inch thick (side slopes of cell) layer of riprap material placed over compacted random fill for slope stabilization.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.1 07/17/00)

- Second Layer: 2-feet thick of random fill (frost barrier) available from stockpiles on site. This layer must be compacted to 95% maximum dry density. This layer must have a hydraulic conductivity of 8.87×10^{-7} cm/s.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.1 07/17/00)

- Third Layer: 1-foot thick layer of clay, available from within the site boundaries (Section 16). This layer must be compacted to 95% maximum dry density. This layer must have a hydraulic conductivity of 3.7×10^{-8} cm/s.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.1 07/17/00)

- Fourth layer: 3-feet thick, minimum, random fill soil (platform fill), also available on site. (It should be noted that the purpose of this layer is to raise the base of the cover to the desired subgrade elevation, but a minimum of 3-feet of this layer is required per radon model). The top 1-foot of this layer must be compacted to 95% maximum dry density. Bottom two feet & below must have a compaction of 80 – 90%, based on a standard Proctor.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.1 07/17/00)

MODULE 72
IUSA – WHITE MESA 11e.(2)
RECLAMATION & DECOMMISSIONING

Soil Cover Design

Platform Fill (Layer 4) and Frost Barrier (Layer 2) will be mixtures of clayey sands and silts with random amounts of gravel and rock size material. In the initial bridging lift of the platform fill, rock sizes of up to 2/3 of the thickness of the lift will be allowed. On all other random fill lifts, rock sizes will be limited to 2/3 of the lift thickness, with at least 30% of the material finer than the #40 sieve. For that portion passing the #40 sieve, these soils will classify as CL, SC, MC or SM materials under the Unified Soil Classification System. Oversized material will be controlled through selective excavation at the stockpiles ad through the utilization of a grader, bulldozer or backhoe to cull oversize from the fill.

VIOLATION Yes ____ No ____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.1 07/17/00)

Clay Layer Materials (Layer 3) will have at least 40% passing the #200 sieve. The minimum liquid limit of these soils will be 25 and the plasticity index will be 15 or greater. These soils will classify as CL, SC, or CH materials under the Unified Soil Classification System.

VIOLATION Yes ____ No ____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.1 07/17/00)

Riprap (Layer 1 – Top) will meet the following specifications:

Location	D_{50} Size	D_{100} Size	Layer Thickness
Top Surface	0.3”	0.6”	6.0”
Slope Surface	3.5”	7.0”	8.0”
Toe Apron	6.4”	12”	24”

The riprap layer will be compacted by at least two passes by a D-7 Dozer (or equivalent) in order to key the rock for stability.

VIOLATION Yes ____ No ____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.1 07/17/00)

MODULE 72
IUSA – WHITE MESA 11e.(2)
RECLAMATION & DECOMMISSIONING

Cell 1-I Reclamation

Cell 1-I will be evaporated to dryness

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.2 07/17/00)

Cell 1-I synthetic liner and raffinate crystals will be removed and placed into tailings cells 2 or 3.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.2 07/17/00)

Cell 1-I excavation of the residual radioactive materials to ensure that the concentration of Ra-226 in land averaged over any $100m^2$ is the same as required by Section 3.2.3.2 (5 pCi/g averaged over the first 15 cm of soils below the surface, and 15 pCi/g averaged over a 15 cm thick layer of soils more than 15 cm below the ground).

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.2 07/17/00)

A portion of Cell 1-I, adjacent to and running parallel to the downstream cell dike, will be used for permanent disposal of contaminated materials and debris from the mill site decommissioning and windblown cleanup. The current estimate is that 10 acres of Cell 1-I will need to be used for permanent disposal. This area will be lined with 12-inches of clay, compacted to 95% maximum dry density, prior to placement of contaminated materials and installation of the final reclamation cap. The clays will have at least 40% passing the #200 sieve. The minimum liquid limit of these soils will be 25 and the plasticity index will be 15 or greater. These soils will classify as CL, SC, or CH under the USCS.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.2 07/17/00)

Cell 1-I Reclamation

Cell 1-I will be breached and converted to a sedimentation basin. All runoff from the mill area and immediately north of Cell 1-I will be routed into the sedimentation basin and will discharge into the natural ground via the channel located at the southwest corner of the basin. The channel is required to be 20-foot wide to accommodate the PMP flood. Since the channel will be in bedrock, no riprap is required. A freeboard depth of 0.5 feet will be maintained during the PMP event.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.2.2 07/17/00)

Cell 2 Reclamation

The top slope will be graded to drain to the south with a slope of 0.2%. The side slopes will be graded to have a 5H:1V (20%) slope.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.2.3 07/17/00)

Raffinate crystals from Cell 1-I will have a consistency similar to a granular material when brought to the cells with large crystals masses being broken down for transport. Placement of the crystals will be performed as a granular fill, with care being taken to avoid nesting of large sized material. Voids around large material will be filled with finer material or the crystal mass broken down by the placing equipment.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.2.3 07/17/00)

The PVC liner from Cell 1-I will be cut up, folded, removed from Cell 1-I and transported to Cell 2 and Cell 3. The liner material will be spread as flat as practical over the designated area. After placement, the liner will be covered as soon as possible with at least one foot of soil, crystals or other materials for protection against wind.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.2.3 07/17/00)

Cell 2 Reclamation

The scrap, contaminated soils and other materials for the first lift will be placed over the existing tailings surface to a depth of up to four feet thick in a bridging lift to allow access for placing and compacting equipment. The first lift will be compacted by the tracking of heavy equipment, such as a Caterpillar D6 Dozer (or equivalent), at least four times prior to the placement of a subsequent lift. Subsequent layers will not exceed two feet and will be compacted to the same requirements. The contaminated soils and other cleanup materials after the bridging lift will be compacted to at least 80% of the standard Proctor maximum density.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.3 07/17/00)

Disposal of radioactive materials can occur in those areas in Cell 2 where the elevation is significantly below the final deposition elevation of 5615 feet.

VIOLATION Yes _____ No _____ N/A _X_ (License Condition 10.4, Letter Dated 12/12/94)

The Cell 2 dump area comprises approximately 10.3 acres and is located in the south-central portion of Cell 2. Trash will be placed at the edge of the Cell 2 cover and pushed over the edge, where the tailings beaches begin and covered with an adequate layer of overburden soils.

VIOLATION Yes _____ No _____ N/A _X_ (License Condition 10.4, Letter Dated 05/23/95)

Cell 3 Reclamation

The top slope will be graded to drain to the south with a slope of 0.2%. The side slopes will be graded to have a 5H:1V (20%) slope.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.4 07/17/00)

Cell 3 Reclamation

Raffinate crystals from Cell 1-I will have a consistency similar to a granular material when brought to the cells with large crystals masses being broken down for transport. Placement of the crystals will be performed as a granular fill, with care being taken to avoid nesting of large sized material. Voids around large material will be filled with finer material or the crystal mass broken down by the placing equipment.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.2.4 07/17/00)

The PVC liner from Cell 1-I will be cut up, folded, removed from Cell 1-I and transported to Cell 2 and Cell 3. The liner material will be spread as flat as practical over the designated area. After placement, the liner will be covered as soon as possible with at least one foot of soil, crystals or other materials for protection against wind.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.2.4 07/17/00)

The scrap, contaminated soils, mill trash & debris, and other materials for the first lift will be placed over the existing tailings surface to a depth of up to four feet thick in a bridging lift to allow access for placing and compacting equipment. The first lift will be compacted by the tracking of heavy equipment, such as a Caterpillar D6 Dozer (or equivalent), at least four times prior to the placement of a subsequent lift. Subsequent layers will not exceed two feet and will be compacted to the same requirements. The contaminated soils and other cleanup materials after the bridging lift will be compacted to at least 80% of the standard Proctor maximum density.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.2.4 07/17/00 and License Condition 10.4.A)

Cell 4A Reclamation

Cell 4A will be evaporated to dryness.

VIOLATION Yes _____ No __X__ N/A _____ (Reclamation Plan Revision 3.0 Section 3.2.2.5 07/17/00)

Cell 4A Reclamation

The crystals, synthetic liner, and any contaminated soils will be placed in Cell 3..

VIOLATION Yes _____ No _X_ N/A _____ (Reclamation Plan Revision 3.0 Section 3.2.2.5 07/17/00)

Non-contaminated materials in cell 4A dikes will be used to reduce the southern slopes of Cell 3 from the current 3H:1V to 5H:1V.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.5 07/17/00)

A 200-foot wide breach and bedrock channel will allow drainage of the precipitation which falls in the cell area and from reclaimed areas above the cell area.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.2.5 07/17/00)

Mill Building and Equipment Decommissioning

All equipment from the uranium and vanadium sections, including ore reclaim, grinding, pre-leach, leach, CCD, SX, and precipitation and drying circuits will be decommissioned including instrumentation, processing piping, electrical control and switchgear, and contaminated structures will be removed.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.3.1 07/17/00)

Contaminated concrete foundations will be demolished and removed or covered with soil as required.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.3.1 07/17/00)

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RECLAMATION & DECOMMISSIONING

Mill Building and Equipment Decommissioning

Uncontaminated equipment, structures and waste materials form mill decommissioning may be disposed of by sale, transferred to other company-owned facilities, transferred to an appropriate off-site solid waste site, or disposed of in one of the tailings cells.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.3.1 07/17/00)

Contaminated equipment, structures and waste materials from mill decommissioning, contaminated soils underlying the mill areas, and ancillary contaminated materials will be disposed of in tailings cells.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.3.1 07/17/00)

Debris and scrap will have a maximum dimension of 20 feet and a maximum volume of 30 cubic feet. Material exceeding these limits will be reduced to within the acceptable limits by breaking, cutting or other approved methods. Empty drums, tanks or other objects have a hollow volume greater than five cubic feet will be reduced in volume by at least 70%. If volume reduction is not feasible, openings shall be made in the object to allow soils or other approve material to enter the object.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.3.1 07/17/00)

Debris and scrap will be spread across the designated areas to avoid nesting and to reduce the volume of voids present in the placed mass.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.3.1 07/17/00)

Mill Building and Equipment Decommissioning

Stockpiled soils and/or other approved material shall be placed over and into the scrap in sufficient amounts to fill the voids between the large pieces and the volume within the hollow pieces to form a coherent mass.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.3.1 07/17/00)

Mill decommissioning areas will include, but will not be limited to the following: **1)** Coarse ore bin and associate equipment, conveyors and structures. **2)** Grind circuit including semi-autogeneous grind (SAG) mill, screens, pumps and cyclones. **3)** The three preleach tanks to the east of the mil building, including all tankage, agitation equipment, pumps and piping. **4)** The seven leach tanks inside the main mill building, including all agitation equipment, pumps and piping. **5)** The counter-current decantation (CCD) circuit including all thickeners and equipment, pumps and piping. **6)** Uranium precipitation circuit, including all thickeners, pumps, and piping. **7)** The two yellow cake dryers and all mechanical and electrical support equipment, including uranium packaging equipment. **8)** The clarifiers to the west of the mill building including the preleach thickener (PLT) and claricone. **9)** The boiler and all ancillary equipment and buildings. **10)** The entire vanadium precipitation, drying, and fusion circuit. **11)** All external tankage not included in the previous list including reagent tanks for the storage of acid, ammonia, kerosene, water, dry chemicals, etc., and the vanadium oxidation circuit. **12)** The uranium and vanadium solvent extraction (SX) circuit including all SX and reagent tankage, mixers and settlers, pumps and piping. **13)** The SX building. **14)** The mill building. **15)** The office building. **16)** The shop and warehouse building. **17)** The sample plant building.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.3.1 07/17/00)

Mill Site Decommissioning

The soil will be excavated to ensure that the concentration of Ra-226 in land averaged over any $100m^2$ does not exceed the background level by more than 5pCi/g averaged over the first 15cm of soils below the surface, and 15pCi/g averaged over a 15cm thick layer of soils more than 15cm below the ground.

VIOLATION Yes _____ No _____ N/A _X_ (Reclamation Plan Revision 3.0 Section 3.2.3.2 07/17/00)

MODULE 72
IUSA – WHITE MESA 11e.(2)
RECLAMATION & DECOMMISSIONING

Mill Site Decommissioning

Windblown contaminated material detected by a gamma survey will be disposed in one of the tailings cells.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.3.2 07/17/00)

Disturbed areas will be covered, graded, and vegetated as required.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.3.2 07/17/00)

Temporary settlement plates will be installed in the tailings cells. At the time of cell closure, a monitoring program will be proposed to the UDRC. Data collected will be analyzed and the reclamation techniques and schedule adjusted accordingly.

VIOLATION Yes _____ No __X__ N/A _____ (Reclamation Plan Revision 3.0 Section 3.2.3.2 07/17/00)

At the time of cell closure or during the placement of interim cover temporary settlement plates will be installed. These temporary settlement plates will consist of a corrosion resistant steel plate ¼ inch thick and two foot square to which a one inch diameter corrosion resistant monitor pipe has been welded. The one inch monitor pipe will be surrounded by a three inch diameter guard pip which will not be attached to the base plate. A minimum three feet of initial soil or tailings cover will be placed on the base plate for a minimum radial distance of five feet from the pipe.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 Section 3.2.3.2 07/17/00)

Quality Control Testing

The frequency of field density tests will not be less than one test per 1,000 CY of compacted contaminated material place and one test per 500 CY of compacted random fill, radon barrier, or frost barrier. A minimum of two tests will be taken for each day that an applicable amount of fill is placed in excess of 150 CY. A minimum of one test per lift and at least one test for every full shift of compaction operations will be performed.

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 07/17/00)

Gradation and classification testing will be performed at a minimum of one test per 2,000 CY of upper platform fill and frost barrier placed. A minimum of one test will be performed for each 1,000 CY of radon barrier material placed. For all materials other than random fill and contaminated materials, at least one gradation test will be run for each day of significant material placement (150 CY).

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 07/17/00)

Atterberg limits will be tested at a rate of at least once each day of significant material placement (150 CY).

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 07/17/00)

During construction, one point proctor tests will be performed at a frequency of one test per every five field density tests (1 test per 2,000 CY placed). Laboratory compaction curves will be obtained at a frequency of approximately one for every 10 to 15 field density tests (1 lab proctor per 5,000 CY to 7,000 CY placed).

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 07/17/00)

For riprap materials, each load will be visually checked against standard piles for gradation prior to transport to the tailings piles. Prior to delivery, site rock durability tests will be performed for each gradation to be used (specific gravity, absorption, sodium soundness, and LA abrasion).

VIOLATION Yes _____ No _____ N/A __X__ (Reclamation Plan Revision 3.0 07/17/00)

MODULE 72
IUSA – WHITE MESA 11e.(2)
RECLAMATION & DECOMMISSIONING

Disposal of Mill Trash & Debris

Material authorized to be disposed of within the Cell 2 tailing retention area include:

a. Contaminated rubber (seals, gaskets, pump liners)
b. Contaminated drums (excluding vanadium pentoxide drums), except those triple rinsed according to RCRA procedures, crushed to eliminate void spaces
c. Solid wastes generated by the Radiation Department (filters, bioassay containers, etc.)
d. Designated solid wastes generated by the laboratory
e. Contaminated clothing and respirator cartridges generated within the mill.
f. Other mill-generated radioactive contaminated wastes may be disposed of within this authorized area upon specific written approval by the Manager of Uranium Processing and the Radiation Protection Officer.

VIOLATION Yes _____ No _____ N/A __X__ (License Condition 10.4, Letter Dated 12/12/94)

The trash disposed of in Cell 2 will consist of primarily office waste and mill generated waste, but will also include some radioactive contaminated mill equipment. Trash will be disposed of in a manner to minimize void spaces and nesting and to enhance compaction. Large structural tanks will require written approval by the Plant Manager or Radiation Protection Officer. Structural tanks will be dismantled or filled with tailings solids to minimize void spaces. All drums or barrels will be crushed to minimize void spaces. Solid metals, concrete, masonry, and wooden members will be cut into pieces no greater than 10-feet long and no more than 27 cubic feet in volume. Structural steel members and other long items will be cut or broken into 10-foot lengths or smaller.

VIOLATION Yes _____ No _____ N/A __X__ (License Condition 10.4, Letter Dated 05/23/95)

Random fill cover will be advanced along the dump as needed. The overburden soils used will be taken from stockpiles located to the east and west of the tailings cells.

VIOLATION Yes _____ No _____ N/A __X__ (License Condition 10.4, Letter Dated 05/23/95)

To assure that materials are sized and disposed of properly in the dump, the dump will be inspected on a daily basis during the daily tailings inspections. Documentation for the dump will consist of weekly photographs of the dump site as will as written documentation of any observations of concern. If no observations of concern are noted, the weekly tailings inspection will document the condition of the dump site.

VIOLATION Yes _____ No _____ N/A __X__ (License Condition 10.4, Letter Dated 05/23/95)

Figure 1: 09/20/05: Cell 4A Leak detection system has been cleaned up and is waiting for final disposal in tailings Cell 3.

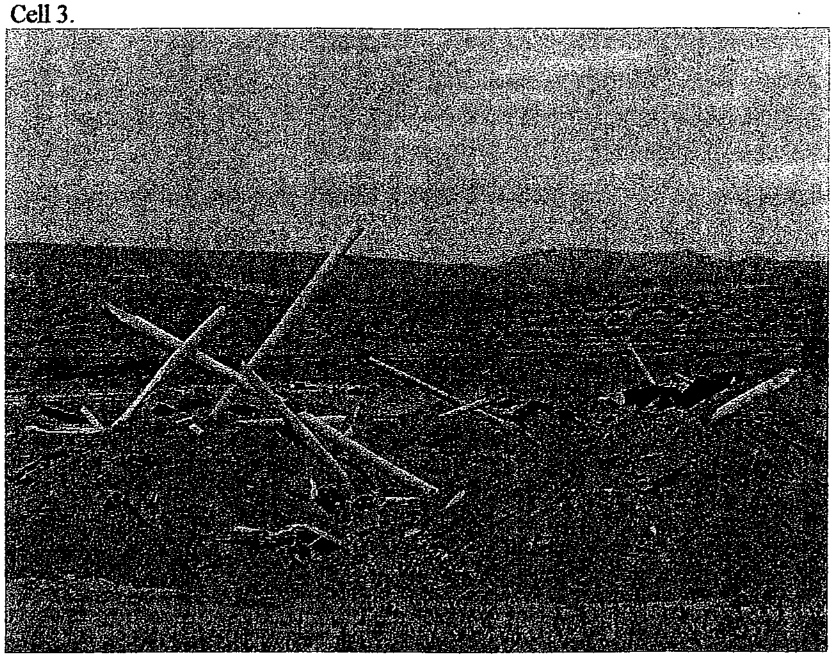


Figure 2: 09/20/05: Cell 4A raffinate crystals waiting for final disposal in tailings Cell 3.

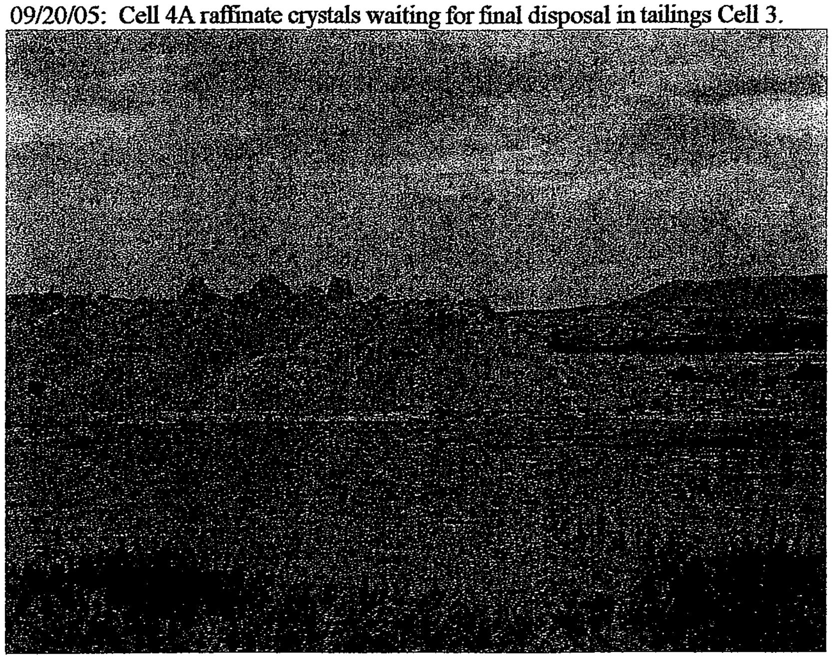


Figure 3: 09/20/05: Cell 4A ~~raffinate~~ crystals waiting for final disposal in tailings Cell 3.

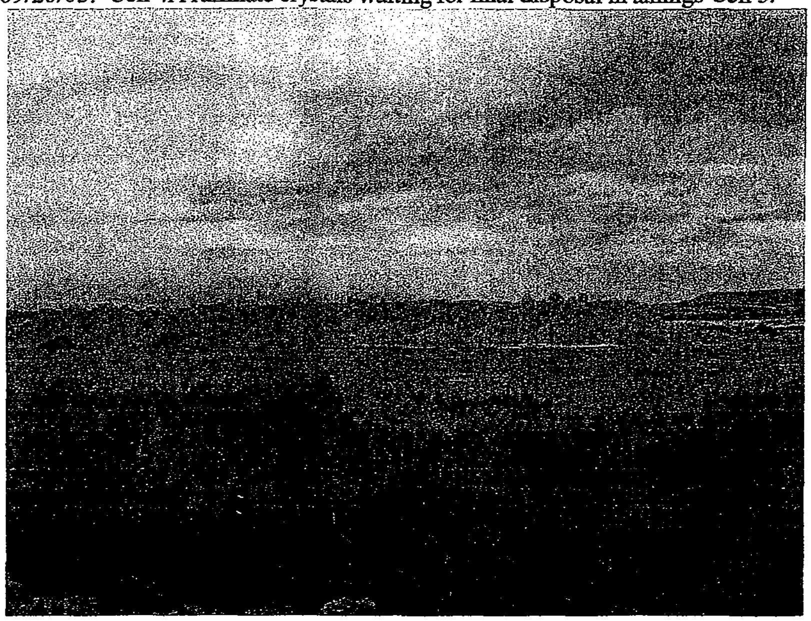


Figure 4: 09/20/05: Cell 4A raffinate crystals waiting for final disposal in tailings Cell 3. Close-up of Figure 4. Black material is liner removed from Cell 4A.

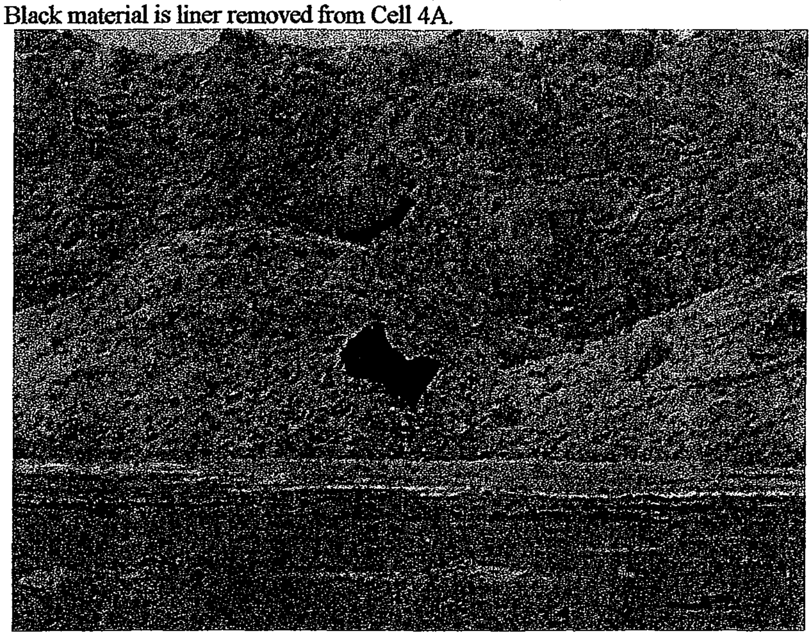


Figure 5: 09/20/05: Known contaminated area still remaining in Cell 4A (prior to radiological survey)

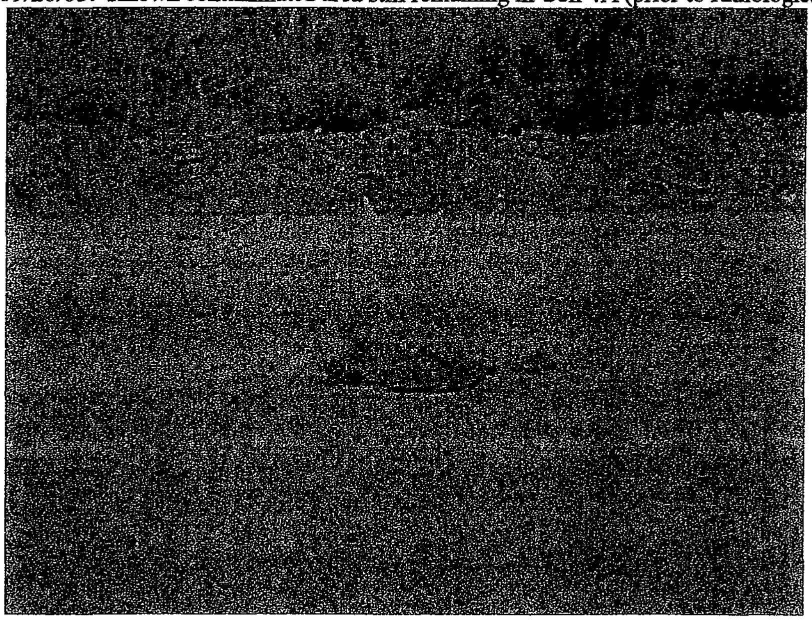


Figure 6: 09/20/05: Cell 4A northwest corner of cell.

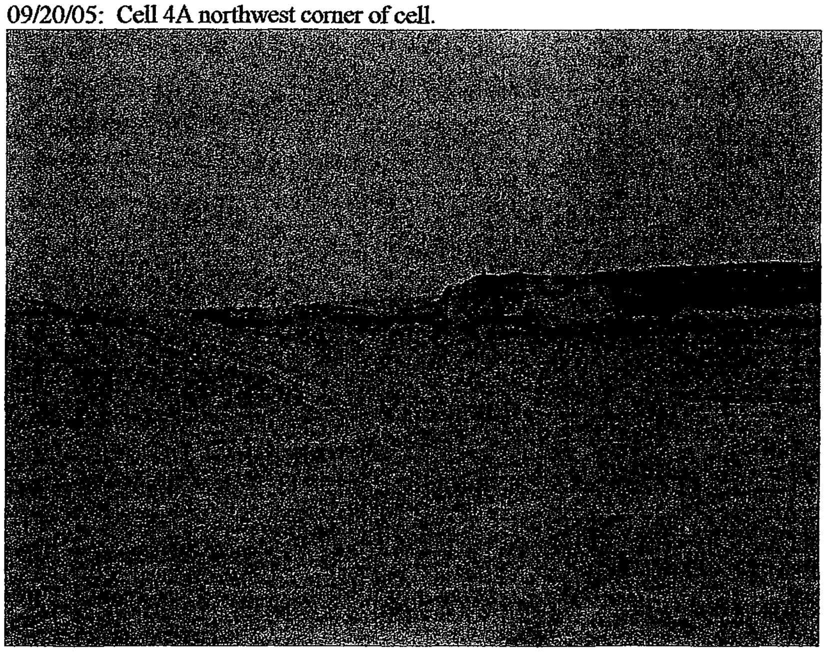


Figure 7: 09/20/05: Cell 4A southwest corner of cell.

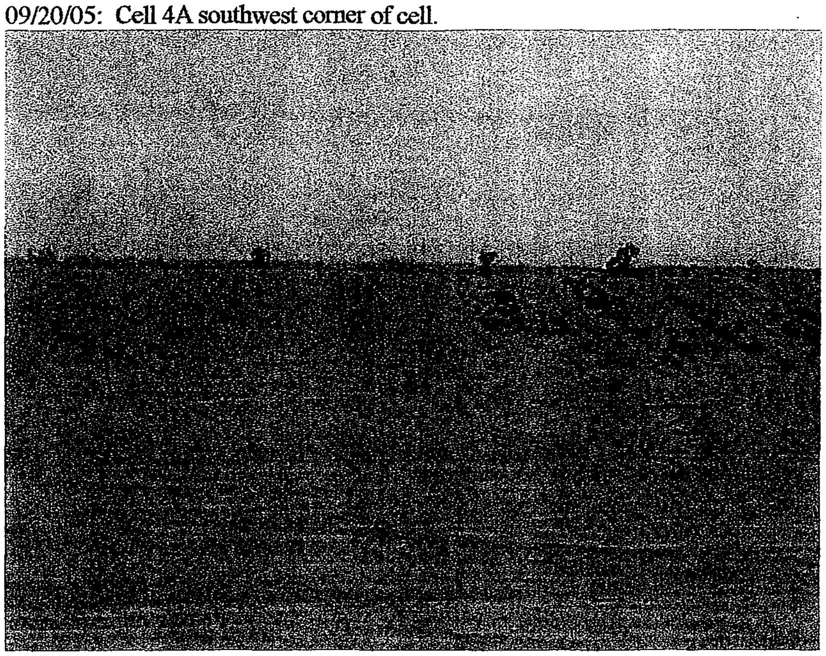
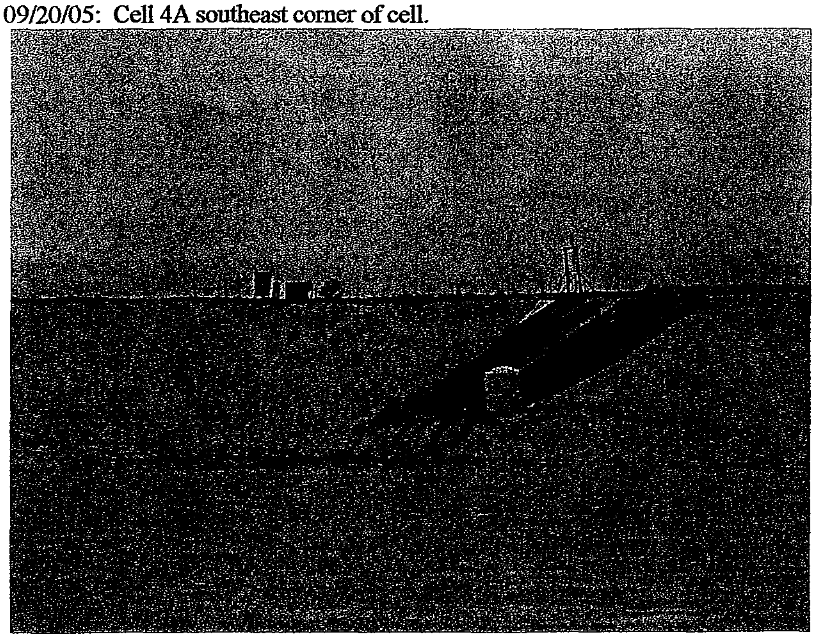


Figure 8: 09/20/05: Cell 4A southeast corner of cell.



DWQ Notice of Violation and Order to Provide Information
Dated July 17, 2006

And
DRC Response and Closure Letter
Dated October 20, 2006

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

RECEIVED
JUL 21 2006
BY:

July 17, 2006

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. David C Frydenlund
Vice President and General Counsel
International Uranium Corporation (IUC)
1050 Seventeenth St. Suite 950
Denver, Colorado, 80265

Subject: **NOTICE OF VIOLATION AND ORDER TO PROVIDE INFORMATION** – Ground Water monitoring and Quality Assurance Requirements: IUC Radioactive Materials License No. UT1900479, License Condition 11.2.C and Ground Water Quality Discharge Permit No. UGW370004

Dear Mr. Shrum:

The Utah Division of Radiation Control (DRC) reviewed groundwater monitoring reports for all groundwater monitoring events during 2005. This includes the 1st quarter (January – March 2005), 2nd quarter (April – June 2005), 3rd quarter (July – September 2005), and 4th quarter (October - December 2005) monitoring events, and all accelerated monitoring for 2005 for the White Mesa Uranium Mill facility near Blanding, Utah.

The enclosed Notice of Violation is based on the findings in the DRC review of the above groundwater monitoring reports.

This Order requires IUC to submit certain information for DRC approval within 30 days of receipt of this Order.

UTAH WATER QUALITY BOARD

D Finerfrock

Dane L. Finerfrock, Co-Executive Secretary

DLF/DH:dh

Enclosure: NOTICE OF VIOLATION AND ORDER TO COMPLY (DOCKET NUMBER UGW06-04)

UTAH WATER QUALITY BOARD

IN THE MATTER OF
INTERNATIONAL URANIUM CORPORATON
1050 SEVENTEENTH ST. SUITE 950
DENVER, COLORADO, 80265

DOCKET NUMBER UGW06-04
NOTICE OF VIOLATION AND ORDER

STATUTORY AUTHORITY

THE UTAH WATER QUALITY BOARD (hereinafter "the **BOARD**") issues this Notice of Violation (NOV) and Order under the *Utah Water Quality Act, as amended, (the Act),* including *Sections 19-5-104, 19-5-106, 19-5-111, and 19-5-115, Utah Code Annotated (UCA)* and in accordance with the *Utah Administrative Procedures Act, UCA §63-46b-1, et seq.*

FACTS

1. International Uranium Corporation (hereinafter **IUC**) facility receives and processes natural uranium-bearing ores including certain specified alternate feed materials, and to possess byproduct material in the form of uranium waste tailings and other uranium byproduct waste generated by the licensee's milling operations. This facility is located approximately 6 miles south of Blanding, Utah on a tract of land in Sections 28, 29, 32, and 33, Township 37 South, Range 22 East, Salt Lake Base and Meridian, San Juan County, Utah.

2. **IUC** was issued Ground Water Quality Discharge Permit No. UGW370004 (hereinafter Permit) on March 8, 2005.

3. Part I.E.1 of the Permit mandates baseline groundwater compliance monitoring frequency at the **IUC** facility, as follows:

   - Part I.E.1(a) Quarterly Monitoring: MW-11, MW-14, MW-26 (formerly TW4-15), and MW-32 (formerly TW4-17).

   - Part I.E.1(b) Semi-annual Monitoring: MW-1, MW-2, MW-3, MW-5, MW-12, MW-15, MW-17, MW-18, and MW-19.

4. Part I.E.1(c)(2) of the Permit requires that all groundwater samples collected be analyzed for the following parameters, including all contaminants specified in Table 2, and 10 other general inorganics including: chloride, sulfate, carbonate, bicarbonate, sodium, potassium, magnesium, calcium, and total anions and cations.

5. Part I.F.1 in part requires the Permittee to report all field and laboratory analyses required by Part I.E.1 of the Permit.

6. Part I.E.1(d)(2) of the Permit requires that all groundwater quality analyses reported shall have a minimum detection limit (MDL) or reporting limit that is less than its respective Ground Water Compliance Limit concentration as defined in Table 2.

7. Part I.E.1(d)(3) of the Permit requires that *"all gross alpha analysis reported shall have a counting variance that is equal to or less than 20% of the reported activity concentration."*

8. IUC submitted the following groundwater monitoring reports to the DRC:

Date of Report	Date DRC Received the Report	Title of the Report
June 30, 2005	July 1, 2005	Groundwater and DMT Performance Standard Monitoring Report 1st Quarter (January through March) 2005
August 31, 2005	September 6, 2005	Groundwater and DMT Performance Standard Monitoring Report 2nd Quarter (April through June) 2005
November 30, 2005	December 1, 2005	Groundwater and DMT Performance Standard Monitoring Report 3rd Quarter (July through September) 2005
March 1, 2006	March 10, 2006	Groundwater and DMT Performance Standard Monitoring Report 4th Quarter (October through December) 2005

FINDINGS

1. IUC failed to sample and report ground water quality results from monitor well MW-3 on the 2nd quarter 2005 monitoring event as required by Parts I.E.1(b)(2) and I.F.1.

2. Contrary to the requirements of Part I.E.(d)(2), IUC reported a MDL (20μg/L) for methyl ethyl ketone (MEK) that exceeded the GWCL (Class II water = 1 μg/L, and Class III water = 2 μg/L) in the 2nd Quarter 2005 (June 20-24, 2005) monitoring event for 23 groundwater quality and QA/QC samples, including: MW-1, MW-2, MW-5, MW-11, MW-12, MW-14, MW-15, MW-17, MW-18, MW-19, MW-23, and 25 through MW-32, MW-60 (field blank), MW-63 (duplicate sample of MW-11), MW-65 (equipment blank), and the trip blank.

3. Contrary to the requirements of Part I.E.(d)(2), IUC reported a MDL (20μg/L) for methyl ethyl ketone (MEK) that exceeded the and GWCL (Class II water = 1 μg/L, and Class III water = 2 μg/L) in the 3rd Quarter 2005 (September 23-25, 2005) monitoring event for 17 groundwater quality and QA/QC samples, including: MW-3, MW-11, MW-14, and MW-23 through MW-32, MW-60 (field blank), MW-63 (duplicate sample of MW-11), MW-65 (equipment blank), and the trip blank.

4. Contrary to the requirements of Part I.E.(d)(2), IUC reported a MDL (20μg/L) for methyl ethyl ketone (MEK) that exceeded the GWCL (Class II water = 1 μg/L, and Class III water = 2 μg/L) for MEK in the 4th Quarter 2005 (December 12-14, 2005) monitoring event for 25 groundwater quality and QA/QC samples, including: MW-1, MW-2, MW-3, MW-5, MW-11, MW-12, MW-14, MW-15, MW-17, MW-18, MW-19, and MW-23 through MW-32, MW-60 (field blank), MW-63 (duplicate sample of MW-11), MW-65 (equipment blank), and the trip blank.

5. Contrary to Part I.E.1(c)(2) of the Permit in the 2nd quarter 2005 monitoring event IUC failed to analyze and report groundwater quality results for carbon tetrachloride in monitor well MW-11.

6. Contrary to Part I.E.1(d)(3) of the Permit, IUC failed to provide adequate an error term for the gross alpha activity concentration reported in the 2nd Quarter 2005 (June 20-24, 2005) monitoring event for 10 monitor wells, including: MW-14, MW-23, MW-24, MW-25, MW-26, MW-27, MW-28, MW-29, MW-30, and MW-32.

7. Contrary to Part I.E.1(d)(3) of the Permit, IUC failed to provide an adequate error term for the gross alpha activity concentration in the 3rd Quarter 2005 (September 23-25, 2005) monitoring event for

10 monitor wells, including: MW-3, MW-18, MW-23, MW-24, MW-26, MW-27, MW-28, MW-29, MW-31, and MW-32.

8. Contrary to Part I.E.1(d)(3) of the Permit, IUC failed to provide adequate error term for the gross alpha activity concentration in the 4th Quarter 2005 (December 12-14, 2005) monitoring event for 8 monitor wells: MW-14, MW-19, MW-23, MW-26, MW-27, MW-28, MW-29, and MW-32. This is a violation of Part I.E.1(d)(3) of the Permit.

VIOLATIONS

Based on the foregoing **FACTS** and **FINDINGS**, **IUC** is in violation of the following Permit requirement:

1. Failed to sample and report groundwater quality results from monitor well MW-3 in the 2nd quarter 2005 monitoring event as required in Parts I.E.1(b)(2) of the Permit.

2. Failed to provide an adequate MDL for MEK sampling and analysis for the 2nd Quarter, 2005 groundwater monitoring event, as required by Part I.E.1(d)(2) of the Permit.

3. Failed to provide an adequate MDL for MEK sampling and analysis for the 3rd Quarter, 2005 groundwater monitoring event, as required by Part I.E.1(d)(2) of the Permit.

4. The Failed to provide an adequate MDL for MEK sampling and analysis for the 4th Quarter, 2005 groundwater monitoring event, as required by Part I.E.1(d)(2) of the Permit.

5. Failed to analyze for carbon tetrachloride in well MW-11 in the 2nd quarter 2005 monitoring event, as required by Part I.E.1(c)(2)(i) of the Permit.

6. Failed to provide an adequate error term for the gross alpha activity concentrations reported in the 2nd Quarter 2005 (June 20-24, 2005) monitoring event, as required by Part I.E.1(d)(3) of the Permit.

7. Failed to provide an adequate error term for the gross alpha activity concentrations reported in the 3rd Quarter 2005 (September 23-25, 2005) monitoring event monitoring event as required by Part I.E.1(d)(3) of the Permit.

8. Failed to provide an adequate error term for the gross alpha activity concentrations reported in the 4th Quarter 2005 (December 12-14, 2005) monitoring event monitoring event as required by Part I.E.1(d)(3) of the Permit.

ORDER

In view of the foregoing **FINDINGS**, and pursuant to *Utah Code Annotated Section 19-5-111* (1953 as amended), IUC is hereby ordered to provide a detailed written submission within 30 days of receipt of this order describing:

a) The root cause of the noncompliance,
b) Steps that have been or will be taken to correct the violations,
c) Date when compliance was or will be regained, and
c) Steps taken or to be taken to prevent reoccurrence of the noncompliance.

NOTICE

Any appeal of the NOV and Order will be pursuant to *Section R317-1-8 of UAC* and *Sections 63-46b-6 through 63-46b-15 of the UCA*. If IUC contests any portion of the NOV and Order, it must do so in writing and request a hearing before the **BOARD** within thirty (30) days of receipt of this **NOTICE. This ORDER is final and fully enforceable unless appealed in writing within 30 days. Any response or written answer to this NOV should be addressed to Dane L. Finerfrock, Co-Executive Secretary, Water Quality Board, 168 North 1950 West, P.O. Box 144850, Salt Lake City, Utah 84114-4850.**

UCA §19-5-115 provides that violators of the *Act* or a related permit, rule, or order may be subject to a civil penalty of up to $10,000 per day of violation. Under certain circumstances of willfulness or gross negligence, violators may be fined up to $25,000 per day.

Signed this 17th day of July 2006.

UTAH WATER QUALITY BOARD

DL Finerfrock

Dane L. Finerfrock
Co-Executive Secretary

DLF/DH:dh

IUC

INTERNATIONAL URANIUM (USA) CORPORATION

August 21, 2006

VIA FACSIMILE AND FEDERAL EXPRESS

Mr. Dane L. Finerfrock
Executive Secretary
Utah Radiation Control Board
State of Utah Department of Environmental Quality
168 North 1950 West
Salt Lake City, UT 84114-4850

Re: NOTICE OF VIOLATION AND ORDER TO PROVIDE INFORMATION - Ground Water monitoring and Quality Assurance Requirements: IUC Radioactive Materials License No. UT1900479, License Condition 11.2.C and Ground Water Quality Discharge Permit No. UGW370004 (the "Permit")

Dear Mr. Finerfrock:

This letter is in response to the above-referenced Notice and Order, received by International Uranium (USA) Corporation ("IUSA") on July 21, 2006, which lists 8 violations of the White Mesa Mill's (the "Mill's") Permit, based on a review of the Groundwater Monitoring Reports for the 1st through 4th quarters of 2005.

The Notice and Order orders IUSA, pursuant to Utah Code Annotated 19-5-1111 (1953 as amended), to provide a detailed written submission describing, for each violation:

a) the root cause of the noncompliance;
b) steps that have been or will be taken to correct the violations;
c) date when compliance was or will be regained; and
d) steps taken or to be taken to prevent reoccurrence of the noncompliance.

IUSA responds as follows:

1. Violation 1 – Failed to sample and report groundwater quality results from monitor well MW-3 in the 2nd quarter 2005 monitoring event as required in Part I.E.1(b)(2) of the Permit.

a) Root Cause of the Noncompliance

This was the first sampling event for MW-3 under the Permit. The following disclosure was included in the Groundwater and DMT Performance Standard Monitoring Report for the 2nd quarter of 2005:

Tel: 303 628 7798
Fax: 303 389 4125

1050 Seventeenth St., Suite 950
Denver, Colorado, USA 80265

info@intluranium.com
www.intluranium.com

Mill personnel were under the mistaken impression that, because MW-3A was being sampled during the Quarter, it was no longer necessary to sample MW-3. Mill personnel have been advised that in the future both MW-3 and MW-3A must be sampled for all constituents, until a determination otherwise is made by the Executive Secretary;

Therefore, the root cause of the noncompliance was inadvertence associated with a lack of familiarity with Permit requirements during the first sampling event for this well.

b) Steps That Have Been Taken to Correct the Violation

As stated in the 2nd quarter 2006 Groundwater and DMT Performance Standard Monitoring Report, Mill personnel were advised at that time that in the future both MW-3 and MW-3A must be sampled for all constituents, until a determination otherwise is made by the Executive Secretary

c) Date When Compliance Was or Will be Regained

MW-3 was sampled during the 3rd quarter 2006 sampling event and in each quarter thereafter.

d) Steps Taken to Prevent Reoccurrence of the Noncompliance

See 1.b) above.

2. Violations 2, 3 and 4 – Failed to provide an adequate MDL for MEK sampling and analysis for the 2nd, 3rd and 4th quarter 2005 groundwater monitoring event, as required by Part I.E.1(d)(2) of the Permit.

a) Root Cause of the Noncompliance

IUSA submits that these are not violations, because this issue had been self-identified by IUSA and included in its quarterly reports, and had been under discussion with Division of Radiation Control ("DRC") personnel.

The following disclosure was provided in the Groundwater and DMT Performance Standard Monitoring Reports for each of the 2nd, 3rd and 4th quarters of 2005:

> The minimum detection limit ("MDL") used by the Analytical Laboratory for methyl ethyl ketone (2-butanone) ("MEK") was 20 ug/L, which exceeds the GWCL in the Permit of 1 ug/L for Class II water and 2 ug/L for Class III water. The Analytical Laboratory has advised IUSA that it is not possible using industry standard analytical procedures to have an MDL of 1 or 2 ug/L for MEK. The Analytical Laboratory is currently making investigations to determine if other analytical methods may be available that would be practicable to employ for future analysis of MEK that would result in an MDL at or below the GWCLs for MEK in the Permit.

The root cause of the noncompliance is therefore the position taken by the Mill's State of Utah certified independent analytical laboratory (the "Analytical Laboratory") that it is unable to achieve an MDL of 1 or 2 ug/L of MEK at the Mill using industry standard analytical procedures.

b) Steps That Have Been Taken to Correct the Violation

As indicated above, IUSA brought this issue to the attention of the Analytical Laboratory and requested the Analytical Laboratory to make investigations to determine if other analytical methods may be available that would be practicable to employ for future analysis of MEK at the Mill that would result in an MDL at or below the GWCLs for MEK in the Permit.

IUSA was advised by the Analytical Laboratory that it had pursued this matter and was unable to identify any such methods.

IUSA then contacted Dean Henderson of DRC in April 2006 to discuss this issue, and specifically asked Mr. Henderson to provide a contact person at the State's analytical laboratory who could be contacted to discuss this matter. In response, Mr. Henderson emailed to IUSA a link to an EPA website (http://web1.er.usgs.gov/nemi) that lists the EPA methods for various analytes, including MEK, with the associated detection limits. This website listed the following three analytical methods for MEK:

- Method 524.2, with an MDL of 0.48 ug/L
- Method 0-4127-96, with an MDL of 0.919 ug/L
- Method 1624, with an MDL of 50 ug/L

IUSA provided the Analytical Laboratory with this information and was advised that Methods 524.2 and 0-4127-96 were designed by EPA to be applied to drinking water samples, and were not as suitable for use on the lower quality groundwater at the Mill, due to potential matrix interferences.

However, in light of the Notice and Order, IUSA has asked the Analytical Laboratory to reconsider this issue.

c) Date When Compliance Was or Will be Regained

IUSA will resolve this matter and report back to the Executive Secretary before the next sampling event in September, 2006

d) Steps Taken to Prevent Reoccurrence of the Noncompliance

Once the analytical methods are determined, the Analytical Laboratory will be instructed to use the appropriate methods for analyzing each sample in the future.

3. Violation 5 – Failed to analyze for carbon tetrachloride in well MW-11 in the 2nd quarter 2005 monitoring event, as required by part I.E.1(c)(2)(i) of the Permit

a) Root Cause of the Noncompliance

IUSA submits that this is not a violation. IUSA did in fact sample and analyze for carbon tetrachloride in MW-11 in the 2nd quarter 2005 sampling event. The results were non-detect. However, IUSA's Analytical Laboratory mistakenly reported the results for carbon disulfide (which is not a required monitoring parameter under the Permit) for MW-11 instead of the results for carbon tetrachloride, in its Analytical Summary Report. IUSA did not notice this mistake in its QA/QC review of the data.

Attached to this letter is a copy of the revised Analytical Summary Report prepared by the Analytical Laboratory dated August 30, 2005, which corrects this mistake.

b) Steps That Have Been Taken to Correct the Violation

See 3 a) above

c) Date When Compliance Was or Will be Regained

The revised Analytical Summary Report was issued on August 21, 2006.

d) Steps Taken to Prevent Reoccurrence of the Noncompliance

IUC will continue to perform QA/QC evaluations of all data reported in its quarterly reports

4. Violations 6, 7 and 8 – Failed to provide an adequate error term for gross alpha activity concentrations for a number of monitoring wells in the 2nd, 3rd and 4th quarter monitoring events, as required by Part I.E.1(d)(3) of the Permit.

a) Root Cause of the Noncompliance

IUSA submits that these are not violations. The error term for gross alpha activity concentrations exceeded the 20% level in the Permit only because IUSA had set the MDL for gross alpha activity at 1 pCi/L for all Class II and Class III wells, which is lower than the MDLs of 3.75 pCi/L for Class II wells and 7.5 pCi/L for Class III wells, that are required under Part I.E.(d)(2) of the Permit. Had IUSA set the higher MDLs, all of the gross alpha activities would have been non-detect for each well in each sampling event and an error term for gross alpha activity would not have been reported for any of the wells.

Furthermore, in all cases the sum of the reported error term plus the reported gross alpha activity was less than the GWCL of 3.75 and 7.5 pCi/L for Class III and Class II wells, respectively.

The Analytical Laboratory has advised that achieving a gross alpha error term of 20% or less should be achievable if the MDL for gross alpha activity is set at these higher levels.

b) Steps That Have Been Taken to Correct the Violation

IUSA will increase the reporting limits for gross alpha activity from 1pCi/L to 3.75 pCi/L for Class II wells and 7.5 pCi/L for Class III wells, commencing with the analytical results for the 3rd quarter of 2006.

c) Date When Compliance Was or Will be Regained

As indicated above, the MDLs will be increased and the gross alpha error term will be maintained within Permit limits commencing on the 3rd quarter 2006 sampling event.

d) Steps Taken to Prevent Reoccurrence of the Noncompliance

The Analytical Laboratory will be instructed to change the MDLs in its analysis and Analytical Summary Report, as discussed above.

If you have any questions or require any further information, please contact the undersigned.

Yours truly,

David C. Frydenlund
Vice President and General Counsel

cc: Ron F. Hochstein
Harold R. Roberts
Steve Landau
David Turk

IUC

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	Report Date:	07/07/05
Project:	Quarterly POC Sampling	Collection Date:	06/21/05 09:10
Lab ID:	C05060997-001	DateReceived:	06/23/05
Client Sample ID:	MW26	Matrix:	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 17:49 / sjl
Bicarbonate as HCO3	411	mg/L		1		A2320 B	06/27/05 17:49 / sjl
Calcium	424	mg/L	D	0.6		E200.7	06/28/05 15:06 / ts
Chloride	52	mg/L		1		A4500-Cl B	06/24/05 13:56 / sjl
Fluoride	0.4	mg/L		0.1		A4500-F C	06/29/05 10:46 / sjl
Magnesium	154	mg/L	D	0.5		E200.7	06/28/05 15:06 / ts
Nitrogen, Ammonia as N	0.70	mg/L		0.05		A4500-NH3 G	06/27/05 11:31 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	06/24/05 11:34 / jal
Potassium	10.1	mg/L		0.5		E200.7	06/28/05 15:03 / ts
Sodium	234	mg/L		0.5		E200.7	06/28/05 15:03 / ts
Sulfate	1880	mg/L	D	30		A4500-SO4 E	06/27/05 14:58 / jal
PHYSICAL PROPERTIES							
pH	7.19	s.u.		0.01		A4500-H B	06/24/05 13:51 / th
Solids, Total Dissolved TDS @ 180 C	3200	mg/L		10		A2540 C	06/24/05 15:37 / th
METALS - DISSOLVED							
Arsenic	ND	ug/L		5.0		E200.8	06/27/05 13:53 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 13:53 / bws
Cadmium	ND	ug/L		0.50		E200.8	06/27/05 13:53 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 13:53 / bws
Cobalt	ND	ug/L		10		E200.8	06/27/05 13:53 / bws
Copper	ND	ug/L		10		E200.8	06/27/05 13:53 / bws
Iron	3180	ug/L		30		E200.7	06/28/05 15:03 / ts
Lead	ND	ug/L		1.0		E200.8	06/27/05 13:53 / bws
Manganese	956	ug/L		10		E200.8	06/27/05 13:53 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 13:53 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 13:53 / bws
Nickel	ND	ug/L		20		E200.8	06/27/05 13:53 / bws
Selenium	ND	ug/L		5.0		E200.8	06/27/05 13:53 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 13:53 / bws
Thallium	ND	ug/L		0.50		E200.8	06/27/05 13:53 / bws
Uranium	9.48	ug/L		0.30		E200.8	06/27/05 13:53 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 13:53 / bws
Zinc	ND	ug/L		10		E200.8	06/27/05 13:53 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	4.3	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
Gross Alpha minus Rn & U Precision (±)	1.3	pCi/L				E900.1	06/27/05 16:15 / rs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	Report Date:	07/07/05
Project:	Quarterly POC Sampling	Collection Date:	06/21/05 09:10
Lab ID:	C05060997-001	DateReceived:	06/23/05
Client Sample ID:	MW26	Matrix:	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
A/C Balance (± 5)	-3.08	%				Calculation	07/07/05 09:28 / ks
Anions	47.3	meq/L				Calculation	07/07/05 09:28 / ks
Cations	44.5	meq/L				Calculation	07/07/05 09:28 / ks
Solids, Total Dissolved Calculated	2960	mg/L				Calculation	07/07/05 09:28 / ks
TDS Balance (0.80 - 1.20)	1.08	dec. %				Calculation	07/07/05 09:28 / ks
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L	D	50		SW8260B	06/27/05 18:29 / rh
Benzene	ND	ug/L	D	2.5		SW8260B	06/27/05 18:29 / rh
Carbon tetrachloride	ND	ug/L	D	2.5		SW8260B	06/27/05 18:29 / rh
Chloroform	430	ug/L	D	25		SW8260B	06/28/05 18:41 / rh
Chloromethane	5.5	ug/L	D	2.5		SW8260B	06/27/05 18:29 / rh
Methyl ethyl ketone	ND	ug/L	D	50		SW8260B	06/27/05 18:29 / rh
Methylene chloride	5.4	ug/L	D	2.5		SW8260B	06/27/05 18:29 / rh
Naphthalene	ND	ug/L	D	2.5		SW8260B	06/27/05 18:29 / rh
Tetrahydrofuran	ND	ug/L	D	2.5		SW8260B	06/27/05 18:29 / rh
Toluene	ND	ug/L	D	2.5		SW8260B	06/27/05 18:29 / rh
Xylenes, Total	ND	ug/L	D	2.5		SW8260B	06/27/05 18:29 / rh
Surr: 1,2-Dichlorobenzene-d4	99.2	%REC	D		80-120	SW8260B	06/27/05 18:29 / rh
Surr: Dibromofluoromethane	98.4	%REC	D		70-125	SW8260B	06/27/05 18:29 / rh
Surr: p-Bromofluorobenzene	92.4	%REC	D		80-120	SW8260B	06/27/05 18:29 / rh
Surr: Toluene-d8	98.4	%REC	D		80-120	SW8260B	06/27/05 18:29 / rh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/21/05 14:55
Lab ID:	C05060997-002	**DateReceived:**	06/23/05
Client Sample ID:	MW28	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 13:21 / sjl
Bicarbonate as HCO3	155	mg/L		1		A2320 B	06/27/05 13:21 / sjl
Calcium	452	mg/L		0.5		E200.7	06/28/05 15:42 / ts
Chloride	80	mg/L		1		A4500-Cl B	06/24/05 14:00 / sjl
Fluoride	0.7	mg/L		0.1		A4500-F C	06/29/05 10:48 / sjl
Magnesium	148	mg/L		0.5		E200.7	06/28/05 15:42 / ts
Nitrogen, Ammonia as N	0.25	mg/L		0.05		A4500-NH3 G	06/27/05 11:33 / jal
Nitrogen, Nitrate+Nitrite as N	0.1	mg/L		0.1		E353.2	06/24/05 11:37 / jal
Potassium	11.6	mg/L		0.5		E200.7	06/28/05 15:42 / ts
Sodium	302	mg/L		0.5		E200.7	06/28/05 15:42 / ts
Sulfate	2010	mg/L		1		E200.7	06/28/05 15:42 / ts
PHYSICAL PROPERTIES							
pH	6.57	s.u.		0.01		A4500-H B	06/24/05 13:56 / th
Solids, Total Dissolved TDS @ 180 C	3720	mg/L		10		A2540 C	06/24/05 15:37 / th
METALS - DISSOLVED							
Arsenic	15.4	ug/L		5.0		E200.8	06/27/05 14:00 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 14:00 / bws
Cadmium	3.39	ug/L		0.50		E200.8	06/27/05 14:00 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 14:00 / bws
Cobalt	40	ug/L		10		E200.8	06/27/05 14:00 / bws
Copper	ND	ug/L		10		E200.8	06/27/05 14:00 / bws
Iron	ND	ug/L		30		E200.7	06/28/05 15:42 / ts
Lead	2.0	ug/L		1.0		E200.8	06/27/05 14:00 / bws
Manganese	1800	ug/L		10		E200.8	06/27/05 14:00 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 14:00 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 14:00 / bws
Nickel	29	ug/L		20		E200.8	06/27/05 14:00 / bws
Selenium	6.1	ug/L		5.0		E200.8	06/27/05 14:00 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 14:00 / bws
Thallium	0.83	ug/L		0.50		E200.8	06/27/05 14:00 / bws
Uranium	3.22	ug/L		0.30		E200.8	06/27/05 14:00 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 14:00 / bws
Zinc	75	ug/L		10		E200.8	06/27/05 14:00 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	2.0	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
Gross Alpha minus Rn & U Precision (±)	1.0	pCi/L				E900.1	06/27/05 16:15 / rs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/21/05 14:55
Lab ID:	C05060997-002	**DateReceived:**	06/23/05
Client Sample ID:	MW28	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
A/C Balance (± 5)	1.83	%				Calculation	07/07/05 09:29 / ks
Anions	46.6	meq/L				Calculation	07/07/05 09:29 / ks
Cations	48.3	meq/L				Calculation	07/07/05 09:29 / ks
Solids, Total Dissolved Calculated	3090	mg/L				Calculation	07/07/05 09:29 / ks
TDS Balance (0.80 - 1.20)	1.20	dec. %				Calculation	07/07/05 09:29 / ks
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	06/27/05 19:14 / rh
Benzene	ND	ug/L		1.0		SW8260B	06/27/05 19:14 / rh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	06/27/05 19:14 / rh
Chloroform	ND	ug/L		1.0		SW8260B	06/27/05 19:14 / rh
Chloromethane	2.8	ug/L		1.0		SW8260B	06/27/05 19:14 / rh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	06/27/05 19:14 / rh
Methylene chloride	ND	ug/L		1.0		SW8260B	06/27/05 19:14 / rh
Naphthalene	ND	ug/L		1.0		SW8260B	06/27/05 19:14 / rh
Tetrahydrofuran	ND	ug/L		1.0		SW8260B	06/27/05 19:14 / rh
Toluene	ND	ug/L		1.0		SW8260B	06/27/05 19:14 / rh
Xylenes, Total	ND	ug/L		1.0		SW8260B	06/27/05 19:14 / rh
Surr: 1,2-Dichlorobenzene-d4	101	%REC			80-120	SW8260B	06/27/05 19:14 / rh
Surr: Dibromofluoromethane	100	%REC			70-125	SW8260B	06/27/05 19:14 / rh
Surr: p-Bromofluorobenzene	85.2	%REC			80-120	SW8260B	06/27/05 19:14 / rh
Surr: Toluene-d8	99.2	%REC			80-120	SW8260B	06/27/05 19:14 / rh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/20/05 13:00
Lab ID:	C05060997-003	**DateReceived:**	06/23/05
Client Sample ID:	MW65	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 13:46 / sjl
Bicarbonate as HCO3	ND	mg/L		1		A2320 B	06/27/05 13:46 / sjl
Calcium	ND	mg/L		0.5		E200.7	06/28/05 15:49 / ts
Chloride	ND	mg/L		1		A4500-Cl B	06/24/05 14:04 / sjl
Fluoride	0.1	mg/L		0.1		A4500-F C	06/29/05 10:52 / sjl
Magnesium	ND	mg/L		0.5		E200.7	06/28/05 15:49 / ts
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	06/27/05 11:35 / jal
Nitrogen, Nitrate+Nitrite as N	1.2	mg/L		0.1		E353.2	06/24/05 11:39 / jal
Potassium	ND	mg/L		0.5		E200.7	06/28/05 15:49 / ts
Sodium	ND	mg/L		0.5		E200.7	06/28/05 15:49 / ts
Sulfate	ND	mg/L		1		A4500-SO4 E	06/27/05 15:03 / jal
PHYSICAL PROPERTIES							
pH	4.10	s.u.		0.01		A4500-H B	06/24/05 13:57 / th
Solids, Total Dissolved TDS @ 180 C	32	mg/L		10		A2540 C	06/24/05 15:37 / th
METALS - DISSOLVED							
Arsenic	ND	ug/L		5.0		E200.8	06/27/05 14:06 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 14:06 / bws
Cadmium	6.93	ug/L		0.50		E200.8	06/27/05 14:06 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 14:06 / bws
Cobalt	ND	ug/L		10		E200.8	06/27/05 14:06 / bws
Copper	88	ug/L		10		E200.8	06/27/05 14:06 / bws
Iron	ND	ug/L		30		E200.7	06/28/05 15:49 / ts
Lead	6.1	ug/L		1.0		E200.8	06/27/05 14:06 / bws
Manganese	ND	ug/L		10		E200.8	06/27/05 14:06 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 14:06 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 14:06 / bws
Nickel	ND	ug/L		20		E200.8	06/27/05 14:06 / bws
Selenium	ND	ug/L		5.0		E200.8	06/27/05 14:06 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 14:06 / bws
Thallium	ND	ug/L		0.50		E200.8	06/27/05 14:06 / bws
Uranium	ND	ug/L		0.30		E200.8	06/27/05 14:06 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 14:06 / bws
Zinc	20	ug/L		10		E200.8	06/27/05 14:06 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	ND	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
DATA QUALITY							
A/C Balance (± 5)	-87.8	%				Calculation	07/07/05 09:30 / ks

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/20/05 13:00
Lab ID:	C05060997-003	**DateReceived:**	06/23/05
Client Sample ID:	MW65	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
Anions	0.093	meq/L				Calculation	07/07/05 09:30 / ks
Cations	0.006	meq/L				Calculation	07/07/05 09:30 / ks
Solids, Total Dissolved Calculated	35.0	mg/L				Calculation	07/07/05 09:30 / ks
TDS Balance (0.80 - 1.20)	0.910	dec. %				Calculation	07/07/05 09:30 / ks
- The ion balance is not appropriate for near blank results.							
VOLATILE ORGANIC COMPOUNDS							
Acetone	46	ug/L		20		SW8260B	06/27/05 19:59 / rh
Benzene	ND	ug/L		1.0		SW8260B	06/27/05 19:59 / rh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	06/27/05 19:59 / rh
Chloroform	3.2	ug/L		1.0		SW8260B	06/27/05 19:59 / rh
Chloromethane	6.6	ug/L		1.0		SW8260B	06/27/05 19:59 / rh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	06/27/05 19:59 / rh
Methylene chloride	ND	ug/L		1.0		SW8260B	06/27/05 19:59 / rh
Naphthalene	ND	ug/L		1.0		SW8260B	06/27/05 19:59 / rh
Tetrahydrofuran	ND	ug/L		1.0		SW8260B	06/27/05 19:59 / rh
Toluene	ND	ug/L		1.0		SW8260B	06/27/05 19:59 / rh
Xylenes, Total	ND	ug/L		1.0		SW8260B	06/27/05 19:59 / rh
Surr: 1,2-Dichlorobenzene-d4	107	%REC			80-120	SW8260B	06/27/05 19:59 / rh
Surr: Dibromofluoromethane	99.6	%REC			70-125	SW8260B	06/27/05 19:59 / rh
Surr: p-Bromofluorobenzene	89.6	%REC			80-120	SW8260B	06/27/05 19:59 / rh
Surr: Toluene-d8	99.2	%REC			80-120	SW8260B	06/27/05 19:59 / rh

Report Definitions:	RL - Analyte reporting limit. QCL - Quality control limit.	MCL - Maximum contaminant level. ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	Report Date:	07/07/05
Project:	Quarterly POC Sampling	Collection Date:	06/20/05 06:27
Lab ID:	C05060997-004	DateReceived:	06/23/05
Client Sample ID:	MW1	Matrix:	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 13:58 / sjl
Bicarbonate as HCO3	298	mg/L		1		A2320 B	06/27/05 13:58 / sjl
Calcium	123	mg/L		0.5		E200.7	06/28/05 15:52 / ts
Chloride	11	mg/L		1		A4500-Cl B	06/24/05 14:06 / sjl
Fluoride	0.5	mg/L		0.1		A4500-F C	06/29/05 10:55 / sjl
Magnesium	51.8	mg/L		0.5		E200.7	06/28/05 15:52 / ts
Nitrogen, Ammonia as N	0.39	mg/L		0.05		A4500-NH3 G	06/27/05 11:37 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	06/24/05 11:52 / jal
Potassium	5.8	mg/L		0.5		E200.7	06/28/05 15:52 / ts
Sodium	166	mg/L		0.5		E200.7	06/28/05 15:52 / ts
Sulfate	637	mg/L	D	10		A4500-SO4 E	06/27/05 15:05 / jal
PHYSICAL PROPERTIES							
pH	7.78	s.u.		0.01		A4500-H B	06/24/05 13:58 / th
Solids, Total Dissolved TDS @ 180 C	1220	mg/L		10		A2540 C	06/24/05 15:37 / th
METALS - DISSOLVED							
Arsenic	ND	ug/L		5.0		E200.8	06/27/05 14:20 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 14:20 / bws
Cadmium	ND	ug/L		0.50		E200.8	06/27/05 14:20 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 14:20 / bws
Cobalt	ND	ug/L		10		E200.8	06/27/05 14:20 / bws
Copper	ND	ug/L		10		E200.8	06/27/05 14:20 / bws
Iron	1800	ug/L		30		E200.7	06/28/05 15:52 / ts
Lead	ND	ug/L		1.0		E200.8	06/27/05 14:20 / bws
Manganese	183	ug/L		10		E200.8	06/27/05 14:20 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 14:20 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 14:20 / bws
Nickel	ND	ug/L		20		E200.8	06/27/05 14:20 / bws
Selenium	ND	ug/L		5.0		E200.8	06/27/05 14:20 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 14:20 / bws
Thallium	ND	ug/L		0.50		E200.8	06/27/05 14:20 / bws
Uranium	ND	ug/L		0.30		E200.8	06/27/05 14:20 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 14:20 / bws
Zinc	ND	ug/L		10		E200.8	06/27/05 14:20 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	ND	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
DATA QUALITY							
A/C Balance (± 5)	-1.72	%				Calculation	07/07/05 09:30 / ks

Report Definitions:

RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	Report Date:	07/07/05
Project:	Quarterly POC Sampling	Collection Date:	06/20/05 06:27
Lab ID:	C05060997-004	DateReceived:	06/23/05
Client Sample ID:	MW1	Matrix:	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
Anions	18.5	meq/L				Calculation	07/07/05 09:30 / ks
Cations	17.9	meq/L				Calculation	07/07/05 09:30 / ks
Solids, Total Dissolved Calculated	1150	mg/L				Calculation	07/07/05 09:30 / ks
TDS Balance (0.80 - 1.20)	1.06	dec. %				Calculation	07/07/05 09:30 / ks
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	06/27/05 21:29 / rh
Benzene	ND	ug/L		1.0		SW8260B	06/27/05 21:29 / rh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	06/27/05 21:29 / rh
Chloroform	ND	ug/L		1.0		SW8260B	06/27/05 21:29 / rh
Chloromethane	2.0	ug/L		1.0		SW8260B	06/27/05 21:29 / rh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	06/27/05 21:29 / rh
Methylene chloride	ND	ug/L		1.0		SW8260B	06/27/05 21:29 / rh
Naphthalene	ND	ug/L		1.0		SW8260B	06/27/05 21:29 / rh
Tetrahydrofuran	85	ug/L		1.0		SW8260B	06/27/05 21:29 / rh
Toluene	ND	ug/L		1.0		SW8260B	06/27/05 21:29 / rh
Xylenes, Total	ND	ug/L		1.0		SW8260B	06/27/05 21:29 / rh
Surr: 1,2-Dichlorobenzene-d4	98.4	%REC			80-120	SW8260B	06/27/05 21:29 / rh
Surr: Dibromofluoromethane	98.0	%REC			70-125	SW8260B	06/27/05 21:29 / rh
Surr: p-Bromofluorobenzene	88.8	%REC			80-120	SW8260B	06/27/05 21:29 / rh
Surr: Toluene-d8	102	%REC			80-120	SW8260B	06/27/05 21:29 / rh

Report Definitions:

RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/21/05 13:01
Lab ID:	C05060997-005	**DateReceived:**	06/23/05
Client Sample ID:	MW5	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 14:09 / sjl
Bicarbonate as HCO3	369	mg/L		1		A2320 B	06/27/05 14:09 / sjl
Calcium	122	mg/L		0.5		E200.7	06/28/05 15:58 / ts
Chloride	48	mg/L		1		A4500-Cl B	06/24/05 14:09 / sjl
Fluoride	1.3	mg/L		0.1		A4500-F C	06/29/05 10:58 / sjl
Magnesium	35.8	mg/L		0.5		E200.7	06/28/05 15:58 / ts
Nitrogen, Ammonia as N	0.52	mg/L		0.05		A4500-NH3 G	06/27/05 11:45 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	06/24/05 11:54 / jal
Potassium	6.9	mg/L		0.5		E200.7	06/28/05 15:58 / ts
Sodium	442	mg/L		0.5		E200.7	06/28/05 15:58 / ts
Sulfate	1070	mg/L	D	10		A4500-SO4 E	06/27/05 15:07 / jal
PHYSICAL PROPERTIES							
pH	7.85	s.u.		0.01		A4500-H B	06/24/05 14:01 / th
Solids, Total Dissolved TDS @ 180 C	1950	mg/L		10		A2540 C	06/24/05 15:37 / th
METALS - DISSOLVED							
Arsenic	ND	ug/L		5.0		E200.8	06/27/05 14:26 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 14:26 / bws
Cadmium	ND	ug/L		0.50		E200.8	06/27/05 14:26 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 14:26 / bws
Cobalt	ND	ug/L		10		E200.8	06/27/05 14:26 / bws
Copper	ND	ug/L		10		E200.8	06/27/05 14:26 / bws
Iron	ND	ug/L		30		E200.7	06/28/05 15:58 / ts
Lead	ND	ug/L		1.0		E200.8	06/27/05 14:26 / bws
Manganese	250	ug/L		10		E200.8	06/27/05 14:26 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 14:26 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 14:26 / bws
Nickel	ND	ug/L		20		E200.8	06/27/05 14:26 / bws
Selenium	ND	ug/L		5.0		E200.8	06/27/05 14:26 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 14:26 / bws
Thallium	ND	ug/L		0.50		E200.8	06/27/05 14:26 / bws
Uranium	ND	ug/L		0.30		E200.8	06/27/05 14:26 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 14:26 / bws
Zinc	ND	ug/L		10		E200.8	06/27/05 14:26 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	ND	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
DATA QUALITY							
A/C Balance (± 5)	-2.16	%				Calculation	07/07/05 09:30 / ks

Report Definitions:

RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

Client:	International Uranium (USA) Corp	**Revised Date:**	08/30/05
Project:	Quarterly POC Sampling	**Report Date:**	07/07/05
Lab ID:	C05060997-005	**Collection Date:**	06/21/05 13:01
Client Sample ID:	MW5	**DateReceived:**	06/23/05
		Matrix:	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
Anions	29.7	meq/L				Calculation	07/07/05 09:30 / ks
Cations	28.5	meq/L				Calculation	07/07/05 09:30 / ks
Solids, Total Dissolved Calculated	1920	mg/L				Calculation	07/07/05 09:30 / ks
TDS Balance (0.80 - 1.20)	1.02	dec. %				Calculation	07/07/05 09:30 / ks
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	06/28/05 03:31 / rh
Benzene	ND	ug/L		1.0		SW8260B	06/28/05 03:31 / rh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	06/28/05 03:31 / rh
Chloroform	ND	ug/L		1.0		SW8260B	06/28/05 03:31 / rh
Chloromethane	3.2	ug/L		1.0		SW8260B	06/28/05 03:31 / rh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	06/28/05 03:31 / rh
Methylene chloride	ND	ug/L		1.0		SW8260B	06/28/05 03:31 / rh
Naphthalene	ND	ug/L		1.0		SW8260B	06/28/05 03:31 / rh
Tetrahydrofuran	4.4	ug/L		1.0		SW8260B	06/28/05 03:31 / rh
Toluene	ND	ug/L		1.0		SW8260B	06/28/05 03:31 / rh
Xylenes, Total	ND	ug/L		1.0		SW8260B	06/28/05 03:31 / rh
Surr: 1,2-Dichlorobenzene-d4	99.2	%REC			80-120	SW8260B	06/28/05 03:31 / rh
Surr: Dibromofluoromethane	98.4	%REC			70-125	SW8260B	06/28/05 03:31 / rh
Surr: p-Bromofluorobenzene	90.4	%REC			80-120	SW8260B	06/28/05 03:31 / rh
Surr: Toluene-d8	100	%REC			80-120	SW8260B	06/28/05 03:31 / rh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	Report Date:	07/07/05
Project:	Quarterly POC Sampling	Collection Date:	06/21/05 12:18
Lab ID:	C05060997-006	DateReceived:	06/23/05
Client Sample ID:	MW63	Matrix:	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 14:23 / sjl
Bicarbonate as HCO3	369	mg/L		1		A2320 B	06/27/05 14:23 / sjl
Calcium	56.0	mg/L		0.5		E200.7	06/28/05 16:40 / ts
Chloride	30	mg/L		1		A4500-Cl B	06/24/05 14:27 / sjl
Fluoride	0.7	mg/L		0.1		A4500-F C	06/29/05 11:01 / sjl
Magnesium	17.2	mg/L		0.5		E200.7	06/28/05 16:40 / ts
Nitrogen, Ammonia as N	0.55	mg/L		0.05		A4500-NH3 G	06/27/05 11:47 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	06/24/05 11:57 / jal
Potassium	6.2	mg/L		0.5		E200.7	06/28/05 16:40 / ts
Sodium	544	mg/L		0.5		E200.7	06/28/05 16:40 / ts
Sulfate	1070	mg/L	D	30		A4500-SO4 E	06/27/05 15:09 / jal
PHYSICAL PROPERTIES							
pH	7.96	s.u.		0.01		A4500-H B	06/24/05 14:04 / th
Solids, Total Dissolved TDS @ 180 C	1940	mg/L		10		A2540 C	06/24/05 15:38 / th
METALS - DISSOLVED							
Arsenic	ND	ug/L		5.0		E200.8	06/27/05 16:21 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 16:21 / bws
Cadmium	ND	ug/L		0.50		E200.8	06/27/05 16:21 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 16:21 / bws
Cobalt	ND	ug/L		10		E200.8	06/27/05 16:21 / bws
Copper	ND	ug/L		10		E200.8	06/27/05 16:21 / bws
Iron	ND	ug/L		30		E200.7	06/28/05 16:40 / ts
Lead	ND	ug/L		1.0		E200.8	06/27/05 16:21 / bws
Manganese	92	ug/L		10		E200.8	06/27/05 16:21 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 16:21 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 16:21 / bws
Nickel	ND	ug/L		20		E200.8	06/27/05 16:21 / bws
Selenium	ND	ug/L		5.0		E200.8	06/27/05 16:21 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 16:21 / bws
Thallium	ND	ug/L		0.50		E200.8	06/27/05 16:21 / bws
Uranium	0.74	ug/L		0.30		E200.8	06/27/05 16:21 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 16:21 / bws
Zinc	ND	ug/L		10		E200.8	06/27/05 16:21 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	ND	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
DATA QUALITY							
A/C Balance (± 5)	-1.92	%				Calculation	07/07/05 09:31 / ks

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	Report Date:	07/07/05
Project:	Quarterly POC Sampling	Collection Date:	06/21/05 12:18
Lab ID:	C05060997-006	DateReceived:	06/23/05
Client Sample ID:	MW63	Matrix:	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
Anions	29.2	meq/L				Calculation	07/07/05 09:31 / ks
Cations	28.1	meq/L				Calculation	07/07/05 09:31 / ks
Solids, Total Dissolved Calculated	1910	mg/L				Calculation	07/07/05 09:31 / ks
TDS Balance (0.80 - 1.20)	1.02	dec. %				Calculation	07/07/05 09:31 / ks
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	06/27/05 15:27 / rh
Benzene	ND	ug/L		1.0		SW8260B	06/27/05 15:27 / rh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	06/27/05 15:27 / rh
Chloroform	ND	ug/L		1.0		SW8260B	06/27/05 15:27 / rh
Chloromethane	1.9	ug/L		1.0		SW8260B	06/27/05 15:27 / rh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	06/27/05 15:27 / rh
Methylene chloride	ND	ug/L		1.0		SW8260B	06/27/05 15:27 / rh
Naphthalene	ND	ug/L		1.0		SW8260B	06/27/05 15:27 / rh
Tetrahydrofuran	ND	ug/L		1.0		SW8260B	06/27/05 15:27 / rh
Toluene	ND	ug/L		1.0		SW8260B	06/27/05 15:27 / rh
Xylenes, Total	ND	ug/L		1.0		SW8260B	06/27/05 15:27 / rh
Surr: 1,2-Dichlorobenzene-d4	102	%REC			80-120	SW8260B	06/27/05 15:27 / rh
Surr: Dibromofluoromethane	102	%REC			70-125	SW8260B	06/27/05 15:27 / rh
Surr: p-Bromofluorobenzene	92.0	%REC			80-120	SW8260B	06/27/05 15:27 / rh
Surr: Toluene-d8	94.4	%REC			80-120	SW8260B	06/27/05 15:27 / rh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/21/05 09:55
Lab ID:	C05060997-007	**DateReceived:**	06/23/05
Client Sample ID:	MW2	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 14:33 / sjl
Bicarbonate as HCO3	373	mg/L		1		A2320 B	06/27/05 14:33 / sjl
Calcium	313	mg/L	D	0.6		E200.7	06/28/05 16:50 / ts
Chloride	7	mg/L		1		A4500-Cl B	06/24/05 14:33 / sjl
Fluoride	0.4	mg/L		0.1		A4500-F C	06/29/05 11:04 / sjl
Magnesium	84.6	mg/L		0.5		E200.7	06/28/05 16:47 / ts
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	06/27/05 11:49 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	06/24/05 11:59 / jal
Potassium	9.7	mg/L		0.5		E200.7	06/28/05 16:47 / ts
Sodium	473	mg/L		0.5		E200.7	06/28/05 16:47 / ts
Sulfate	1850	mg/L	D	30		A4500-SO4 E	06/27/05 15:16 / jal
PHYSICAL PROPERTIES							
pH	7.42	s.u.		0.01		A4500-H B	06/24/05 14:06 / th
Solids, Total Dissolved TDS @ 180 C	3060	mg/L		10		A2540 C	06/24/05 15:38 / th
METALS - DISSOLVED							
Arsenic	ND	ug/L		5.0		E200.8	06/27/05 16:27 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 16:27 / bws
Cadmium	ND	ug/L		0.50		E200.8	06/27/05 16:27 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 16:27 / bws
Cobalt	ND	ug/L		10		E200.8	06/27/05 16:27 / bws
Copper	ND	ug/L		10		E200.8	06/27/05 16:27 / bws
Iron	ND	ug/L		30		E200.7	06/28/05 16:47 / ts
Lead	ND	ug/L		1.0		E200.8	06/27/05 16:27 / bws
Manganese	ND	ug/L		10		E200.8	06/27/05 16:27 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 16:27 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 16:27 / bws
Nickel	ND	ug/L		20		E200.8	06/27/05 16:27 / bws
Selenium	7.0	ug/L		5.0		E200.8	06/27/05 16:27 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 16:27 / bws
Thallium	ND	ug/L		0.50		E200.8	06/27/05 16:27 / bws
Uranium	6.25	ug/L		0.30		E200.8	06/27/05 16:27 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 16:27 / bws
Zinc	12	ug/L		10		E200.8	06/27/05 16:27 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	1.3	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
Gross Alpha minus Rn & U Precision (±)	0.9	pCi/L				E900.1	06/27/05 16:15 / rs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/21/05 09:55
Lab ID:	C05060997-007	**DateReceived:**	06/23/05
Client Sample ID:	MW2	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
A/C Balance (± 5)	-1.65	%				Calculation	07/07/05 09:31 / ks
Anions	44.8	meq/L				Calculation	07/07/05 09:31 / ks
Cations	43.4	meq/L				Calculation	07/07/05 09:31 / ks
Solids, Total Dissolved Calculated	2930	mg/L				Calculation	07/07/05 09:31 / ks
TDS Balance (0.80 - 1.20)	1.04	dec. %				Calculation	07/07/05 09:31 / ks
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	06/28/05 04:17 / rh
Benzene	ND	ug/L		1.0		SW8260B	06/28/05 04:17 / rh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	06/28/05 04:17 / rh
Chloroform	ND	ug/L		1.0		SW8260B	06/28/05 04:17 / rh
Chloromethane	3.5	ug/L		1.0		SW8260B	06/28/05 04:17 / rh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	06/28/05 04:17 / rh
Methylene chloride	ND	ug/L		1.0		SW8260B	06/28/05 04:17 / rh
Naphthalene	ND	ug/L		1.0		SW8260B	06/28/05 04:17 / rh
Tetrahydrofuran	ND	ug/L		1.0		SW8260B	06/28/05 04:17 / rh
Toluene	ND	ug/L		1.0		SW8260B	06/28/05 04:17 / rh
Xylenes, Total	ND	ug/L		1.0		SW8260B	06/28/05 04:17 / rh
Surr: 1,2-Dichlorobenzene-d4	98.4	%REC			80-120	SW8260B	06/28/05 04:17 / rh
Surr: Dibromofluoromethane	100	%REC			70-125	SW8260B	06/28/05 04:17 / rh
Surr: p-Bromofluorobenzene	83.2	%REC			80-120	SW8260B	06/28/05 04:17 / rh
Surr: Toluene-d8	98.0	%REC			80-120	SW8260B	06/28/05 04:17 / rh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES

*ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602*

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	Report Date:	07/07/05
Project:	Quarterly POC Sampling	Collection Date:	06/20/05 13:20
Lab ID:	C05060997-008	DateReceived:	06/23/05
Client Sample ID:	MW60	Matrix:	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 14:35 / sjl
Bicarbonate as HCO3	2	mg/L		1		A2320 B	06/27/05 14:35 / sjl
Calcium	ND	mg/L		0.5		E200.7	06/28/05 16:53 / ts
Chloride	ND	mg/L		1		A4500-Cl B	06/24/05 14:36 / sjl
Fluoride	ND	mg/L		0.1		A4500-F C	06/29/05 11:06 / sjl
Magnesium	ND	mg/L		0.5		E200.7	06/28/05 16:53 / ts
Nitrogen, Ammonia as N	ND	mg/L		0.05		A4500-NH3 G	06/27/05 11:51 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	06/24/05 12:02 / jal
Potassium	ND	mg/L		0.5		E200.7	06/28/05 16:53 / ts
Sodium	ND	mg/L		0.5		E200.7	06/28/05 16:53 / ts
Sulfate	ND	mg/L		1		A4500-SO4 E	06/27/05 15:18 / jal
PHYSICAL PROPERTIES							
pH	4.59	s.u.		0.01		A4500-H B	06/24/05 14:10 / th
Solids, Total Dissolved TDS @ 180 C	56	mg/L		10		A2540 C	06/24/05 15:38 / th
METALS - DISSOLVED							
Arsenic	ND	ug/L		5.0		E200.8	06/27/05 16:34 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 16:34 / bws
Cadmium	ND	ug/L		0.50		E200.8	06/27/05 16:34 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 16:34 / bws
Cobalt	ND	ug/L		10		E200.8	06/27/05 16:34 / bws
Copper	ND	ug/L		10		E200.8	06/27/05 16:34 / bws
Iron	ND	ug/L		30		E200.7	06/28/05 16:53 / ts
Lead	ND	ug/L		1.0		E200.8	06/27/05 16:34 / bws
Manganese	ND	ug/L		10		E200.8	06/27/05 16:34 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 16:34 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 16:34 / bws
Nickel	ND	ug/L		20		E200.8	06/27/05 16:34 / bws
Selenium	ND	ug/L		5.0		E200.8	06/27/05 16:34 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 16:34 / bws
Thallium	ND	ug/L		0.50		E200.8	06/27/05 16:34 / bws
Uranium	ND	ug/L		0.30		E200.8	06/27/05 16:34 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 16:34 / bws
Zinc	ND	ug/L		10		E200.8	06/27/05 16:34 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	ND	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
DATA QUALITY							
A/C Balance (± 5)	-76.0	%				Calculation	07/07/05 09:32 / ks

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/20/05 13:20
Lab ID:	C05060997-008	**DateReceived:**	06/23/05
Client Sample ID:	MW60	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
Anions	0.039	meq/L				Calculation	07/07/05 09:32 / ks
Cations	0.005	meq/L				Calculation	07/07/05 09:32 / ks
Solids, Total Dissolved Calculated	88.0	mg/L				Calculation	07/07/05 09:32 / ks
TDS Balance (0.80 - 1.20)	0.640	dec. %				Calculation	07/07/05 09:32 / ks
- The ion balance is not appropriate for near blank results.							
VOLATILE ORGANIC COMPOUNDS							
Acetone	330	ug/L		20		SW8260B	06/27/05 16:13 / rh
Benzene	ND	ug/L		1.0		SW8260B	06/27/05 16:13 / rh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	06/27/05 16:13 / rh
Chloroform	5.0	ug/L		1.0		SW8260B	06/27/05 16:13 / rh
Chloromethane	1.9	ug/L		1.0		SW8260B	06/27/05 16:13 / rh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	06/27/05 16:13 / rh
Methylene chloride	ND	ug/L		1.0		SW8260B	06/27/05 16:13 / rh
Naphthalene	ND	ug/L		1.0		SW8260B	06/27/05 16:13 / rh
Tetrahydrofuran	ND	ug/L		1.0		SW8260B	06/27/05 16:13 / rh
Toluene	ND	ug/L		1.0		SW8260B	06/27/05 16:13 / rh
Xylenes, Total	ND	ug/L		1.0		SW8260B	06/27/05 16:13 / rh
Surr: 1,2-Dichlorobenzene-d4	101	%REC			80-120	SW8260B	06/27/05 16:13 / rh
Surr: Dibromofluoromethane	101	%REC			70-125	SW8260B	06/27/05 16:13 / rh
Surr: p-Bromofluorobenzene	93.2	%REC			80-120	SW8260B	06/27/05 16:13 / rh
Surr: Toluene-d8	94.4	%REC			80-120	SW8260B	06/27/05 16:13 / rh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/21/05 07:37
Lab ID:	C05060997-009	**DateReceived:**	06/23/05
Client Sample ID:	MW18	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 14:48 / sjl
Bicarbonate as HCO3	417	mg/L		1		A2320 B	06/27/05 14:48 / sjl
Calcium	515	mg/L	D	0.6		E200.7	06/28/05 16:59 / ts
Chloride	45	mg/L		1		A4500-Cl B	06/24/05 14:41 / sjl
Fluoride	0.4	mg/L		0.1		A4500-F C	06/29/05 11:09 / sjl
Magnesium	111	mg/L	D	0.5		E200.7	06/28/05 16:59 / ts
Nitrogen, Ammonia as N	0.10	mg/L		0.05		A4500-NH3 G	06/27/05 11:53 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	06/24/05 12:12 / jal
Potassium	8.3	mg/L		0.5		E200.7	06/28/05 16:56 / ts
Sodium	184	mg/L		0.5		E200.7	06/28/05 16:56 / ts
Sulfate	1710	mg/L	D	30		A4500-SO4 E	06/27/05 15:20 / jal
PHYSICAL PROPERTIES							
pH	7.01	s.u.		0.01		A4500-H B	06/24/05 14:11 / th
Solids, Total Dissolved TDS @ 180 C	2980	mg/L		10		A2540 C	06/24/05 15:38 / th
METALS - DISSOLVED							
Arsenic	ND	ug/L		5.0		E200.8	06/27/05 16:41 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 16:41 / bws
Cadmium	ND	ug/L		0.50		E200.8	06/27/05 16:41 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 16:41 / bws
Cobalt	ND	ug/L		10		E200.8	06/27/05 16:41 / bws
Copper	ND	ug/L		10		E200.8	06/27/05 16:41 / bws
Iron	63	ug/L		30		E200.7	06/28/05 16:56 / ts
Lead	ND	ug/L		1.0		E200.8	06/27/05 16:41 / bws
Manganese	77	ug/L		10		E200.8	06/27/05 16:41 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 16:41 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 16:41 / bws
Nickel	ND	ug/L		20		E200.8	06/27/05 16:41 / bws
Selenium	ND	ug/L		5.0		E200.8	06/27/05 16:41 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 16:41 / bws
Thallium	1.16	ug/L		0.50		E200.8	06/27/05 16:41 / bws
Uranium	39.0	ug/L		0.30		E200.8	06/27/05 16:41 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 16:41 / bws
Zinc	ND	ug/L		10		E200.8	06/27/05 16:41 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	2.0	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
Gross Alpha minus Rn & U Precision (±)	1.0	pCi/L				E900.1	06/27/05 16:15 / rs

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/21/05 07:37
Lab ID:	C05060997-009	**DateReceived:**	06/23/05
Client Sample ID:	MW18	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
A/C Balance (± 5)	-0.843	%				Calculation	07/07/05 09:32 / ks
Anions	43.8	meq/L				Calculation	07/07/05 09:32 / ks
Cations	43.1	meq/L				Calculation	07/07/05 09:32 / ks
Solids, Total Dissolved Calculated	2790	mg/L				Calculation	07/07/05 09:32 / ks
TDS Balance (0.80 - 1.20)	1.07	dec. %				Calculation	07/07/05 09:32 / ks
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	06/28/05 05:02 / rh
Benzene	ND	ug/L		1.0		SW8260B	06/28/05 05:02 / rh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	06/28/05 05:02 / rh
Chloroform	ND	ug/L		1.0		SW8260B	06/28/05 05:02 / rh
Chloromethane	4.8	ug/L		1.0		SW8260B	06/28/05 05:02 / rh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	06/28/05 05:02 / rh
Methylene chloride	ND	ug/L		1.0		SW8260B	06/28/05 05:02 / rh
Naphthalene	ND	ug/L		1.0		SW8260B	06/28/05 05:02 / rh
Tetrahydrofuran	ND	ug/L		1.0		SW8260B	06/28/05 05:02 / rh
Toluene	ND	ug/L		1.0		SW8260B	06/28/05 05:02 / rh
Xylenes, Total	ND	ug/L		1.0		SW8260B	06/28/05 05:02 / rh
Surr: 1,2-Dichlorobenzene-d4	102	%REC			80-120	SW8260B	06/28/05 05:02 / rh
Surr: Dibromofluoromethane	102	%REC			70-125	SW8260B	06/28/05 05:02 / rh
Surr: p-Bromofluorobenzene	83.2	%REC			80-120	SW8260B	06/28/05 05:02 / rh
Surr: Toluene-d8	96.0	%REC			80-120	SW8260B	06/28/05 05:02 / rh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
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ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	**Report Date:**	07/07/05
Project:	Quarterly POC Sampling	**Collection Date:**	06/21/05 12:18
Lab ID:	C05060997-010	**DateReceived:**	06/23/05
Client Sample ID:	MW11	**Matrix:**	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
MAJOR IONS							
Carbonate as CO3	ND	mg/L		1		A2320 B	06/27/05 15:00 / sjl
Bicarbonate as HCO3	364	mg/L		1		A2320 B	06/27/05 15:00 / sjl
Calcium	58.7	mg/L		0.5		E200.7	06/28/05 17:02 / ts
Chloride	31	mg/L		1		A4500-Cl B	06/24/05 14:43 / sjl
Fluoride	0.7	mg/L		0.1		A4500-F C	06/29/05 11:12 / sjl
Magnesium	18.2	mg/L		0.5		E200.7	06/28/05 17:02 / ts
Nitrogen, Ammonia as N	0.64	mg/L		0.05		A4500-NH3 G	06/27/05 12:01 / jal
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.1		E353.2	06/24/05 12:14 / jal
Potassium	6.3	mg/L		0.5		E200.7	06/28/05 17:02 / ts
Sodium	544	mg/L		0.5		E200.7	06/28/05 17:02 / ts
Sulfate	1090	mg/L	D	30		A4500-SO4 E	06/27/05 15:22 / jal
PHYSICAL PROPERTIES							
pH	8.00	s.u.		0.01		A4500-H B	06/24/05 14:12 / th
Solids, Total Dissolved TDS @ 180 C	1950	mg/L		10		A2540 C	06/24/05 15:38 / th
METALS - DISSOLVED							
Arsenic	ND	ug/L		5.0		E200.8	06/27/05 16:54 / bws
Beryllium	ND	ug/L		0.50		E200.8	06/27/05 16:54 / bws
Cadmium	ND	ug/L		0.50		E200.8	06/27/05 16:54 / bws
Chromium	ND	ug/L		25		E200.8	06/27/05 16:54 / bws
Cobalt	ND	ug/L		10		E200.8	06/27/05 16:54 / bws
Copper	ND	ug/L		10		E200.8	06/27/05 16:54 / bws
Iron	ND	ug/L		30		E200.7	06/28/05 17:02 / ts
Lead	ND	ug/L		1.0		E200.8	06/27/05 16:54 / bws
Manganese	95	ug/L		10		E200.8	06/27/05 16:54 / bws
Mercury	ND	ug/L		0.50		E200.8	06/27/05 16:54 / bws
Molybdenum	ND	ug/L		10		E200.8	06/27/05 16:54 / bws
Nickel	ND	ug/L		20		E200.8	06/27/05 16:54 / bws
Selenium	ND	ug/L		5.0		E200.8	06/27/05 16:54 / bws
Silver	ND	ug/L		10		E200.8	06/27/05 16:54 / bws
Thallium	ND	ug/L		0.50		E200.8	06/27/05 16:54 / bws
Uranium	0.76	ug/L		0.30		E200.8	06/27/05 16:54 / bws
Vanadium	ND	ug/L		15		E200.8	06/27/05 16:54 / bws
Zinc	ND	ug/L		10		E200.8	06/27/05 16:54 / bws
RADIONUCLIDES - DISSOLVED							
Gross Alpha minus Rn & U	ND	pCi/L		1.0		E900.1	06/27/05 16:15 / rs
DATA QUALITY							
A/C Balance (± 5)	-2.05	%				Calculation	07/07/05 09:32 / ks

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix interference.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

ENERGY LABORATORIES, INC. * 2393 Salt Creek Highway (82601) * PO Box 3258 * Casper, WY 82602

LABORATORY ANALYTICAL REPORT

		Revised Date:	08/30/05
Client:	International Uranium (USA) Corp	Report Date:	07/07/05
Project:	Quarterly POC Sampling	Collection Date:	06/21/05 12:18
Lab ID:	C05060997-010	DateReceived:	06/23/05
Client Sample ID:	MW11	Matrix:	Aqueous

Analyses	Result	Units	Qualifier	RL	MCL/ QCL	Method	Analysis Date / By
DATA QUALITY							
Anions	29.5	meq/L				Calculation	07/07/05 09:32 / ks
Cations	28.3	meq/L				Calculation	07/07/05 09:32 / ks
Solids, Total Dissolved Calculated	1930	mg/L				Calculation	07/07/05 09:32 / ks
TDS Balance (0.80 - 1.20)	1.01	dec. %				Calculation	07/07/05 09:32 / ks
VOLATILE ORGANIC COMPOUNDS							
Acetone	ND	ug/L		20		SW8260B	06/27/05 16:58 / rh
Benzene	ND	ug/L		1.0		SW8260B	06/27/05 16:58 / rh
Carbon tetrachloride	ND	ug/L		1.0		SW8260B	06/27/05 16:58 / rh
Chloroform	ND	ug/L		1.0		SW8260B	06/27/05 16:58 / rh
Chloromethane	2.4	ug/L		1.0		SW8260B	06/27/05 16:58 / rh
Methyl ethyl ketone	ND	ug/L		20		SW8260B	06/27/05 16:58 / rh
Methylene chloride	ND	ug/L		1.0		SW8260B	06/27/05 16:58 / rh
Naphthalene	ND	ug/L		1.0		SW8260B	06/27/05 16:58 / rh
Tetrahydrofuran	ND	ug/L		1.0		SW8260B	06/27/05 16:58 / rh
Toluene	ND	ug/L		1.0		SW8260B	06/27/05 16:58 / rh
Xylenes, Total	ND	ug/L		1.0		SW8260B	06/27/05 16:58 / rh
Surr: 1,2-Dichlorobenzene-d4	102	%REC			80-120	SW8260B	06/27/05 16:58 / rh
Surr: Dibromofluoromethane	102	%REC			70-125	SW8260B	06/27/05 16:58 / rh
Surr: p-Bromofluorobenzene	88.8	%REC			80-120	SW8260B	06/27/05 16:58 / rh
Surr: Toluene-d8	102	%REC			80-120	SW8260B	06/27/05 16:58 / rh

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.

DcF

State of Utah

Department of
Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION
CONTROL
Dane L. Finerfrock
Director

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

OCT 25 2006

October 20, 2006

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. David C Frydenlund
Vice President and General Counsel
International Uranium Corporation (IUC)
1050 Seventeenth St. Suite 950
Denver, Colorado, 80265

Subject: **NOTICE OF VIOLATION AND ORDER TO PROVIDE INFORMATION** – Ground Water monitoring and Quality Assurance Requirements: IUC Radioactive Materials License No. UT1900479, License Condition 11.2.C and Ground Water Quality Discharge Permit No. UGW370004.

Dear Mr. Frydenlund:

The Utah Division of Radiation Control (DRC) reviewed IUC's August 21, 2006 response to Notice of Violation and Order to Provide Information (Docket Number UGW06-04).

Based on this review DRC has determined that the following violations be withdrawn:

2. Failed to provide an adequate MDL for MEK sampling and analysis for the 2nd Quarter, 2005 groundwater monitoring event, as required by Part I.E.1(d)(2) of the Permit.

3. Failed to provide an adequate MDL for MEK sampling and analysis for the 3rd Quarter, 2005 groundwater monitoring event, as required by Part I.E.1(d)(2) of the Permit.

4. The Failed to provide an adequate MDL for MEK sampling and analysis for the 4th Quarter, 2005 groundwater monitoring event, as required by Part I.E.1(d)(2) of the Permit.

This withdrawal is based on identification of a typographical error in Table 2 of the Permit for MEK. Table 2, incorrectly, has a GWQS for MEK concentration of 4 $\mu g/L$. The correct GWQS for MEK is 4,000 $\mu g/L$. This typographical error will be corrected in the next Permit modification.

5. Failed to analyze for carbon tetrachloride in well MW-11 in the 2nd quarter 2005 monitoring event, as required by Part I.E.1(c)(2)(i) of the Permit.

The DRC accepts IUC explanation for violation 5. The DRC has received the analytical laboratory report with the corrected analytical data for MW-11 for the 2nd quarter 2005 monitoring event.

And the following violations stand:

1. Failed to sample and report groundwater quality results from monitor well MW-3 in the 2nd quarter 2005 monitoring event as required in Parts I.E.1(b)(2) of the Permit.

6. Failed to provide an adequate error term for the gross alpha activity concentrations reported in the 2nd Quarter 2005 (June 20-24, 2005) monitoring event, as required by Part I.E.1(d)(3) of the Permit.

7. Failed to provide an adequate error term for the gross alpha activity concentrations reported in the 3rd Quarter 2005 (September 23-25, 2005) monitoring event monitoring event as required by Part I.E.1(d)(3) of the Permit.

8. Failed to provide an adequate error term for the gross alpha activity concentrations reported in the 4th Quarter 2005 (December 12-14, 2005) monitoring event monitoring event as required by Part I.E.1(d)(3) of the Permit.

After considering the penalty criteria for violations 1, 6, 7, and 8 in UAC R317-1-8, and IUC's good faith efforts to correct the problems and steps to prevent re-occurrence DRC recommends no monetary penalty be assessed. However, should these violations be repeated in the future a penalty may be assessed.

Thank you for your continued cooperation. Please contact Dean Henderson at 801-536-0046 with any questions.

UTAH WATER QUALITY BOARD

D L Finerfrock

Dane L. Finerfrock, Co-Executive Secretary

DLF/DH:dh

DWQ Notice of Violation
and
Groundwater Corrective Action Order to Comply
Dated August 24, 2006

And Final Consent Agreement

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

AUG 2 8 2006

August 24, 2006

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. David C Frydenlund
Vice President and General Counsel
International Uranium Corporation (IUC)
1050 Seventeenth St. Suite 950
Denver, Colorado, 80265

Subject: **NOTICE OF VIOLATION AND GROUND WATER CORRECTIVE ACTION ORDER TO COMPLY** – IUC Radioactive Materials License No. UT1900479, License Condition 11.2.C and Ground Water Quality Discharge Permit No. UGW370006 (Permit)

Dear Mr. Frydenlund:

The Utah Division of Radiation Control (DRC) reviewed groundwater monitoring reports for all groundwater monitoring events during 2005. This includes the 2nd quarter (April – June 2005), 3rd quarter (July – September 2005), and 4th quarter (October - December 2005) monitoring events, and all accelerated monitoring for 2005 for the White Mesa Uranium Mill facility near Blanding, Utah.

The enclosed Notice of Violation is based on the findings in the DRC review of the above groundwater monitoring reports.

This Order requires IUC to submit within 30 days, a plan and timetable for completion of a Ground Water Contamination Investigation Report, and a Ground Water Corrective Action Plan.

It appears that timely submittal of the Background Groundwater Quality Report (existing wells) as required in Part 1.H.2 of the Permit may have allowed us to avoid this action.

UTAH WATER QUALITY BOARD

D L Finerfrock

Dane L. Finerfrock, Co-Executive Secretary

DLF/DH:dh

Enclosure: NOTICE OF VIOLATION AND ORDER TO COMPLY (DOCKET NUMBER UGW06-03)

UTAH WATER QUALITY BOARD

IN THE MATTER OF
INTERNATIONAL URANIUM CORPORATION
1050 17th STREET, SUITE 950
DENVER, COLORADO, 80265

DOCKET NUMBER UGW06-03
NOTICE OF VIOLATION AND ORDER

STATUTORY AUTHORITY

THE UTAH WATER QUALITY BOARD (hereinafter "the **BOARD**") issues this Notice of Violation (NOV) and Order under the *Utah Water Quality Act, as amended, (the Act),* including *Sections 19-5-104, 19-5-106, 19-5-111, and 19-5-115, Utah Code Annotated (UCA)* and in accordance with the *Utah Administrative Procedures Act, UCA §63-46b-1, et seq.*

FACTS

1. International Uranium Corporation (hereinafter **IUC**) facility receives and processes natural uranium-bearing ores including certain specified alternate feed materials, and to possess byproduct material in the form of uranium waste tailings and other uranium byproduct waste generated by the licensee's milling operations. This facility is located approximately 6 miles south of Blanding, Utah on a tract of land in Sections 28, 29, 32, and 33, Township 37 South, Range 22 East, Salt Lake Base and Meridian, San Juan County, Utah.

2. The Utah Water Quality Act (UCA 19-5-107) mandates that:

   "*...it is unlawful for any person to discharge a pollutant into waters of the State or cause pollution which constitutes a menace to public health and welfare, or is harmful to wildlife, fish of aquatic life, or impairs domestic, agricultural, industrial, recreational of other beneficial uses of water,...*"

3. The Ground Water Quality Protection (GQWP) Rules in UAC R317-6-6.14 require:

   "*A. If monitoring or testing indicates that the permit conditions may be or are being violated by ground water discharge operations or the facility is otherwise in an out-of-compliance status, the permittee shall promptly make corrections to the system to correct all violations of the discharge permit.*"

4. The GWQP rules in UAC R317-6-6.17(A) requires that when a facility is out of compliance:

   "*...2. The permittee shall initiate monthly sampling, unless the Executive Secretary determines that other periodic sampling is appropriate, until the facility is brought into compliance.*

   3. The permittee shall prepare and submit within 30 days to the Executive Secretary a plan and time schedule for assessment of the source, extent and potential dispersion of the contamination, and an evaluation of potential remedial action to restore and maintain ground water quality and insure that permit limits will not be exceeded at the compliance monitoring point and best available technology will be reestablished."

5. **IUC** was issued a Ground Water Quality Discharge (GWQD) Permit No. UGW370004 on March 8, 2005 (hereafter Permit).

6. Part I.C.1 of the Permit requires thats:

> *"...Ground water quality at the site must at all times meet all the applicable GWQS and ad hoc GWQS defined in R317-6 even though this permit does not require monitoring for each specific contaminant."*

7. The GWQD Permit defines Ground Water Compliance Limits (GWCL), Ground Water Quality Standards (GWQS) and ad hoc GWQS in Part I.C, Table 2. Of these, GWQS and ad hoc GWQS represent the highest contaminant concentration limits, and are defined as follows:

Table 1. IUC Permit Defined GWQS

Contaminant	GWQS (µg/L)	Source	Citation
Manganese	800	Ad-hoc	UAC R317-6-2.2
Selenium	50	Rule	UAC R317-6-2
Uranium	30	Rule	UAC R317-6-2
Chloroform	70	Ad-hoc	UAC R317-6-2.2
Dichloromethane	5	Rule	UAC R317-6-2
THF	46	Ad-hoc	UAC R317-6-2.2

8. Part I.G.1 of the Permit requires accelerated groundwater quality sampling be conducted:

> *"... if the concentration of a pollutant in any compliance monitoring sample exceeds a GWCL in Table 2 of the Permit; the facility shall then:*
> *a) Notify the Executive Secretary in writing within 30 days of receipt of data; and*
> *b) Immediately initiate accelerated sampling of the pollutant as follows:*
> *1) Quarterly Baseline Monitoring Wells – for wells defined by Part I.E.1(a) the Permittee shall initiate monthly monitoring,*
> *2) Semi-annual Baseline Monitoring Wells – for wells defined by Part I.E.1(b) the Permittee shall initiate quarterly monitoring.*
> *Said accelerated monitoring shall continue at the frequencies defined above until the compliance status of the facility can be determined by the Executive Secretary."*

9. Part I.G.2 of the Permit defines ground water quality Out-of-Compliance status in Part I.G.2, when:

> *"a) The concentration of a pollutant in two consecutive samples from a compliance monitoring point exceed:*
> *1) A GWCL in Table 2 of this Permit, and;*
> *2) The reported ground water concentration for that pollutant exceeds the mean by two standard deviations. For purposes of this Permit, the standard deviation and mean will be calculated using values for the ground water pollutant at each individual compliance monitoring point or well;* ***or*** (emphasis added)
>
> *b) The concentration value of any pollutant in two or more consecutive samples is statistically significantly higher than the applicable permit limit. The statistical significance shall be determined using the statistical methods described in Statistical Methods for Evaluating Ground Water Monitoring Data from Hazardous Waste Facilities, Vol. 53, No. 196 of the Federal Register, Oct. 11, 1988."*

10. EPA methods for determining statistical significance of groundwater quality monitoring results found in the October 11, 1988 Federal Register (Vol. 53, No. 196, pp. 39720-39731) [hereafter EPA FR] were finalized in the federal regulations at 40 CFR 264. Under these EPA rules, ground water quality results from an individual well can be compared to specified groundwater protection standard or GWQS, pursuant to the requirements of 40 CFR 264.97(h)(5)(i)(2), as follows:

> *"If an individual well comparison procedure is used to compare an individual compliance well constituent concentration with ... a groundwater protection standard, the test shall be done at a Type I error level no less than 0.01 for each testing period.... This performance standard does not apply to tolerance intervals, prediction intervals or control charts."*

In the EPA FR the agency committed to publish an additional guidance document after finalization of the rule changes in question (ibid., p. 39722).

11. The EPA guidance document, entitled "Statistical Analysis of Ground-Water Monitoring Data at RCRA Facilities Interim Final Guidance" (530-SW-89-026) was published in February, 1989 (hereafter EPA Guidance). In this EPA Guidance, the agency provided a Confidence Interval test for comparison of the mean contaminant concentration in a monitoring well against a defined maximum contaminant level or GWQS.

12. Parts I.E and I.F of the Permit require IUC to monitor local groundwater quality conditions and report the results there of to the Division of Radiation Control (DRC) pursuant to Part I.F.1.

13. IUC submitted the following quarterly groundwater monitoring reports to the DRC:

Table 2. Summary of 2005 IUC Quarterly Reports

Report Date	Date DRC Received	Title of the Report
June 30, 2005	July 1, 2005	Groundwater and DMT Performance Standard Monitoring Report 1st Quarter (January through March) 2005
August 31, 2005	September 6, 2005	Groundwater and DMT Performance Standard Monitoring Report 2nd Quarter (April through June) 2005
November 30, 2005	December 1, 2005	Groundwater and DMT Performance Standard Monitoring Report 3rd Quarter (July through September) 2005
March 1, 2006	March 10, 2006	Groundwater and DMT Performance Standard Monitoring Report 4th Quarter (October through December) 2005

14. IUC submitted a March 1, 2005 report entitled " State of Utah Radioactive Materials License No. UT1900479 White Mesa Mill, Blanding, Utah Semi-Annual Effluent Monitoring Report for Period July 1, 2004 thru December 31, 2004." (hereafter IUC 2004 2nd Semi-Annual Effluent Report).

FINDINGS

1. The DRC reviewed groundwater monitoring reports for all groundwater monitoring events during 2005. This includes the 2nd quarter (April – June 2005), 3rd quarter (July – September 2005), and 4th quarter (October - December 2005) monitoring events and all accelerated monitoring for 2005. Based on this review the following contaminants and wells exceeded their respective GWQS in at least two monitoring events:

Table 3. IUC Monitoring Wells Exceeding GWQS

Contaminant	GWQS (ug/l)	Well	Monitoring Event & Date	Concentration ($\mu g/L$)	Statistically Significant[(2)]?
Manganese	800 [(1)]	MW-14	2nd Qtr 2005, 6/22/05 Accl 7/2005, 7/26/05 Accl 8/2005, 8/24/05 3rd Qtr 2005, 9/23/05 Accl 10/2005, 10/26/05 Accl 11/2005, 11/15/05 4th Qtr 2005, 12/13/05	1,840 2,000 1,900 2,110 1,950 1,880 1,960	Yes
		MW-26	2nd Qtr 2005, 6/21/05 Accl 7/2005, 7/26/05 Accl 8/2005, 8/24/05 3rd Qtr 2005, 9/23/05 Accl 10/2005, 10/26/05 Accl 11/2005, 11/15/05 4th Qtr 2005, 12/13/05	956 1,100 1,430 1,160 1,410 949 1,030	Yes
		MW-32	2nd Qtr 2005, 6/23/05 Accl 7/2005, 7/27/05 Accl 8/2005, 8/24/05 3rd Qtr 2005, 9/23/05 Accl 10/2005, 10/26/05 Accl 11/2005, 11/15/05 4th Qtr 2005, 12/13/05	4,220 4,720 4,670 4,580 4,590 4,530 4,340	Yes
Selenium	50	MW-15	2nd Qtr 2005, 6/23/05 4th Qtr 2005, 12/13/05	79.3 92.5	Yes
Uranium	30	MW-3	3rd Qtr 2005, 9/23/05 4th Qtr 2005, 12/13/05	35.9 30.9	Yes
		MW-14	2nd Qtr 2005, 6/22/05 Accl 7/2005, 7/26/05 Accl 8/2005, 8/24/05 3rd Qtr 2005, 9/23/05 Accl 10/2005, 10/26/05 Accl 11/2005, 11/15/05 4th Qtr 2005, 12/13/05	58.9 65.5 66.5 67.5 70.1 69.7 67.6	Yes
		MW-15	2nd Qtr 2005, 6/23/05 4th Qtr 2005, 12/13/05	45.3 47.7	Yes
		MW-18	2nd Qtr 2005, 6/21/05 4th Qtr 2005, 12/13/05	39 39	No
Chloroform	70[(1)]	MW-26	2nd Qtr 2005, 6/21/05 Accl 7/2005, 7/26/05 Accl 8/2005, 8/24/05 3rd Qtr 2005, 9/23/05 Accl 10/2005, 10/26/05 Accl 11/2005, 11/15/05 4th Qtr 2005, 12/13/05	430 260 780 810 960 1,100 1,200	Yes
Dichloromethane	5	MW-26	2nd Qtr 2005, 6/21/05 Accl 8/2005, 8/24/05 3rd Qtr 2005, 9/23/05 Accl 10/2005, 10/26/05 Accl 11/2005, 11/15/05 4th Qtr 2005, 12/13/05	5.4 11 5.9 9.8 7.8 12	No
THF	46[(1)]	MW-1	2nd Qtr 2005, 6/20/05 4th Qtr 2005, 12/14/05	85 58	No

Footnotes:
1) Ad hoc GWQS also provided as allowed by UAC R317-6-2.2.
2) Statistical significance determined by Confidence Interval method from EPA Guidance, p. 6-3. Tests were conducted to ensure a Type I error level no less than 0.01 (99% confidence), as based on the number of samples available for each well. Samples tested included all IUC results provided for the period of May, 1999 thru December, 2005. Each confidence interval was calculated on a well-by-well basis and compared against each contaminant's respective GWQS.

2. Pursuant to the EPA Guidance, DRC staff conducted Confidence Interval tests on each contaminant and well, listed in Table 3 above, to determine statistical significance. Said data was evaluated in combination with additional IUC groundwater data, collected between 1999 and 2005. From this analysis, the DRC determined that Out-of-Compliance status exists for four (4) contaminants and eight (8) wells, as summarized in Table 3, above.

3. DRC review of groundwater quality information in the IUC 2004 2nd Semi-Annual Effluent Report (Attachment I) shows prominent increasing uranium concentration trends exist in wells MW-14 and MW-15. From this historic IUC information, these steadily increasing uranium trends have existed since about 1989 and 1991 in wells MW-14 and MW-15, respectively.

4. Since the submittal of any of the 2005 Groundwater Quality Monitoring reports ICU has taken no action to correct the system as required by UAC R317-6-6.14(A).

VIOLATIONS

Based on the foregoing **FACTS** and **FINDINGS**, **IUC** is:

1. In violation of UCA 19-5-107(1) for the following contaminants:

Table 5. IUC Groundwater Quality Violations

No.	Contaminant	Description
1	Manganese	As illustrated by Out-of-Compliance status in three IUC monitoring wells, MW-14, MW-26, and MW-32.
2	Selenium	As illustrated by Out-of-Compliance status in one IUC monitoring well, MW-15.
3	Uranium	As illustrated by Out-of-Compliance status in three IUC monitoring wells, MW-3, MW-14, and MW-15.
4	Chloroform	As illustrated by Out-of-Compliance status in one IUC monitoring well, MW-26.

2. In violation for failure to promptly make corrections to the system to correct all groundwater discharge violations of the Permit, pursuant to UAC R317-6-6.14(A).

3. In violation Permit requirements in Part I.C.1 for contaminants exceeding GWQS as listed in Table 5, above.

ORDER

In view of the foregoing **FINDINGS**, and pursuant to *Utah Code Annotated Section 19-5-111* (1953 as amended), **IUC** is hereby ordered to:

1. Immediately implement accelerated groundwater sampling and analysis for the wells and

contaminants listed in Table 5, below. All sampling shall conform to the requirements of Part I.E and F of the Permit. Results of said accelerated sampling shall be submitted in writing to the DRC at the time of the following regularly scheduled quarterly report, as required by Part I.F.1 of the Permit. Accelerated sampling shall continue at the frequencies specified in Table 5, until further Executive Secretary notice, pursuant to UAC R317-6-6.17(A)(2).

Table 5. Accelerated Sampling Required

Original Baseline Frequency	Accelerated Frequency Required	Well	Contaminants
Quarterly	Monthly(1)	MW-14	Manganese, uranium
		MW-26	Chloroform, dichloromethane, and manganese
		MW-32	Manganese
Semi-Annual	Quarterly(2)	MW-1	THF
		MW-3	Uranium
		MW-15	Selenium, uranium,
		MW-18	Uranium

Footnotes:
1) Routine or baseline sampling frequency = quarterly, see Permit Part I.E.1(a).
2) Routine or baseline sampling frequency = semi-annual, see Permit Part I.E.1(b).

2. Pursuant to UAC R317-6-6.17(A)(3), prepare and submit for Executive Secretary approval within 30 days of receipt of this NOV and Order, a written plan and time schedule for:

   A. Submittal of a written assessment of the source, extent and potential dispersion of the groundwater contamination, for Executive Secretary review and approval

   B. Submittal of a written evaluation of the potential remedial action to restore and maintain ground water quality, for Executive Secretary review and approval,

   C. Submittal of a written completion report, for Executive Secretary review and approval, to document:

      1) Ground water remediation that ensures that Permit limits will not be exceeded at the compliance monitoring points, and

      2) Prompt correction of all sources and discharging systems to correct all violations of the discharge permit, pursuant to UAC R317-6-6.14A.

NOTICE

Any appeal of the NOV and Order will be pursuant to *Section R317-1-8 of UAC* and *Sections 63-46b-6 through 63-46b-15 of the UCA*. If IUC contests any portion of the NOV and Order, it must do so in writing and request a hearing before the **BOARD** within thirty (30) days of receipt of this **NOTICE. This ORDER is final and fully enforceable unless appealed in writing within 30 days. Any response or written answer to this NOV should be addressed to Dane L. Finerfrock, Co-Executive Secretary, Water Quality Board, 168 North 1950 West, P.O. Box 144850, Salt Lake City, Utah 84114-4850.**

UCA §19-5-115 provides that violators of the *Act* or a related permit, rule, or order may be subject to a civil penalty of up to $10,000 per day of violation. Under certain circumstances of willfulness or gross negligence, violators may be fined up to $25,000 per day.

Signed this 24th day of August 2006.

UTAH WATER QUALITY BOARD

D L Finerfrock

Dane L. Finerfrock
Co-Executive Secretary

DLF/DH/LM:dh

IUC

INTERNATIONAL URANIUM (USA) CORPORATION

September 28, 2006

VIA FACSIMILE AND FEDERAL EXPRESS

Mr. Dane L. Finerfrock
Executive Secretary
Utah Radiation Control Board
State of Utah Department of Environmental Quality
168 North 1950 West
Salt Lake City, UT 84114-4850

Re: NOTICE OF VIOLATION AND GROUNDWATER CORRECTIVE ACTION ORDER TO COMPLY - IUC Radioactive Materials License No. UT1900479, License Condition 11.2.C and Ground Water Quality Discharge Permit No. UGW370004 (the "Permit")

Dear Mr. Finerfrock:

This letter is in response to the above-referenced Notice and Order, received by International Uranium (USA) Corporation ("IUSA") on August 28, 2006, which lists 3 violations of the White Mesa Mill's (the "Mill's") Permit, based on a review of the Groundwater Monitoring Reports for the 1st through 4th quarters of 2005, and orders IUSA to take certain actions.

IUSA responds as follows:

Accelerated Monitoring

The Notice and Order requires IUSA to

"Immediately implement accelerated groundwater sampling and analysis for the wells and contaminants listed in Table 5, below. All sampling shall conform to the requirements of Part I.E and F of the Permit. Results of said accelerated sampling shall be submitted in writing to the DRC at the time of the following regularly scheduled quarterly report, as required by Part I.F.1 of the Permit. Accelerated sampling shall continue at the frequencies specified in Table 5, until further Executive Secretary notice, pursuant to UAC R317-6-6.17(A)(2).

Tel: 303 628 7798
Fax: 303 389 4125

1050 Seventeenth St., Suite 950
Denver, Colorado, USA 80265

info@intluranium.com
www.intluranium.com

confused with the second *Table 5, Accelerated Sampling Required* on page 6 of the Notice and Order, which is referred to under **Accelerated Monitoring** above) are the result of natural background influences and do not represent groundwater contamination. This will be demonstrated in the Background Groundwater Quality Report that is required to be completed by IUSA and submitted to the Executive Secretary under Part I.H.3 of the Permit (the "Background Groundwater Quality Report"). As a result, there is no need for a source evaluation or remedial action at this time.

Under the Permit, it is intended that background groundwater quality will be determined on a well-by-well basis, as defined by the mean plus second standard deviation concentration. IUSA is currently working with the Executive Secretary to establish background (including the mean plus second standard deviation) for all of the constituents being sampled under the Permit. Until such time as background is established it is premature to conclude that there has been any groundwater contamination at the site.

Pending completion of the Background Groundwater Quality Report, the Permit merely sets Ground Water Protection Limits ("GWPLs") based on State Groundwater Quality Standards ("GWQS") for Class II and Class III groundwater, as applicable. Those GWPLs do not take into account natural background at the site. All of the constituents listed in the First Table 5 exceed these GWPLs, but do not exceed natural background levels, as will be demonstrated in the Background Groundwater Quality Report.

The need to establish background concentrations at the site (including the mean and second standard deviation) has been recognized by the Executive Secretary. In the Statement of Basis for the Permit, dated December 1, 2004, the Utah Division of Radiation Control concluded that:

> "a significant amount of historic groundwater quality data has been collected by IUC for many wells at the facility. In some cases, these data extend back about 25 years to September, 1979. However, the Executive Secretary has not yet completed an evaluation of the historic IUC data, particularly with regards to data quality and quality assurance issues." (pages 5-6)
>
> . . .
>
> "Because background groundwater quality at the IUC facility has not yet been approved, the Executive Secretary cannot determine if any contaminant is naturally occurring and therefore detectable or undetectable for purposes of selecting GWPLs in each well. Consequently, the Executive Secretary will initially assign the GWPLs as if they were "undetectable". After submittal and Executive Secretary approval of the existing well Background Ground Water Quality Report, pursuant to Part I.H.3, the Permit can be re-opened and the GWPLs modified, see discussion below. Accordingly, the GWPLs set today in Table 2 of the Permit were calculated by use of the classification factors, being 0.25 and 0.5 times the GWQS for Class II and III groundwater respectively." (pages 7-8)

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chloroform contamination at the site, and should not also be included as a violation under the Permit. Investigations to date indicate that the chloroform contamination is from a temporary laboratory facility that was located at the Mill site prior to construction and operation of the Mill, and that disposed of laboratory wastes into a State of Utah inspected and approved disposal leach field, and/or septic tank drainfields that serviced both laboratory operations and sanitary sewage prior to construction of the Mill's tailings cells.

A. submit a written assessment of the source, extent and potential dispersion of any groundwater contamination, for Executive Secretary review and approval;
B. submit a written evaluation of the potential remedial action to restore and maintain groundwater quality, for Executive Secretary review and approval; or
C. submit a written completion report, for Executive Secretary review and approval, to document:
    1) Ground water remediation that ensures that Permit limits will not be exceeded at the compliance monitoring points, and
    2) Prompt correction of all sources and discharging systems to correct all violations of the discharge permit, pursuant to UAC R317-6-6.14A.

In order to allow the Executive Secretary to determine whether or not such exceedances of GWPLs in the Permit are due to natural background influences at the site, and in order to comply with the provisions of Part I.H.3 of the Permit, IUSA proposes the following schedule for completion and submission of the Background Groundwater Quality Report:

- A meeting will be held between IUSA representatives and the Executive Secretary and his staff during the week of October 6, 2006, or such later date as may be required by the Executive Secretary, to discuss the resolution of data, statistical and other issues that have arisen to date in preparation of the Background Groundwater Quality Report; and
- Submission of the Background Groundwater Quality Report within 6 weeks from the date of such meeting, or such later date as may be determined by the Executive Secretary.

If you have any questions or require any further information, please contact the undersigned.

Yours truly,

David C. Frydenlund
Vice President and General Counsel

cc: Ron F. Hochstein
Harold R. Roberts
Steven D. Landau
David Turk

IUC

INTERNATIONAL URANIUM (USA) CORPORATION

October 25, 2006

VIA PDF AND FEDERAL EXPRESS

Dane L. Finerfrock, Co-Executive Secretary
Utah Water Quality Board
Utah Department of Environmental Quality
168 North 1950 West
P.O. Box 144810
Salt Lake City, UT 84114-4810

Re: International Uranium Corporation. State of Utah Ground Water Discharge Permit No. UW370004. Final Consent Agreement, 8/24/06 DRC NOV and Order (Docket No. UGW06-03)

Dear Mr. Finerfrock:

Enclosed please find the final Consent Agreement for this matter, signed on behalf of International Uranium (USA) Corporation.

Yours truly,

David C. Frydenlund
Vice President and General Counsel

cc: Ron F. Hochstein
Harold R. Roberts
Steven D. Landau

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

State of Utah

Department of
Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION
CONTROL
Dane L. Finerfrock
Director

October 27, 2006

Mr. David C. Frydenlund
Vice President and General Counsel
International Uranium (USA) Corporation
1050 Seventeenth Street, Suite 950
Denver, CO 80265

Re: August 24, 2006 DRC Notice of Violation and Order, Docket No. UGW06-03: **Final Consent Agreement.**

Dear Mr. Frydenlund,

Thank you for returning the Final Consent Agreement, recently negotiated to resolve the August 24, 2006 DRC Notice of Violation and Order regarding exceedances of State Ground Water Quality Standards at your White Mesa uranium mill facility in 2005. We have executed the Agreement and return a copy of it herewith for your records.

Please feel free to contact us if you have any questions. We look forward to working with you to solve this problem.

Sincerely,

D Finerfrock

Dane L. Finerfrock
Co-Executive Secretary

DLF/LBM:lm

cc: Rob Herbert, DWQ (w/attachment)

F:/.../ConsentAgreementTransLtr.doc
File: IUC 8/24/06 NOV and Order

UTAH WATER QUALITY BOARD

IN THE MATTER OF INTERNATIONAL URANIUM (USA) CORPORATION 1050 17th Street, SUITE 950 DENVER, COLORADO 80265	:	**DOCKET NUMBER UGW06-03**
	:	**CONSENT AGREEMENT**

This **CONSENT AGREEMENT** (hereinafter "**AGREEMENT**") is between **INTERNATIONAL URANIUM (USA) CORPORATION** (hereinafter **IUC**) and the **UTAH WATER QUALITY BOARD** (hereinafter the "**BOARD**"), concerning violations of the *Utah Water Quality Act, as amended, (the Act)*, including sections *19-5-104, 19-5-106, 19-5-111 and 19-5-115, Utah Code Annotated (UCA)* and in accordance with the *Utah Administrative Procedures Act, UCA 63-46b-1, et seq.*

1. The **BOARD** has authority to administer the *Utah Water Quality Act, as amended 1953*, (hereinafter the "*ACT*").

2. The **EXECUTIVE SECRETARY** of the **BOARD** (hereinafter the "**EXECUTIVE SECRETARY**") will administer the terms and provisions of this **AGREEMENT**. Pursuant to *Utah Code Annotated, Section 19-5-115*.

3. The **EXECUTIVE** SECRETARY issued the **NOTICE OF VIOLATION** and **ORDER**, Docket Number **UGW06-03** (hereinafter the "**ORDER**") to IUC on August 24, 2006. **IUC** did not appeal the **ORDER** by requesting a hearing before the **BOARD**; therefore, the **ORDER** became final.

4. This **AGREEMENT** does not in any way relieve IUC from any other obligation imposed under the Act or any other State or Federal laws.

5. **IUC** accepts the following facts and stipulations:

   A. The **BOARD** issued **IUC** a Ground Water Quality Discharge Permit (hereinafter "Permit") on March 8, 2005.

   B. Part I.H.3 of the Permit required **IUC** to submit a Background Ground Water Quality Report for Existing Wells (hereinafter "BGWQ Report"), for **EXECUTIVE SECRETARY** approval, on or before June 6, 2005.

   C. As of this date, **IUC** has been unable to and has not submitted the BGWQ Report required by Part I.H.3 of the Permit.

   D. In response to the **ORDER**, in an **IUC** letter of September 28, 2006 **IUC** provided a proposed schedule for submittal of the BGWQ Report, but however failed to comply with Item No. 2 of the **ORDER**, in that no written plan and time schedule was provided for:

      1. Submittal of a written assessment of the source, extent and potential

UTAH WATER QUALITY BOARD

IN THE MATTER OF INTERNATIONAL URANIUM (USA) CORPORATION 1050 17th Street, SUITE 950 DENVER, COLORADO 80265	:	**DOCKET NUMBER UGW06-03**
	:	**CONSENT AGREEMENT**

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   A. The **BOARD** issued **IUC** a Ground Water Quality Discharge Permit (hereinafter "Permit") on March 8, 2005.

   B. Part I.H.3 of the Permit required **IUC** to submit a Background Ground Water Quality Report for Existing Wells (hereinafter "BGWQ Report"), for **EXECUTIVE SECRETARY** approval, on or before June 6, 2005.

   C. As of this date, **IUC** has been unable to and has not submitted the BGWQ Report required by Part I.H.3 of the Permit.

   D. In response to the **ORDER**, in an **IUC** letter of September 28, 2006 **IUC** provided a proposed schedule for submittal of the BGWQ Report, but however failed to comply with Item No. 2 of the **ORDER**, in that no written plan and time schedule was provided for:

      1. Submittal of a written assessment of the source, extent and potential

dispersion of the groundwater contamination, for Executive Secretary review and approval,

2. Submittal of a written evaluation of the potential remedial action to restore and maintain ground water quality, for Executive Secretary review and approval,

3. Submittal of a written completion report, for Executive Secretary review and approval, to document:

   a. Ground water remediation that ensures that Permit limits will not be exceeded at the compliance monitoring points, and

   b. Prompt correction of all sources and discharging systems to correct all violations of the discharge permit, pursuant to UAC R317-6-6.14A.

~~6.~~ The parties now desire to resolve this matter fully without further administrative proceedings except to the extent provided herein by entering into this **AGREEMENT**.

7. In resolution of said **ORDER** referenced in Paragraph 3, **IUC** agrees to the following:

   A. **IUC** agrees to submit the BGWQ Report, for **EXECUTIVE SECRETARY** review and approval, on or before January 2, 2007.

   B. In the event that the **IUC** fails to submit the BGWQ Report by the deadline specified in Item 7.A, above, **IUC** agrees to pay stipulated penalties in the amount of $500 per day for every day beyond January 2, 2007, that the BGWQ Report is not submitted.

   C. The **EXECUTIVE SECRETARY** shall either approve or disapprove the BGWQ Report. If the **EXECUTIVE SECRETARY** does not approve the BGWQ Report, IUC shall submit to the **EXECUTIVE SECRETARY**, by no later than 30 calendar days from the date of disapproval, the complete plan and schedule as required by Item No. 2 of the **ORDER.** If the complete plan and schedule are not submitted by that date, IUC agrees to pay stipulated penalties in the amount of $7000 per day for each day beyond that date that the complete plan and schedule are not submitted.

8. **IUC** agrees to pay any required penalties in the form of a check, within 30 days of written notice from the **EXECUTIVE SECRETARY**, made payable to the State of Utah, and delivered or mailed to:

   Division of Radiation Control,
   Utah Department of Environmental Quality
   P.O. Box 144850
   168 North 1950 West
   Salt Lake City Utah, 84114-4850

9. The **BOARD** will view completion of the requirements as outlined in this **CONSENT AGREEMENT** as compliance with it.

10. The deadlines stipulated in items 7.A thru C may be amended by mutual agreement of the parties in writing.

11. Nothing contained in this **AGREEMENT** shall preclude the **BOARD** from taking

additional actions to include additional penalties against **IUC** for permit violations not resolved by this **AGREEMENT**.

12. If an agreement between **IUC** and the **EXECUTIVE SECRETARY** cannot be reached in a dispute arising under any provision of this **AGREEMENT, IUC** or the **EXECUTIVE SECRETARY** may commence a proceeding with the **BOARD** under the *Administrative Procedures Act* to resolve the dispute. A final decision in any adjudicative proceeding shall be subject to judicial review under applicable state law.

13. Nothing in this **AGREEMENT** shall constitute a waiver by **IUC** to raise in defense any legal or factual contention for future allegations of noncompliance.

14. Nothing in this **AGREEMENT** shall constitute or be considered as a release from any claims, to include natural resource damage claims, cause of action, or demand in law or equity which the **STATE** may have against **IUC**, or any other person, firm, partnership or corporation for any liability arising out of or relating in any way to the release of pollutants to waters of the State.

15. While the **BOARD** is presently not considering additional enforcement actions for any past or ongoing violations, nothing in this **AGREEMENT** shall preclude the **BOARD** from taking such actions to include other penalties against **IUC** for violations of the ACT or permit violations not resolved by this **AGREEMENT.**

AGREED to this 23rd day of October, 2006.

IUC

By______________________
Authorized Agent

UTAH WATER QUALITY BOARD

By______________________
Co-Executive Secretary

F:\...\GWQS Final Settlement Agreement.doc
File: IUC, 8/24/06 NOV and Order

DRC Inspection Report
Dated January 5, 2007

No notices of violation issued

DRC Inspection of December 13, 2006

State of Utah

Department of Environmental Quality

Dianne R. Nielson, Ph.D.
Executive Director

DIVISION OF RADIATION CONTROL
Dane L. Finerfrock
Director

JON M. HUNTSMAN, JR.
Governor

GARY HERBERT
Lieutenant Governor

DCF, HMM, RFH, SDL, DT

RECEIVED
JAN 12 2007
BY:

January 5, 2007

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Dave Frydenlund
Denison Mines (USA) Corp.
1050 Seventeenth Street
Suite 950
Denver, Colorado 80265

Re: Site Inspection conducted on December 13, 2006 at the White Mesa Uranium Mill facility in Blanding Utah

Dear Mr. Frydenlund:

This letter refers to the inspection conducted at the White Mesa Uranium Mill (Mill) on December 13, 2006, by Ray Nelson and John Hultquist, representatives of Division Radiation Control (DRC). The inspection consisted of selective examinations of procedures, records review, and observations by the inspectors relative to requirements of the Radioactive Material License (RML) and Utah Radiation Control Rules.

The inspectors examined calibration records, operating procedures, and the Semi-Annual Environmental monitoring report for the period of January 2006 through June of 2006. Inspectors were given a tour of the facility which afforded an opportunity to observe handling, storage, and processing of feed stock at the Mill. Additionally, the tour permitted an inspection relative to the Soda Ash spill and subsequent cleanup of that material during the first week of December 2006. Based on the results of the inspection several items of concern were identified and are summarized below.

Item 1

Alternate Feed material is stockpiled in piles that exceed 25 feet in height. Inspectors were told that the piles get much higher at times. The DRC has concerns that the height may facilitate wind dispersal. The material in the piles has been processed and the material does not have the same characteristics that are found in ore. The DRC believes that the potential to spread contamination is greater than conventional ore. IUC staff indicated that limiting the height of the piles would be discussed with management and evaluated. Please document the results of your review.

Item 2
Mill personnel use water to stabilize the stockpiled source material. When inspectors asked if they had considered use of fixatives added to the water as a soil binder they indicated that IUC management had discussed the idea but it was rejected. Using water only as a soil binder to eliminate wind dispersal is a good idea unless the management of the water after spraying poses a potential ground water contamination issue. The ideal would be to limit the number applications of the water to minimize the amount of water contacting the source material. Using Magnesium Chloride or a polymer in the water as a soil binder would decrease the number of water applications, and the potential spread of contamination in the run off. The DRC requests that IRC management reevaluate the use of a soil binder for use in controlling potential wind blown contamination from stock piles.

Item 3
There are substantial numbers of contaminated barrels on site that need to be managed. The current milling operations focus on immediately crushing drums as they accumulate and moving them into the cell for disposal. Since the newer drums may have an increased potential to be contaminated the current focus on the newer drums is probably appropriate. However, the DRC suggests that cleanup of all of the drums on site needs to be done as soon as possible. Please provide a date as to the clean up of all of the drums on site could be completed.

Item 4
Prior to leaving the Mill, DRC staff spent some time surveying the road from the Mill to where it joins State Highway 191. Inspectors identified several locations in the roadway adjacent to the south side of the blacktop that surveyed at 10 times background levels using a Ludlum Model 19 Micro R Meter. It appears that at some time in the past ore may have fallen off conveyances that were delivering it to the Mill. Three soil samples were taken and analyzed using gamma spectroscopy. The Gamma Spec analyses indicate Uranium levels at 3 pCi/gram to 90 pCi/gram and Ra226 concentrations at 9 pCi/gram to 215 pCi/gram. IUC should survey the roadway into the Mill highway 191 to the main gate, document the findings, and propose actions to remediate the condition.

Item 5
During the site tour inspectors noted a section of the restricted area fence about ten feet long had sustained some damage and it appears that the damage was caused by a large animal. Mill staff indicated that they assumed that Mule deer that frequent the property had damaged the fence. The RSO agreed to repair the fence within a couple of days. Please acknowledge that the fence has been repaired.

Item 6

DRC staff visited air sampling locations BHV-1, BHV-2 BHV-4, BHV-5, and BHV-6. Inspectors evaluated soil conditions at these air sampling locations using a 2 x 2 NaI probe and a 2220 Ludlum survey meter. Survey results were recorded in Counts Per Minute (CPM) and ranged from 10,400 CPM to 15,750 CPM. Background levels at the site office averaged about 12,000 CPM. It appears that all of the measurements approximate background levels plus or minus 30%. However, environmental data indicates a possible dust loading problem on air filters at some of these air monitoring locations. The DRC recommends that air monitoring calibration worksheets should be updated and provide a location where staff can document conditions that may potentially affect dust loading. Documentation of agricultural activities adjacent to Mill property may help explain if dust loading of filters at certain times of the year is an artifact of off site activities. The DRC also recommends that the worksheet include signature blocks for the person changing the filters.

In closing no violations were proposed by the inspectors. However, the DRC requests that IUC provide a written response no later than 30 days from receipt of this letter. Please address concerns identified in this letter. Your response should be addressed to Dane Finerfrock, Executive Secretary Utah Radiation Control Board. Should you have any questions related to this inspection please contact Ray Nelson at 801-536-4250.

UTAH RADIATION CONTROL BOARD

DLFinerfrock

Dane L. Finerfrock, Executive Secretary

cc: Dave Turk Radiation Safety Officer White Mesa Mill

DLF/JH/RGN:rn